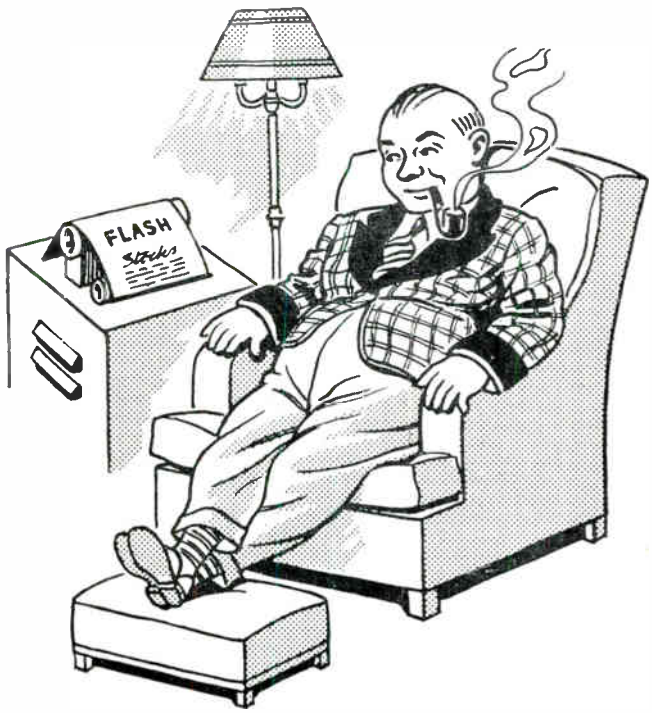
Facsimile



The STORY of FACSIMILE EQUIPMENT AS MANUFACTURED BY THE ALDEN PRODUCTS COMPANY

OUR YEARS OF EXPERIENCE, and cumulative skills, in the designing and production of RADIO COMPONENTS, are now being used in making equipment which covers ***the entire field of FACSIMILE.***

Actual service, as found in war and communication work under all conditions, has given a PRACTICAL quality to our equipment which, under ordinary conditions, would not have been obtained in years of engineering with limited application.

ALDEN PRODUCTS COMPANY is manufacturing practically ALL TYPES AND SIZES of facsimile and impulse recording equipment—using all the varied recording mediums; Photographic Paper, Film, Electrolytic Paper, Teledeltos, and Ink.

By "COVERING THE ENTIRE FIELD," we mean . . .

1. Some of our equipment has been used for the transmitting and receiving of photographic pictures of reasonably high resolution (such as the war pictures now appearing in the news).

2. Continuous Recorders — of the type whose value has been proven on National and International news service circuits — are now on their way to the Orient, to be used for the receiving of the so-called "picture" languages.

3. Also, through the use of ALFAX (the first high-speed black and white permanent recording paper), HIGH-SPEED Signal Analysis Equipment has been made possible for various laboratories and Government Departments. Other equipments have employed Teledeltos Paper for message work and other purposes.

4. For outlying posts, where servicing equipment is an impossibility, or, where radio or wire links are of poor quality and power, ALDEN Tape Recorders (recording medium, ink) — have been designed to operate with a minimum of trouble and adjustments, and have PROVED MOST SATISFACTORY.

5. The ability of ALFAX Paper and ALDEN Machines to record impulses as they occur, without the inertia problems of many previous methods, has made possible other recorders at various speeds (including slow). They will record a whole day's history of related phenomena, with time indicated, and often — with self-calibrated linear reference marks for ready interpretation.

ALDEN PRODUCTS COMPANY

BROCKTON [64F1], MASSACHUSETTS

117 North Main Street

FIG. 1. REPRODUCED FROM FACSIMILE RECEPTION ON FILM AT 96 LINES PER INCH. NOTE THE EXCELLENT CONTRAST

FIG. 2. REPRODUCED FROM FACSIMILE RECORDING ON ALFAX NO. 66 PAPER. ORIGINAL WAS A FAMILIAR ADVERTISEMENT

SUITING FACSIMILE DESIGNS TO SERVICE NEEDS

A Review of the Special-Purpose Facsimile Equipment Manufactured by Alden Products Company

BY MILTON ALDEN

I HAVE just picked up an old Webster's Dictionary published in 1890, the year I was born; I have turned to *Facsimile* and find *facsimile*, also *Facsimile telegraph*, defined as "a telegraph apparatus reproducing messages in autograph."

Before me is a book of about 300 pages published in 1938 entitled *Facsimile*. Beside me on the floor are a portion of over 3,200 patents that have a bearing on at least some of the phases of facsimile problems. One of these patents shows a date nearly a hundred years ago, 1846, and one by a man calling himself "I. Ludvoic Charles Adrien Joseph Guyot D'Arlincourt of Paris, in the French Empire, gentleman," dated 1871 which shows a grasp of nearly all the problems of facsimile, and in principle indicates means of solving them that are paralleled by today's best practices. Interspersed are also some early patents of Edison's on electrolytic paper.

Yet when I tell someone that we are making facsimile equipment, the word is meaningless. Why? Well, to a large extent most of the patents and the equipment shown in the book mentioned above have not met the acid test of actual operation. In other words, none of the equipment described attained sufficiently widespread commercial or other usage to become known to the general public. To reach that goal, equipment must not only work as an engineering experiment, but must justify itself economically.

For illustration, we are licensed to make and use what, insofar as we know, is the first black and white paper, capable of recording at high speed, which does not smudge, deteriorate, or fade, and is inexpensive enough to manufacture for home use.

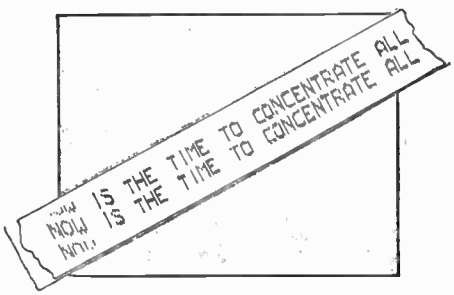


FIG. 3 FACSIMILE TAPE RECORDING

As set forth, all the principles used in "faxs" have been known for a long time but, like radar for instance, it has taken the war and its necessities to provide the testing grounds.

At Alden Products Company, we have been particularly fortunate in having contracts for the production of "faxs" equipment covering the whole gamut of requirements.

For example, our company has supplied continuous page recorders used and proved by extensive service on press circuits, the day-in-and-day-out kind of service that eliminates the bugs and takes the equipment out of the experimental or strictly engineering field. We are now duplicating this equipment for operation on radio circuits in China.

For the poorer circuits, radio or wire, we have produced tape recorders by taking the better features of existing machines and building into them great ruggedness and simple interchangeability of parts. Doughboys can adjust them with their fingers, and use a dime as a screwdriver. All gears are enclosed, running in baths of oil, and the construction is such that desert storms or tropical fungus does not prevent their functioning. These tape recorders operate without synchronization. A special design feature is the spreading of the recording during interference, fading, or weak signals, for easier reading.

In the picture recording (photographic) fields, the equipment we have made has been compact, portable, of high quality, and capable of work with all kinds of power supplies operated under adverse conditions.

Out of this experience we are developing an organization and techniques for the manufacture of equipment covering facsimile and the entire field of impulse recording.

It is very evident that there is no one universal system or any one recording

Reprinted from September 1944 *FM* AND TELEVISION.

FIG. 4, RIGHT: ORIGINAL FINGER-PRINT RECORD. ABOVE: ACTUAL SIZE OF FACSIMILE RECORDING ON ALFAX PAPER. NOTE THE DEGREE OF ENLARGEMENT

medium that meets all needs. For illustration, we are working with the most precise and compact equipment for high-resolution transmission of photographs or film. Although this apparatus has its uses, the number of hours a day any such equipment is required is very limited. Today's newspaper pictures of the invasion are credited to this same equipment. When the Graf Spee was sunk in Rio de Janeiro, Associated Press picture circuits were kept busy with these photos, only to lapse into idleness until the next unusual interest event. Therefore, despite its value for certain purposes, the photographic picture transmission field is limited. The transmission is relatively slow and requires some photographic skill or training on the part of the operator. Because of these limitations, this equipment is not suited for home use or volume business communications.

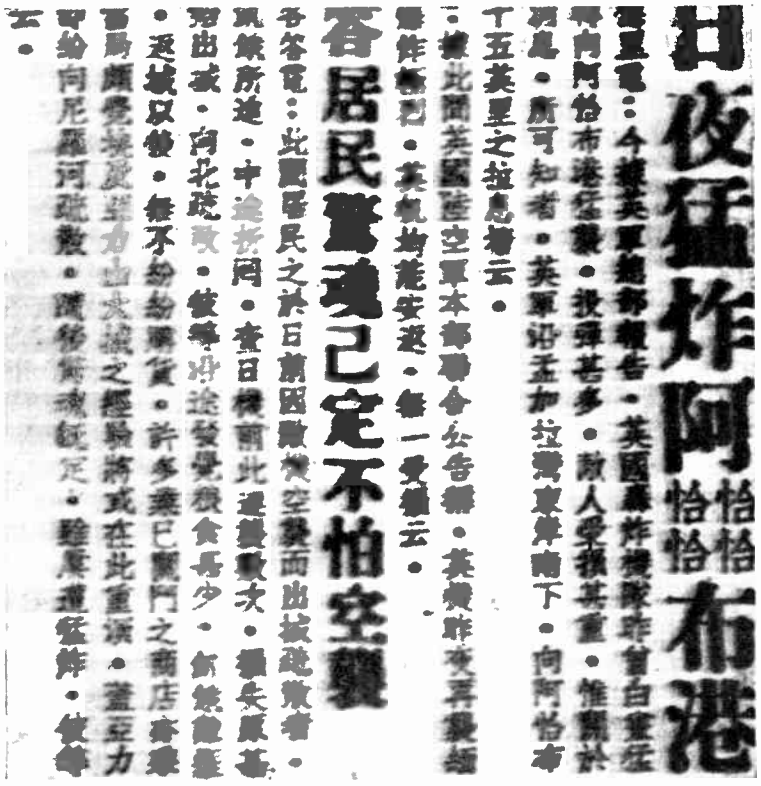


FIG. 5. FACSIMILE TRANSMISSION IS IDEAL FOR HANDLING MESSAGES IN CHINESE

A very simple technique for certain types of messages is possible using Teledeltos paper, manufactured by Western Union for their own use, but available to others. This is a black conducting paper, faced or coated with a light-color compound. The current discharge from a fine needle electrode produces a miniature arc and destroys the coating, thus producing a gray to black recording. Where single and intermittent messages are to be sent and no great speed is required, the equipment can be simple. It does not lend itself very readily to continuous recording, and requires electrode replacement. This is a fairly delicate adjustment. Like carbon paper recording, it has a tendency to smudge. The light coating comes off from abrasion if not carefully handled. The

recording current produces slight smoke or fumes and, at times, when too much current has been applied, the paper has been known to catch on fire. As it is a coated paper, it depends on 100 per cent perfect coating. This means unusual care in its manufacture.

Although there are situations where the use of Teledeltos paper would be more satisfactory than any other readily available recording medium, it could not be considered a universal paper. By this we mean it would not be the ideal for home recording. For such use, the paper must lend itself to continuous recording. That is, the paper must be in a roll instead of individual sheets that have to be inserted one at a time. We say *paper*, instead of *medium*, because film would not be suited for the home, and cost must be reasonable for wide home use.

Alfax paper fills the bill for home use. It is an electro-sensitive paper, with a controlled moisture content which is easily maintained until use by packing in sealed tin cans. It is removed from the can, placed in the humidor compartment of the recorder and, as the moisture content is greater than would be the result from ab-

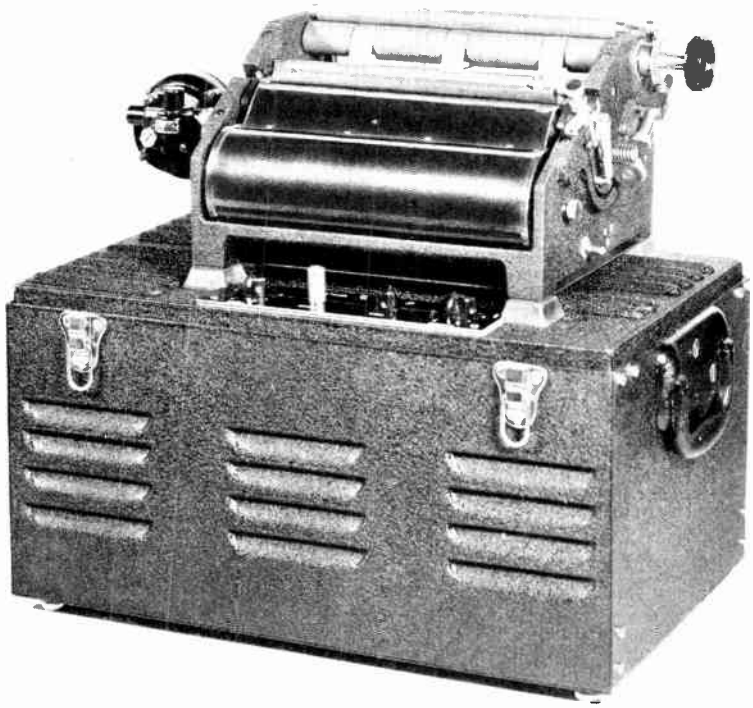


FIG. 6, ABOVE: PAGE RECORDER FOR ELECTROLYTIC RECORDING, USED ON INTERNATIONAL PRESS CIRCUITS. FIGS. 6 AND 7, BELOW: RECORDINGS ON ALFAX NO. M620. SMALL TYPE WAS RECORDED AT RATE OF 400 WORDS PER MINUTE

"Buck's a bit upset! The cannibal natives around here have nick-named him 'hors d'oeuvres'!"

Holbrook

SCHOOL ENDS; WELL ATTENDED

Legion Fund Total Soars to $1368.84

The fund for matching suits and other gifts for the Brockton Legion Junior baseball team.

"My wife's away, so I bring these down to her sister's house for washing!"

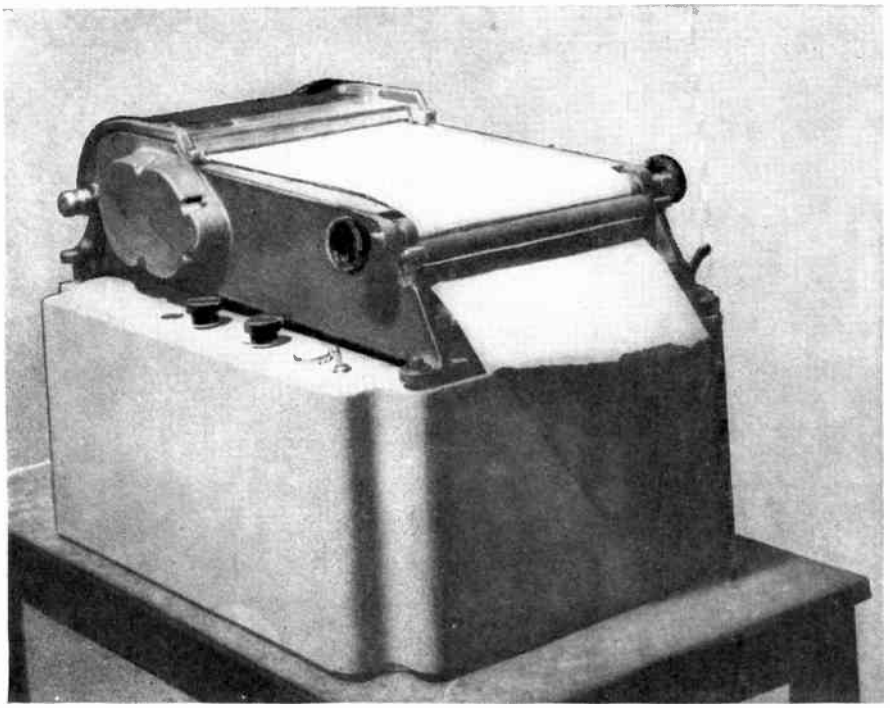


FIG. 8. RECORDERS ARE DESIGNED FOR SIMPLICITY, ADAPTABILITY, AND VISIBILITY

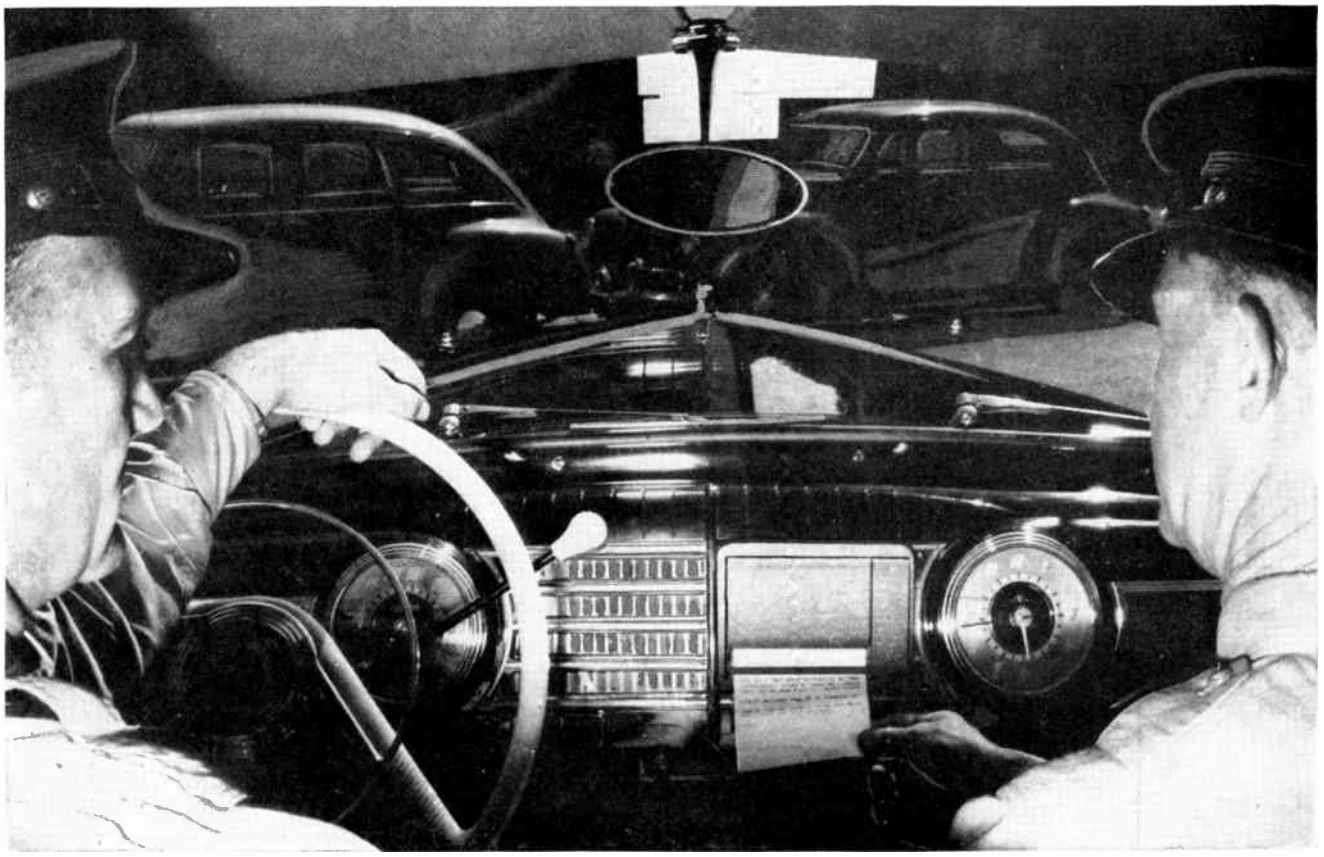
sorption at the highest humidities encountered, it works equally well during high humidity as low, with the paper always having the optimum conducting value.

Since the recorded mark penetrates clear through the Alfax recording paper, it is very useful for getting additional copies. The paper can be treated with a preparation that makes the base paper translucent. Thus, the recordings can be used as a tracing in a blueprint, Ozalid, or similar apparatus for obtaining any quantity of duplicate prints. In weather map work, recordings may be overlapped with previous recordings or master maps for comparison.

Alfax paper differs essentially from coated paper in that it can be made uniformly, for it is simply an immersion process in which the paper is run through an electrolyte. Edison and others were issued patents on electro-chemical paper, but the chemistry of their day did not provide them with a paper that was high speed and black, that did not fade, and was inexpensive enough to apply to sizeable sheets. As a matter of fact, some of their chemical conclusions as to what was happening were incorrectly interpreted. That which is suited to the home, where simplicity is a first, is that which is generally well-suited for some commercial applications.

Thus, in one of the police communication problems, the ideal equipment does not involve photography and yet provides for permanent records. When a supposed criminal is held, his keep costs money. Prompt identification calls for immediate transmission of fingerprints and their interpretation. In transmitting fingerprints, the white lines or spacing between the markings is the important part. The lines or the whorls converge to zero and for interpretation must indicate widths of spacing as narrow as .003 of an inch. We have

FIG. 9. A 4-IN. PAGE RECORDER, OPERATING AT 200 WORDS PER MINUTE, CAN BE OPERATED BY STANDARD POLICE RADIO

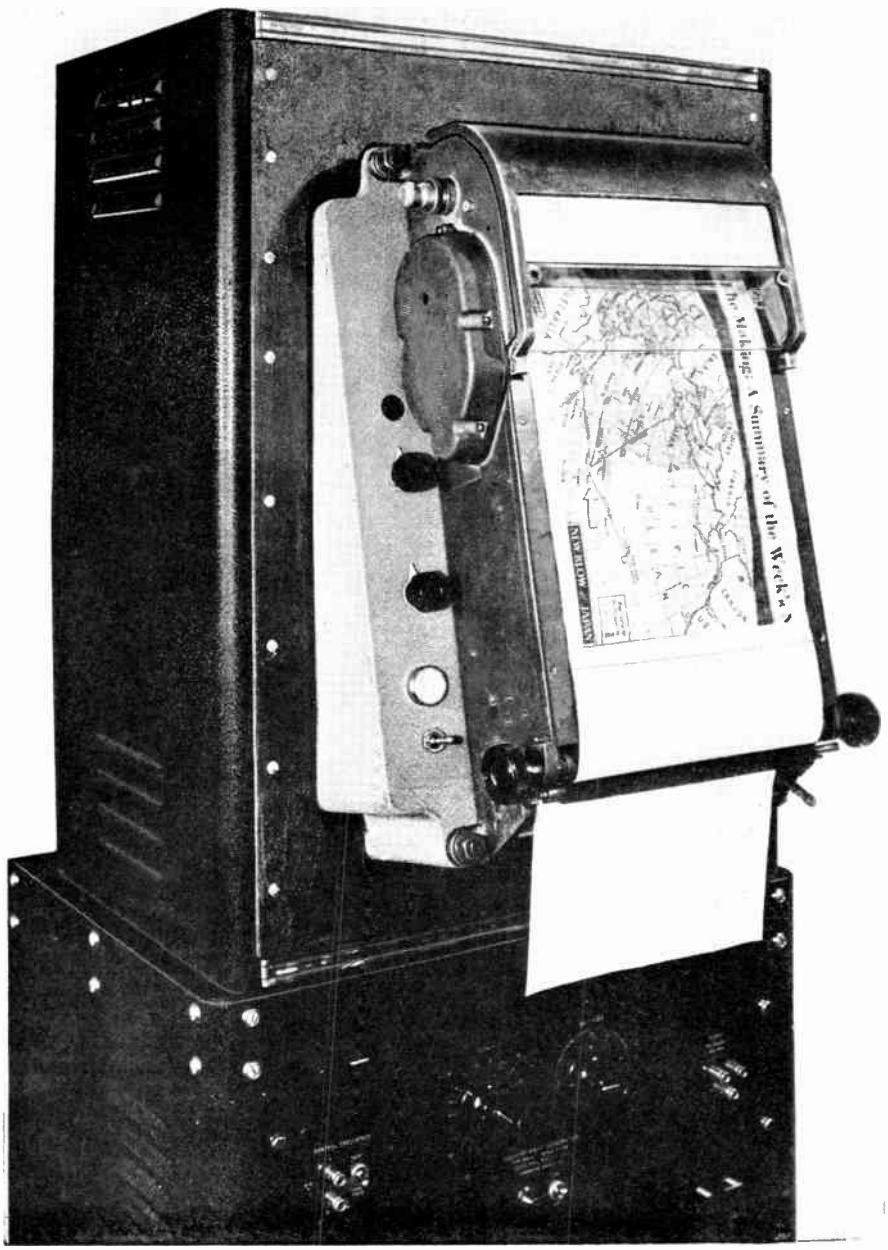


produced ideal equipment, using Alfax paper, for this purpose. Other systems, in their experimental designs, have photographically enlarged the fingerprints and then transmitted them. What we do is to transmit them directly as taken, with extra fine special scanning. Then we record them directly in double their original size on Alfax paper, without delay and without photography. The result is an enlarged print on which it is easier to count the lines and analyze them than in the original. The same equipment transmits the subject's photographs and record. These photographs are of newspaper quality and, with the fingerprints and record

THIS IS A SAMPLE OF TYPE 295 AND TYPE 295A FOR FIGURES

THIS IS A SAMPLE OF TYPE 295 AND 295"A FOR FIGURES

FIG. 10, ABOVE: SAMPLE OF TYPE USED FOR TRANSMITTING DISPATCHES TO POLICE CARS BY FACSIMILE. FIG. 11, BELOW: 8-IN. CONTINUOUS RECORDER USED FOR TRANSMISSION OF MAPS. SIMILAR MODELS HAVE RECORDING AREA 18 INS. WIDE



information, are a definite aid in the prompt identification of a suspect or criminal.

We have chosen to consider all impulse-recording as facsimile. By covering this field, our engineers have delved into many closely related problems and we now have standard designs for all the various mechanical, optical, frequency control, motor, photoelectric and other units for many different purposes. For instance, there have been many methods of synchronizing, and we are licensed under a number that are unique. However, in practice we are finding that the same synchronizing and driving means used in film or photographic transmission is also best suited for our continuous recording equipment using Alfax paper.

Thus the compact oscillator, controlled by a compensated, compact electro-driven tuning fork, driving a synchronous motor comprise three units which solve, in a most practical way, this phase of much equipment.

Likewise in tape recording, our interchangeable-parts printer is suited for the poorer non-synchronized circuits by recording two sets of characters simultaneously, yet it and its drive mechanism are available for other circuit requirements.

We have had considerable to say about high-speed recording because we had available somewhat standardized, or perhaps better called basic-unit designs for high-speed recording. We were presented by a government department with a slow recording problem. Here again the Alfax paper was best suited, not by itself, but because the recording equipment had no inertia or lag, no pens to fill, ribbons or carbon paper to contend with, needles to replace, etc. However, as no one machine or system meets all needs, we find that no one electrolytic paper meets all requirements any more than one photographic paper fills all the needs of photography. Thus a whole new line of engineering and development has been started with the *use-applications* as a laboratory which

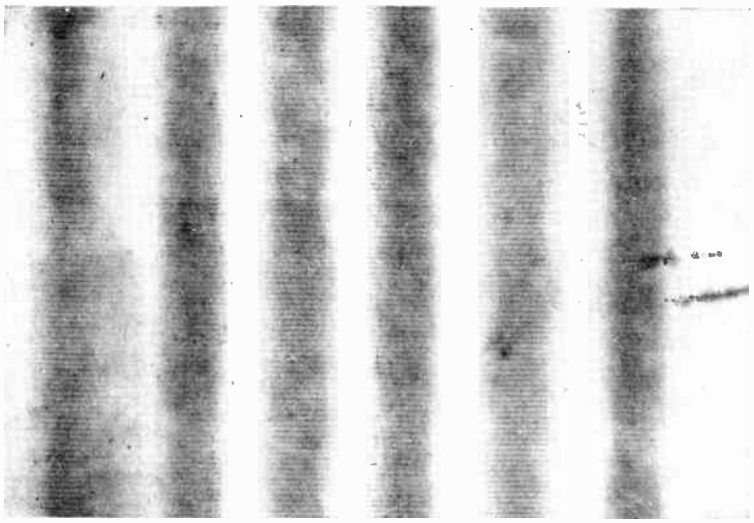


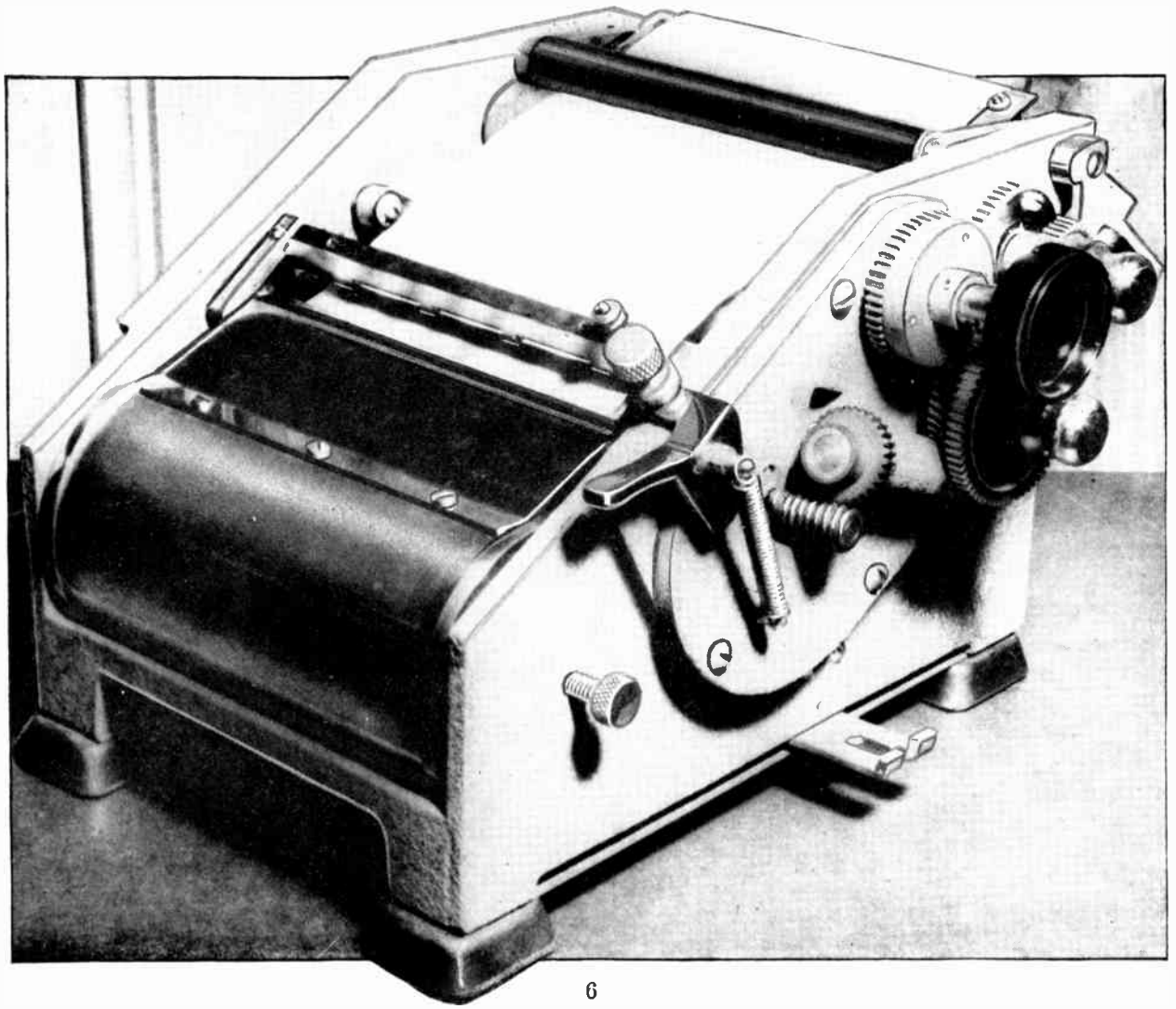
FIG. 12. ALFAX RECORDING OF 60-CYCLE CURRENT, AT 80 LINE-INS. PER SECOND

speeds up the search for practical answers.

When we speak of recording without inertia, we think comparatively, with many other types of recorders in mind. That is, there are recorders with the recording means mounted at the end of arms. When the action is sudden, the arms swing further than they should. In cases where the action is uniform, it must reverse itself. Thus it cannot operate at high speeds. Again, if the recording is on a drum, with paper held around the drum and a needle or electrode follows the turning paper, there is the problem of bounce at the paper's edge. Other recorders have magnetically driven printing bars which introduce inertia, frequency response, and bounce problems. However, where the paper is fed continuously, with a helix electrode on one side of the paper and a floating electrode on the other, all impulses are recorded the exact instant in which they occur. Further, as the helix is round, it can be perfectly balanced and run at any speed without introducing oscillation or vibration.

In certain of our equipment, the marking is due to the electrochemical action between the electrode and the paper, and the passage of the current has the effect of dyeing the paper. The electrode is a spiral helix wire with quick-fastening terminals, so that if it ever needs to be replaced, that can be done easily and quickly, even by the uninitiated. The other electrode is, in one instance, a thin blade that slips into position, and is as easy to replace as a safety razor blade. Another modification is a simple stamping which, in practice, we

FIG. 13. THIS 4-IN. RECORDER IS A VERSATILE MACHINE, MAKING SHARP PICTURES AT SPEEDS UP TO 36 INS. PER MINUTE



have never worn out, but which can be replaced, if damaged, by simply pressing it into its holder.

We have talked about quality and high resolution, fast recording, slow recording, continuous recording. Now let's conclude by covering fast recording a little more specifically, talking about sizes of records and applications of what might be called coarse recording.

In high speed recording, we have the equipment and recording paper that operates as high as 42 ins. per minute with copy 4 ins. wide, making 168 square inches per minute, or 80 linear inches of recorded line per second. A recording is shown in fig. 12 of a 60 cycle signal. Note the peaks recorded 120 of a second apart.

The high speed recording on Alfax paper is of special interest to those having the problem of recording low frequency phenomena such as encountered in the fields of seismography, geophysics, vibration, fatigue, electro-medicine, and can fit any aperiodic or irregular pulse for analytical study and future reference. Any imaginative engineer can think of many such applications. Although the highly specialized, single-application equipment may not be profitable business for us, it adds to the scope of our experience and, therefore, is of interest to us.

As you know, terminal equipment and speeds are tied into the frequencies available in the circuits or radio links. Thus, on circuits where speed in getting through the messages is a must, resolution or detail may have to be sacrificed because the necessary frequencies are not available for transmission. Consequently, the equipment we are bringing through for service in police cars calls for a message of about 200 words in one minute in boldface type, about ¼ in. high, as shown in Fig. 10. Thus, either the driver or his companion can be given, in one minute, the confirmation of car numbers or any instructions that have been transmitted orally. Since the width of the paper is 4 ins., a minimum of dashboard space is used. To load the recorder, cover is opened, a paper roll is inserted, the cover closed, and the machine is ready to operate. No adjustments or fussing of any kind are required.

The same equipment is applicable to the locomotives, tugboats, trucks or other transportation facilities to which instructions and orders are given. This equipment is also designed so that a duplicate message is recorded in a locked chamber, avoiding all dispute as to the receipt and contents of the messages. In accident investigation, this can be invaluable.

Now about size: for FM multiplex sound and facsimile broadcasting, we are presenting a chairside set using four inch recording. We have no qualms in making this equipment simple, efficient, well-styled, and low in cost. If and when the industry is ready to use it, it will be available in production. We propose to use Alfax paper for this machine.

We manufacture two types of machines with a recording width of 8 ins. Table or bench models and models for mounting on standard relay racks are illustrated in Figs. 8 and 10.

For the transmission of weather maps, drawings, plans, or the format of a full page of newspaper, we are making an 18-in. continuous recorder, Fig. 10. In this equipment the recording is instantly visible as it is recorded.

Thus we are covering all sizes, speeds, resolution, circuit requirements, and recording mediums, so as to meet any requirement, not with some particular system, but with the equipment and medium best suited to do each specific job.

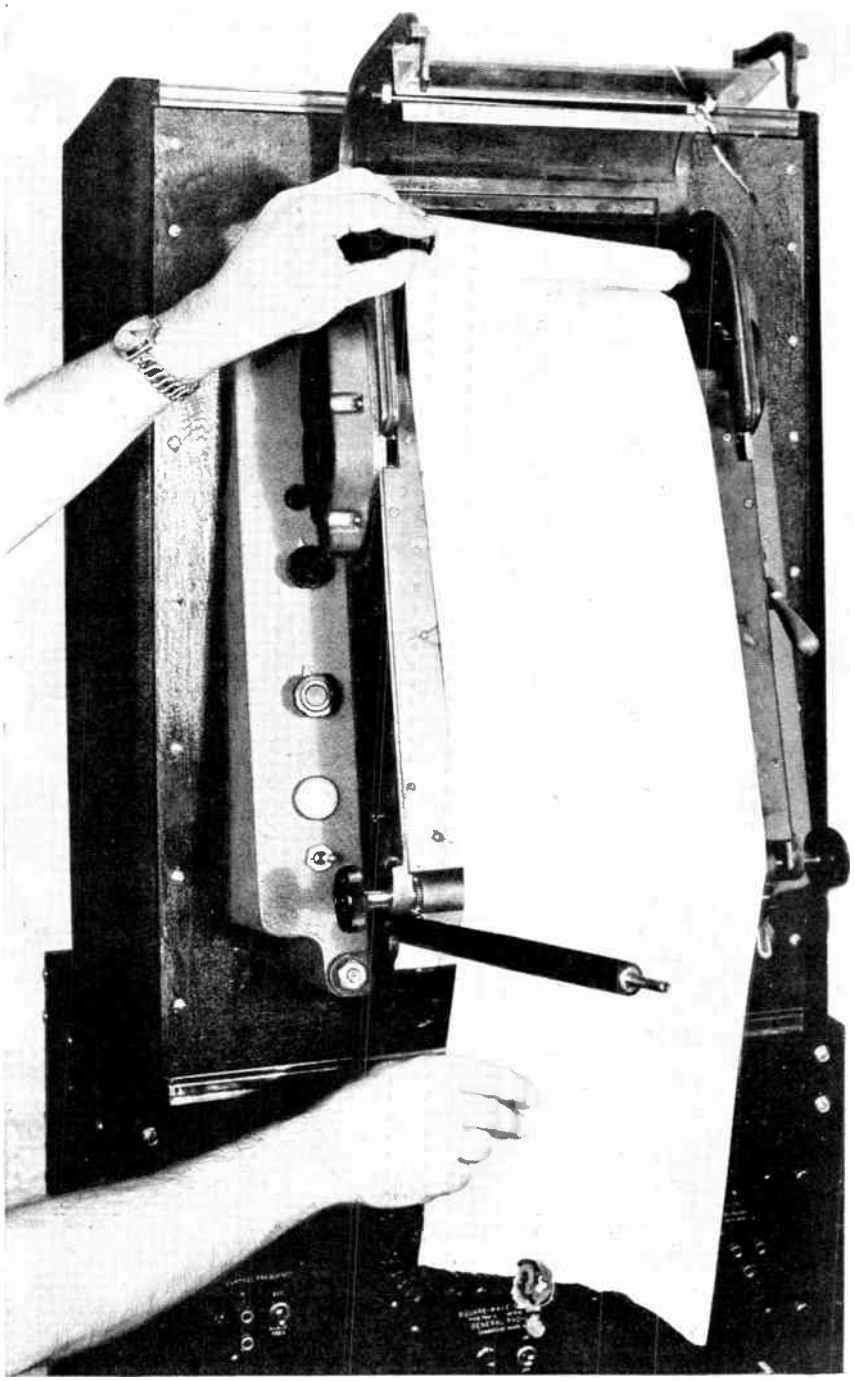
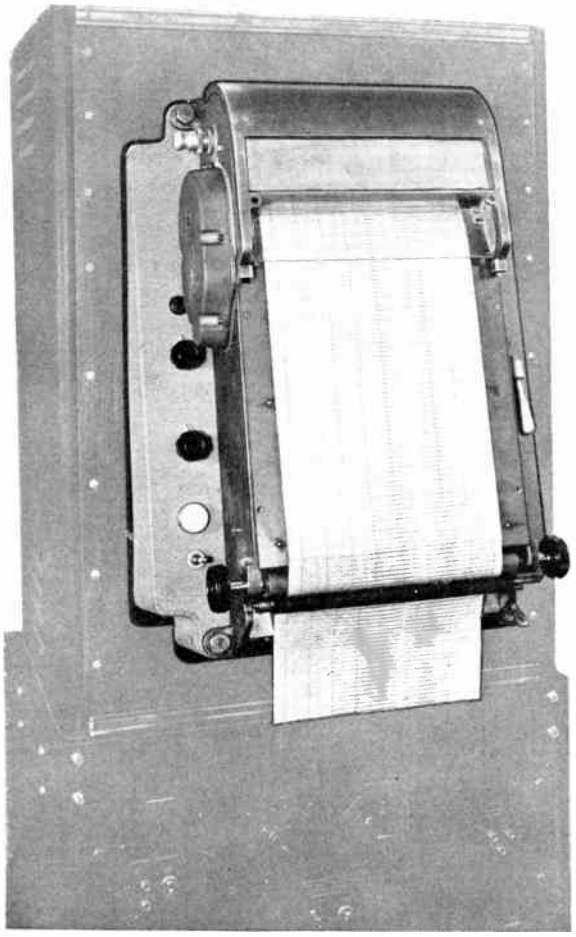


FIG. 14. INSERTING NEW ROLL OF ALFAX PAPER REQUIRES LESS THAN A MINUTE

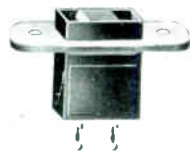
AUTHOR'S NOTE: This speed of inserting paper is important in providing continuity. In the above recorder, as in the police car model, no threading or feeding of the paper through narrow openings.

SUPPLEMENTARY NOTE ON IMPULSE RECORDING



IMPULSE RECORDING Complete cycles of varying instruments can be scanned or their impulse recorded so that the one recording shows the trend and relation to each other at the time they occur. If recording is by radio and atmospherics or fading obliterates the impulse at times, the continuity of recording shows the trend and allows the blanks or indistinctly recorded sections to be plotted. Instrument recording can be high speed or as low as one inch an hour. Recording helix can be synchronously driven or Selsyn controlled with paper feed synchronously driven to provide time recording. Thus all kinds of possibilities of impulse recording exist.

AC POWER OUTLET



Here is a power outlet using the smallest possible space, Underwriters' approved, and fitting your manufacturing assembly process of assembly to chassis by eyelets or rivets and soldering of leads.

• • •

420-439 TUBE SOCKETS FOR TEST EQUIPMENT

Patented sockets for tube testers and aging racks. Designed with a minimum of flexing and free floating, so that the metal in the contact will never crystallize and fail. Test runs indicate a life expectancy of a million and a half insertions.

• • •

440FH FUSEHOLDER

Here is a patented fuseholder that uses the machines and tools in your assembly line. It eyelets or rivets in place, has spring to eject burned out fuse, prevents rattle, and open side contact for easy removal of fuse ends when glass breaks.

• • •

455 ACORN TUBE SOCKET

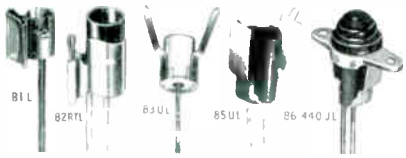
Acorn socket for test equipment with enclosed bottom to keep out dust. Also used for top of adapter for tube checkers.

• • •

480 BREADBOARD SOCKETS

Sockets with contact extensions easy to solder to check point to point or attach clips to. You can screw directly to a breadboard.

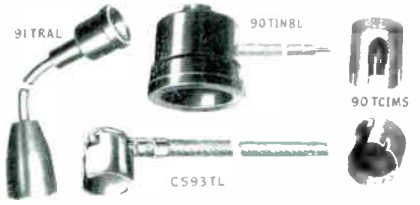
80 Series DIAL LIGHT SOCKETS



Standardize on these dial light sockets on all your new designs. Supplied with leads -- single or double. Single wire socket made complete with minimum metal one stroke of press. Center contact and insulation automatically assembled as lead is measured, cut to length, and stripped. Thus low cost and delivery schedules met with leads to your specifications.

• • •

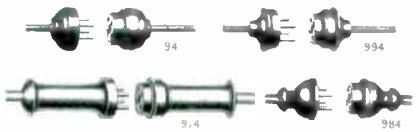
90 Series TUBE CAP CONNECTORS WITH LEADS



Your every requirement of quality tube caps, insulated or not, supplied with leads to your specs for every voltage requirement. Many made special, such as containing resistors to suppress oscillation, with tools for hundreds of different moldings, stampings and all types of wire to draw from.

• • •

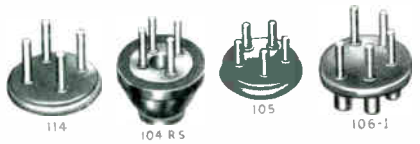
94-98 and 970-990 TWO-PIECE PLUGS TO FIT RADIO TUBE SOCKETS



These are two-piece plugs with various covers that thread on the bases in which the prongs are the same as radio tubes and so fit the conventional tube sockets.

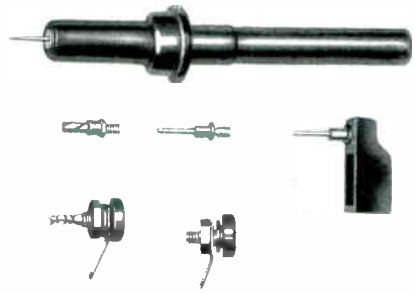
• • •

100-112 ONE-PIECE PLUGS TO FIT RADIO TUBE SOCKETS



An inexpensive one-piece molded plug to fit conventional tube sockets -- molded insulation surrounding insulation on leads, the ends of which protrude through the prongs and are soldered by dipping.

110 TEST PRODS



Easily held test prods with protecting flange to keep finger from metal -- Interchangeable prods include hardened point for piercing insulation. Also supplied in series with neon bulb for short checking.

• • •

121-125P MINIATURE PLUGS and 441-445 SOCKETS OF LATEST DESIGN

The little miniature plugs and sockets are the sockets and plugs for all modern design. Compact metal seal socket with Underwriters' collar provides government spec. quality at commercial prices. Plug provides finger grip, long insulation protection for each lead, providing compact neatness on end of cable.

Choose the 121P to 125P series of plugs and associate sockets 441-445 wherever you wish to make chassis connections of one to five leads. The *coming standards of quality and compactness* indicate that these metal seal sockets must be chosen rather than anything previously available. Has integral Underwriters' collar and associated plug has finger grip, long protection for leads and provided for locking screw when required. Incorporates our usual design requisites to give you quality at low cost.

• • •

DETACHABLE TERMINAL CONNECTORS 203SH to 205SH PLUGS and 203F and 204F ASSOCIATE CONNECTORS

Here are the two to five wire Terminal Connectors that took the trailing cord and plug off speakers, did away with terminal strips, allowed for standardization of volume speaker production and met all Underwriters' requirements for a detachable connector.

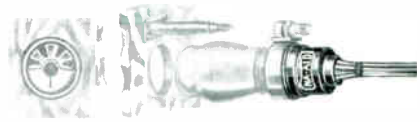
Further it provided a most inexpensive, completely insulated contact with strain relief on each lead, using a minimum of material and labor. Thus at low costs, connectors with leads to any sets specification were provided by the millions—on exacting schedules—and at low cost requiring a minimum of material and labor, the pooling of orders and purchase requirements to attain the highest procurement and factory efficiency.

206SH to 207SH PLUGS

Here is the same type connector as 203-5 series for 6 and 7 connections. Detachable Terminal Strip, made special any number of terminals and shape, with same advantages of Underwriters' protecting collar preventing contact with live prongs, short overall height, with complete individual lead insulation, strain relief and locking feature where required.

• • •

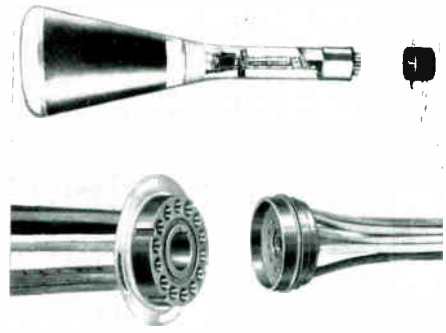
206FC to 208FE TUNING EYE ASSEMBLIES WITH LEADS



Supplied by us by the millions with leads to customers' length. Basic design has three parts -- molding, contacts, disc. Contact has minimum metal; minimum molding material; but product provides protecting collar from live prongs, complete insulation of each lead, individual strain relief and contact allows fast transfer of heat for perfect soldering. By pooling wire requirements, flexible high speed braiding department, special tools, trained operators and mingling of orders, most exacting schedules of customers met at surprising low cost. One order to us buys the assembly of us, quantity large or small with no overruns of wire or of odd lots of parts, scheduling or planning costs as would be the case with parts and wire bought separately and assembled by set or wire manufacturers.

• • •

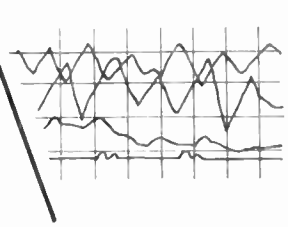
211-214 CATHODE RAY TUBE CONNECTORS



Do not make several problems of Cathode Ray Connectors and Sockets. An experience in supplying the first pioneers for the pilot runs to the latest radar gives you the connectors with leads, compact, individual strain relief, individual insulation with generous safety factors and every type of wire to provide (even in small quantity) a connector with the proper insulation of leads, and to your particular requirements as to length, including shielding of any leads, lacing, overall braiding, intervening connectors or "what have you."

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY

Alden Research Center • Westboro • Massachusetts



Radio Station W F D F FM
Flint, Michigan

Gentlemen:

Now that the F. C. C. has given the "green light" to multiplexing for a subscription fee, F. M. Stations will do well to look into the subject of offering a commercial facsimile service. All that is needed to make facsimile a money producer is for the radio station to initiate an interesting, saleable program; for instance, the broadcasting of up to date information which has a saleable value such as stock and commodity reports, weather reports, headline news, legislative reports, and other types of material for which business houses, clubs, hotels, or individual business men would be potential customers.

The possibilities in this area are admirably outlined in the enclosed reprint from the September issue of "Industry" Magazine to which we have attached descriptive material describing Alden Facsimile Equipment now ready to be applied in this field.

The Alden Scanners, utilizing the flat bed technique, get away from the limitations of the old drum type facsimile scanners and allow stations to work out a diversity of programming which can be fed continuously through the scanner without the constant irritation and delay of having to reload a drum type scanning device.

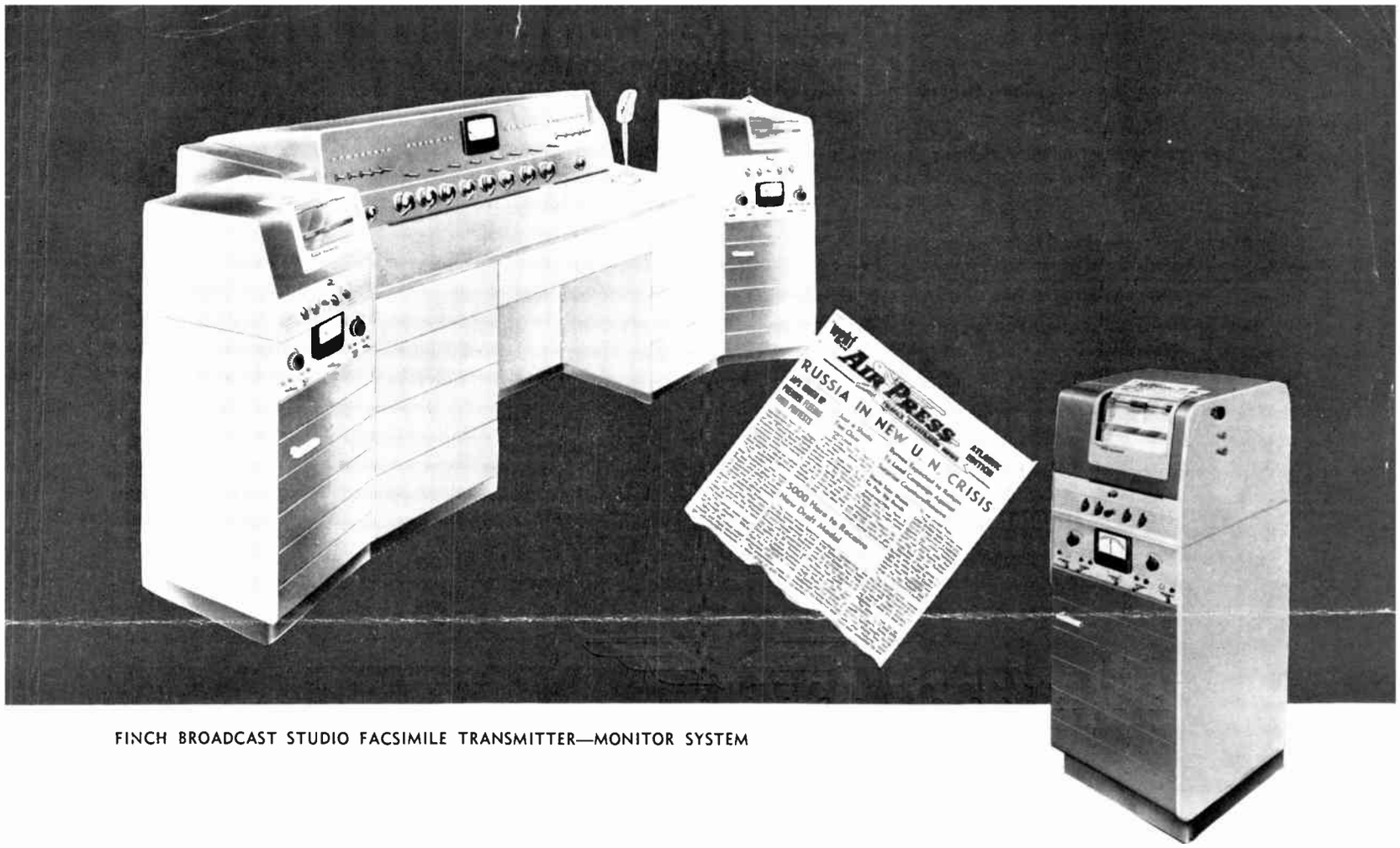
This company, an affiliate of the Alden Products Company, is prepared to work out individual applications of facsimile for any F. M. Stations that are seriously considering offering subscription service under this new ruling.

Very truly yours

ALDEN ELECTRONIC AND IMPULSE
RECORDING EQUIPMENT COMPANY

H. B. Hills

HBH/L
Encl.



FINCH BROADCAST STUDIO FACSIMILE TRANSMITTER—MONITOR SYSTEM

Announcement to FM broadcasters

The single Finch Broodcost Sconner shown obove is sufficient for limited focsimile broadcasting, but it does not provide uninterrupted focsimile progroms os does the complete two sconner instollotion shown cn left. Price: Approx. $2500 (subject to O.P.A. opprovol).

Owners of many progressive FM radio stations are investing in Finch Facsimile broadcasting installations, thus enabling themselves to get in on the ground floor of a wide new field of radio broadcasting. Transmitting not only news, pictures, features and comics, but paid advertising of a scope never before available in radio, they will be able to open up extensive new radio markets in their communities.

Illustrated is our new Broadcast Transmitter-Monitor Installation, consisting of two Finch high-quality, precision broadcast scanners, each with an associated monitor receiver; all necessary power supplies, program amplifiers and selective switching arrangements for insuring uninterrupted transmission of any number of pages.

The Finch Broadcast Scanner is a precision instrument of the finest quality, built to give many years of reliable service. Provided with Finch automatic copy loading and ejection, it also includes a receiver operating on the outgoing signal of the unit, thus making it possible for the operator to observe the program and correct faulty adjustments. Two scanners are provided to permit an uninterrupted flow of program, making it possible to start a new page as soon as the preceding page is completed. Switching panels are provided enabling the operator to control both scanners from either unit. Program amplifiers, power supplies, and other minor accessories are furnished, so that the output signal of the installation may be handled by the master control desk of the radio station in the same manner as the output of a studio.

Following promulgation of FCC facsimile standards, units purchased now will be modified, if necessary, at moderate cost.

Approximate Price of complete unit at upper left. (Subject to O.P.A. approval):

$7500.00

To obtain a reservation insuring early delivery, communicate without delay:

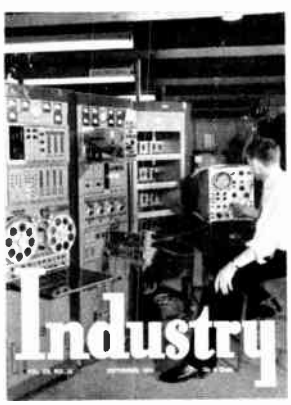
Sales Office, Finch Telecommunications, Inc.

10 East 40th St., New York 16, N. Y. • MUrroy Hill 5-7976

finch facsimile

A NEW BROADCASTING TECHNIQUE

Multiplexing is opening up new profit opportunities for the country's more than 500 FM stations. A Massachusetts company, Browning Laboratories, in Winchester, is today the sole manufacturer of the receiving equipment for multiplex



Reprinted from September, 1955, issue of INDUSTRY
official publication of Associated Industries of Massachusetts

A New Broadcasting Technique

Multiplexing is opening up new profit opportunities for the country's more than 500 FM stations. A Massachusetts company, Browning Laboratories, in Winchester, is today the sole manufacturer of the receiving equipment for multiplex

Signing the initial contract for production of Multicast Receivers are Mr. William S. Halstead, President of Multiplex Services Corporation, New York (left, seated) and Mr. Gardiner G. Greene, President of Browning Laboratories, Inc. of Winchester. Witnessing the signing (l. to r.) are Mr. B. C. Lord, Chief Engineer, Multiplex Services Corporation, Mr. Richard Brayley, Consulting Engineer to Browning Laboratories, and Messrs. Harry Paul and Anthony Costa, Chief Tuner Engineer and Plant Manager, respectively, of Browning. BELOW. The Multicast Receiver, now in production at the Browning plant.

A NEW word is being added to the FM broadcaster's vocabulary—"profit". With the majority of the country's 500-plus FM stations operating in the red, a new broadcasting technique — multiplexing—shows signs of new life for an old broadcasting technique.

Browning Laboratories, Winchester, is a major supplier of multiplexing equipment, and is providing it to FM broadcasters throughout the country.

Radio broadcasting revenue is almost entirely derived from advertising, and, with few exceptions, advertisers have been more attracted to TV and AM radio. Frequency modulation—FM—was an invention of Major Edwin Armstrong, and was hailed, at the time of its inception in 1937, as the broadcasting mode of the future. Quiet and static-free, unaffected by lightning and atmospheric disturbances, FM also provided the wide frequency range that is now receiving such prominence as high fidelity.

However, the somewhat greater complexity of FM receivers—and resulting higher cost—has restricted the listening market, together with the fact that FM operates at a higher frequency than AM — amplitude modulation—and thus does not carry as long a distance. Today, FM stations are mostly either operated simultaneously with an AM affiliate carrying the identical programs, or offer special musical programs which are directed to the high fidelity listener.

With these limitations restricting FM's appeal to the advertiser, the search has been for additional revenue. It is this search that makes multiplexing so appealing.

Fundamentally, multiplexing is a technique that permits an FM station to broadcast, over one transmitter, up to five separate and distinct programs. Regular broadcasting is completely unaffected— those at home continue to receive the same programs as before, while the other four programs can be designed for special purposes and sold as a special service to interested groups. Thus, farmers could, for a small monthly charge, receive specially designed news and market programs and, in so doing, provide the station with the additional revenue it requires.

The "main channel"—the programs which can now be received by anybody with an FM receiving set—is completely unaffected by the additional four "sub-channels" —which can only be received with specially designed equipment. Furthermore, unauthorized reception of these sub-channels, where they are normally sold at a fee, renders the receiver liable to legal prosecution under Sec. 605 of the

Federal Communications Act which prohibits "pirating" of private broadcasting.

Though authorized by the Federal Communications Commission only in March, 1955, multiplexing was first proved feasible by Major Armstrong in 1938. His work in refining the technique and making it commercially practicable continued at a slow pace, however, until 1948 when an associate, William S. Halstead, visualized multiplexing's advantages for the struggling FM stations and, on his own initiative, began a lengthy series of experiments that culminated in proving that multiplexing transmitting and receiving equipment could be made economically and without interfering with established FCC standards for FM broadcasting. The "trick" was to use these sub-channels without affecting the station's normal broadcasting.

The equipment required consists of three elements: an adaptation of the station's existing transmitter; an fm receiver designed to higher than normal standards; and a receiver-adapter which receives the sub-channel.

This 2" facsimile desk scanner of Alden Products Co. is a great boon to central and branch bank operations.

Fundamentally, multiplexing establishes a new type of one way communications system. It has an advantage over other radio communications systems of first, the distance provided by the power of the FM station, and, second, the quality of transmission required by FCC standards. Since the station can lease the services of the sub channels, it enables new revenue while leaving regular broadcasting activities undisturbed. As such, multiplexing has a wide range of applications.

Most functional music — background music in public places, hotels, restaurants, factories, etc., is now transmitted over leased telephone wires for which is charged a monthly rental charge on a per mile basis. Furthermore, as the distance from the transmitting source increases, so do the wire charges resulting in such high charges at some points as to make the service prohibitive and restricting the potential market for such services. Multiplexing, however, eliminates fixed wire charges and increases the market potential to the area served by the FM broadcasting station. It has been estimated that converting an installation from wire to multiplexing would, when measured against wire charges alone, pay for itself in 20 months or less.

Another promising application is facsimile—a technique of converting a radio signal into the written word. Though garnering much publicity when first announced several years ago, facsimile has never realized its full potentialities due to a lack of adequate facilities for transmitting the signal.

Facsimile was pioneered and developed by another Massachusetts manufacturer prominent in the electronics industry, Alden Products Company of Brockton.

In 1947 the Alden Products Company in cooperation with the *Philadelphia* Bulletin carried an FM facsimile multiplexed broadcast from the FM Station *WPEN*, then owned by the *Bulletin*, to Atlantic City to a convention of radio broadcasters.

The scanner was located in Philadelphia and the bulletin recorder in the Claridge Hotel lobby where the news editors' comments were heard as the printed news appeared enlarged on three by eight foot bulletin board recorder.

This transmission was then only allowed experimentally by the FCC, but now that FCC has given the "greenlight" to multiplex subscription service, it becomes a commercially feasible application, and it finds the Alden Electronic and Impulse Recording Equipment Company of Westboro, Mass., who are now the manufacturers of the developments in facsimile of Alden Products Company, ready with transmitting equipment for broadcast stations and recorders for the subscribers to be operated through Browning receivers.

The scanning equipment available makes it possible for a sta-

The first FM station sound and facsimile transmission from a commercial station, Atlantic City, in 1947.

tion to have a diversity of programs for a wide range of subscribers and to be able to get the most revenue using both the peak and valley hours.

In reporting horse races, it can show the results graphically as well as in words. The recorders are physically small enough to be against the wall in a booth so the juke box listeners may be paying to listen to a combination sound and facs recorder reporting sporting events and news.

From a revenue point of view, these same recorders can report in the off hours for the business man the particular information on which he wishes to keep up-to-date, as well as the flash information that may occur during business hours.

Using multiplexing, it is possible to adapt the facsimile technique to transmit the national news section of a newspaper to a number of small local papers who could have the pre-set news and eliminate any re-writing or type-setting charges. Another application is a special service for business men, in which, through facsimile, they can receive in their own office special business developments, and other information. Through specially designed "billboards", facsimile can be adapted to desired locations.

Browning Laboratories is working closely with Alden Products and their affiliated companies in developing facsimile techniques for use in conjunction with multiplexing.

These are but a few examples of multiplexing applications, but are by no means a complete list. In effect, the multiplex technique is applicable whenever there is a requirement for one way communications and the wide coverage of a powerful radio station is desirable.

Alden Products Co., Brockton, manufactures this giant 5-foot bulletin recorder which receives transmission of up-to-the-minute news as shown in this simulated billboard display.

A Massachusetts company — Browning Laboratories in Winchester — is presently the sole manufacturer of multiplex receiving equipment as developed by Mr. Halstead. Founded over 20 years ago for the design and manufacture of electronic equipment, Browning has obtained a national reputation for FM receivers for the high fidelity market. It was this experience—plus the multiplexing requirement for receiving equipment of extra high standards—that resulted in Browning undertaking a full scale engineering program in close cooperation with Mr. Halstead, and for demonstrating the equipment in many places within the past few months—including the National Convention of the National Association of Radio and Television Broadcasters in Washington.

Since multiplexing represents a type of "private" broadcasting, Browning does not expect such equipment to be offered to the general public. Currently, most customers are those who are already providing a broadcasting service and wish to either convert or expand into multiplexing. Active discussions are also underway with those who visualize new services.

With its foundation resting on making profit for an FM broadcaster, where practically none existed previousily, multiplex has an assured future, and Browning is counting on multiplex as a major factor in their future growth.

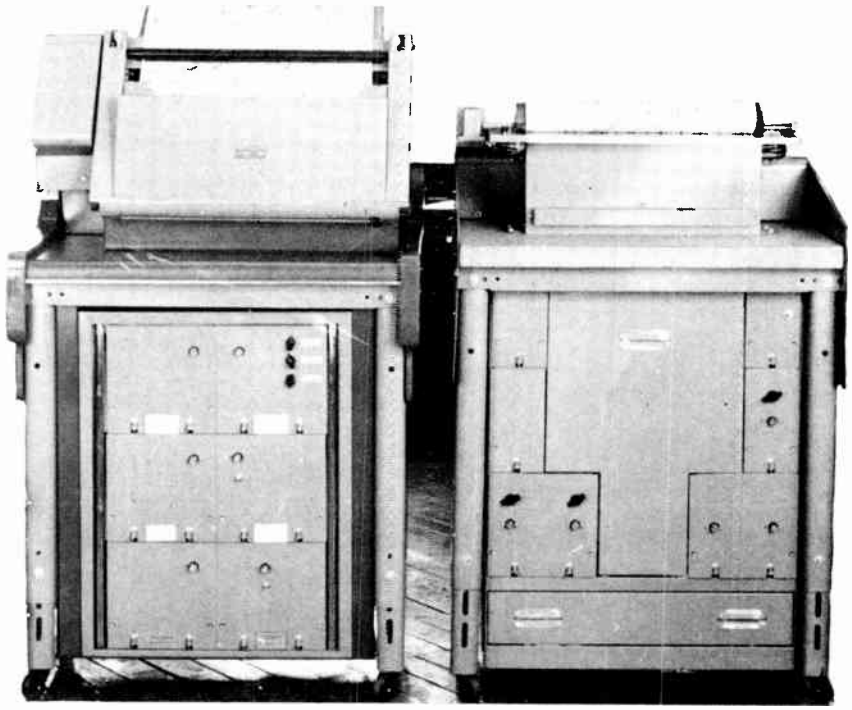
THE ALDEN 19" CONTINUOUS FACSIMILE SYSTEM

Basically the same as the High Speed system, this equipment allows a rapid transmission of large copy such as weather maps, blueprints, drawings, and photographs where it is necessary or desirable to have one piece reproductions.

This recorder will reproduce copy fed into the scanner, at the rate of 11.4 square inches per minute. Much more rapid transmission is possible when telephone lines are not used but instead private lines or microwaves. Here too, the recorded copy can be any length up to 100 feet, allowing the transmission of large size blueprints. If copy exceeds 19" on its narrowest dimension, it can be transmitted in sections and re-assembled upon being recorded.

All electronics are of plug in design and are contained in the base of the instrument, making servicing a simple procedure. The compact self-contained equipment requires less operating attention than any facsimile devices available today. The continuous rolls of Alfax paper need no attention other than reloading thus eliminating the need for the stand-by attention required by drum type recorders. This is a major saving offered by Alden equipment.

Applications are the transmission of:



Weather maps, blueprints, art work, photographs, printers layouts, text, aerial maps, and other material where all possibility of transmission error must be eliminated and speed of transmission is of great importance.

All Alden Facsimile System equipment illustrated here is composed of predesigned and tested units custom assembled to meet the specific demands of the transmission circuits involved, number of recorders to be operated off one transmitter, and the customer's particular requirements.

Actual quotations will be submitted upon a determination of the above factors.

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY

WESTBORO, MASS.

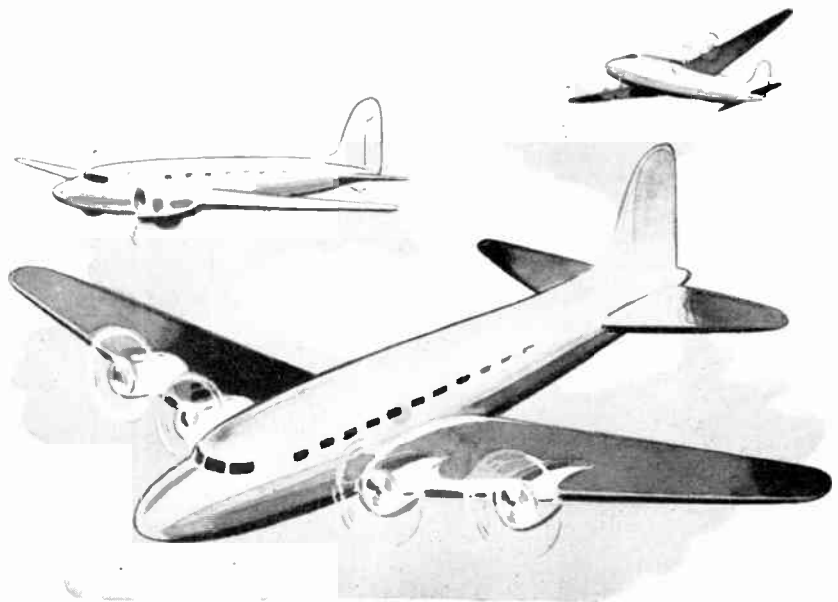
A New Facsimile Dispatch & Report System

by

Milton Alden

Facsimile Equipment to be Released for "Use Tests"

This article appears in the Sept.-Oct. "Municipal Signal Engineer"



RECENTLY I viewed the slides of an old newspaper photographer which showed the early bi-planes, tri-planes, and monoplanes. These went back to the time that Graham White was the first and only contestant to successfully fly a plane from Atlantic, (Mass.) to Boston Light and back, a distance of approximately ten miles, during the first American Air Meet. This was front-page news in those days and thousands of people flocked to the field to see White and the others perform.

But, to get back to the pictures. The pictures showed many crashes. The job in those days was to keep the planes in the air, and had nothing to do with communications. As I looked over these pictures my mind wandered to a recent report on airplane safety in which FACSIMILE COMMUNICATION was advocated as one aid to safer flying.

One of the problems dealt with in the report was the congestion at airports. Planes, some of which travel three miles or more a minute, are "stacked", waiting their turn to come in. They circle and circle and await radio telephoned instructions from the tower. At times the weather at the port is marginal for visibility and perhaps rapidly changing. This is the picture as I understand it.

Now a rather startling statement was made in this report; it said, in effect, that listening to the radiophone is just one more thing that the pilot, who already has plenty on his mind, has to do, and that he often thinks he heard what he wanted to hear, rather than what was actually said. It went on to state further, that "repeats" were often necessary, as well as confirmation of the message by pilot to tower. This not only consumed time valuable in more ways than one but often congested the wavelength in use. This report, in which we had no part, went on to state that facsimile was the natural cure to this communication problem. It would fit into the need for relieving congestion, by operating on a different wavelength. It would be used for confirming oral instruction with more words per minute than are transmitted orally, so, in addition to making the content of instructions sure, it would save precious time. Furthermore, facsimile could, with very little ingenuity, overcome the language difficulties of the phone encountered in planes approaching foreign airports, by providing symbols, sketched directions indicating time graphically, or whatever might be worked out as desired for the purpose of plane communication. The visible facsimile recording, not being transitory, would be valuable for later reference, in addition to

Is Facsimile an Answer to the Air Pilot's Prayer?

Facsimile as a means of communicating with the air pilot has the following advantages:

Records instructions as given—no chance of misunderstanding.
Eliminates repeats, or confirmation.
Operates on a wave-length different from the plane's set, relieving radio congestion.
More words per minute than spoken message.
Can overcome language difficulties by making possible graphic instructions.
Permanent—can be referred to as often as necessary.
More readily understood than oral message when received under bad conditons.

ADVANTAGES OF THE ALDEN DISPATCH RECORDER:

Uses little panel space.
All received messages can be easily read.
Provision can be made for a duplicate of the received message going into a locked comment, thus proving receipt.

Illustrating the Simplicity of the Alden 4″ Recorder

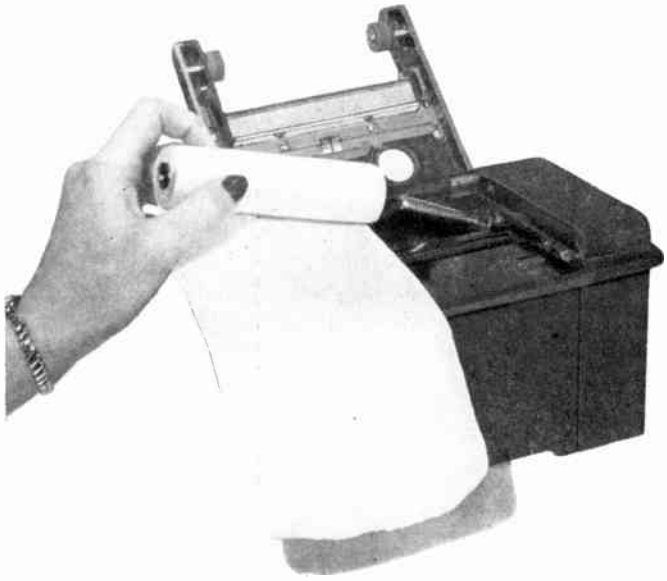


Fig. 1. Putting paper in the recorder is extremely simple. Roll is inserted on a spindle held by spring tension at an angle to meet the roll. The paper is then pushed down into the cavity.

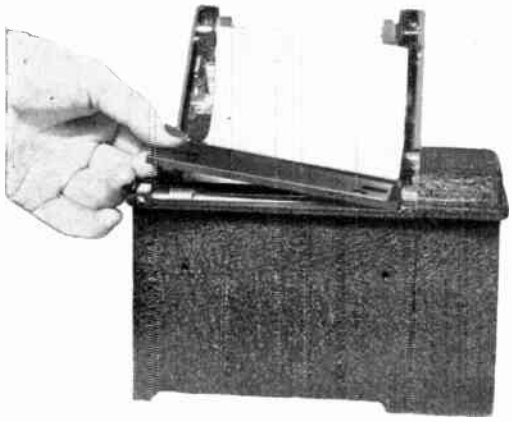


Fig. 2. Molded plate is easily taken off for access to the helix for removal or cleaning.

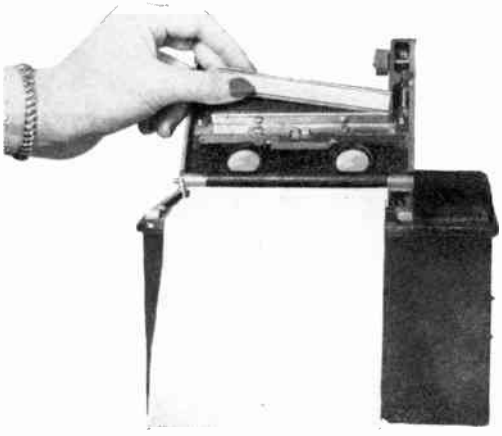


Fig. 3. The recorder plate, a simple stamping, is inserted with a flick of the finger.

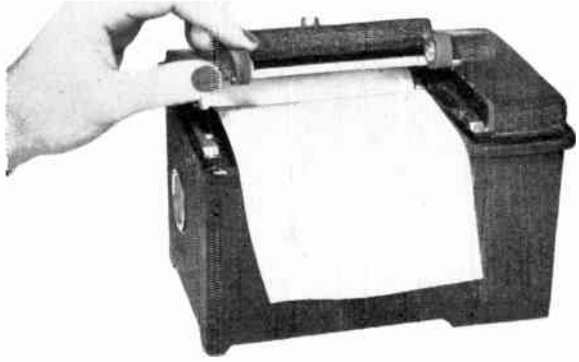


Fig. 4. Cover is closed and latched simply by pushing it down. There are no recorder plates to adjust nor is it necessary to feed paper through slots or roll, nor any need of straightening adjustments.

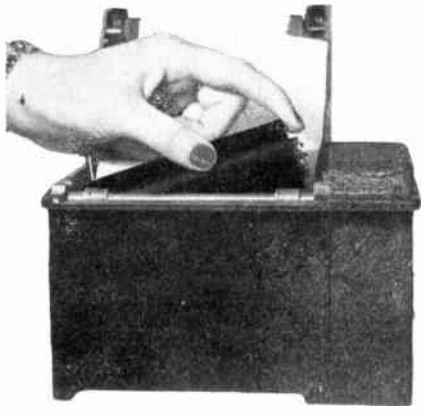


Fig. 5. The helix roll is easily inserted or removed as illustrated.

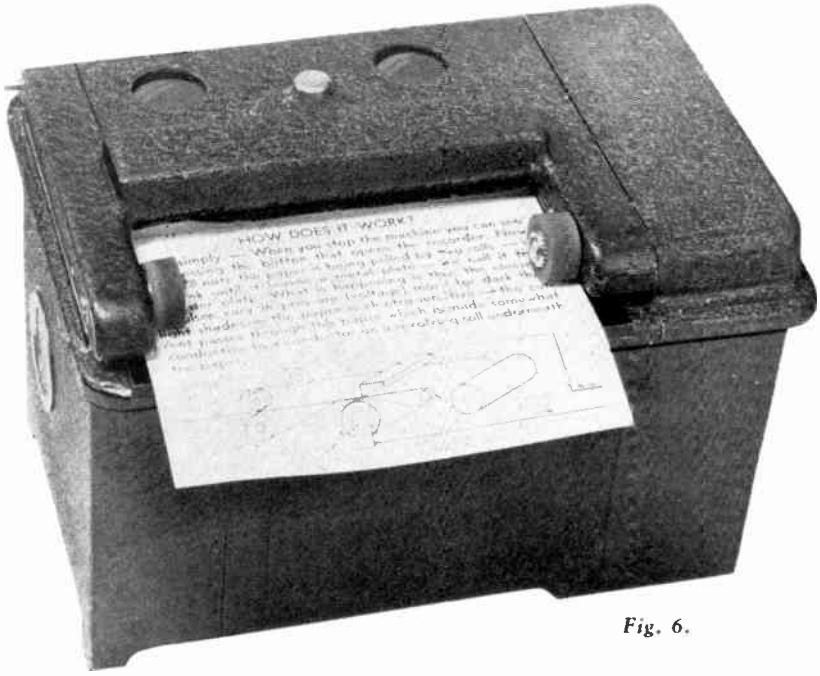


Fig. 6.

the advantage of being read rather than heard at the time received.

The Alden Dispatch Recorder was thought through with plane emergency use, or locomotive and emergency uses in mind, with the requirement that it use little panel space and that the recording could be easily read. The design, in fact, is such that side vision and an occasional glance will give one the message while concentrating on operation of the plane or vehicle. Two recorders can be connected to provide duplicate recordings, or recording paper can be double sheeted, with the second copy of the received message going into a locked compartment. This would show what messages were received and their clarity. Incidentally, facsimile messages—when received under bad conditions or a high ratio of noise to signal strength—are more readily interpreted than the same message received by radio phone under like conditions.

The Alden Dispatch, report or communication prototype recorders were designed not only for airplane use, but for locomotive, emergency cars, police cars, taxis, power line communication, and use in remote places where there is no existing service or preventative service such as is provided for phone and teletype operation in this country.

To meet these all around requirements certain minimum objectives had to be met. First the recording paper must be easily inserted. At times this might have to be done in the dark and very speedily If the paper had to be fed through slots or rolls and then adjusted as to straightness, the use of such a recorder would be limited. Consequently you will note from the illustration, Fig 1 on page 2, that a spring raises the bar to an angle so that a new roll of paper slides on easily. The roll is pushed down and the free end of the paper is pulled to the edge of the recorder. The top cover is slammed down, it latches with a click and the recorder is ready to operate. There are no printer blade or paper adjustments to be made at any time.

The recorder plate is one element that has a shorter life than the complete unit and so is made readily replaceable. The wear is not frictional, but the recording on the paper is in part the result of electrolytical deposits of the metal in the paper fibres.

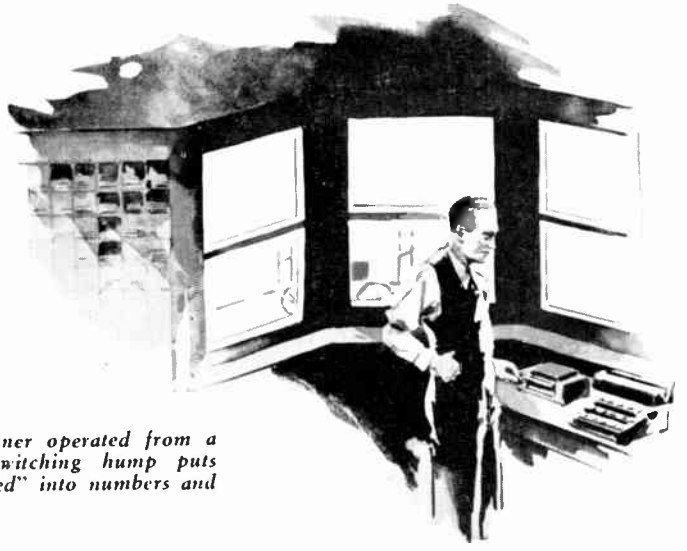
The recorder plate is a stamping. It is easy to handle, guides into place and could be replaced in darkness, if necessary.

The elements of the recorder are shown on page 6, Fig. 7. They are paper holder A, revolving helix B, paper feed rollers C, gear box for driving helix and paper feed roll at the proper relational speeds, D, motor E-1, recorder plate F, and in one type of framing system, a framing solenoid E-2

Now all the elements are built as self-contained, interchangeable units. *Compare the construction with a typewriter or a teletype.*

If any unit wears out, proves defective, or is suspected of not performing up to standard, a spare unit quickly replaces it with no time delay or need of any serviceman.

Note that these units have bullet-headed dowels of generous size that find their proper location in bell-mouthed holes on whatever they mount. Also note the generous size Alden Coin-captive Allen head bolts that hold these units together.



The Dispatch Scanner operated from a signal tower or switching hump puts "certainty with speed" into numbers and instructions.

They are slotted and you can use a screwdriver to loosen or tighten or you can use an Allen wrench. The latter is shaped like a cane. See sketch page 6, Fig. 8. Thus, you can reach down when used lengthwise and when used sidewise tighten with excellent leverage even when located in corners. Now, if you haven't the Allen wrench, and you haven't a screw driver, let's hope you have a penny, dime, or coin. The slot is cut in an arc so a penny fits perfectly and with it you can get the leverage to tighten or loosen the bolt. Once you have it loosened, you can make the rest of the necessary turns rapidly with the fingers since the bolt head is knurled to give the fingers a good gripping surface.

One other point—The bolts are captive; that is, they and the lock washer are held to the unit. Thus they are not lost, dropped, or misplaced. (Figs. 9 & 10.)

One of the problems of any dispatch system is for the information to be easily read. Dispatch information, as a rule, consists of short directions immediately composed or prepared. This may also be true of news dispatches. The messages may be continuous for periods, but are apt to be intermittent. So in making sure the message is easily read you have to go back to the source, the

GO AHEAD

CLEVELAND TOWER
ANSWERING NC ONE, FOUR,
ONE, FIVE, SEVEN. FIELD
ZERO. CEILING ONE THOU-
SAND FEET. VISIBILITY
FOUR MILES. ALTIMETER

An original typewritten message, actual size, is shown above. At the right, the facsimile reception, 50% enlarged, is reproduced to show how easily messages can be read. To fully test this, hold off at 4 feet and note ease of reading.

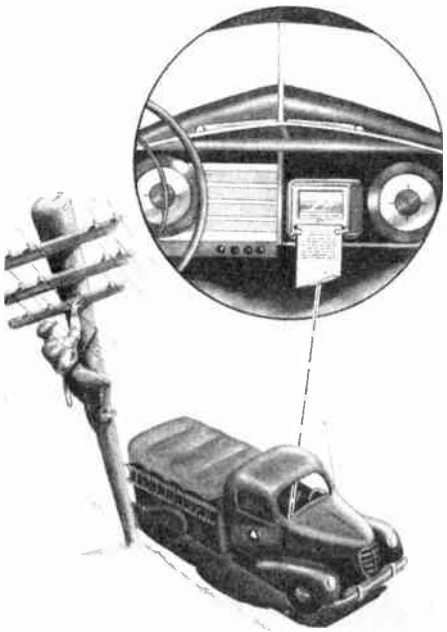
GO AHEAD

CLEVELAND TOWER
ANSWERING NC ONE, FOUR,
ONE, FIVE, SEVEN. FIELD
ELEVATION SEVEN EIGHT
ZERO. CEILING ONE THOU-
SAND FEET. VISIBILITY
FOUR MILES. ALTIMETER

Some Suggested Uses for the 4-inch Dispatch Recorder

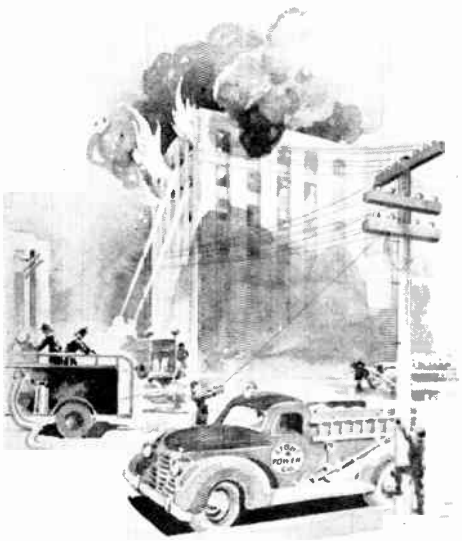
Shows the recorder linked to dispatch system in any station or airport, providing up-to-the minute information on the open space.

Shows a taxi driver returning to stand to note calls recorded by facsimile in his absence.

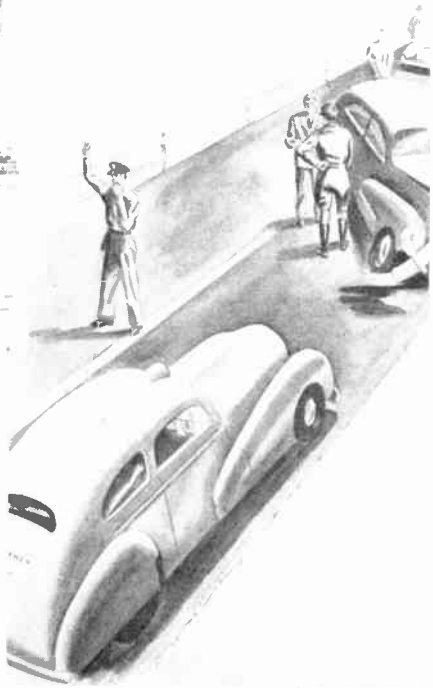


Shows, at right, dispatch message being recorded in emergency car while repairman is away from the car.

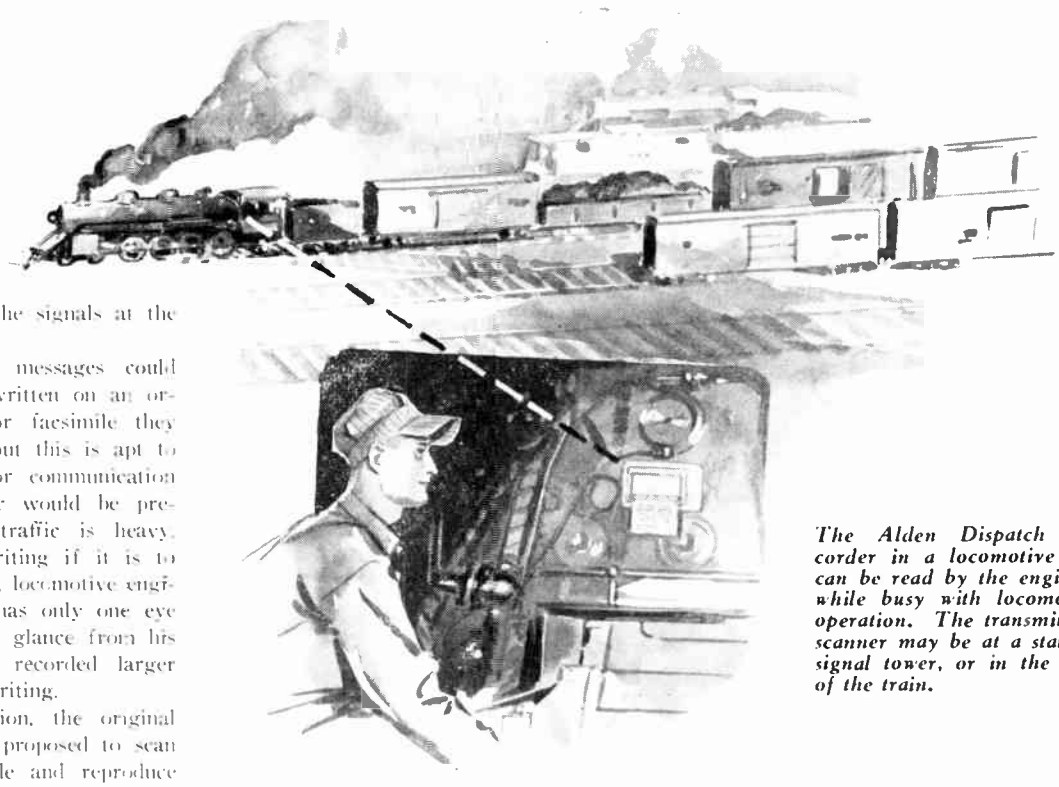
Fireman leaving fire house with location, number, and briefing information.



Dispatch recorder coordinates the operation of all fire apparatus through the din and excitement.



Alden Facsimile, at left, is extremely useful in assuring completeness and accuracy, as transmission of detailed messages solely by radio phone is difficult and unreliable. This is especially true where police cruisers are manned by only one officer. While police leave car for emergency, communications are continued through facsimile. The Alden dispatch and report system provides to emergency and transportation situations: certainty, speed-up of operation, tremendous savings in time and dollars—and often in lives.



The Alden Dispatch Recorder in a locomotive cab can be read by the engineer while busy with locomotive operation. The transmitting scanner may be at a station, signal tower, or in the rear of the train.

scanner that provides the signals at the transmitter end.

Now most dispatch messages could be most conveniently written on an ordinary typewriter. For facsimile they can be hand written, but this is apt to take up more space or communication time so the typewriter would be preferred wherever the traffic is heavy. All right. But typewriting if it is to be read by a car driver, locomotive engineer, or aviator who has only one eye for it and just time to glance from his controls, needs to be recorded larger than the original typewriting.

To meet this situation, the original Alden dispatch system proposed to scan typewriting 2-2/3" wide and reproduce it at the recorder enlarged one and one half times. That worked out all right as far as readability was concerned, but it required that the original writing to be scanned be written on paper of adding machine width about five words to a line. This was fairly satisfactory for typing but the width was rather narrow for writing.

Equipment can be built to these standards, but it appears that there are many applications where the four inch, actually 4.1 inch, recorded line will be used. For illustration, if the recorders are used, we will say, by United Press or some such service to parts of South America or remote places where it has not been practical to serve using complicated equipment, the recording will not need to be enlarged.

To take care of the case where enlargement is desirable, a six inch recorder can be provided that records the copy written on four inch paper enlarged one and one half times. See illustration of copy original size and as received enlarged. (See bottom of page 3.)

It can be seen that signals from the scanner can be received by either recorder. The same scanner can also direct the message to the Alden Master Size 18" Recorder which blows it up four times. This serves as a remote bulletin board and recording of this size is readily read by large groups at some distance from the recorder.

The illustrations accompanying the article tell their own story of the many places the Alden system can be used.

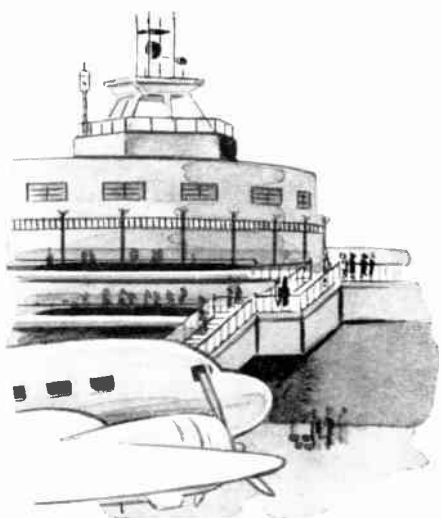
It would appear that it could save dollars of substantial amount in any switching yard. (See above.)

It has been talked of as giving firemen at the fire station (in one of our largest cities) the box call, giving information on what fire fighting equipment is on the way and where to. On fire trucks it has been proposed to have facsimile recorder to inform and coordinate above the clatter and confusion. (See page 4.)

A prime use is in police cars. Even where two officers are riding together, it is only possible to absorb a limited message by ear over the radio phone; any substantial message must be laboriously written down, with delay and chance of error. When there is only one officer, the need for Facsimile is correspondingly greater. In addition, there are many circumstances where the officers must be out of the car, and in such cases Facsimile is the only practical way of recording messages. An incidental feature which is of special interest to all users of emergency equipment is the Alden Back Connector illustrated in Fig. 12, page 8. This connector permits the instant removal of a unit (such as an amplifier, or an entire set) for servicing and instant replacement with a spare.

It has been considered by railroad accountants as part of a system of ticket clearance, eliminating hours of copying and analysis; each route over which a

The simplicity and the easily replaceable units of the Alden Recorder were in part inspired by a provider of communication service to South America, who has visualized its use in unattended outposts by technically untrained persons.



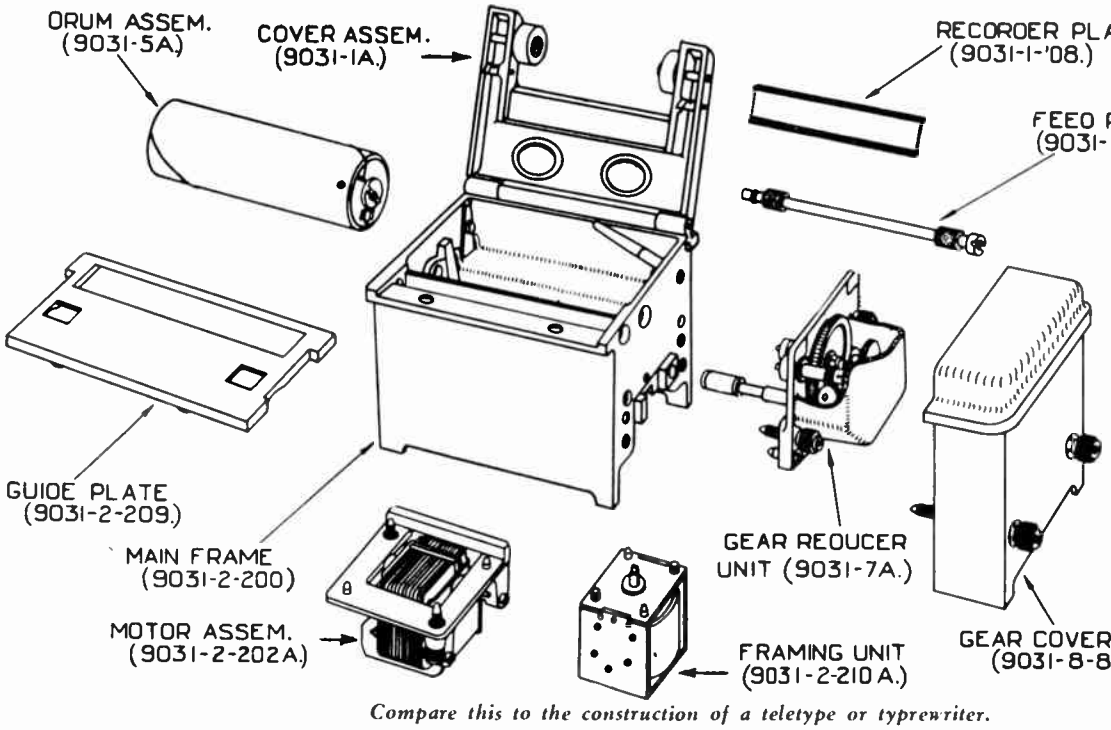


Fig. 7. All elements of the Alden dispatch Recorders are made in units. Any unit with life less than that of the entire device can be quickly replaced. Diagram shows gear train for helix and paper feed with the gear exposed (which is complete unit attached by means of screw shown below.) Motor unit is similarly attached within the bottom of the recorder.

Compare this to the construction of a teletype or typrewriter.

ticket is sold would without any copying be recorded from ticket with written or stamped destination, the cancellation stamp and conductor's punching, the proper number of recorders being used to provide copy for each railroad concerned.

Airlines have planes traveling empty because information on passengers is missing—planes often reach the next stop before the information that a passenger didn't show up for space bought or reserved. Facsimile has been advocated to solve the delay in transposing to teletype and relieve the load on congested circuits. As a ticket was sold, it or a copy is placed in an automatic scanner where the ticket tells its own story without any rewrite or transposing. The information is noted at a clearance center while the ticket seller proceeds with his next customer.

Pencil memos of cancellations and failure of passengers to show up would be transmitted with equal facility and speed. Likewise reverse information on open space would be up to the minute. (See page 4.)

The Alden dispatch system in mills, departments, branches of industrial concerns would allow instant information, notes and sketches to go to selected departments and to the Alden Master Size Bulletin recorders for group information.

Remote bulletin boards for newspapers, department stores, public places, points announcing train arrivals—interspersed with advertising—are other uses.

Perhaps hotel service is one of the greatest possible places for this system, operated with small recorders in rooms, recording incomplete phone calls, bulletin service on each floor, with announcements, ads, and special services which guests might selectively request as their particular interest—such as market reports, race results, baseball scores, late news, weather, what is going on, etc. (See page 7.)

HOW DOES THE DISPATCH SCANNER WORK? The scanner, as proposed for delivery early next year, works quite simply. Copy is laid on a table; a lever is pressed. The copy is drawn into the scanner where it is scanned. (See Fig. 13, page 8.) The starting of the scanner sends out an impluse. This impulse starts the motor at the recorder end and the paper starts to feed. A second series of impulses frames the recorder. Framing starts the recorded line at the same time that it started to be scanned at the transmitter end.

Now the scanner can be set manually to a quickly adjusted stop that stops the scanners operation when the message is complete whether it is one paragraph or many. Also, circuits are possible in which the scanner will automatically stop when the end of the copy has been reached.

Regardless of whether the automatic or manually set stopping system is used,

Fig. 8. You may operate the captive studs that hold the replaceable units together, by the familiar Allen Wrench, screw driver, penny or dime.

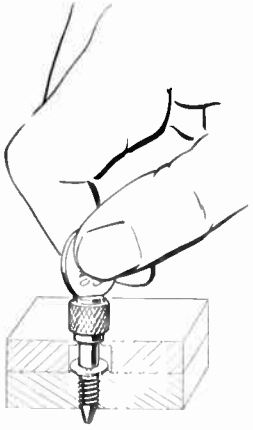


Fig. 9. Even when the captive stud is tightened with an Allen Wrench, a penny in the arced slot gives sufficient leverage to loosen.

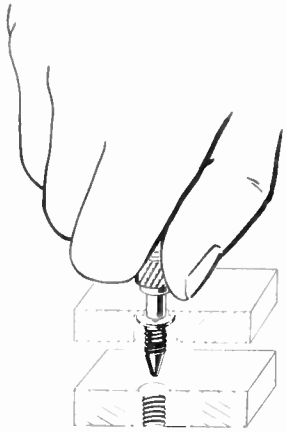
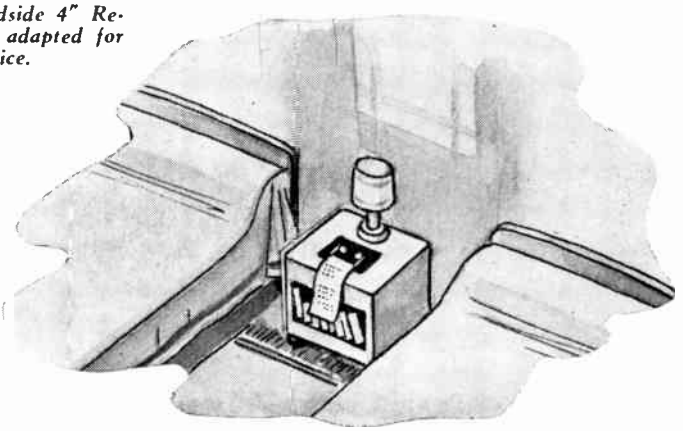


Fig. 10. Once loosened, the knurled finger grip provides for rapid unscrewing and for screwing in the replaced unit to the point of final tightening.

FACSIMILE IN HOTELS

A new service feature with which to intrigue the interest of guests and to add to their sense of complete satisfaction.



Shows bedside 4" Recorder as adapted for hotel service.

Facsimile can offer the hotel guests personalized service in their rooms and in the hotel lobby through quick and accurate dispensation of messages, news, and by coordinating activities throughout the hotel.

The impression of the management's personal interest in each guest can be instilled with minimum duplication of effort and time and with maximum efficiency.

Here's How It Works

In The Guest's Room his name and any special requests he has left at the desk will appear on the facsimile recorder as he enters, so that he may see that his orders have been correctly interpreted and he will be sure of receiving all messages in his room.

Besides the message service, hotel facsimile sends a list of the current specials of all hotel facilities. . . . "lower prices for laundry service this week," "chef's special in the hotel grill today" . . . . Special events of the day in the hotel . . . . musicales, banquets, conventions, parties. . . . What is going on in town . . . plays, concerts, sporting events, night club entertainment. Upon the guest's request, other special features may be sent to his room such as happenings in guest's home town, race results, football and baseball scores, stock market returns or quotas on individual stocks that the guest has selected, and travel information such as train and plane schedules.

In the Lobby

Fig. 11. IN THE LOBBY — Alden 18" Utility Recorder enlarging 4" crammed copy so as to be readable at a distance of 10 to 15 feet.

In the Lobby the 18 inch Master Utility Recorder shows messages which have general interest, such as the race results, amusements in town, news flashes, weather reports, travel information. Added to this will be up-to-the-minute paging of guests.

Here is a service that can coordinate all the services of your hotel in an efficient and satisfactory center. It can bring profit through customer satisfaction, as well as possible advertising revenue, and savings through centralization and simplification of hotel services involving messages and information.

---

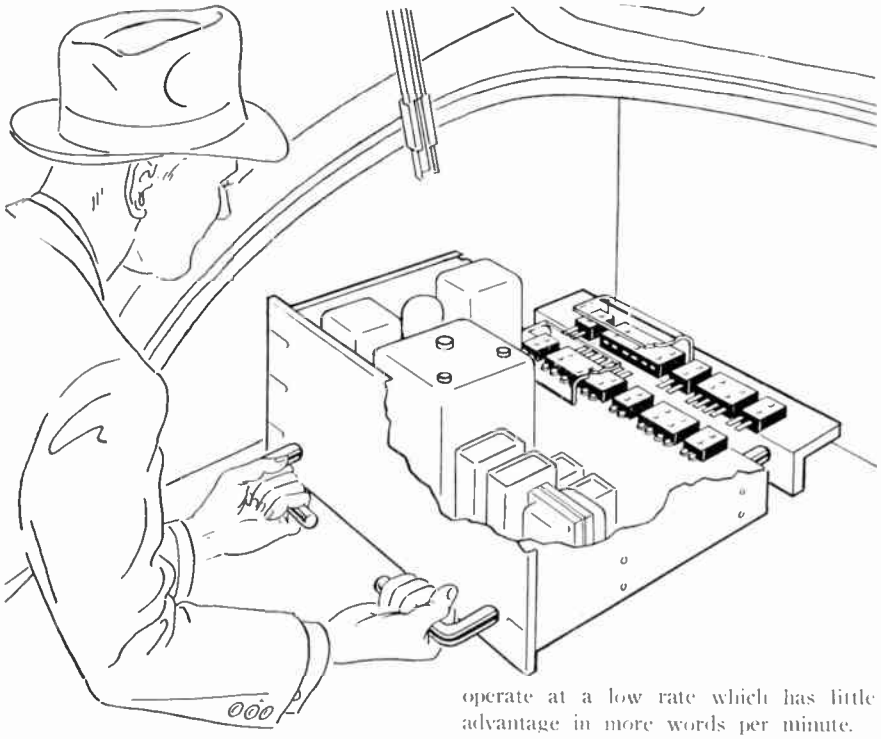
the copy is automatically ejected, and the scanner set ready for the next piece of copy. Simultaneously the recorder stops to await the next message.

For just black and white communications (all that is usually required for dispatch or report systems) a lower subcarrier frequency can be used than for transmitting such as the tonal shades of photographs. By operating at slower rates of paper feed than radio models it is possible to use the poorer wire circuits that are limited as to transmit the frequency that they can transmit.

Whereas the frequency requirements are the main problem where telephone lines are to be used, there are other problems of noise level, threshold, etc., so that the telephone company should be consulted whenever a telephone line will be the connecting link. Bear in mind that for black and white and the requirement of only interpretable information, poorer circuits, (cross talk, etc.) can be tolerated than those required for photographic facsimile which is the facsimile field on which telephone engineers have had the most experience.

The purpose of this article is to give general information so that the reader can evaluate the possibilities in the fields in which he is interested.

The limitations as well as the possibilities of facsimile need to be told. Many people jump to the conclusion that facsimile should make every teletype and



Showing the Alden Back Connector as installed in a police car, permitting the entire set to be instantly removed for servicing, and immediately replaced with a spare unit.

other means of recording obsolete, but it is not likely to displace the teletype on established lines that are multiplexed and the only information to be sent is words and where traffic is not congested. The reason is that such lines are often of poor quality and cannot pass the frequencies needed except that the recorder operate at a low rate which has little advantage in more words per minute.

On the other hand, facsimile is a natural for all high frequency radio links because of the tremendous number of words, as well as other information, that can be transmitted in a short time; further it has been proved out on international and cross country press service transmitted by radio. We have supplied equipment (lend-lease) destined for China where it is a natural for its picture language.

The dispatch system fits nicely into established FM emergency services. It offers no particular problems in interplant, hotel, and local service by wire.

In many sections of the country, often the most recently developed parts, the telephone circuits present fewer problems and the trend is to upgrade all telephone lines thus lessening the future telephone problems related to facsimile.

Now—in conclusion—one point should be emphasized. The foregoing summary of uses for ALDEN FACSIMILE in the field of Dispatch and Report Systems, IS NOT INTENDED TO BE ALL-INCLUSIVE. Far from it. There are, doubtless, hundreds of entirely practical applications which can be made, over and above those mentioned here. ALDEN DISPATCH RECORDERS are now available and the Alden Universal Scanner can be ordered as prototype equipment for experimenting and determining the practicability of any application . . . wherever a system for dispatch and report is sought or is likely to prove advantageous.

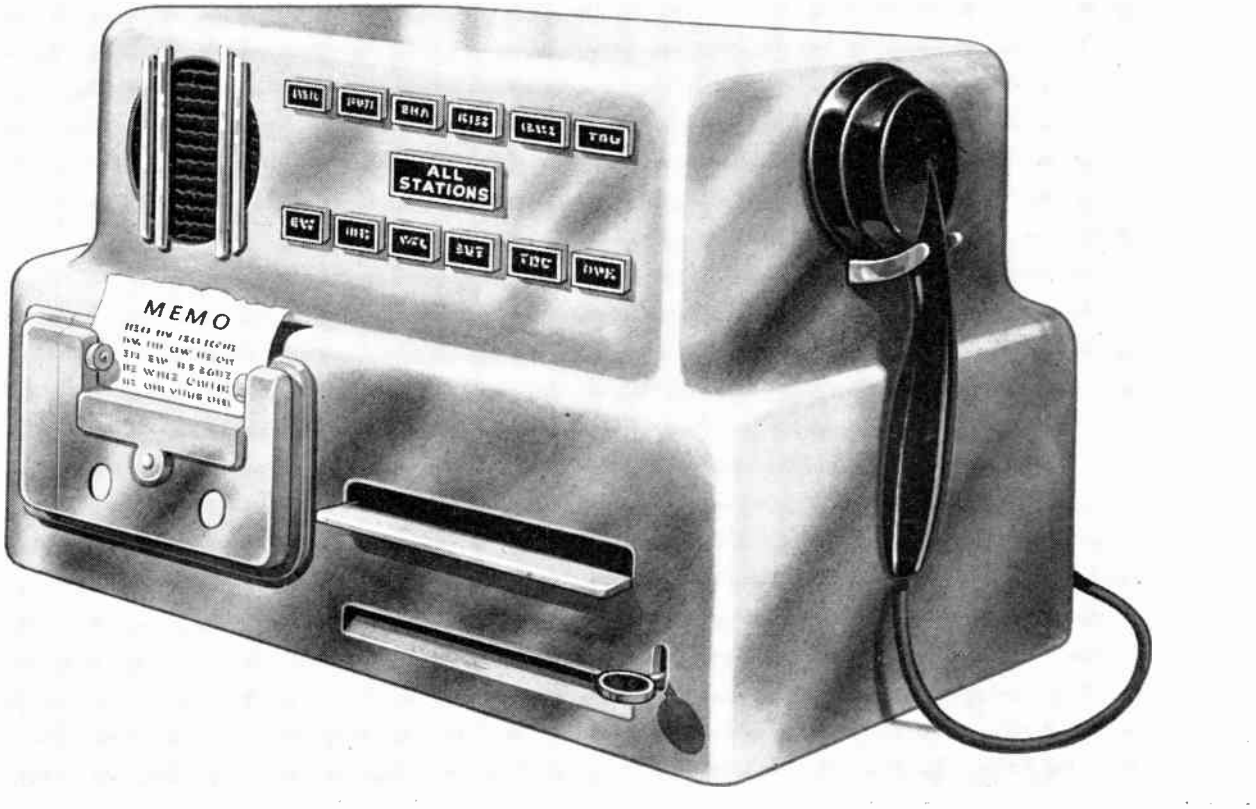


Fig. 13. Showing Alden Dispatch Service as applied to office and inter-plant transmission of facsimile messages. Typwritten or handwritten mesage is placed in Message Slot "A," desired station button is pressed, Sending Button "B" is depressed, causing message to be reproduced automatically in facsimile at the desired station. All equipment then resets ready for the next transmission. Recorder "C" at left is used to monitor the message being sent. Surmounting the Dispatch Transmitter is an interphone equipped with microphone or private phone if desired.

6-18-48

finch
TELECOMMUNICATIONS INC.

General Offices
Passaic, New Jersey

10 East Fortieth Street
New York 16, New York
MUrray Hill 5-7976

Sales Offices
New York

June 16, 1948

FM STATION OWNER and/or MANAGER:

The Federal Communications Commission, on June 10th, approved simplex and multiplex facsimile operation over FM broadcast stations on a commercial basis, effective July 15, 1948. This clears the way for a new service that may serve as an additional revenue builder for your FM station.

Surprisingly, the equipment for the facsimile studio requires only a very small investment for the initial installation which may be used for developing facsimile program technique. This low-priced equipment uses chemically treated paper, but it will give highly satisfactory results until such time as Finch Colorfax, which records on untreated, inexpensive paper in color or black and white, is ready for the market in 1949.

For $1,475 we can supply a combination scanner and monitor unit (see attached bulletin) for the facsimile studio. We can also supply recorders with automatic framing, mounted in suitable cabinets and arranged for connection to FM radio receivers in the following combinations at prices that will be furnished upon request, indicating quantities required:

Recorder without amplifier for attachment to an FM receiver having an output power of 10 or more watts.

Recorder with amplifier for attachment to an FM receiver having an output power of less than 10 watts.

Remote start-stop control of recorder when the FM radio receiver is turned on. $115.00

Electrolytic paper, 100 foot rolls - $2.40 each in lots of 1 - 100 rolls
$1.75 each in lots of 101 or more rolls.

If you desire a complete facsimile broadcast console with two combination scanner and monitor units and an additional monitor for operation from a radio receiver with all necessary switching controls and signal level meter, we recommend the Finch FRS 147A broadcast console (see attached bulletin) except equipped with the more modern FRS 142C scanner and monitor units, (see bulletin) at a price of $6,000.00.

The above prices are f.o.b. Passaic, New Jersey, and will remain firm until September 1, 1948. All quotations are subject to prior sale.

Delivery of the combination scanner and monitor unit may be made in approximately 30 days after receipt of order. The complete facsimile broadcast console with two combination scanner and monitor units may be shipped in approximately 60 days after receipt of order. Recorders with or without associated amplifiers and remote start-stop controls may be shipped in approximately 90 days after receipt of order. Orders may be placed on the nearest branch of the Graybar Electric Company, or sent directly to us.

If you wish further information on facsimile broadcasting, please write us.

The purchaser of Finch facsimile equipment is granted a non-exclusive license under Finch patents to use the equipment for the purpose for which it was designed. Finch also agrees to save the purchaser harmless from all claims or suits for infringement of facsimile patents arising out of the use of said apparatus.

Yours very truly,
FINCH TELECOMMUNICATIONS, INC.

A. J. Eaves, Vice President.

aje/g
enc.

Finch Telecommunications, Inc.
Passaic, N. J., U. S. A.
Sales Office: 10 E. 40th St., New York 16, N. Y.

Flash!

FACSIMILE BROADCASTING - -

A NEW PROGRAM SERVICE FOR

F. M. BROADCASTING STATIONS!

SOME DATA ON THE FACSIMILE

PICTURE FROM "FACSIMILE HEADQUARTERS."

finch facsimile

NEW REVENUE FROM SPONSORED FACSIMILE PROGRAMS FEATURING NEWS AND STOCK REPORTS, NEWSPAPER TABLOIDS, PICTURES, COMICS, EDUCATIONAL MATERIAL, AND PRINTED ADVERTISING BY RADIO —

FACSIMILE Broadcasting is a new program service for FM stations.

News and stock reports, tabloid newspapers, pictures, comics, educational material and printed advertising can now be transmitted by FM Radio.

The 142 C Finch Broadcast Facsimile Unit comprises a scanner and monitor and all the necessary electronic components for delivering a satisfactory facsimile signal to the speech input equipment so that the facsimile program may be handled in the same manner as a microphone circuit.

This unit meets the Federal Communications Commission's requirements with respects to:

Index of Cooperation
Type of modulation
Polarity of modulation
Phasing signal
Modulation characteristics
Permissible noise level.

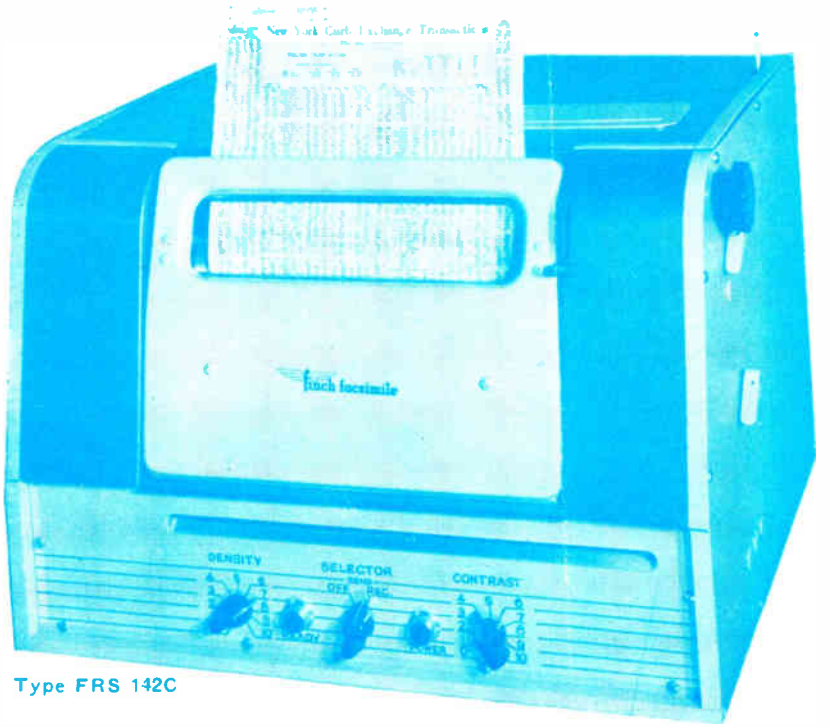
And the following:

Useful scanning line—8.2 inches
Line advance—105 lines per inches
Scanning speed—360 lines per minute
Copy speed—3.4 linear inches per minute or
28 square inches per minute
Copy length—11 inches.

Physical and operating characteristics:

Weight—approx. 110 lbs.
Dimensions—17 3/8" x 16 9/16" x 12 1 16"
Power supply—110 V. 50-60 cycle p.s.
Transmitter Power Output—8 dbm or 6 milliwatts

This unit will transmit any black and white copy (printed, typed, written, sketched, or photographed) on ordinary paper, 8 1/2 inches wide and 11 inches long. In loading, the message or picture is inserted edgewise in "transmit slot" and automatically loaded when "transmit button" is pressed. Copy is stripped from drum and ejected from machine after sending by pressing "eject" button.



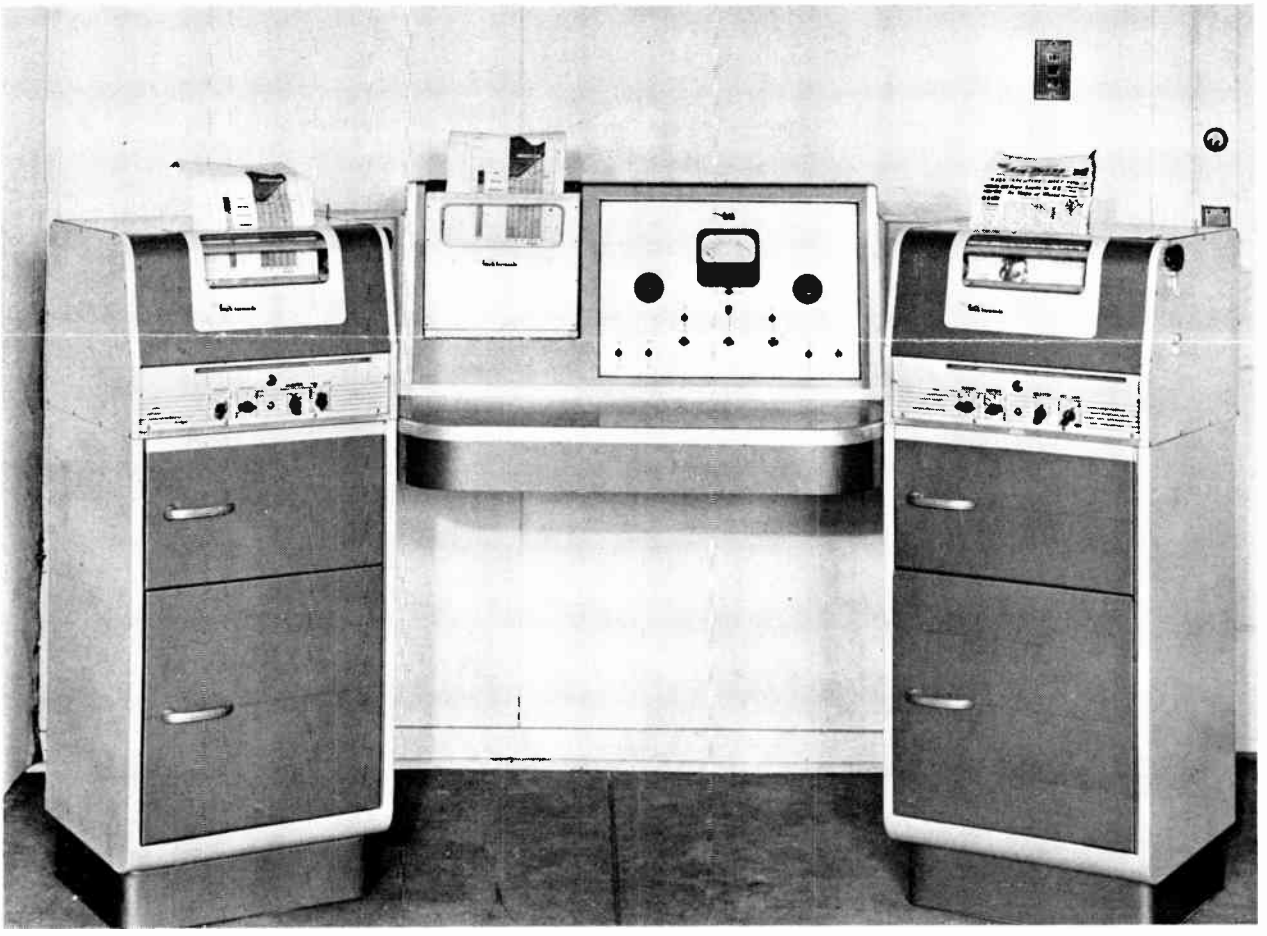
Type FRS 142C

Covered by U. S. and Foreign Patents

In using this single scanner and monitor unit as an introduction to facsimile broadcasting the initial expense is kept to a minimum with only a loss of approximately 20 seconds program time between copy transmission to permit scanner to return to the start position for the next copy. It should be noted that during this 20 second period the transmitted copy is automatically ejected and the new copy is loaded onto the scanning drum. While this operation is in process aural announcements may be made to preserve the continuity of programs.

finch *First in Facsimile*

Facsimile Broadcasting Equipment



COMPLETE facsimile input equipment for broadcasting stations, as shown above, can now be supplied by Finch.

Finch facilities make it possible to build these fine installations to your order for delivery in a few months.

This compact, convenient equipment utilizing the latest facsimile techniques will provide complete facsimile facilities for your station at moderate cost.

The complete installation consists of two broadcast scanners (facsimile transmitters), type FR146C, to assure uninterrupted facsimile programs, and one control unit, type FBC147A, for convenient, coordinated operation of the installation.

The FB146C broadcast scanner is a precision built facsimile transmitter mounted at convenient height on a utility cabinet. Driven by a single phase synchronous motor at 360 r.p.m., it scans 105 lines per inch of the transmitted copy at the rate of 360 lines per minute, to send about 28 square inches of clearly defined printed copy or pictures per minute. The scanner will transmit pages 8½″ wide by any length up to 11″.

Also included in the scanner cabinet of the FB146C are a Finch Automatic Copy Loader which accurately and reliably loads the page to be sent on the scanner drum in a fraction of a second and, at the touch of a finger, ejects it from the cabinet when the transmission has been completed, and a Monitor Facsimile Recorder which automatically produces a facsimile copy of the matter being sent, thus enabling the operator to observe and correct, if necessary, the adjustment of the scanner.

OVER

The FBC147A control unit is built in a desk which is secured to the two FB146C cabinets, connecting the three components to form a single compact unit. Facing the operator at the rear of the desk is a simple, easily operated control switching panel. This panel contains an attenuator for each of the two scanners for adjusting the output power level to the radio transmitter, transfer switches for connecting the output of each scanner either to the radio transmitter or to a dummy load during adjustments (these switches are so arranged that only one scanner at a time can be connected to the output terminals of the control unit), a meter and switch arranged to permit measuring the output of either scanner, and other switches associated with the operation of the control monitor. Mounted beside the switching panel is the control monitor recorder provided to make possible the recording of any facsimile signal fed to its terminals. This is intended primarily to record the station's own facsimile broadcast as received by an external radio receiver (not included in this equipment).

Standard Finch units are built to operate on 115 volts, single phase, 60 cycle power.

To give the finest facsimile broadcast service to your community use equipment by

finch *First in Facsimile*

FINCH TELECOMMUNICATIONS, INC., PASSAIC, NEW JERSEY, U. S. A.

AUTOMATIC ELECTRIC FACSIMILE

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus
Electrical Engineers, Designers and Consultants

1033 WEST VAN BUREN STREET CHICAGO 7, U. S. A.

Circular 1602 October, 1947

AUTOMATIC ELECTRIC FACSIMILE

GENERAL DESCRIPTION

Automatic Electric Facsimile* provides for rapid and accurate point-to-point transmission of written, printed or pictorial matter over wire or radio channels. Best reproduction is obtained when the copy for transmission is black and white but with special equipment colored copy can also be transmitted. The facsimile reproduction is always black and white or intermediate shades of gray.

Automatic Electric Facsimile can be connected to any wire or radio channel of a nature suitable for voice transmission, and will transmit effectively as far as a telephone conversation can be transmitted. For local or intra-city service ordinary telephone pairs or loops can be leased or installed. Private line telephone circuits such as can be leased from telephone companies are suitable for inter-city facsimile transmission.

Automatic Electric Facsimile does not require experienced operators. Anyone can operate the equipment competently with a short period of instruction. This, in addition to complete accuracy, makes Automatic Electric Facsimile ideal for communications use in manufacturing concerns, pipeline companies, police departments, credit associations, department stores, transportation companies, home and branch offices, advertising agencies — in any business requiring swift error-free communications between two or more points. The great superiority of facsimile over other means of communication is its ability to transmit sketches, drawings, graphs and other pictorial matter in addition to written or printed matter.

The original copy to be transmitted is secured to a drum which turns at a fixed speed. As the drum turns, a tiny beam of light is focused on the copy and the reflections of light are captured by a photo-electric cell. The mechanism housing the light beam source and the photo-electric cell moves automatically in a direction parallel to the axis of the drum so that the light beam progressively travels the length of the rotating drum, scanning the entire area of the copy being transmitted at a rate of 105 scanning lines per inch.

The varying reflections of light from the copy being scanned cause the photo-electric cell to emit a correspondingly varying signal current. This current is amplified and used to modulate a carrier frequency current generated by an oscillator in the machine. The amplitude modulated carrier may be transmitted over any facility suitable for telephone conversation. Received in the distant machine, it is de-modulated, and the varying signal current causes the recording of the facsimile reproduction.

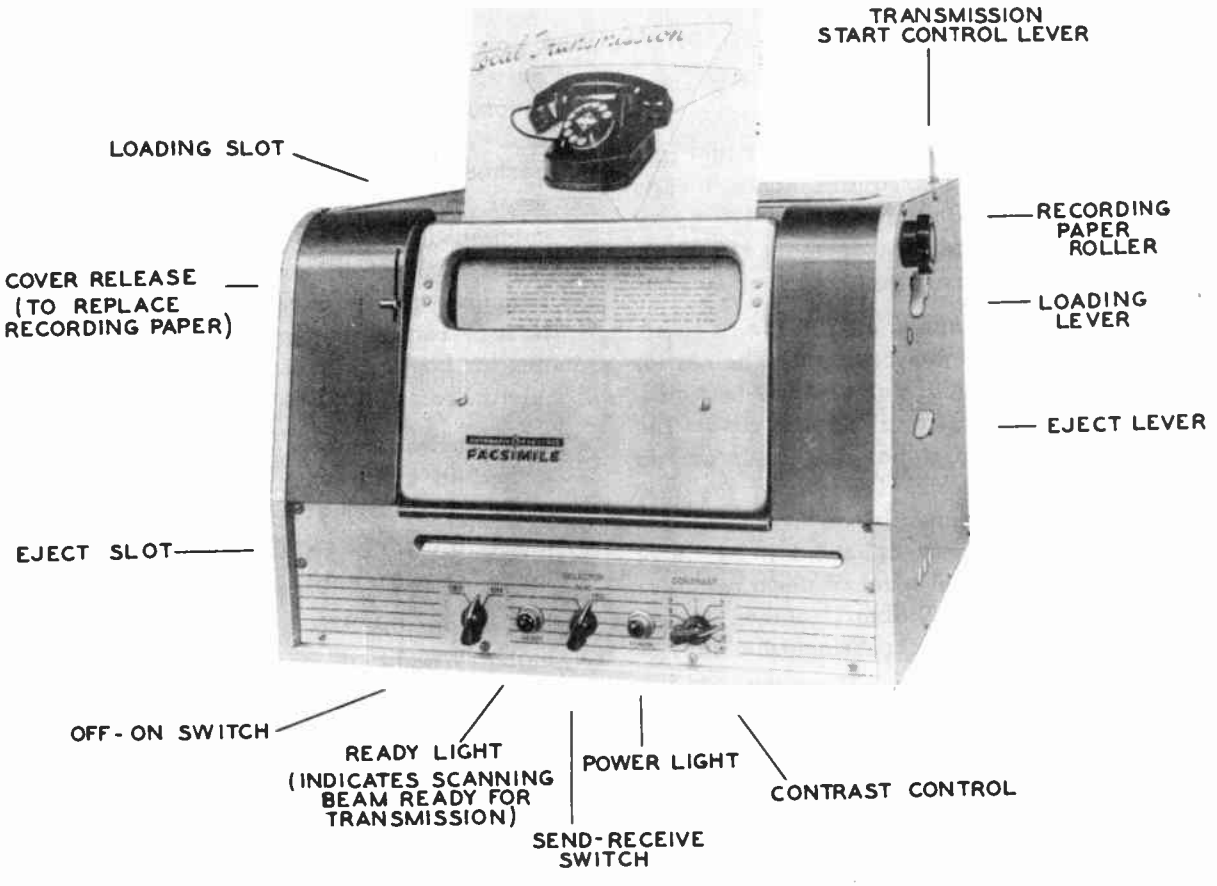
The receiving and recording apparatus of each machine consists of a revolving drum with a single spiral of wire fixed to its surface. This wire is fastened to each end of the drum and is wound around it so as to describe one complete turn around the drum.

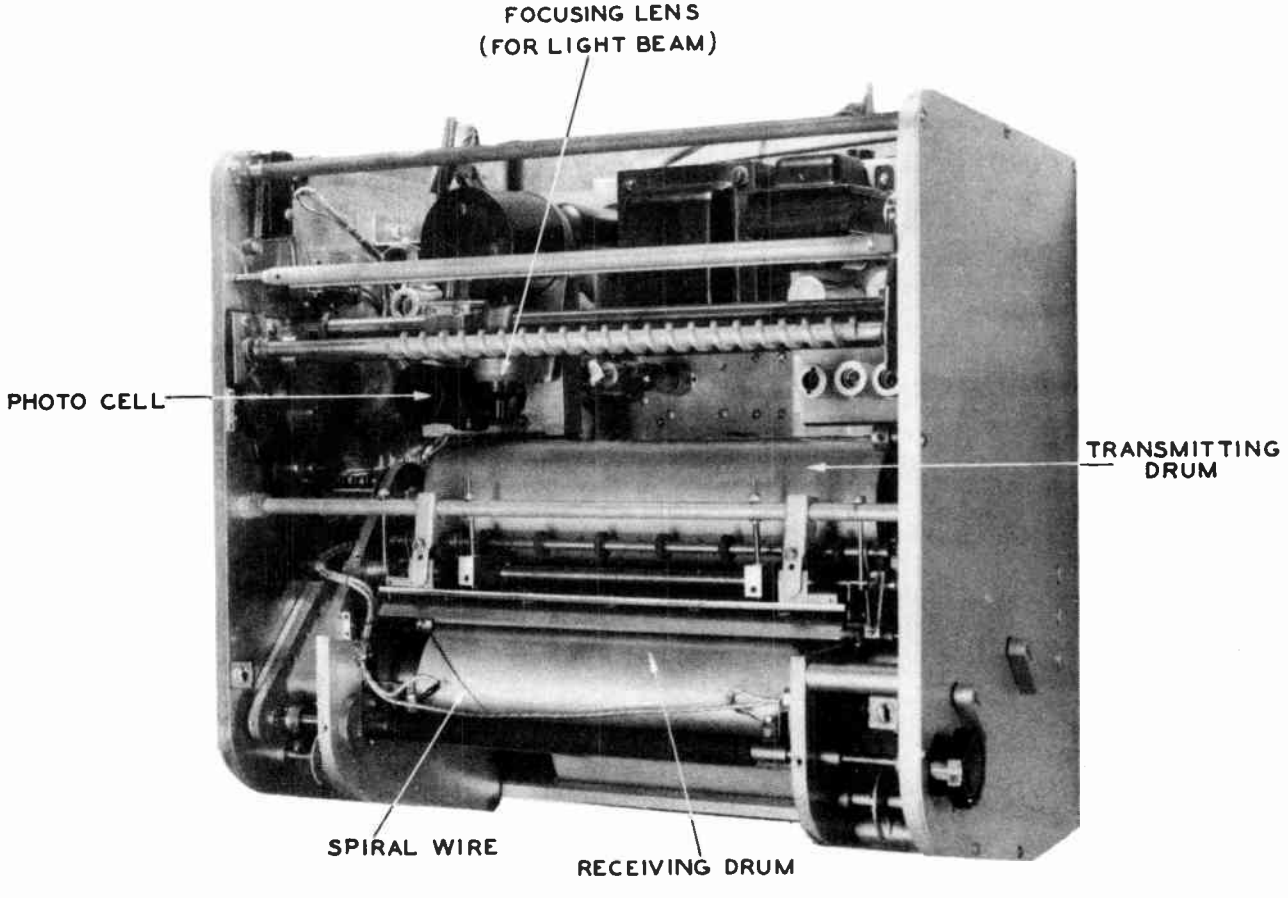
As the recording drum revolves at a speed synchonized with that of the transmitting drum, one point on the spiral wire makes electrical contact with the knife edge of a metal bar fixed in position parallel to the axis of the drum. Moistened electro-sensitive recording paper is automatically drawn between the two, so that the electrical contact between the wire and the bar is through the paper. Because of the spiral form of the wire, the point of electrical contact moves progressively the length of the wire and the metal bar during each revolution of the drum.

The incoming signal current passes from the spiral wire through the paper to the metal bar. The signal currents corresponding to black on the original copy cause the electro-sensitive paper to dye a permanent black. The signals corresponding to white do not affect the recording paper. The result is a black and white reproduction on the electro-sensitive paper of the copy being transmitted. The facsimile reproduction is a finished product and requires no further processing.

Facsimile systems may consist of more than two machines. Auxiliary apparatus can be supplied to accomplish such functions as starting and stopping the machines by remote control, selection of one or more machines in a network, or any other requirements peculiar to the system proposed. Complete data will be supplied on receipt of your specifications.

* *Manufactured under facsimile patents of Finch Telecommunications, Inc.*





SPECIFIC CHARACTERISTICS OF STANDARD FACSIMILE MACHINE

1. The standard Automatic Electric Facsimile machine, Type 71, is a combination transmitter and receiver. It transmits 14.5 square inches of copy per minute. This is equivalent to 1.7 linear inches of 8½ inch wide copy or about 150 words of single spaced typewritten matter.

2. An ordinary voice channel, either wire or radio, is required to connect the machines. The carrier frequency used is 1700 c.p.s., which is modulated by a maximum signal of 1350 c.p.s. The theoretical lower and upper sidebands extend from 350 to 3050 cycles. Practically, the machines operate satisfactorily on voice circuits providing the ordinary telephone bandwidth of 200-2800 cycles. Output level of the transmitter is normally adjusted to 0 dbm (1 milliwatt) and the receiver will operate satisfactorily on signals as low as −20 dbm.

3. Operation is simple. Copy for transmission must be on sheets which are 8½ inches wide and may be up to 11 inches in length. Copy is loaded automatically by placing it in the loading slot and pressing a lever. Unloading is also accomplished automatically by pressing a second lever. The single operating adjustment is to compensate for varying degrees of black and white contrast in copy being transmitted. A monitor copy, produced in the sending machine as it is transmitting, permits the operator to adjust for best transmission. No operating adjustments are required at the receiver.

4. The electro-sensitive recording paper is furnished in continuous 100-foot rolls. Rolls are supplied in sealed containers to preserve the moisture content required for proper reproduction. They are easily loaded in the machine.

5. Dimensions are 17⅜" wide x 16$^{9}/_{16}$" deep x 12" high. Weight is approximately 110 pounds. Commercial power required is 110V, 60 cycle a.c.

Printed in United States of America
500—J. S. S.—10-47

The first, foremost and only facsimile service operated exclusively for TV

There's quite a difference between International News Facsimile and other facsimile photo services now being offered to television stations. It will pay you to check these facts before you buy facsimile:

1. International News Facsimile is a TV photo wire exclusively. It does *not* attempt as others do to serve both TV stations and newspapers on the same circuit, because that would sacrifice the requirements and format of each at the expense of the other.

2. International News Facsimile transmits an average of 75 pictures a day—all of which are specifically sized and scripted for immediate telecasting. No processing is required at the receiving end.

3. International News Facsimile transmissions move at the rate of 1½ inches per minute. This is 50 per cent faster than any other existing facsimile circuit.

4. International News Facsimile was first in the facsimile news field by more than eight months. This pioneering experience is reflected in a firmly established, operating, and rapidly expanding client network that includes some of the nation's top TV stations (listed below).

5. International News Facsimile is now making installations to transmit over the same facsimile circuit on-the-scene "taped" recordings with actual photos of major news events or personalities—another first in TV news programming.

It makes sense to buy International News Facsimile — a facsimile service that is exclusively and completely tailored for television. It is TV's own news photo service backed by the engineering prowess and experienced know-how of the news agency that has been the outstanding pioneer in TV facsimile as well as TV news films (the top-rated Telenews daily and weekly newsreels).

INTERNATIONAL NEWS FACSIMILE CLIENTS

- **WFBG-TV**—Altoona, Pa.
- **WBAL-TV**—Baltimore, Md.
- **WGN-TV**—Chicago, Ill.
- **WLWT**—Cincinnati, O.
- **WNBK**—Cleveland, O.
- **WLWC**—Columbus, O.
- **WLWD**—Dayton, O.
- **KOA-TV**—Denver, Colo.
- **WEOA-TV**—Evansville, Ind.
- **KQTV**—Ft. Dodge, Ia.
- **WOOD-TV**—Grand Rapids, Mich.
- **WTIC-TV**—Hartford, Conn.
- **WFBM-TV**—Indianapolis, Ind.
- **KDUB-TV**—Lubbock, Tex.
- **WNHC-TV**—New Haven, Conn.
- **WOW-TV**—Omaha, Neb.
- **WENS**—Pittsburgh, Pa.
- **WRAY-TV**—Princeton, Ind.
- **WJAR-TV**—Providence, R. I.
- **WHUM-TV**—Reading, Pa.
- **WTVU**—Scranton, Pa.
- **KACY-TV**—St. Louis, Mo.

INTERNATIONAL NEWS SERVICE

Robert H. Reid, Television Sales Manager • 235 East 45th Street • New York 17, New York

Reprinted from: BROADCASTING—TELECASTING JANUARY 4, 1954

International News Facsimile

"...has lived up to the promises you made - - and in some cases, exceeded them."

WOW
RADIO—TELEVISION
WOW TV

MEREDITH WOW, INC. • INSURANCE BUILDING, OMAHA, NEBRASKA
WEBSTER 3400

January 4, 1954

Mr. Robert H. Reid
International News Service
235 East 45th Street
New York 17, N. Y.

Dear Bob:

I think it's about time we let you know how pleased we are with International News Facsimile. It has lived up to the promises you made--and in some cases, exceeded them.

Ray Clark tells me that he now averages 35 to 45 pictures in each of his three daily TV newscasts. In fact, Ray seldom is "on camera" while he reports the national and international scenes. On the sports side, Jack Payne is especially pleased with your fax coverage.

Sincerely,

James M. McGaffin, Jr.
Director of News
MEREDITH WOW, INC.

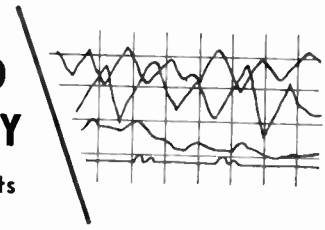
James M. McGaffin, Jr.
dh

NBC AFFILIATE • WOW • 590 KC • 5000 WATTS.....WOW TV • CHANNEL 6 • NBC AND DUMONT

Reprinted from: BROADCASTING—TELECASTING JANUARY 18, 1954

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY

Alden Research Center • Westboro • Massachusetts



Subject: NEW HORIZONS IN FACSIMILE and GRAPHIC RECORDING using ALFAX PAPER

Dear Sir:

More or less suddenly we are getting a great interest in components for special recorders--so we are making this mailing to you.

In part, it is a realization that sensitivity of Alfax papers--in the light shades--makes it possible to detect instantly the slightest variations or the most transient pulse--yet intense signals do no harm; that one paper serves for high speed or low speed; that the flying spot recorder can be unattended--automatic--and because of constant inertia--and expanded separation of pulse marking--there isn't much of anything that cannot be instantly recorded. Accuracy of interpretation is always easy because of ability to spread information over any width of paper--yet using equipment that does not need critical adjustment, babying, or uniform environment such as required in using the recording instrument techniques of the past.

The foregoing is a whale of a long paragraph--and to everyone it may not have much meaning--but to others, it will.

As for you -- what we are trying to say is: Why not determine how ALFAX PAPER and the ALDEN TECHNIQUES of Scanning and Recording will be helpful to you, and in some way get started now while it is new and will probably do more for you than when everyone is using it.

Very truly yours

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY

Milton Alden

Milton Alden, President,

MA/L

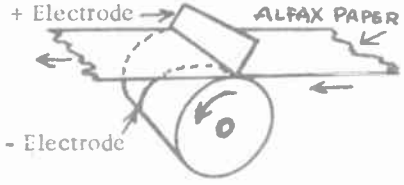
alfax paper opens new horizons

in instantly visible graphic recording

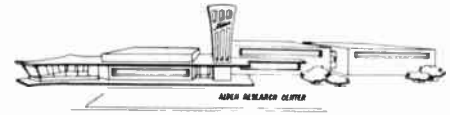
with **Alden group B "flying spot" * fact finders & components**

"Electricity is the Ink"

Revolving Negative Helix Electrode makes Flying spot contact with paper between it and positive electrode. Marks paper when and only when current flows.



made in all widths, spot speeds and rates of paper feed.



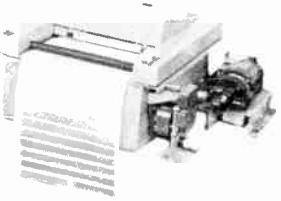
Alden Electronic and Impulse Recording Equipment Co.
WESTBORO, MASS.

* The flying spot contact is the intersecting spot of a revolving helix and a moving, self-compensating, self-freshening electrode, an Alden exclusive patent.

GROUP B - THE ALDEN "FLYING SPOT" RECORDER

WHAT IS IT?....

It's a brand new type of facsimile recorder opening new horizons never before possible with old style techniques. It's made possible by Alfax Paper in which electricity acts as the ink, marking the paper instantly, indelibly and permanently. This paper process combined with patented Alden techniques has resulted in the smokeless, fumeless recorders which do not require complicated, moving parts and will provide extremely wide tone response, versatility and adaptability.



Alden Helix Recorder

WHAT WILL IT DO?...

Basically it is a device for recording electrical signals; it uses a flying contact spot and marks at right angles to the paper advance. It will mark whenever you pass current between the electrodes and through the paper.

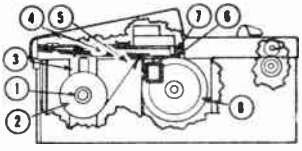
....It can be used as a continuous record of signals against time. The advantage to this is that you write at high recording speeds at low paper advance rates.

....You can drive the helix or select a sweep to match some other device such as in facsimile (recording an optical scan where the sweep matches); magnetic detection of flaws where the helix rotates to correspond with the rotation of a magnetic detector head.

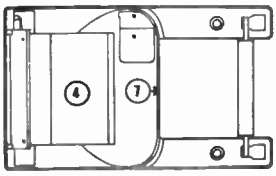
....Also used where the helix sweep does not match or correspond to any physical motion but produces a synchronous time base of some arbitrary duration so that an existing electrical pulse pattern can be recorded and compared with this as a standard.

HOW DOES IT WORK?...

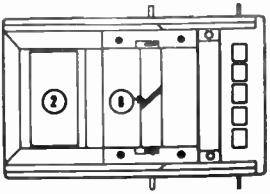
Alden molded buttons (1) push into ends of roll of Alfax Paper (2) which in turn slides into spring tension paper holder (3) in the paper humidor. Paper is simply pulled forward, cover closed, and it's ready to record. Paper tension unit (4) applies constant, uniform pressure on broad area of paper regardless of diminishing roll diameter and will act on even last inches of paper. Uniform paper sensitivity is maintained by keeping the paper supply and recording elements in an airtight chamber (5), recording at the exact point of emergence (6), so that the paper does not emerge until after it has been marked. The revolving loop positive electrode (7) actually deposits ions onto the Alfax Paper as it records. This makes possible the designing of an electrode that constantly presents a freshened surface to the paper. The negative helix electrode (8), a fine wire of stainless steel, is mounted on spring action supports. The resilient action resulting urges the electrode into a constantly uniform operating position against the paper. This resilient action compensates for wear of moving parts, vibration, or variations in paper width. In the event current is turned off the tension of the loop electrode is automatically reduced by a solenoid raising the level of the moving recording blade.



RECORDER SIDE VIEW



COVER INSIDE TOP VIEW



CHASSIS TOP VIEW

. . . Continued from preceding page

You can have on hand the elements for almost any possible recording by ordering an assortment of helices or motors for several sizes of recorders. Recorder components are made for quick assembly. Pilot pins precisely locate each unit in the recorder and coin-operated target screws secure them for easy replacement or permanent installation. All elements and units have been designed as "building blocks" to be produced in volume--thus the designer or manufacturer who wishes to incorporate these elements as part of his own equipment can design housings and casings which are distinctively his own. These thoroughly engineered units and components, which have a minimum cost when bought in production quantities, solve the problems of quickly designing either evaluation or prototype equipment that will be required in quantity.

Alden Electronic and Impulse Recording Equipment Company is now manufacturing complete recorders, but because of variety of sizes and the present demand they are brought through in custom lots--and so priced; therefore disregard the listed prices if you are contemplating volume orders of either completed recorders or units.

COMPONENT RECORDERS

2" BASIC RECORDER--2-1/4" paper printing width.
Cat.#302A Price $718.00

5" BASIC RECORDER--5-0/0" paper printing width.
Cat.#305A Price $718.00

8" BASIC RECORDER--8-0/0" paper printing width.
Cat.#308A Price $787.00

11" BASIC RECORDER -- 11-0/0" paper printing width.
Cat.#311A Price $851.00

19" BASIC RECORDER -- 18-3/4" paper printing width.
Cat.#319A Price $1064.00

STATE WHETHER recording is to be from right-to-left or left-to-right (from front of recorder) and degree of helix drum. (360 for Facsimile or 370 for Instrumentation.)

Prices of drive assemblies include necessary equipment such as motor mount, gear train, coupling positioned at right height for recorder connection and Alden Detachable Line Cord.

DRIVE UNITS FOR 2-1/4" RECORDERS

HELIX DRIVE ASSEMBLY--
Provide a 2-1/4" line in:

1 second - #825-60A $112.93
1/3 second - #825-180A 112.93
1/6 second - #825-360A 112.93

1/30 second - #825-1800A 112.93
1/60 second - #825-3600A 136.72

PAPER FEED ASSEMBLY--

.6"/min. #826-.6A $75.96
1.0"/min. #826-1A 75.96
1.8"/min. #826-1.8A 75.96
3.6"/min. #826-3.6A 75.96
6.0"/min. #826-6A 75.96
12.0"/min. #826-12A 75.96
18.0"/min. #826-18A 124.02
36.0"/min. #826-36A 75.96

DRIVE UNITS FOR 5" RECORDERS

HELIX DRIVE ASSEMBLY--
Provide a 5" line in:

1 second - #825-60A $112.93
1/3 second - #825-180A 112.93
1/6 second - #825-360A 112.93

1/30 second - #825-1800A 112.93
1/60 second - #825-3600A 136.72

PAPER FEED ASSEMBLY--

.6"/min. #826-.6A $75.96
1.0"/min. #826-1A 75.96
1.8"/min. #826-1.8A 75.96
3.6"/min. #826-3.6A 75.96
6.0"/min. #826-6A 75.96
12.0"/min. #826-12A 75.96
18.0"/min. #826-18A 124.02
36.0"/min. #826-36BA 124.02

DRIVE UNITS FOR 8" RECORDERS

HELIX DRIVE ASSEMBLY--
Provide an 8" line in:

1 second - #825-60A $112.93
1/3 second - #825-180A 112.93
1/6 second - #825-360A 112.93

1/30 second - #825-1800BA 136.72
1/60 second - #825-3600BA 136.72

PAPER FEED ASSEMBLY--

.6"/min. #826-.6A $75.96
1.8"/min. #826-1.8A 75.96
3.6"/min. #826-3.6A 75.96

18.0"/min. #826-18BA 83.98
36.0"/min. #826-36BA 124.02

DRIVE UNITS FOR 11" RECORDERS

HELIX DRIVE ASSEMBLY--
Provide an 11" line in:

1 second - #825-60A $112.93
1/3 second - #825-180A 112.93
1/6 second - #825-360A 112.93

1/30 second - #825-1800BA 136.72
1/60 second - #825-3600BA 160.43

PAPER FEED ASSEMBLY--

.6"/min. #826-.6BA 149.76
1.8"/min. #826-1.8BA 124.02
3.6"/min. #826-3.6BA 124.02

18.0"/min. #826-18BA 83.98
36.0"/min. #826-36CA 149.76

DRIVE UNITS FOR 19" RECORDERS

HELIX DRIVE ASSEMBLY--
Provide a 19" line in:

1 second - #825-60A $112.93
1/3 second - #825-180A 112.93
1/6 second - #825-360BA 136.72

1/30 second - #825-1800CA 136.72
1/60 second - #825-3600DA 160.43

PAPER FEED ASSEMBLY--

.6"/min. #826-.6BA $149.76
1.8"/min. #826-1.8BA 124.02
3.6"/min. #826-3.6BA 124.02

18.0"/min. #826-18BA 83.98
36.0"/min. #826-36CA 149.76

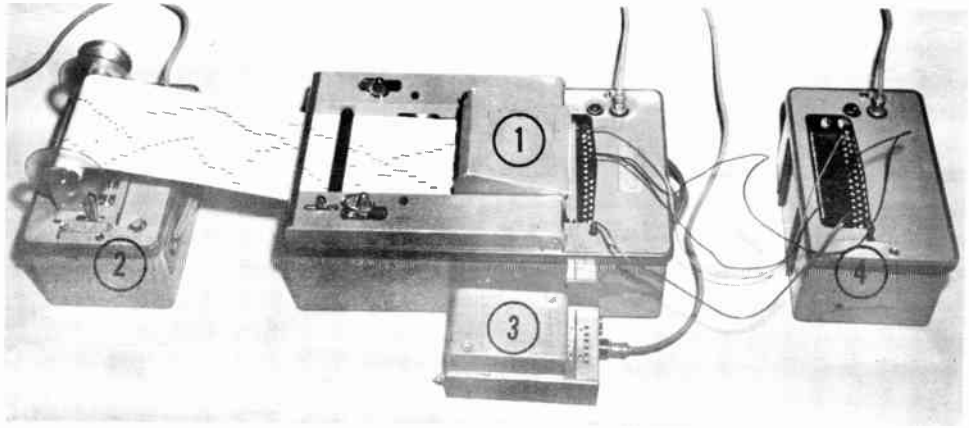
Whereas all of the elements in these Alden recorders are designed for low-cost, quantity production--the 2-1/4" recorder, a complete unit with self-contained motors, is being planned for large scale production. In anticipation of lower costs this recorder is being specially priced at $480.00--complete with motors and plug-in back connector plate.

SPECIAL HELIX RECORDER

2 1/4"printing width. Plug in and it's ready for signal.
600 RPM -- 6" of paper per minute
Cat.#302BA-600 $480.00
3600RPM - 36" of paper per minute
Cat.#302BA-3600 $480.00

FOR COMPLETE INFORMATION SEND FOR ALFAX GROUP "B" BOOKLET.
Alden Electronic and Impulse Recording Equipment Company, Westboro, Massachusetts

A Complete ALDEN Monitoring, Control and Analysis Set-Up



(1) Alden Recorder with 30 marking electrodes available for recording on-off information by remote switches, relays, electric eyes, etc. No moving parts except the paper feed; electricity is its ink--producing a permanent, non-smudging trace. Low voltage and current requirements allow temporary or permanent sensing "hookups" with light #20 wire. Two models with speeds of: 1" and 12" per min. #230A-12 ($410.00)
1" and 6" per min. #230 6-6 ($380.00)

(2) The newly designed Alden Paper Takeup ($150.00) that winds the Alfax Paper on a core for future study or storage. Removeable spool ends may be used repeatedly with low cost additional cores. Takeup has two speeds, an overriding clutch and its own motor, and may be located so desired distance of unrolled recordings are visible for observation of recording.

(3) An Alden Pulse Timer ($100.00) especially designed to introduce a timing trace in one channel of the recorder. Traces can be at second, minute, or hour intervals to suit individual applications. Simple, rugged and reliable.

(4) The Alden Standard Power Supply ($85.00) produces low voltage writing current for the 30 Channel Recorder. Matching pin jack boards allow simple and rapid "hook-ups". An alternate model ($200.00) provides a signal light for each circuit so that it can be mounted at a control station as an instantaneous warning system.

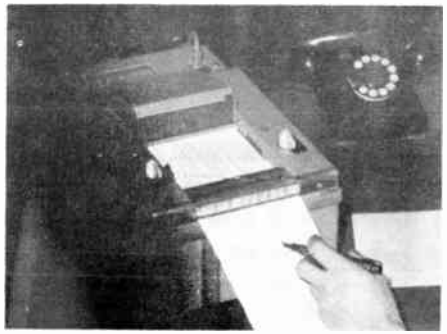
Don't postpone it any longer. Put an Alden 30 Channel Fact-Finding Kit on your payroll right away. It works for you this year for only 36-1/2 cents an hour--for nothing after that. Give high-priced people the proper tools to work with--and Save.

Recorder, Model #230A-12	$410.00
Paper Takeup, Model #230TUA	150.00
Power Supply, Model #730-1A	85.00
Timer, Model #860-10M	100.00
1 Dozen Rolls Alfax Paper	35.00
	$780.00
When purchased as a Kit	$730.00
Savings - - - - - - - - - - - - -	$ 50.00

ALDEN SYSTEMS COMPANY
ALDEN RESEARCH CENTER • WESTBORO, MASSACHUSETTS 9/56

. . . how to GET THE FACTS!

- FACTS YOU NEED TO MAKE DECISIONS
- FACTS YOU CAN'T GET ANY OTHER WAY



Alden 30-Channel Fact-Finder
Recorder operates continuously and unattended, giving a record of up to 30 phenomena.

Alden Fact Finders can get you unquestionable, brass-tack facts about 30 different things at once. They can be unrelated things in 30 different places if you so desire, but the Alden Fact Finder gets them, sorts them, relates them, measures and records them. It even stores them for you until you need them--all automatically.

No observer or motion picture camera could do as much for you so inexpensively. You don't need skilled technicians. Anyone can make the setups and interpret the results. Your own imagination is the only limit on the scope of applications.

A Typical Case History — On Us

Alden Recorders have been analyzing machine and production situations for years, but here's a different type of application.

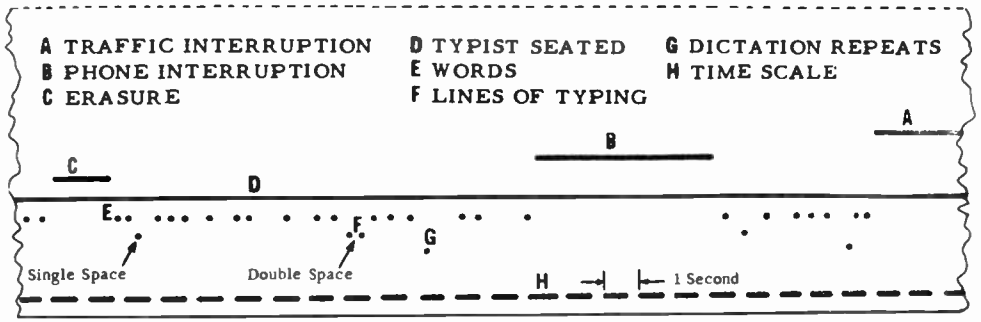
In our Westboro Research Center we had a secretarial problem. Machine dictation was heavy and just not getting out on time.

Two stenographers were involved and with their cooperation we began getting facts about the job. We wanted facts on . . .

- .Traffic diversions
- .Telephone interruptions
- .Typing time
- .Errors and erasures
- .Dictating machine repeats
- .Effects of unfamiliar copy

In two hours, an Alden 30 Channel Recorder in our laboratory 50 feet away, was recording all the data for us without the slightest interference with the work in progress.

ALDEN SYSTEMS COMPANY
ALDEN RESEARCH CENTER • WESTBORO, MASSACHUSETTS



The diagram shows a typical section of the tape on one of our stenographers. Note how clearly you can tell what's going on. In this case the time scale dashes read in seconds for a fine analysis, but other paper speeds can be used for longer elements. All occurrences are referenced to time and to each other. We used an ordinary ruler to read the exact time as recorded by the stenographer herself. This illustration uses only one quarter of the recorder's capacity--7 elements and time.

A quick, visual inspection of the tape pointed out the trouble and the obvious corrections. Delays and interruptions totaled far more than we realized and our dictation had to be improved. No guess work or intuition. These were FACTS!

Of course we didn't get the extra girl we thought we needed--and saved the price of 5 or 6 recorder kits, but that was not the most important results of the study.

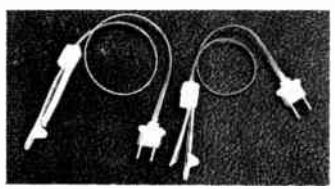
We Found A New Technique!

We had a way to get information not possible before. The recordings showed us style and skill of each stenographer. Not just words per minute, sentence and paragraph interruptions...we had those too, but we also had confidence or hesitation, rhythm or stumbling. We had the pattern of the work and the more we analyzed it, the more it told us.

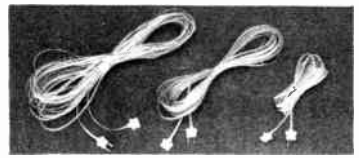
Try it on your own clerical situation, office pool, or typist training. You'll get results that save you dollars.

Plug-In Components Eliminate Need For Technical Skill

Sensitive Alden Motion Switches let you be your own technician. Easy to attach, they fasten to anything with masking tape, thumb tacks, screws, etc. The safe, low voltage allows you to pick up the motion you want--where you want it--at the point that gives you positive indication of the facts you're after.



Two switch types, normally open and normally closed, provide great flexibility of application. The resilient plastic switch bodies take extreme over-travel or pressure without distortion. Switch, cord and connector are molded in one piece...you just plug it in. Saves hours of hookup time on complicated studies.



Flat wire connecting sets with mating plugs come in convenient lengths for bringing data to a central station without splicing. Run them under mats--through doors or windows--anywhere.

The Alden 30 Channel Fact Finder can be connected and put into operation immediately. Simple, plug-in, Nylon encased electrodes permanently mark the moving Alfax Paper (electricity is the ink) as circuits are closed or opened by simple Alden Motion Switches. Recorder operates continuously and unattended providing instantly visible recording of up to thirty separate occurrences.

Here are a few suggestions from the many hundred different ways Sensitive Alden Motion Switches can get you the facts or provide solutions to unusual situations. Note how masking tape and thumb tacks do the job.

A. Recording revolutions of a motor drive. This could be a time pulse or an intermittent operation.

B. Record tiny parts on an uphill conveyor. Extreme sensitivity lets you get them all. (An air exhaust on the paddle shown would make the contact for a different application.

C. Recording strokes of a staking tool, or many other types of presses.

D. Synchronous motor with an irregular cam to provide a patterned time pulse as a reference for special uses.

E. Record pressure readings directly from the needle of the gage with glass removed.

F. An impromptu fire warning. Thread or other combustible linkage makes contact when broken.

G. Upper and lower limit recording for any reciprocating action. Could also be content level of tank or bin.

H. Security check on restricted area. Switch records when door is opened. Could record traffic through a passageway.

I. A human hair hygrometer. Can be accurately calibrated to give record of humidity point reading in a process area.

J. Recording packages passing a conveyor gate.

K. A finger actuated switch for an observer or participant. A group of these, coded for elements, provide time study equipment that anyone can use.

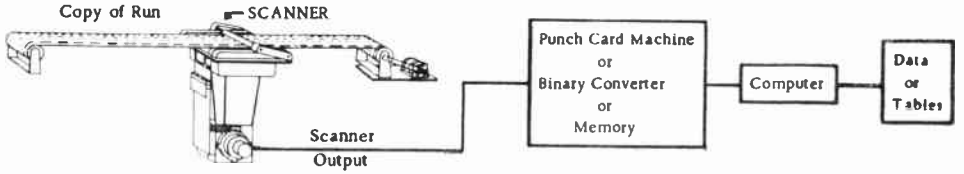
(Continued from front page)

30 Channel Fact Finder studies again and again prove Alden facsimile much faster and more accurate in transmission of information than key punching, teletype or telephoning. Ask for quotations by phoning in your problem or application.

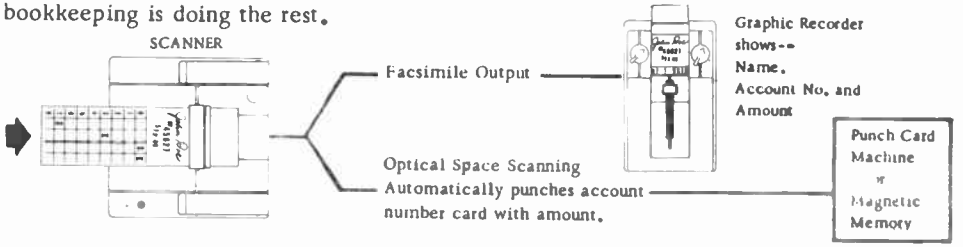
ALDEN FLAT SCANNERS

Although the Alden Flat Scanners are designed primarily for facsimile transmission--they are being custom-built and incorporated in other equipment for rescanning of records.

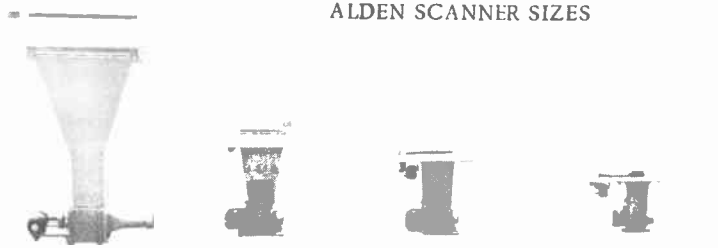
For instance, a 30-Channel Recorder is being used for instant graphic recording of a run. Being graphic, where the pattern suggests significance, the scanner is scanning the information and converting it into binary information to be used in a computer.



Another typical use is having the depositor making a withdrawal at a Savings Bank mark squares on the withdrawal slip. These marks are optically scanned, the resulting pulses automatically punching a card or filing it in a magnetic memory. The depositor a-la-supermarket is doing all the manual work -- facsimile and automatic bookkeeping is doing the rest.



ALDEN SCANNER SIZES



19" Scanning Width •		8" Scanning Width •		5" Scanning Width •		2" Scanning Width •	
Helix Speed	Price	Helix Speed	Price	Helix Speed	Price	Helix Speed	Price
900 RPM	$4320.00	1800 RPM	$3150.00	1800 RPM	$2875.00	3600 RPM	$1920.00
120 RPM	$4225.00	300 RPM	$2850.00	300 RPM	$2660.00	600 RPM	$1800.00
60 RPM	$4100.00						

Mounted on Work Center Top as Standard Equipment

Top Mounted Scanner and Electronics fit in Alden Mobile Work Center

• Scanning Resolution is 100 lines per inch.

Standard Alden Flat Scanners are supplied without electronics. Standard scanners consist of optical and photo tube elements, scanning drive, and selective copy feed mechanisms--with drives.

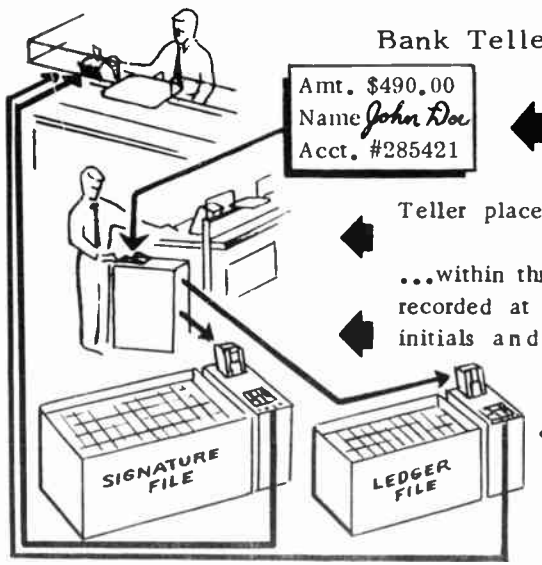
Selective or special purpose feeds supplied to meet requirements.

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY, WESTBORO, MASS.

ALDEN Completely Automatic FACSIMILE

Automatic Scanning - -
Automatic Receiving

● TYPICAL INSTALLATION



Customer makes out withdrawal slip. Signs it.

Teller places it here in automatic scanner ...

...within three seconds circuit time--signature is recorded at signature file. If it is OK, clerk initials and automatically OK-facsimile appears at teller's recorder.

Simultaneous with transmission to signature file, a facsimile of account number and amount withdrawn appears at the ledger file recorder.

The account balance is determined and if adequate for the withdrawal the entry is made then and the entry and new balance exactly as made are reproduced on the teller's recorder--he detaches this facsimile (the edge of the paper has an adhesive); and instantly heat seals in the customer's passbook--All the bookkeeping whether hand, machine, or punched card is handled at the central file so no more lines of waiting people at tellers' windows.

No possible error in passbook.

The deposit--posting interest procedures are much the same but simpler.

Four times as much traffic can be handled at tellers' windows--no errors in transposition are possible--accounts are up-to-date by the moment--circuit time is minimized whether telephone or citizens' band circuits are used.

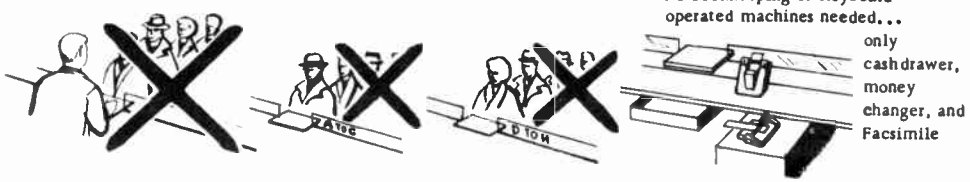
● The bank installation only illustrates the principles of the fastest, accurate way of communicating already printed or written information·such as stockroom bin cards to inventory control--fast charge or credit information--baggage or car checking--insurance data, etc.

(Continued on back page)

Eliminates waiting lines

Eliminates Alphabetical Queues

No Bookkeeping or Keyboard operated machines needed... only cashdrawer, money changer, and Facsimile



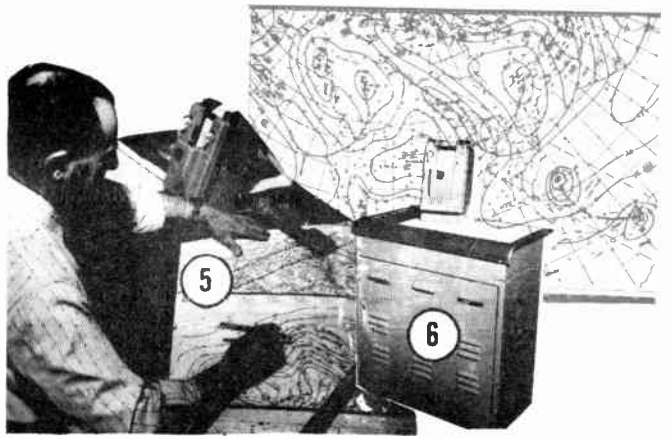
Alfax Paper and Alden Recording Techniques Have Made Possible New Facsimile Equipment as Aids to Forecasters in Getting Information and Speeding it to the Public and Clients.

Alden Weather Map Recorders Operating off of Washington Weather Network.

Latest weather maps are received direct from Washington and reproduced on Alfax Paper in this Alden 19" Recorder (1). The Alden 8" Monitor Recorder (2) receives reduced copies of the same maps using the electronics from the 19" Recorder.

Continuous Scanner and Recorder Can Be Used To Transmit or Duplicate At Regular or High Speed.

The Alden 19" Continuous Flat Scanner (3), is used to duplicate any number of copies at regular or high speed on the Alden 19" Recorder (4) or sends them over internal circuits, or microwave links at rate of one map in less than two minutes.



Forecaster Service, Using Alden High Speed 2" System, Over Direct Lines to Client.

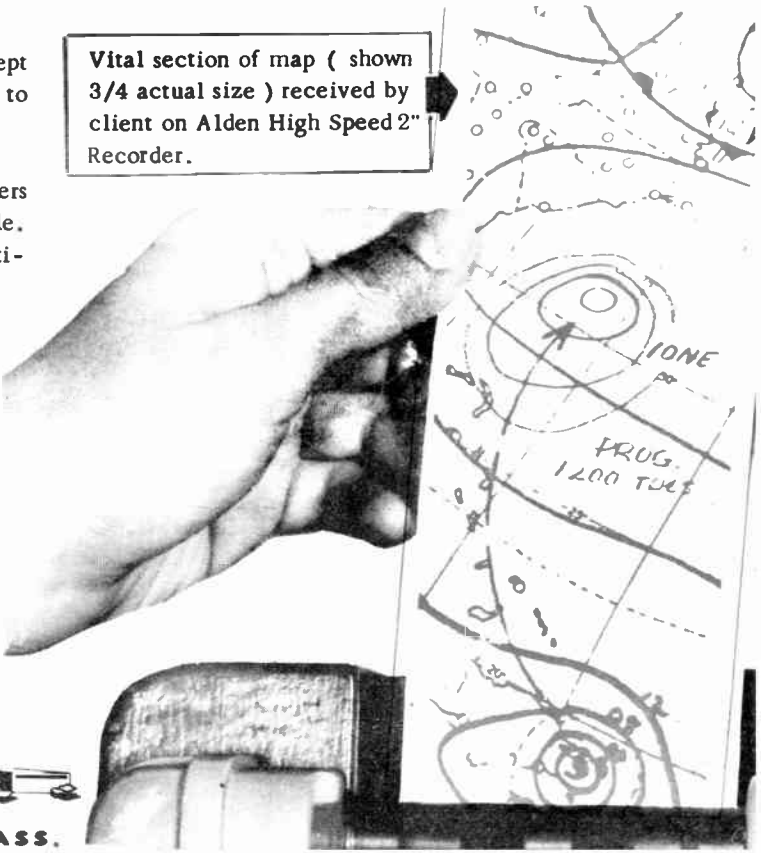
The Alden 2" Scanner (5) selects vital or pertinent information such as a section of a map without cutting and transmits it with supplementary information in a fraction of the time it takes to send a whole map. Vital section of map received immediately on client's recorder (6).

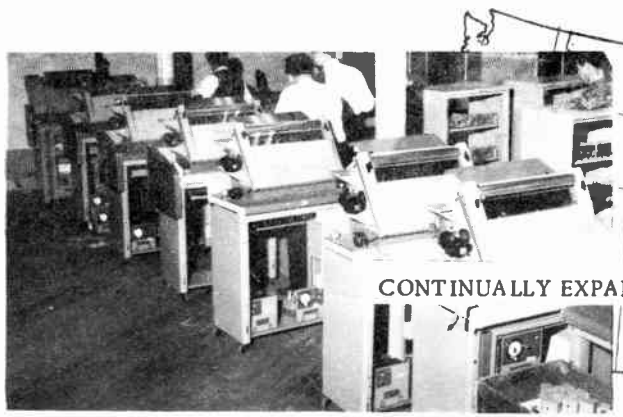
A COMPLETE LINE OF EQUIPMENT TO OPERATE OFF OF THE WEATHER NETWORK

It is now practical to operate one recorder for maps to use for forecasting--another to record a continuous record for files or kept on reels for study. It is also practical to have a smaller recorder or recorders operating simultaneously either as a monitor or to have copies for secondary purposes. The smaller map often being as useful for some purposes as the larger.

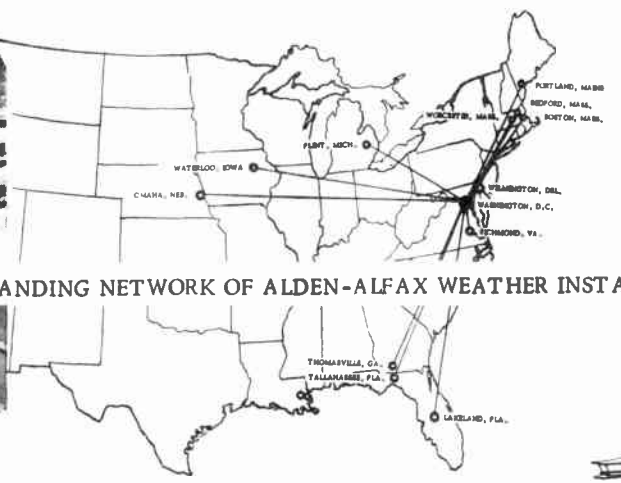
The Alden Flat Copy Scanner can transmit or operate at high speeds to provide duplicate copies from one or several recorders simultaneously. They also provide a high speed system where the proper transmission link for high speed operation is available. Whereas whole maps take twenty minutes, the Alden Selective Scanners conserve circuit time and in minutes the selected pertinent information or condensed words and graphic information can be accurately transmitted faster than any other way.

Vital section of map (shown 3/4 actual size) received by client on Alden High Speed 2" Recorder.





Alden 19" Recorders coming off the production line.



CONTINUALLY EXPANDING NETWORK OF ALDEN-ALFAX WEATHER INSTALLATIONS

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT CO. WESTBORO, MASS.

THE ALDEN BULLETIN RECORDER

Paper width = 5 feet!

Height = any practical height in multiples of 4' and 6'.

It can be located outdoors or indoors, in any location where instructions, information, or advertising needs to be presented to large groups of people, either collected together or passing by on foot or by automobile.

The Bulletin Board can record 12 square feet of copy per minute as sent out from a remote transmitter station, either wire or a microwave system. Under a field test, 800 miles of recording lines were accomplished in 4 days -- 12,000 square feet of copy with no adjustments, inks, ribbons, or replacement of parts. Electricity acted as the ink, permanently and chemically dyeing the Alfax paper. Electrical current cost during this use was 72 cents!

The only attention normally required of the Bulletin Board is merely to re-supply it with paper.

Many and varied applications.

1. Railroad station and airport announcement boards.
2. Traffic control information on toll roads, super highways, detours.
3. Merchandising announcements in department stores, super markets, etc.
4. Activities announcement boards in ocean liners.
5. Remote control news bulletins.
6. As an automatic prompter for motion picture or TV actors.
7. As an enlarger (10 times) for making accurate patterns for painters, decorators, mechanics.

All Alden Facsimile System equipment illustrated here is composed of pre-designed and tested units custom assembled to meet the specific demands of the transmission circuits involved, number of recorders to be operated off one transmitter, and the customers' particular requirements.

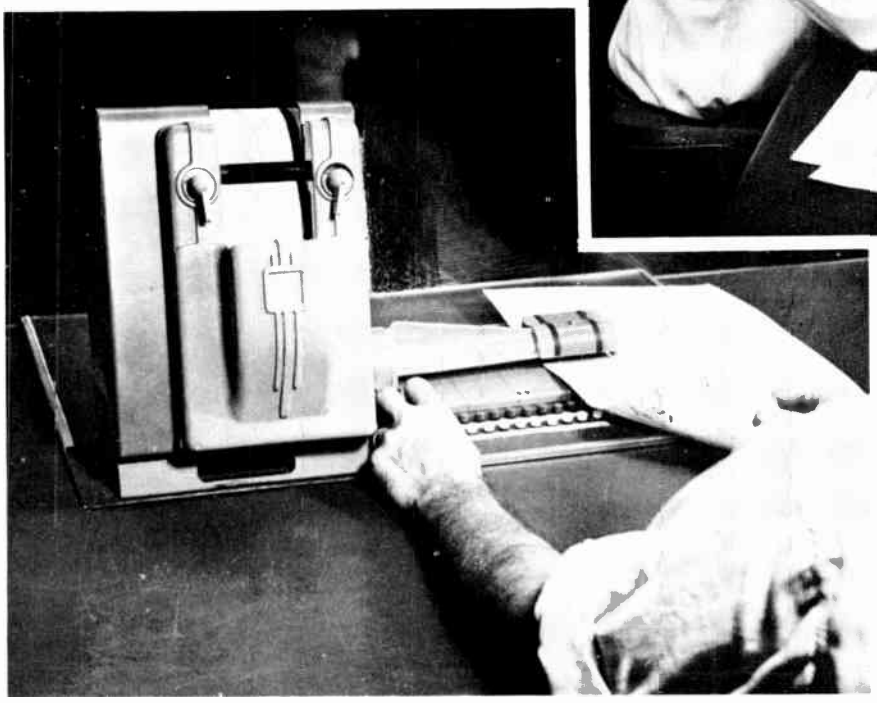
Actual quotations will be submitted upon a determination of the above factors.

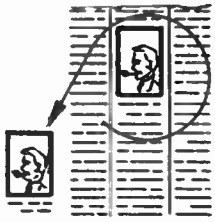
ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY
WESTBORO, MASSACHUSETTS

ALDEN FACSIMILE SYSTEMS

Simple - Versatile - Dependable

THE ALDEN HIGH-SPEED SELECTIVE DISPATCH SYSTEM





HIGH SPEED SELECTIVE DISPATCH SYSTEM
Specially designed to permit selection of pertinent data from any copy -- letters, dispatches, reports, etc. -- for instant transmission of vital bursts of information, wherever needed -- yet complete reproductions can also be sent.

THE HIGH SPEED SELECTIVE SYSTEM

This selective system is the most rapid and yet economical user of circuit time and recording paper ever developed for facsimile transmission. It "reads" copy of any length either from top to bottom when fed columns of 2" in width, or from side to side when text of a greater width is presented to the transmitter.

The open end transmitter arm with its 2" scanner allows desired sections of any copy to be selected and transmitted without unwanted copy or white space. Either part or whole maps, magazine articles, newspaper articles, business forms, cards, books, photographs, blueprints, etc. are quickly and clearly transmitted. Copy does not have to be mounted on a drum, nor does it have to be mutilated in any way. Large copy is transmitted in sections and easily re-assembled after being printed by the recorder.

To illustrate the speed of this 2" equipment, 72 square inches of copy (1800 words of newspaper type or 800 words of typewriter text) can be transmitted and received per minute over internal plant lines or a microwave system. This is faster than speech and at the same time provides a written record. There is no wasted paper at the recording end as the transmitter only operates as it sees copy -- a completely blank space in the copy causes the transmitter to pause until the next copy appears under the scanner. Over telephone circuits the speed of transmission is still twice the information you can talk.

The finished copy is made upon Alfax, an electrosensitive single ply paper which records instantly without fumes or odor. The result is an attractive clear sepia copy that is permanent, smudgeproof, and can be written upon and handled with no special precautions being necessary. It is fed off a continuous roll and allows recorded copy of any length up to 100 feet without reloading.

The soundness and simplicity of design results in an instrument that requires little attention, either for operation or servicing, with standard replacement parts which require only a "plug in" technique for replacement on those rare occasions when trouble may develop.

There are numberless applications of Alden Facsimile systems in business. In fact, anywhere where information needs to be copied and moved either interplant or office or intra plant or office, both quickly and without any possibility of error. Some typical applications follow.

Transmission of: Purchase Order Information.

Manufacturing Order Information.

Personnel records, account information, identity information, printed articles in their entirety or contract clauses, orders, instructions, directions, illustrations, drawings.

Research libraries can transmit information from rare and valuable books, pamphlets, documents without losing possession of the original at any time.

All Alden Facsimile System equipment illustrated here is composed of pre-designed and tested units custom assembled to meet the specific demands of the transmission circuits involved, number of recorders to be operated off one transmitter, and the customers' particular requirements.

Actual quotations will be submitted upon a determination of the above factors.

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT COMPANY
WESTBORO, MASSACHUSETTS

10-6-47

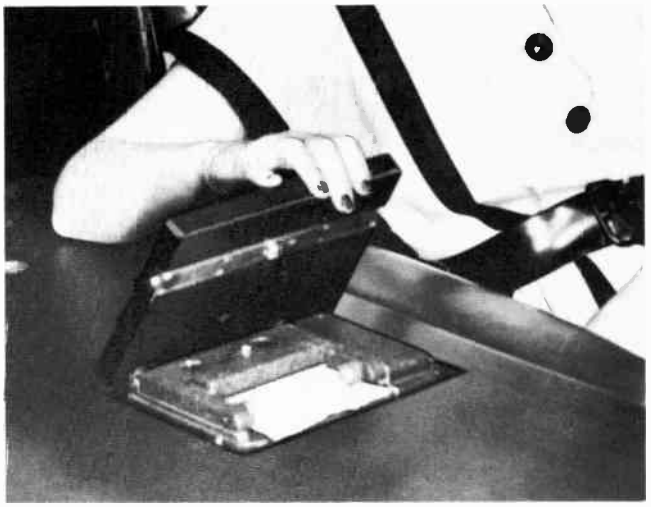
HOME Recording

Here's the Alden "Four"

The ideal unit to launch your home recording program. It's practical – designed for easy home use. It's economical – inexpensive to own, inexpensive to operate.

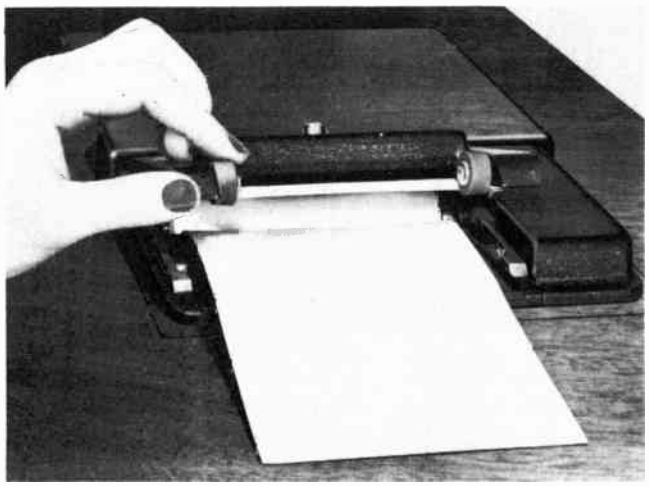
Our four inch recorder in an attractive chairside cabinet or in a handsome, compact night table readily fits in with home life.

When the recorder is not in use, the chairside cabinet presents a smooth end table surface. Press a button in the top surface, the cover section swings back flat against the top, the recorder comes up flush and is ready to record.



With earlier home equipment, people had to struggle to use it. Inserting paper seemed to be one of the things which prevented early acceptance of the equipment. So we have made this operation simple. You can do it seated in your armchair.

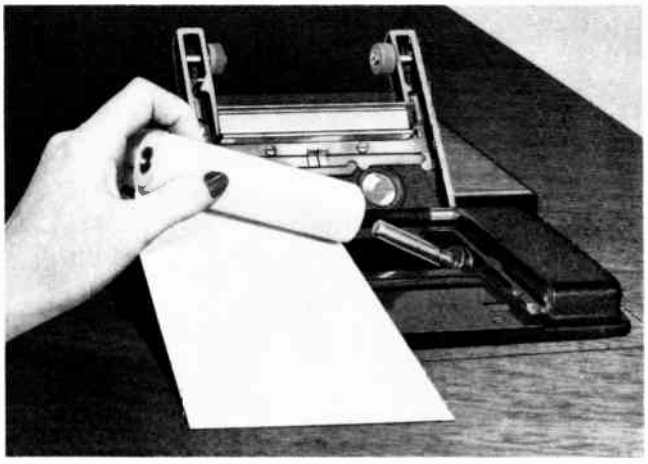
Pressing the button on the actual recorder cover releases it so that it can be opened to insert a new paper roll.



The spindle which locates the new roll of paper automatically swings upward at an angle and the new paper is inserted over this spindle. A locking latch is

ALDEN PRODUCTS COMPANY

BROCKTON, MASS.

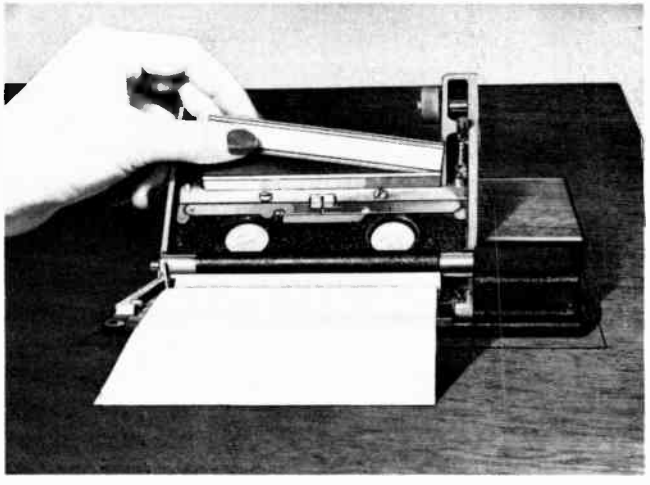


pushed to the side of the recorder and the paper roll is then simply pressed down into the cavity until it locks in place.

The free end of the paper is then pulled forward beyond the front edge of the recorder and the cover is closed. It will latch equally well if it is closed, dropped, or slammed shut.

Note that there has been no feeding or winding of the paper around guide rolls or through slots.

Another problem in home use was the changing of the actual recording element. In our system the recording on the paper is in part the results of metallic deposits from the recorder plate into the paper fibre.



We have made this recorder plate a simple metal stamping — easy to handle, easy to insert. It has two printing edges so that when eventually one edge loses its high printing quality, the recorder plate can be removed and reinserted with the other edge printing.

Again we have made this operation simple. Having opened the recorder by pressing the button in its top cover, this recorder plate will be exposed in the cover section. By pressing this plate back into its rubber cushion, it can be lifted out of its support. The new unit can then be inserted by pressing it against the rubber cushion and pushing it down until it locks in the support.

Now let's look at the actual Recorder—

THE ALDEN FOUR

Opposite is an exploded drawing of it. Compare this to the construction of a typewriter or teletype. .

In the Alden four-inch recorder, we utilize unit construction. Where each group of parts perform a certain function it is made as a unit. These units as shown in the drawing assemble easily to form the complete recorder. Bullet-headed dowels inserted into bell-mouthed holes quickly align the units in their precise location and Alden captive screws then lock the units in place. These screws can be quickly brought to finger tightness by twisting the knurled head and given their final tightening by a screw driver, Allen wrench, or coin. Note that since they are captive screws they remain part of the unit and cannot be lost or separated.

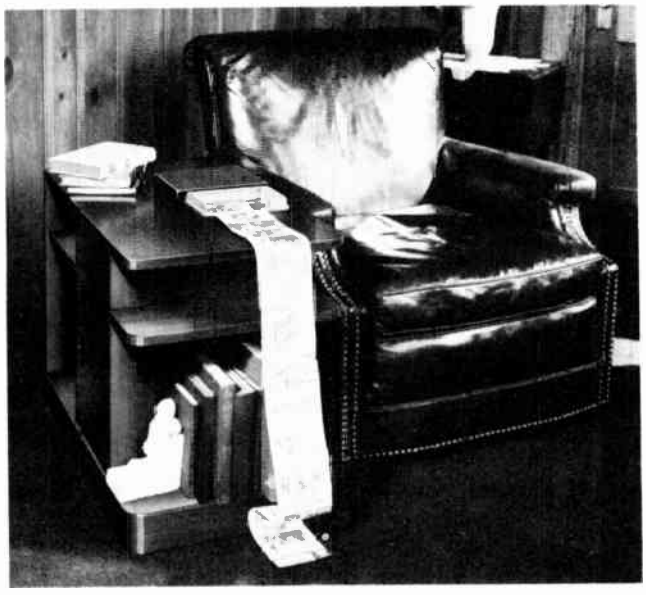
If any unit of an Alden recorder is suspected of not performing up to standard, a spare unit quickly replaces it with no time delay or need of serviceman. In this manner the Alden 4″ recorder does not require the regular servicing and preventative maintenance customary in telephone and teletype operation.

The present Alden "four" is the "boiled down" result of much trial and error in which we have tried and discarded more complicated design which added to the cost and space required, but did not add to the quality of the recording.

Because of this thinking the Alden 4″ recorder has basic simplicity. You get much more than the intrinsic value of the material and labor involved and from our standpoint, we can readily manufacture it in volume production offering equipment that will give you long and satisfactory service at low price.

Order Number and Price List

HOME UNITS



#9054-A "Four" Chairside Recording Unit. This is the complete chairside unit for home recording. It includes the solid mahogany chairside cabinet #9054-A, the Alden "Four" recorder 9031-A, and high impedance amplifier #9032EA. This complete model allows you to select your choice of FM receivers. **$250.**

#9062-A Night Table Home Recording Unit. This unit includes a handsome, compact night table #9062-1A, Alden "Four" recorder 9031-A, and a high impedance amplifier #9032FA. This complete model enables you to select your choice of FM receiver. **$175.**

#9053-A "Eight" Chairside Recording Unit. This includes the solid mahogany chairside cabinet #9053-1A, 8.2 inch recorder #9028-A, and high impedance amplifier #9032EA. **$500.**

#9052-A The 18″ Master Utility Recorder for display advertising and news bulletins in store windows, Hotel lobbies, railroad stations, clubs and homes.

Programs recorded by the Alden 9052-A are identical to those received by the Alden "Four". They are enlarged four times in recording. giving 18 inch width and copy advance of 13.7 inches per minute with 51 inches of copy exposed at one time. One scanner can transmit to several 18″ recorders located at various vantage points, with frequency requirements of the connecting link still the low bandwidth required for 4″ copy.

9052-A recorders can be provided to record on a one-to-one scale from copy transmitted by the Alden 18″ Scanner (9020-A) or by the Alden Universal Scanner (9009-A) with an 18″ drum, thus recording a full "Readers' Digest" condensed novel in thirty minutes. The recorder can also be provided to record three times enlarged copy from the Universal Scanner with a six inch drum (Dow Jones report width.)
The 18″ recorder and the recorder amplifier are included in the attractive, yet rugged metal cabinet. The cabinet is fitted with necessary cables and with electrical back connectors for the recorder amplifier. Back connectors are covered with plexiglass shields which give protection and wires are color coded to make signal tracing quick and easy. **$800.**

RECORDERS

#9031-A Four Inch Recorder. This is the Alden "Four" recorder. It operates to RMA standards with 4.1 inch recorded line, 3.43 inches per minute paper feed. Can be mounted in panel openings $4\frac{11}{32}$″ x $7\frac{5}{16}$″ with depth behind opening of $3\frac{15}{16}$″. **$100.**

#9028-A Eight Inch Recorder. This is the Alden "Eight" designed with the same principles of simplicity and ruggedness of the Alden "Four". Overall dimensions 13⅝" long, 12" wide, 5¾" in height. **$350.**

#9031-BA Alden "Four" Selector Recorder. This is the Alden four inch recorder with an instant-switching selector gear for receiving either 4.1 inch transmissions at 1 to 1 ratio or 8.2 inch transmission at a 2 to 1 reduction in size. **$125.**

#9031-CA Alden "Four" Modified Recorder. This is the Alden four inch recorder designed to receive 8.2 inch transmission, recording at a 2 to 1 reduction in size. **$100.**

RECORDER AMPLIFIERS

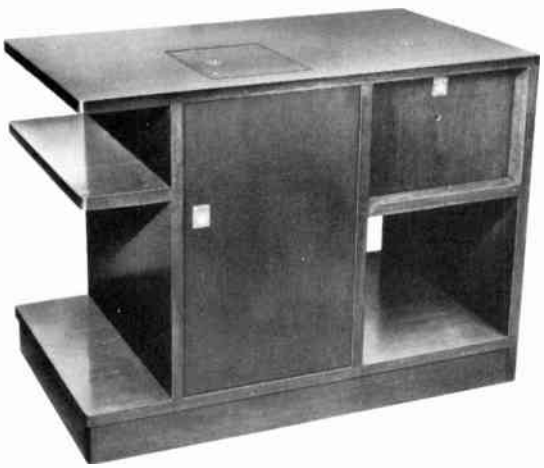
#9032-EA High-impedance Amplifier. This unit is designed to connect in before the audio amplier of FM receivers and provides high-impedance input, recorder marking power, threshold control circuit and plug-in connector and space for the optional automatic control unit #9049-A. Simple slide-in back connectors make it part of the chairside cabinet or it can be used separately. **$50.**

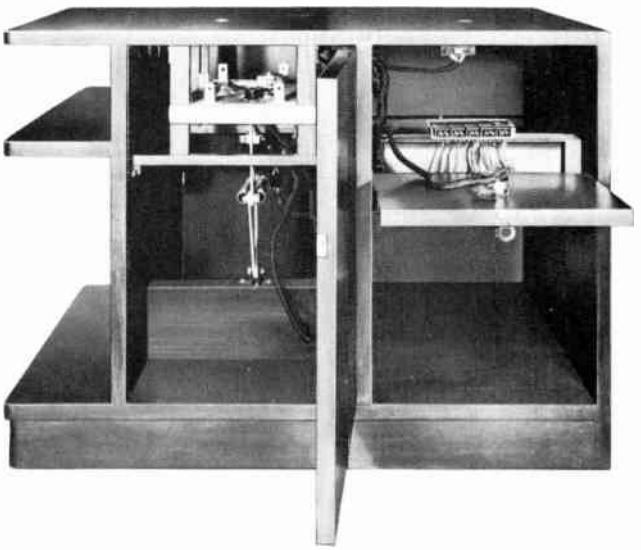
#9032-FA High-impedance Amplifier. This is an amplifier having the same specifications and functions of #9032EA, but its chassis is designed for the night table #9062-1A. **$50.**

#9032-A Low-impedance Amplifier. This unit contains a low impedance input amplifier and threshold control. It can be utilized with 500 ohm impedance connections. **$50.**

#9049-A Automatic Control Unit. This is an optional unit for automatic start-stop and framing of the Alden "Four" recorder. A simple plug-in connection makes it part of the high-impedance amplifier #9032-A or it can be used separately. **$35.**

CABINETS





#9054-1A Chairside Cabinet. This is the mahogany chairside cabinet for the Alden "Four" recorder. The cabinet is made specifically for comfortable home use. It contains the necessary cables for mounting the recorder and amplifier and includes the elevating mechanism that brings the recorder up into position when the cover is open. **$100.**

#9053-1A Eight Inch Chairside Cabinet. This is the same unit as #9054-1A with panel openings and elevator mechanisms designed for the Alden eight inch recorder. **$100.**

#9062-A Night Table Cabinet. This is a handsome cabinet designed for home use. Requires little space. Comes in your choice of finish with all cable connections and amplifier back connectors installed. **$25.**

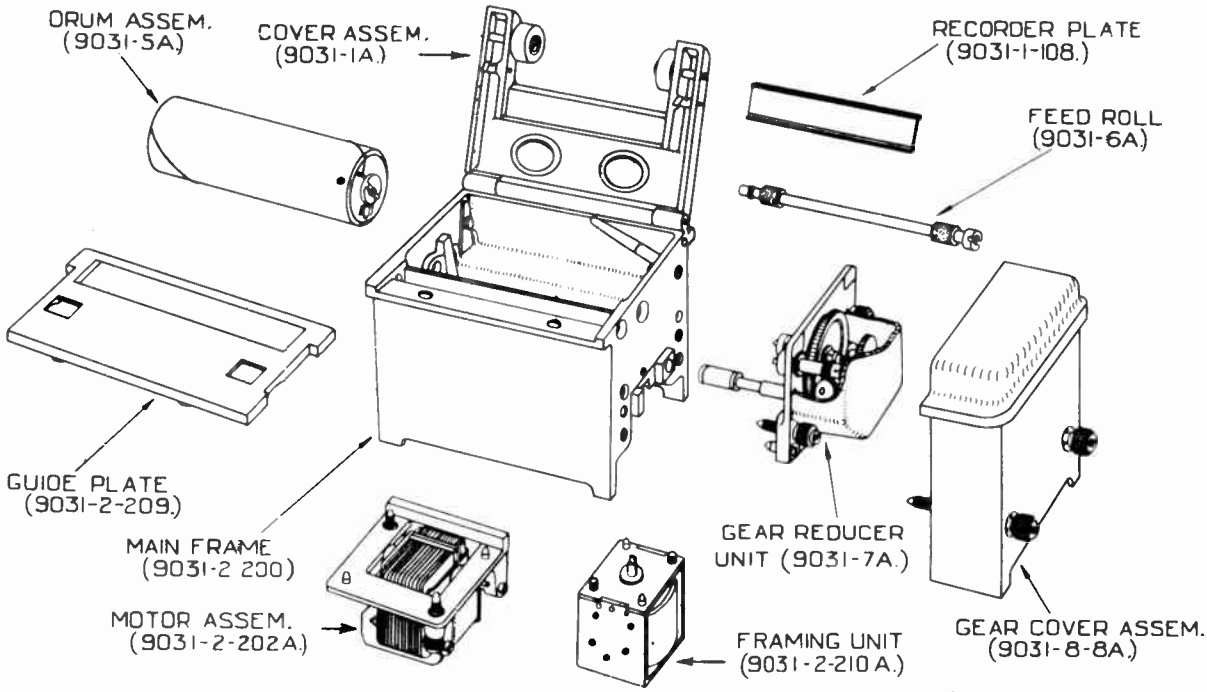
ACCESSORIES

#9031-1-108 Recorder Plates. These stainless steel recorder plates are factory honed to precision thickness and have double printing edges for double life. **$0.25**

Alfax Paper Electrosensitive paper for the Alden recorders and impulse recording equipment can be purchased from the Alfax Paper Company, 41 Riverside Avenue, Brockton, Mass.

ALDEN PRODUCTS COMPANY

BROCKTON, MASS.



Compare this to the construction of a teletype or typewriter.

Specifications

Characteristics:

The Alden 4" Recorder, (9031-A) is made to the Radio Manufacturers' Association (Committee TR-11) standards for home facsimile broadcasting. These standards are the crystallization of good facsimile procedure evolved through years of facsimile experience. Equipment made to these home broadcast standards is adaptable to many other facsimile applications in communications, signal monitoring, impulse recording, and recording of high-speed traces:

Rate of paper advance ..... 3.43 inches/min.
Useful recording line ..... 4.1 inches
Resolution ..... 105 lines/inch
Recording speed
360 lines/min. (rpm of the recording drum)

Frequency requirements:

The bandwidth requirements of the 4" recorder are flexible in the important lower frequency range. The four inch recorder uses a bandwidth of 3000 cycles with double sideband modulation. This is positioned in the frequency spectrum by a subcarrier frequency. When normal black and white transmission of printed copy and line sketches are sent at RMA standards, the bandwidth can be positioned low on the spectrum and *the sidebands can be suppressed* without noticeable change in the fidelity of the recording. This makes possible telephone operation on *inexpensive* lines, sending wire and radio transmissions simultaneously, and receiving facsimile broadcasts on sets with low frequency response.

Mounting Space

The small size of the Alden 4" recorder recommends it for mounting in cabinets, on a table, desk or wall where space is limited. It fits in a mounting hole 4-11/32 X $7\frac{5}{16}$ inches and extends $3\frac{15}{16}$ inches behind the panel. End flanges are made $\frac{3}{4}$" wide with side flanges of $\frac{7}{16}$" for secure and easy mounting.

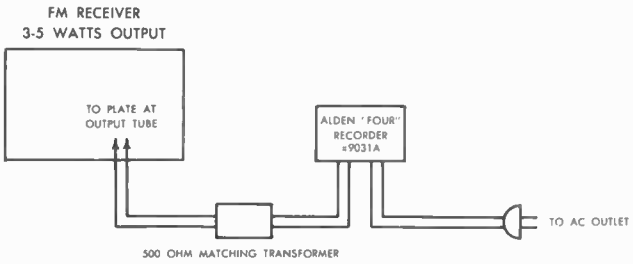
HOME Recording

Receiver Connection

With the Alden 4″ recorder it is possible to choose your own FM receivers. There are two general types of receiver connections — the first, using receiver-output connections for sets with 3 to 5 watts output — the second, using pre-amplifier connections for sets with lower output. Within these two classifications you may add various refinements to the operation. Block diagrams of the connections with refinements are given below.

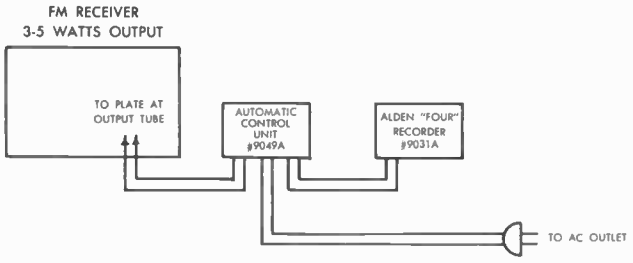
RECEIVER OUTPUT CONNECTIONS

The *simplest form* of facsimile operation would be a scanner using a sub-carrier that positions the facsimile signal within the frequency response range of the FM receiver amplifiers. Then all you need for reception is the Alden "four", an FM set having 3 to 5 watts output, and a 500 ohm matching transformer. In this simplest type of operation the framing is accomplished by rapid push-button framing.



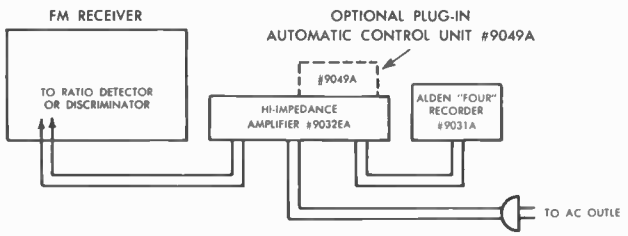
For the same operation with sets having 500 ohm speaker coils, the matching transformer is omitted.

Refinements that can be added to the simplest operation include a control unit that will provide automatic start-stop and framing by the facsimile signal.



PRE-AMPLIFIER CONNECTIONS

For sets with output power less than 3 watts we supply a hi-impedance recorder amplifier #9031EA. In the simplest form of connection, the amplifier provides rapid push button framing. To have fully automatic framing and automatic start-stop by the facsimile signal, the #9049A automatic control unit plugs into and becomes part of the hi-impedance amplifier.



FM sets connected to the recorder in this way will be flexible enough to record facsimile transmissions at frequencies above the response of their audio amplifiers.

This may be the case when the scanner at the transmitter uses a subcarrier that positions the facsimile signal beyond the frequency range of the audio amplifier in the receiver or when multiplexing sound and facsimile simultaneously.

In making out orders, determine just how you plan to operate. Order your recorders and components accordingly.

ALDEN PRODUCTS COMPANY

BROCKTON, MASS.

ALDEN PRODUCTS COMPANY
Manufacturing Product Engineers
117 NORTH MAIN STREET
BROCKTON • 64 • MASSACHUSETTS

Sept. 24, 1947

past week we had the pleasure of exhibiting our 4" Fac- Recorders, 18" Master Utility Recorders, and Univ rsal rs at the National Association of Broadcasters Convention antic City. The results of this showing are so signifi- hat we want to inform you of them immediately.

, the Alden Four Recorder was received with an enthusiasm that surprised even those of us who have been closely associated with it. FM station owners, managers, and others who attended the Convention immediately realized the economic advantages of the 4" recorder, both from an operating point of view as well as the low initial cost. Their imagination literally seemed to carry them away at times as they thought of the many types of programs that could be offered, and the distribution that could be obtained with the equipment. This enthusiasm substantiated our feeling of long standing that the Alden Four is "Facsimile" from an economic, practical, and programming point of view.

Second, multiplexed programs were received daily during the Convention on the Alden Four Recorder and Master Utility Recorder in the lobby of the hotel Claridge in Atlantic City - programs that were transmitted from WPEN-FM in Philadelphia, approximately 70 miles away. To our knowledge, this is the first time that simultaneous transmission of sound and facsimile has been successfully accomplished. Multiplexing thus opens up an entirely new era in radio broadcasting, for now audio programs can be greatly stimulated and increased in value by coordinated, simultaneous facsimile recording, and similarly facsimile programs take on an entirely new aspect when you visualize what can be accomplished by transmitting sound at the same time. The fact that multiplexing can be satisfactorily accomplished is due primarily to the use of the 4" Recorder with its lower frequency requirements. The enthusiasm and surprise with which the multiplexing was received by Convention members further strengthened our contention that the four inch recorder is by far the most practical, since multiplexing with facsimile insures maximum utilization and flexibility.

Third, the low cost of the equipment, both scanners and recorders, very visibly impressed station owners and managers that at last facsimile had come out of the laboratories and was available as a production product. Operators of stations, large and small, could see valuable applications for facsimile in their areas -

applications that would positively create a demand for recorders and programs - applications that caused station operators to place orders for Alden facsimile equipment on the spot. The most important factors that made this demand appear real in the minds of these men were the low cost of our recorders (note attached sheets on Home Recorders) and the fact that our recorders are now in production.

The great interest displayed in the Alden Four Recorder, Master Utility Recorder, and Universal Scanner was not by any means restricted to operators of FM stations. Persons representing many other types of communications, advertising agencies, industry, etc. had specific applications for our facsimile equipment, based on the simplicity of programming and low cost of the Alden Four Recorder. It seems to us that the uses for facsimile are almost limitless - an impression that was created by the imaginative thinking of the men with whom we talked at the Convention.

We are giving you this information because we want to keep you posted on facsimile, and we feel that this is truly vital information.

We are also enclosing our Questions and Answers, Home Recording, and Dispatch Recording sheets which should be incorporated in your BROWN BOOK. We feel sure that you will share our enthusiasm for the immediate future of facsimile and can see many applications for its use in your area.

Because of the results of this four day show, we have had to revise our production schedule of the Alden Four Recorders, Alden Master Utility Recorders and the Alden Scanners. This revision of the production schedule enables us to take orders now on this equipment for inclusion in our production runs in the immediate future. If you can see the possibilities for facsimile in your area, and we believe there are many, and you want to be one of the first, we sincerely urge you to get your order in now for early delivery.

Summarizing, we honestly and emphatically believe that facsimile has now hit full force, and that nothing can stop it from here on in! So, if you want to catch the bandwagon, again let us urge you to get your order in for the Alden Fours and related equipment now.

Sincerely yours,

ALDEN PRODUCTS COMPANY

R.R. Christensen-L
Enclosures

Questions and Answers Regarding Facsimile

10-6-41

THE PURPOSE OF THIS BOOKLET IS --- first to give the uninitiated or non-technical person some idea of how facsimile operates.

It follows with a discussion of STANDARDS and what they mean in a practical way.

Some of the other questions unfold the story of the FOUR INCH RECORDER - in giving all-round service, building the largest possible audience, meeting various technical and manufacturing requirements.

The questions further take the broadcaster and user through different tests by which he may see exactly HOW TO USE OUR EQUIPMENT.

Most of the answers have been developed from actual experience and by people already using this equipment in the field. They cover many points which have been repeatedly asked of us.

We believe the questions and answers lead to the conclusion --- THAT THOSE WHO INTEND TO GET INTO FACSIMILE, SHOULD DO SO NOW.

RADIO NA-ALD PRODUCTS
117 NORTH MAIN STREET
BROCKTON • 64 • MASSACHUSETTS

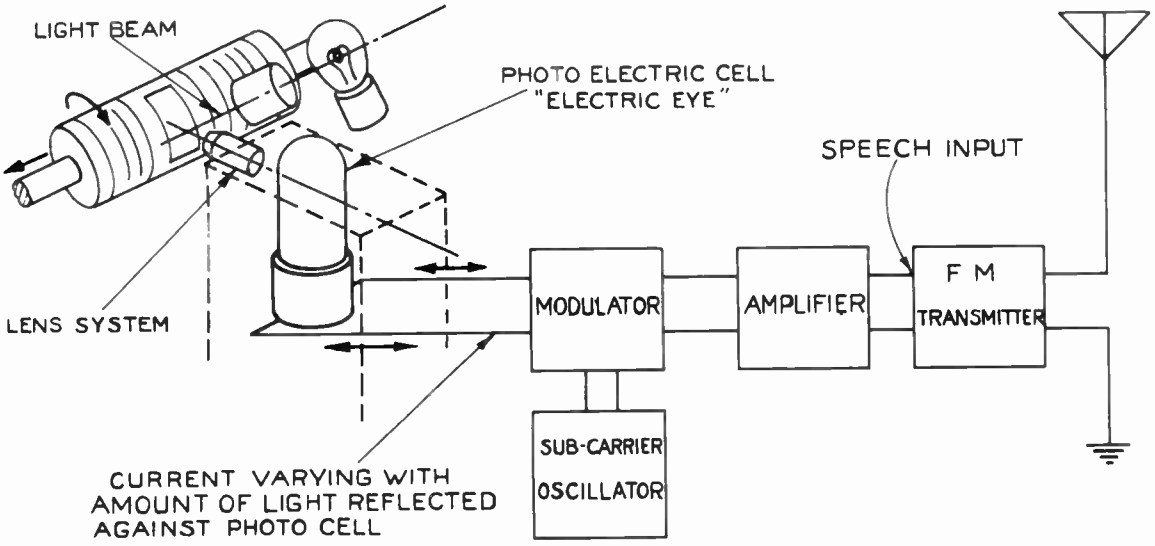
HOW IS FACSIMILE BROADCASTED AND RECEIVED?

In a very general way - one piece of equipment at the broadcasting station called the scanner takes the place of the microphone and is connected to the transmitter in the same way.

At the receiving end - the recorder with its built-in rectifier takes the place of the speaker.

WHAT IS THE FUNCTION OF THE SCANNER?

The usual scanner consists of a rotary drum to which is attached the copy or material to be transmitted which may be reading matter, sketches, or pictures. A point of light is directed at a spot on this drum, and as the drum turns, the reflected light from this spot varies with the shades of the so-called copy. This reflected light goes back through a lens system and an aperture much as in a camera - is reflected back into the sensitive surface of a metallic plate in an electric eye tube. Thus, the variation in the intensity of the reflected light changes the value of the current flowing through this tube in accordance with the light or dark shades of the area examined. As the drum rotates; it moves transversely to the reflected light beam by means of a lead screw so that the electric eye views a narrow strip of the copy in a continuous spiral until the whole length of the drum is viewed or scanned.



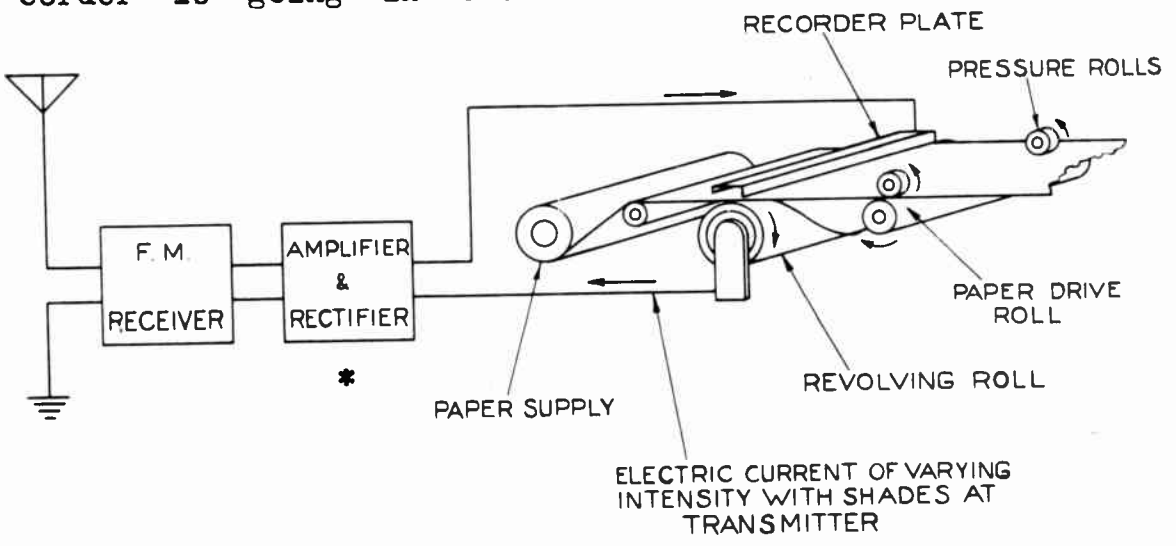
The varying current from the electric eye goes to what is called a modulator where it produces corresponding variations in another circuit which is driven at a steady frequency by a device called an oscillator.

This current is then amplified and goes directly to the transmitter. The current generated by the oscillator is called the subcarrier because its frequency is lower than that of the carrier wave of the FM transmitter. The modulation of the subcarrier by the current from the electric eye is amplitude modulation. The amplitude modulation is fed into the FM transmitter and is transmitted as frequency modulation by the station carrier wave.

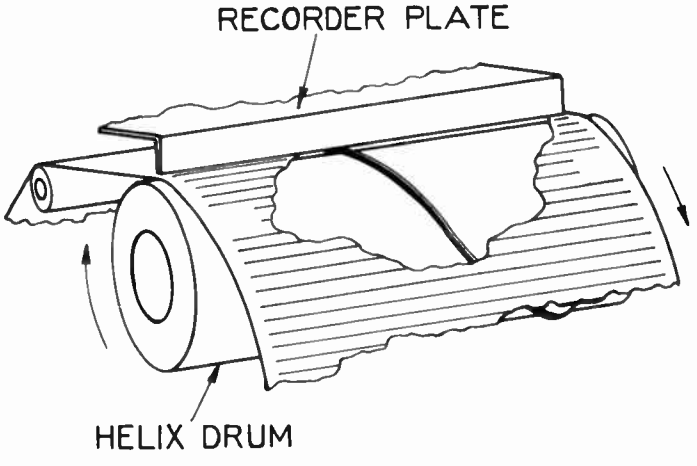
WHAT IS THE FUNCTION OF THE RECORDING EQUIPMENT?

The FM radio set receives the frequency modulated facsimile signal as it would receive sound programs. After passing through the amplifier in the set, or in some cases a special amplifier, the facsimile signal goes through a rectifier, so that the final current going into the re-

corder is going in one direction. Electrosensitive



paper is used in the recorder and the recording effect in part is very much like electroplating. The actual marking takes place as follows: The recorder has a rotating drum with a conducting helix or spiral wound once around it. The electrosensitive paper passes between this conductor and a recorder plate of approx. the same thickness as the light beam admitted to the electric-eye at the scanner. The drum with the conductor (helix) rotates



* Note:

The rectifier is built into the recorder unit. In this manner the recorder will in many cases operate directly from the output of the receiver amplifier without a special amplifier necessary. See the question on "How Do You Receive Facsimile Programs?"

at exactly the same speed as the drum at the scanner, synchronized either through the power line or by special equipment.

As this helix rotates, it intersects the recorder plate so that a marking spot moves from one side of the paper to the other at the same rate of speed and in the same time it takes the light at the scanner to view one turn of the revolving copy.

The paper feed of the recorder moves the paper forward one scanning line for each turn of the scanning drum at the transmitter. Going back to the scanner - we saw that there was a variation of the current flowing thru the electric eye due to the variations of the copy - these same variations in current at the recorder vary the amount of current going through the paper - thus a full strength signal makes a full black or brown mark - no signal produces no effect or white - intermediate signals produce shades of the paper corresponding to those seen by the eye at the scanner.

The recording or marking is direct and immediately visible. Thus there is no developing or processing required. No liquids or baths are in the equipment. There is one other function that the recorder has to perform either manually or automatically. The marking at the recorder must start at the edge of the recording at the same time the light starts to scan the edge of the copy. This is called framing or phasing.

WHAT ARE THE STANDARDS FOR HOME FACSIMILE BROADCASTING?

The Radio Manufacturers' Association Committee (known as the TR-11 Committee on Facsimile) have submitted their proposed standards recommending a 4.1 inch and 8.2 inch recorded line; the RTPB panel have proposed standards that are in effect identical to the RMA, except they do not include the 4.1 inch recorded line (copy width). The standards will be eventually determined by the FCC, presumably after a hearing as to what best serves the public interests.

WHAT ARE THE STANDARDS FOR HOME FACSIMILE PROPOSED BY THE RADIO MANUFACTURERS' ASSOCIATION COMMITTEE (TR-11)?

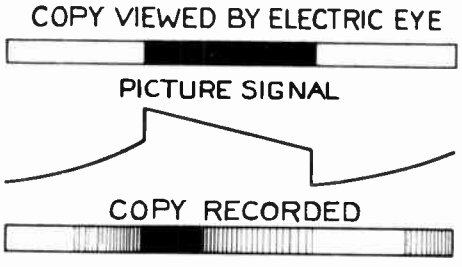
They are:

1. Useful scanning line shall be 8.2 or 4.1 inches.
   ("Useful scanning line" is width of copy scanned, or circumference of the drum minus space used for phasing and/or margin).
2. Line advance shall be 105 lines per inch.
   (This means that the photoelectric cell at the scanner will view the circumference of the drum 105 times as it advances one inch, in strips approximately 1/105 inch wide.)
3. Scanning speed shall be 360 lines per minute.
   (This means that the scanning drum or equivalent must revolve at 360 RPM. Thus when recording 1 to 1 with 105 line resolution the paper advances 3.43 inches per minute. This is obtained by dividing 360 by 105.

4. Type of modulation - Standard facsimile broadcasting in the 88-108 mc (FM) band shall be based upon the use of subcarrier amplitude modulation until there have been demonstrated new developments desirable for adoption as new standards.

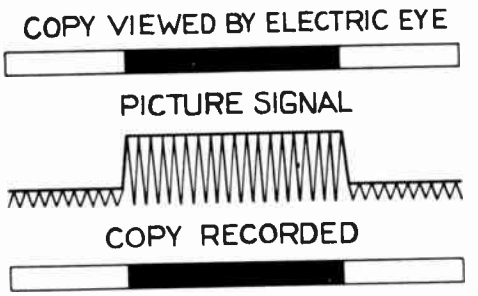
(Subcarrier amplitude modulation enables the photocell in the scanner to transmit an even level of signal when viewing a constant shade of color steadily.)

To design an amplifier for handling directly the current from an electric eye involves certain difficulties, one of which is the presence of relatively constant areas of shading on the copy; thus the amplifier would have to be designed to sustain a direct current for the duration of such constant shading areas. An ordinary amplifier could not do that: special DC amplifiers would be needed.



The illustration shows the picture signal distortion introduced by the inherent characteristics -- capacitance, etc. -- of the ordinary amplifier. An exact recording will not be received.

To avoid this difficulty, a fixed frequency is introduced in the scanner upon which the varying levels of the picture signal are impressed.



The picture signal impressed on the fixed sub-carrier frequency passes through the ordinary amplifier undistorted.

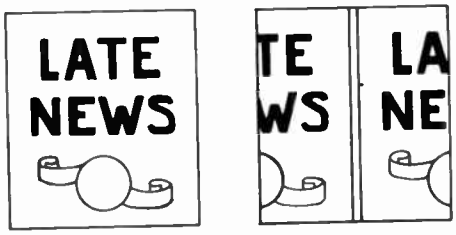
This frequency is the Sub-carrier frequency and the amplifier circuit can pass this steady frequency without the distortion that will be encountered in a DC amplifier. The picture on this subcarrier can be put directly on wire lines or into the speech output of your radio transmitter.

5. Polarity of modulation. On subcarrier amplitude modulation, the maximum signal shall be on black. (The reason for this standard is that it is possible to transmit both positive or negative copy. For home broadcasting, positive copy shall be sent.)

6. Phasing signal. The non-picture signal portion of the line stroke cycle (total scanning line) shall be 45° or 1/8 revolution, the first 15° of this non-picture signal interval shall represent transmission at approximate full white, the second 15° transmission at approximately full black, and third 15° transmission at approximately full white, the synchronizing signal thus produced constituting a protected pedestal.

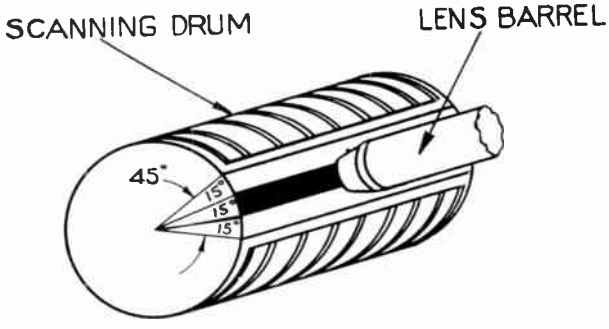
(The phasing signal is a short, strong pulse sent by the scanner -- transmitter -- and utilized in the recorder to frame the copy. The need for framing arises out of the fact that the edges of the paper in the recorder must be under the point of printing at

the same instant the edges of the copy being transmitted is viewed by the photocell. If the copy is not in phase -- or framed -- then as the photocell views the edge of the copy, the recorder may print this edge anywhere across the page. See illustration.



FRAMED COPY UNFRAMED COPY

The phase signal utilized to center the received copy is to be generated by sending a full black signal bordered on both sides by a full white signal. One method of sending this phase signal is to have the photocell in the scanner generate these signals by viewing a white area, black area, then white area. In the proposed standards this white-black-white phasing area would occupy 1/8 of a circumference of the drum with even divisions of space for the three portions of the white-black-white signal. See figure.



7. Modulation Characteristics. The sub-carrier modulation shall normally vary approximately linearly with the optical density range of the subject copy (as the log of the reciprocal of the intensity of reflected light.) (This means that the level -- amplitude -- of

signals representing shadings from black to white must vary as the depth of the shading on the copy, the highest level of signal being for black, this signal level dropping for each lighter shade, until the minimum level of picture signal is sent for white.)

The presumed purpose for a standard of this character would be that the transmitted signal would match the characteristics of electrosensitive recording paper so that adjustments would not be required at the recorder. This standard was modified to read "approximately" as various types of paper differ in their response characteristics.

8. Permissible noise level - The sub-carrier noise level shall be capable of being maintained at least 30 decibels below the maximum (black) picture modulation level.

The sub-carrier frequency explained in paragraph 4, may introduce a certain amount of hum into the transmissions. It is proposed that this hum or noise be kept at a certain ratio below the level of signal sent for black -- maximum level of signal. The decibel is used as the unit to measure this ratio and the RMA proposes the height of the black signal be 30 db above the noise level.

9. Copy delivery. Copy shall be delivered at the top, in order that the recording will be done and the copy will be readable in a "straight-up position." (With this rule, the top of any written paragraph will be received first so the transmission can be read as it is recorded.)

IF THERE ARE NO FCC STANDARDS YET, IS IT SAFE TO BUY RECORDING EQUIPMENT?

Radio Manufacturers Association standards are being followed by all manufacturers, to the best of our knowledge. These RMA standards are for the most part simply the crystallization of good facsimile procedure evolved during several years. Therefore, it would seem that they are unlikely to undergo any major change henceforth. Field tests are being made with both 4" and 8" paper widths. The 4" seems the most logical, involving less paper expense, and requiring smaller frequency band widths, less cubic inches of installation space, lower motor costs. We feel that it will be the standard adopted. In any event 4" recorders are usable even with 8" scanning as discussed under "Fours" and "Eights."

"Four" and "Eights"

Wherever the "four inch" recorder is referred to, we mean recorders printing a 4.1 inch scanning line and thereby having 4.1 inch paper width plus margins. There are three Alden models of this type.

1. Alden #9031A 4" prints a 4.1 inch copy width at 1 to 1 ratio.
2. Alden #9031BA 4" has a selector gear for receiving 4.1 or reduced 8.2 inch transmissions.

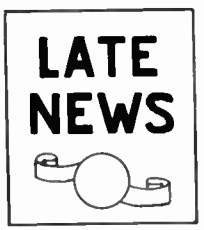
3. Alden #9031CA 4" receives 8.2" transmissions but reduces them to 1/2 size 4 inch recording.

"Eight inch" recorder refers to recorders printing 8.2 inch recorded line. The Alden model of this type is #9028A 8".

WILL A FOUR INCH RECORDER PRINT FROM A TRANSMITTER SENDING OUT 8.2 INCH SCANNING WITHOUT ADDITIONAL EQUIPMENT OR MODIFICATION?

Yes. Without any modification, the Alden 4" recorder will receive 8" transmission. The recording will be compressed to 1/2 the width of the transmitted copy since the lines per inch, paper feeds, and all other factors except the length of the recorded line are identical.

The copy received from 8" transmission will be readable when the copy transmitted has sufficient size. See illustration.



8" COPY BEING TRANSMITTED

COPY AS RECEIVED ON 4" RECORDER

WILL AN 8" RECORDER PRINT FROM 4.1" SCANNING WITHOUT ADDITIONAL EQUIPMENT OR MODIFICATIONS?

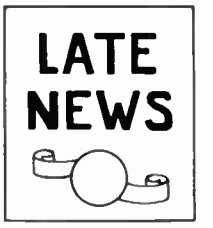
Yes. It will, but it will expand the recording to twice the width of the copy being sent and will therefore use twice as much paper as a 4" recorder receiving the same transmission. See Figure

COPY BEING TRANSMITTED

COPY AS RECORDED ON 8" RECORDER

CAN THE 4" RECORDER RECEIVE 8" TRANSMISSION 1/2 SIZE?

Yes. This, however, requires a different gear unit to reduce the paper feed to 1/2 its former speed. A half size reproduction of the copy is then obtained using 1/4 the area of paper which a corresponding 8" recorder would use. Alden #9031BA has a gear selector for instantly switching from 4" to 8" transmissions. See figure



COPY BEING TRANSMITTED

COPY AS RECEIVED ON ALDEN 9031-BA 4" RECORDER

IF THE 4" RECORDER MODIFIED TO RECEIVE 8" TRANSMISSION AT 1/2 SIZE USES ONLY 1/4 OF THE PAPER THE 8" RECORDER WOULD USE, WHY ISN'T THIS A PREFERRED ARRANGEMENT?

In some ways it might be. However, if the copy being transmitted is the smallest suitable size for the 8" recorder, the printing may be too small to be easily read when reduced on a 4" recording. But, if modified 4" recorders dominate any receiving area, the transmitting station would be obligated to use print readable when reproduced on the modified 4" recorder.

How Do You Receive Facsimile Programs?

WHAT RECEIVING EQUIPMENT IS NEEDED FOR HOME FACSIMILE RECEPTION?

To operate from any type or quality of FM set, Alden Products Company puts out a package which includes a 4 inch recorder and amplifier mounted in a chairside table or night desk. This amplifier contains a thresh-

old limiter, a framing and stop-start circuit that automatically starts the recorder when a facsimile signal is received, frames the copy, and stops it when the facsimile ceases and returns it to sound operation.

As far as we know, this will operate from any existing FM set. Various manufacturers will provide terminals for facsimile operation on equipment coming to market.

WHAT IS THE SIMPLEST FORM OF FACSIMILE OPERATION?

The simplest facsimile operation would be a transmitter using a 2,200 cycle subcarrier. Then all you need is the 4" recorder and an FM set having 3000 cycles frequency response and having 3 watt output. In this instance, part of the upper sideband of the facsimile signal is suppressed.

For the same standard of quality, the eight inch recorder must have a receiver with 6,000 cycles frequency response and furnishing greater power output.

In this simplest operation the framing will be manual.

WHAT ARE REFINEMENTS THAT CAN BE ADDED TO THE SIMPLE OPERATION?

Automatic framing, threshold limitor, automatic starting by the facsimile signal and program selection, complete automatic adjustments and volume control.

DOES THE SPEAKER HAVE TO BE DISCONNECTED WHEN RECEIVING FACSIMILE?

No. Tests in homes indicate that with the speaker left connected the station can announce the program that is

about to be sent by facsimile which makes it more interesting and calls attention to what is coming without anyone having to give his attention to the set. The peep heard in the speaker indicates that the facsimile is working and that the set is in tune.

IS A TIME OR PROGRAM CLOCK THE ONLY WAY THE RECORDER CAN BE STARTED AUTOMATICALLY?

No. Alden can provide in the recorder amplifier, and set manufacturers can incorporate in their sets and amplifiers, a means that starts the recorder the instant the set "hears" the facsimile signal and stops it the instant the facsimile signal is off the air for 5 seconds or more. Thus no paper is wasted. Important news, weather dispatches, etc., can be caught by simply leaving the set tuned in. Programs or announcers can indicate that facsimile is to follow, and as the facsimile signals come on, the recorder starts and also automatically frames.

DOES ONE NEED A PROGRAM CLOCK FOR EARLY MORNING PROGRAMS SUCH AS ARE DIRECTED TO FARMERS AND OTHERS?

No. The set can be left on to operate as described above. If a program clock happens to be available, the clock can tune on the set somewhat ahead of time so it will warm up and settle down with no paper being wasted until the facsimile signal actually starts; thus, program clocks do not have to be in exact time with the broadcast station.

SHOULD ONE EXPECT FINE PICTURES COMPARABLE TO MAGAZINES?

The real objective of facsimile is to put out useful and interesting programs and whereas one may think of facsimile merely as a method of sending pictures, every study seems to indicate that programs will be textural copy illustrated with small, salient pictures. In other words, facsimile is going to be more like the READERS DIGEST than LIFE or the SATURDAY EVENING POST. Just as the READERS DIGEST reprints articles without the original illustrations, but does lighten them with prints and sketches, so may facsimile develop its program technique. With such program technique, perfectly acceptable copy can be received in inexpensive sets and in areas where the sound program is unsatisfactory due to fading and man-made noise such as ignition.

WHAT FREEDOM IN THE CHOICE OF EQUIPMENT AND OPERATION DOES THIS STANDARD OF PROGRAM ALLOW?

With the type program discussed you can operate directly from the receiver and amplifier skipping the threshold limiter. Copy can be received direct from the amplifier without a threshold limiter and there may be some background noise printed by the recorder. In receiving copy with fine tonal shadings, this background must be closely controlled. With programs of the READERS DIGEST type, less tuning in "on the nose" of this type is necessary.

WHAT IS THE ADVANTAGE OF THE PROGRAM BUILT AROUND INTERESTING TEXT AND ILLUSTRATIVE SKETCHES RATHER THAN THE FIRST TYPE OF INDISCRIMINATE PHOTOGRAPHS?

With the READERS DIGEST type program you can get coverage in areas where audio reception is submarginal and you can work with simpler and less expensive sets without the necessity of automatic controls and precision tuning.

DOES THIS STANDARD OF PROGRAM LESSEN THE PROBLEM AT THE TRANSMITTER?

Yes, problems of adjustment in the scanner occur when programs are built around photographs. For best results photographs must be selected or remade for the optimum reproduction. Focussing will need to be carefully maintained at all times. Also for the best results, wedges to emphasize the particular shades of a photograph will need to be pretested for best results before going on the air. One also must be very careful not to place photographs with fine tonal values in copy followed by full black - as they require different settings.

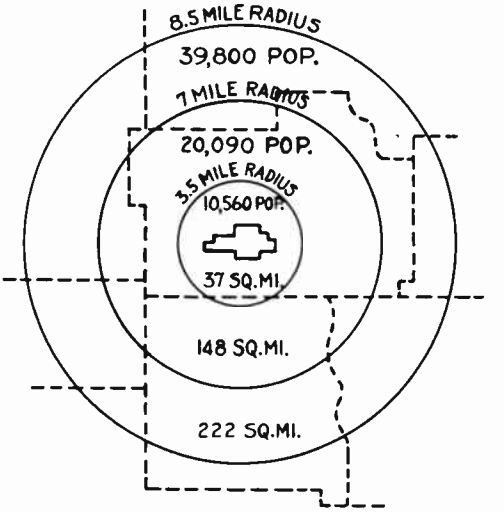
DO YOUR RECORDERS HAVE TO BE ADJUSTED FOR DIFFERENT PROGRAMS?

Not if programs are of the standards discussed. Recorders may use various makes and types of paper -- and as in photography, they are not going to be identical. So again, unless there is a situation where all transmitter controls are set and copy is all pre-tested and elaborate automatic control circuits are designed; unsatisfactory results can be expected from programs in which pictures with critical tonal shades predominate.

A few careless or poorly planned programs of this type put out by uninformed broadcasters - when high expectations have been built up in the minds of listeners - can ruin a

station for facsimile broadcasts.

Therefore, we are urging that the programming be built up on textural content and timeliness, using sketches, wash drawings and the like by artists that familiarize themselves with the type of illustration that gives the best facsimile effect - and initially at least, the programs should be designed for reception by the poorer sets and those in marginal areas and often operated by people with no technical understanding.



A typical propogation map demonstrates how putting out the type of program that can be received satisfactorily in marginal areas makes a real increase in receiving audience.

What Does a Broadcaster Want to Know?

WHAT ARE THE PROBLEMS OF A BROADCASTER GOING ON THE AIR WITH FACSIMILE?

Repeatedly scanners have been shipped and delivered to broadcasters and without any modification or special changes in the transmitting equipment, they have been on the air within an hour. They have literally been wheeled into a studio, the power cord connected, the scanner output plugged into the speech input of the FM transmitter and they immediately put out a satisfactory facsimile signal.

In the field, any set - even in sets receiving substandard audio signals - will operate facsimile recorders. (See questions Facsimile Reception).

DOES THIS RECITAL OF THE SIMPLICITY OF FACSIMILE ON THE AIR MEAN THAT THE SCANNER HAS NO ADJUSTMENTS?

No. There are wedge setting (giving choice of shades one wishes to emphasize) and focussing. Many purchasers arrange through Alfax Programs, Inc. to have their engineers and technicians visit the factory, become familiar with the choice of the most favorable copy, copy loading and all phases of its operation.

HOW DO YOU SELECT SUBCARRIER FREQUENCIES FOR FACSIMILE BROADCASTING?

Alden scanners have oscillators (plug-in type for convenience) in the following frequencies: 2000 cycles, 3600 cycles, 5400 cycles, 7200 cycles, 9000 cycles, 15,000 cycles and within these ranges subcarrier oscillators of other frequency can be supplied. The choice of frequency depends on what is desired to be accomplished.

Using the low frequency subcarriers, places your facsimile signal low in the frequency spectrum. Low positioning of the facsimile signal and the small bandwidth required for four inch transmissions makes it possible to use the 4" recorder with any FM sets on the market to the best of our knowledge. Thus the greatest possible audience or coverage is possible.

WHY CONSIDER THE HIGHER FREQUENCIES AT ALL?

For multiplexing. Under the question on multiplexing the method of multiplexing is described in which the subcarrier signal for the facsimile was 13.5 kc.

For such operation the set would have to pass 15000

cycles. This does not, of course, mean that the speaker has to respond (few do above 10,000) or that the audio in the set have a 15000 cycle response. It is assumed that in nearly any F.M. set at the discriminator or radio detector the set handles up to 15,000 cycles, consequently a facsimile amplifier can connect at this point. So for operations of this type, higher frequency subcarriers can be used.

WHAT HAPPENS AT THE RECEIVER IF BROADCASTERS USE DIFFERENT SUBCARRIER FREQUENCIES?

Nothing unless, for instance, a broadcaster is transmitting for eight inch recorders, he may find it necessary to use a sub-carrier oscillator generating frequencies beyond the frequency response of inexpensive sets.

WHAT IS MULTIPLEXING?

Multiplexing is the simultaneous transmission of facsimile and sound programs by the same FM radio station. The F.C.C. has stated in effect that sound and facsimile can be multiplexed if such operation does not detract from satisfactory reception of sound.

HOW MIGHT FM AND FACSIMILE BE MULTIPLEXED SO THAT BOTH FACSIMILE AND SOUND MIGHT BE BROADCASTED SIMULTANEOUSLY?

Using an Alden 4.1" recorder, it might be determined to send facsimile programs with a sub-carrier of 13,500 cycles. Thus the facsimile program could be transmitted at frequencies from 12,000 cycles to 15,000 cycles --

and the sound program at all frequencies up to 10,000 cycles.

IS IT REASONABLE THAT THIS METHOD OF MULTIPLEXING MIGHT MEET WITH THE F.C.C. APPROVAL?

In our opinion it is doubtful except that it might be allowed at certain so-called facsimile hours or on stations who are specializing in facsimile programs rather than music.

IS MULTIPLEXING A MUST FOR FACSIMILE TO SUCCEED?

Definitely not. From samples of program reaction it appears that once a facsimile program aimed at certain classes of audience is started, they do not want it stopped and the alternate sound and facsimile has unlimited entertainment value.

This is something that has to be seen and experienced to be fully realized.

IF MULTIPLEXING AS DESCRIBED IS NOT CONSIDERED AND IF THE LOWER FREQUENCIES MAKE POSSIBLE THE USE OF INEXPENSIVE SETS FOR FACSIMILE OPERATION, IS THERE ANY REASON TO USE SUBCARRIER FREQUENCIES ABOVE 2,000 OR 3,000 CYCLES?

There is little reason to use higher subcarrier frequencies with four inch transmissions. It may, however, be pointed out that by raising the subcarrier to 12,000 cycles the "peep" of the facsimile signal could not be heard through many sets and speakers. Thus if you have such a set and tune in to a station broadcasting facsimile, you wouldn't hear the signal. This

might be a disadvantage as you would then conclude they were off the air.

Presumably the preferred operation will always be with some of the facsimile audible as an automatic telltale that facsimile is being transmitted and as a practical matter the signal helps in tuning both facsimile and audio for a loud facsimile signal indicates the set is detuned.

What About Facsimile Programs?

WHAT KIND OF PROGRAMS BUILD AN AUDIENCE?

One sure-fire program seems to be a 6:30 AM program that tersely states the happenings that have transpired since midnight and therefore are not found in the morning newspapers.

Special information broadcasts to the farmer, pilot, retailer, business man giving weather, business reports, special services. These can be of real value to the recorder owner. Take weather coverage for example: where FM stations serve smaller areas than AM, weather reports can give local conditions and predictions on what to wear, when crops can be sprayed, what air mail flights will probably not go through.

The special service and news broadcasts make facsimile a valuable asset in your listeners' homes; a wide variety of programs aimed at housewives and children give facsimile great entertainment value. For the women there can be sustaining broadcasts giving dress patterns, recipes, special shopping notes, household hints -- for children, everything from sports quizzes to bedtime stories

and comics. Late night programs offer the listener his choice of condensed books or summary of the week's news.

Programs having "teaser announcements" between facsimile transmissions. These announcements merely telling what the next transmission is to be -- weather, market reports, baseball scores, or even a cross-word puzzle -- and making brief comments on them -- " today's weather map promises warm weather in the White Mountains," "closing market reports show a surprising lift in buying," etc. - - build up interest and give facsimile high entertainment value.

What About Combined Broadcast and Wire Service?

CAN FACSIMILE BE USED OVER TELEPHONE LINES?

The Alden 4" Recorder is adaptable to telephone work. The average voice wire suppresses the upper facsimile sideband, but for average black and white copy this has little visible effect. Lines having high losses may require a higher gain amplifier than is used in general facsimile reception. To record fine detail and shadings the facsimile band width can be narrowed on very poor lines by sending at slower rates of paper feed.

Can Facsimile Speed the Sales of FM Sets?

WHAT HAPPENS WHEN THE DEMAND FOR RECORDERS PYRAMIDS VERY RAPIDLY?

With low cost recorders operating from inexpensive sets, any community initiating service and entertainment programs on a regular schedule will create a demand that will only be satisfied by large quantities of recorders.

To be prepared for this situation, preproduction quantities are being manufactured - to be followed by production runs. Dies, molds, jigs, fixtures, complete processes are part of the program to be able to provide any quantity required.

Why Wait?

WILL IT PAY TO INSTALL FACSIMILE NOW?

Yes. Facsimile tied in with FM will give dealers enthusiasm and added reason to push FM sets. There is no question that FM quality is important and that most people buying expensive sets are going to buy FM and AM - but at the same time, many people have not been impressed with FM. If set owners have the prospect of inexpensive FM sets particularly with facsimile this might very well substantially swell the number of FM listeners. FM sets with facsimile should be a means of reaching your outlying and rural areas - Moreover these listeners are going to be the type of customers that prospective advertisers will appreciate.

It is also self-evident that condensed, localized weather programs perhaps every hour are the kind of programs that will sell to the prospective advertiser. In fact, those checking into the situation, feel confident that there will be no trouble in selling facsimile space to either local or national advertisers. Even assuming there is no way to charge for facsimile at the present time, the bulletin size equipment as well as the small recorders can be set up in many public gathering places

and thus be very effective in promoting the stations putting out facsimile programs.

Like everything else, there is no substitute for experience in suiting your operation to your particular audience. The scanning equipment is comparatively inexpensive percentage-wise in the investment of a station. With facsimile the number of hours a station can be on the air economically is greatly increased. It also appears that in any area there are enough enthusiasts to buy the $250 facsimile package who either have an FM set or would buy one to build up an audience even on an experimental basis when they have the assurance of some regular daily programs.

WHAT REASON OTHER THAN GIVING SET PURCHASERS ANOTHER REASON FOR WANTING F. M. SETS PROMPTS BROADCASTERS TO BUY NOW?

One of the problems many stations face is providing public service programs and certainly many facsimile programs can be classified as public service.

SHOULD ANYONE HESITATE TO BUY FACSIMILE EQUIPMENT WHO EXPECTS TO BE IN THE FACSIMILE FIELD?

No. First-hand information is needed. In every instance where use-tests are being made the opportunities are clearly indicated-- and with production recorders now available a jackpot awaits those who get started immediately.

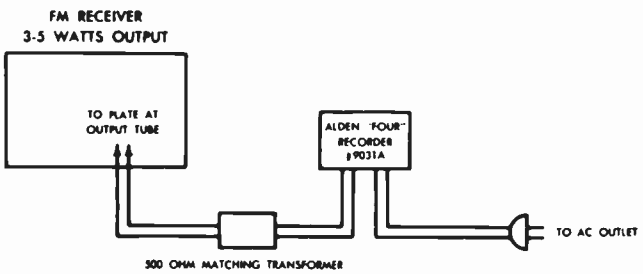
RECEIVER CONNECTION

With the Alden 4" recorder it is possible to choose your own FM receivers. There are two general types of receiver connections - the first (using receiver-output connections) for sets with 3 to 5 watts output - the second (using pre-amplifier connections) for sets with lower output. Within these two classifications you may add various refinements to the operation. Block diagrams of the connections with refinements are given below.

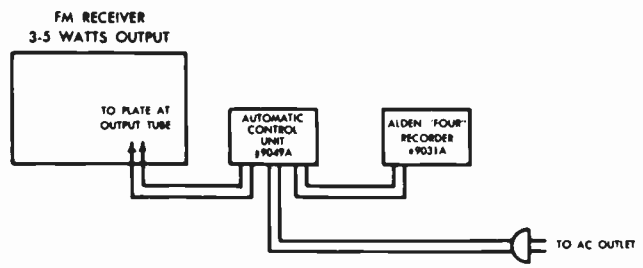
Receiver Output Connections

The simplest form of facsimile operation would be a scanner using a sub-carrier that positions the facsimile signal band width within the frequency response range of the average FM receiver amplifiers. Then all you need for reception is the Alden "four", an FM set having 3 to 5 watts output, and a 500 ohm matching transformer. In this simplest type of operation the framing is accomplished by rapid push-button framing.

The matching transformer is omitted with sets having 500 ohm speaker coils.

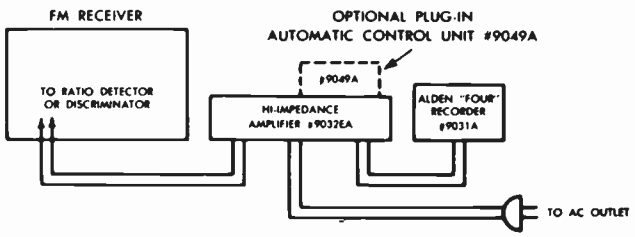


Refinements that can be added to the simplest operation include a control unit that will provide automatic start-stop and framing by the facsimile signal.



Pre-Amplifier Connections

For sets with output power less than 3 watts we supply a hi-impedance recorder amplifier #9031EA. In the simplest form of connection, the amplifier provides rapid push-button framing. To have fully automatic framing and automatic start-stop by the facsimile signal, the #9049A automatic control unit plugs into and becomes part of the hi-impedance amplifier.



FM sets connected to the recorder in this way will be flexible enough to record facsimile transmission at frequencies above the response of their audio amplifiers. This may be the case when the scanner at the transmitter uses a sub-carrier that positions the facsimile signal band width beyond the frequency range of the audio amplifier in the receiver.

In making out orders, determine just how you plan to operate. Order your recorders and components accordingly.

Have you ordered your Alden Four Inch Facsimile Recorder?

Now $100.00

The Alden Four Inch Recorder is jigged and fixtured for its preproduction runs — orders are being accepted for production. Broadcasters who are not content with just theory are using this recorder for home use tests.

Here are some of the things you can do with the Alden Four Inch Facsimile Recorder —

You can use this recorder with the inexpensive sets even when operating under marginal reception conditions. Such sets connect to amplifier supplied in our complete home recording package with the recorder housed in either a chairside cabinet or night table.

The low frequency requirements of this four inch recorder make possible experimental multiple operation of facsimile and sound simultaneously with more than 10,000 cycles of the frequency spectrum left for sound. Note this gives higher frequencies on the spectrum for sound than used for simultaneous television and sound broadcasting.

The same low frequency requirements make possible the simultaneous transmission and reception of broadcasts to bulletin size or four inch recorders by phone line and radio separately or in combination.

Manufacturers indorse the Alden Four Inch Recorder because of small cubic space, and its low power consumption makes it particularly adaptable to mobile use and operation from rural lighting units.

Free descriptive literature sent on request — or send one dollar to be placed on our SPECIAL MAILING LIST to receive timely facsimile releases. This includes a 20-page booklet just off the press discussing dual operation, multiplexing, hook-ups to existing sets, standards, how facsimile broadcasting operates, and answering many other pertinent questions.

ALDEN PRODUCTS COMPANY

117 North Main Street Brockton 64, Mass.

IN CONCLUSION-----We like the four-inch recorder. We believe it is the universal recorder for practically all types of facsimile work.

Here's Why--

Physically the 4" recorder is small and rugged.

It lends itself to volume production.
It can be mounted anywhere -- recorder space less than 0.1 cubic feet.
It "fits-in" -- looks well in panels, cabinets, dashboards.

Power drain is a minimum with the "four".

This is an important factor in mobile communication.
Important where rural lighting plants are used.

Frequency requirements of "four" transmission are low.

Makes possible facsimile transmissions over average telephone voice channels.
FM sets having low frequency audio response can receive "four" transmissions.
Problems of multiplexing are at a minimum.

Programming assures 100% readership.

The 4" recorder width holds the eye.
No distraction by second columns.
Ads cannot be missed.
3.43 inch/min. paper advance is a comfortable reading speed.
A large staff of re-write and makeup men is not necessary.
Program preparation falls into a simple, orderly procedure.

Receiver connections are simple.

Set manufacturers can provide simple plug for recorder.
You can tap in at the discriminator or speaker according to your choice of existing FM set.
Inexpensive receivers can be used.

Costs now are right.

Price of recorders is within reach of the average receiver owner.
Volume production of the 4" recorder will bring even these prices down.

ALDEN PRODUCTS COMPANY

117 NORTH MAIN STREET
BROCKTON • 64 • MASSACHUSETTS

Alden Products Company
117 North Main Street
Brockton 64, Massachusetts

SPECIALISTS IN BETTER CONNECTORS - CONNECTING DEVICES
PLUG-IN UNITS - CONNECTING CABLES - BACK CONNECTING CHASSIS

Subject: Facsimile and Impulse Recording

You or your company have been on our mailing list as being interested in facsimile or impulse recording, but as you haven't received any recent mailings you are perhaps wondering about what we have been doing in these fields.

We have been busy with continuous development work on varied equipment for the government as well as producing custom built equipment for various groups.

In one of the developments we are transmitting and recording the ordinary letterhead 8-1/2 x 11" in 32 seconds.

If you figure it out, you will note such speeds are reproducing typewriter digits or characters at the rate of at least 100 per second. This development was made possible through the use of the new low voltage, super-sensitive stable recording paper known as Alfax. It records instantly upon the passage of electric current.

The new Alfax papers coupled with our development of related recorders not only makes possible practical high speed facsimile, but opens up the possibility of all the types of recording as set forth in the enclosed circulars put out by the Alfax Paper and Engineering Company.

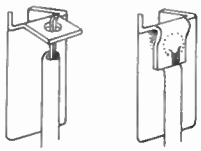
As this letter and enclosures will in part bring you up to date about what we are doing and thinking in the impulse recording field, we would appreciate hearing from you about your present interest in facsimile or impulse recording. We are enclosing a questionnaire for you to check your interest. Let us hear from you.

Very truly yours
ALDEN PRODUCTS COMPANY

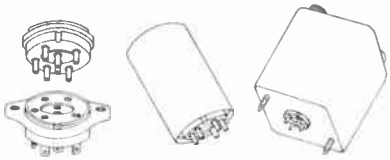
John M. Alden
(See last page)

J. M. Alden-L

ALDEN BETTER CONNECTORS INVARIABLY USE-

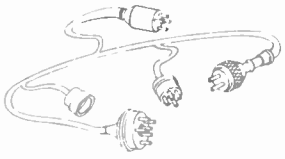


Forward connected contacts make possible foreshortened molded insulation - have snubbing action for each lead and allow each lead to be completely insulated.

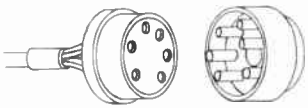


Plug-in bases with variable pin patterns for isolating critical leads and insuring equipment against misconnection. Built rugged - to last the life of unit.

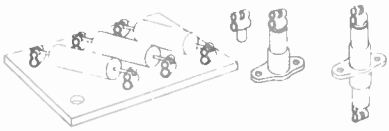
Compact tube and other clamps-- Using little space and top operated.



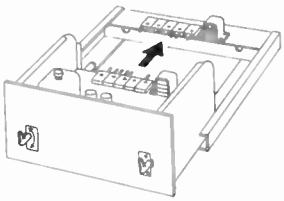
Cables with our connectors or any other if better suited for the purpose - engineered as complete units with whatever insulation, shielding or kind of wire required.



Detachable terminal strips.



Miniaturized and individual terminals, stand offs and feed throughs.



Back connected chassis, miniature and all sizes for use in racks. Cable come to back support - for ready inspection - and back connectors break circuit and identify each lead. Locking devices bring chassis into place and eject no matter how heavy.

RECORDING PROBLEM QUESTIONNAIRE

Keep me on your mailing list----------YES--------NO--------
Send price list on Plug-In Unit Parts----------YES--------NO--------

Your name: _____
Company Name: _____
Address - Street: _____
City: _____ State _____

YOUR POSITION:

Owner	Instrument Engineer	Sales Manager	Technician
Engineer	Executive Engineer	Project Engineer	Professor
	Design Engineer	Salesman	
	Other----------		

YOUR INTEREST:

High Speed Facsimile	Monitoring	Target Tracking
High Speed Impulse	Multiple Traces	Atomic Radiation
Computers		General

If you have a specific problem, complete information as to what you would like to accomplish - the signal you start with and what you want the record to show - will make our replies to your inquiries more to the point than when your questions are generalities.

The following questions can act as a check list and we suggest filling in the answers in the instances where the questions are pertinent.

WHAT IS THE NATURE OF THE PHENOMENON YOU WISH TO RECORD ?

_____

_____

AMPLITUDE OF RECORDED SIGNAL

	A. C.		D. C.	
	Max.	Min.	Max.	Min

Duration of signal _____

WAVE FORM OF SIGNAL _____

ANY PORTION OF WAVE FORM YOU WISH TO EMPHASIZE _____

DO YOU WANT THE RECORDING SELF-CALIBRATING? _____

DO YOU WANT THE TIME INDICATED? _____

HAVE YOU A SOURCE OF STANDARD SIGNALS OR INFORMATION YOU WISH TO HAVE SHOWN FOR COMPARISON TO THE DIRECT READING? _____

IF THE SIGNAL OR PHENOMENON IS NOT ALREADY AN ELECTRICAL IMPULSE OR SERIES OF PULSES CAN IT BE CONVERTED TO VOLTAGE? _____

(With Alden translators any voltage can translate into a time element so that with helix recording and the right choice of helix revolutions per minute, width of paper and paper feed, it usually is possible to either record a complete curve or a sampled curve of almost any phenomenon at accuracies not readily possible in many of the previous types of recorders).

WOULD MULTITRACE RECORDINGS ON SINGLE STRIP BE ADVANTAGEOUS?

(Our recording permits crossing of traces.)

PHENOMENA TO BE RECORDED

1. _____ 4. _____

2. _____ 5. _____

3. _____ 6. _____

HOW MANY TRACES PER RECORD _____

REMARKS ON GROUPING TRACES _____

DO YOU WISH LINEAR RESPONSE _____

LOGARITHMIC RESPONSE _____

ANY OTHER KIND OF RESPONSE _____

(We can do this with specially curved helices)

IF SAMPLING IS TO BE USED WHAT IS:

PREFERRED RATE OF SAMPLING _____

PREFERRED PAPER SPEED (.01" x samples/second) _____

PREFERRED WIDTH OF RECORD _____ inches.

REQUIRED ACCURACY (% of full scale) _____

MAXIMUM FREQUENCY _____ WAVE SHAPE RECORDING _____

MAXIMUM FREQUENCY FOR R. M. S. VALUE RECORDING _____

RECORDING THE RESULTS OF SCANNING

HOW MANY DEGREES SCAN _____ RATE OF SCAN/SECOND _____

FREQUENCY OF SIGNAL _____ PULSE DURATION _____

IS SCANNER DRIVE SELSYN _____ SYNCHRONOUS MOTOR _____

MECHANICAL _____ OTHER TYPE _____

IS SCANNING UNI-DIRECTIONAL? _____

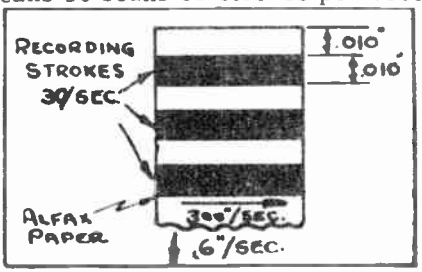
IS SCANNING RECIPROCATING? _____

FOR RECIPROCATING WILL RECORDING BE NEEDED IN BOTH DIRECTIONS? _____

In general there are two methods of recording. . . one by means of a moving stylus or spot, the other by means of two intersecting lines of which one is a helical conductor around a drum and the second a linear electrode intersecting the helix.

The advantages of Alfax paper are particularly brought out in the helix method of recording since there is no stylus or stylus inertia, and, therefore the speeds of writing and the accuracy of recording are not limited. With the helix type of recording you are not limited to charts or sheets but you can record continuously using continuous rolls of paper in any length and any width. With the helix type of recording the actual writing is at right angles to the direction of paper travel thus making possible high writing speeds without it being necessary to advance the paper rapidly. For example, if you want to record 300"/sec. on a strip 10" wide, let's calculate a paper advance which

will make each recording stroke easily discernible and readily interpretable. 300"/sec. on a 10" width obviously means 30 scans or strokes per second. Assuming the preferred .010" width of each recording stroke and introducing an additional .010" space between strokes means the paper advance would be 30 x 2 x .010" which is .6" per second paper advance. In this way you are actually recording 300"/sec. with only .6"/sec. paper speed.



THE MOST SUITABLE METHOD OF RECORDING A RAPIDLY CHANGING PHENOMENON IS BY MEANS OF SAMPLING. AT EACH SAMPLING THE VALUE OF THE PHENOMENON IS CONVERTED INTO A SIGNAL SUITABLE FOR RECORDING AS A POINT ON THE RECORDING.

A phenomena that is changing from one minute to another can be very clearly recorded by 10 or 20 samples per minute. If the change is in a matter of seconds it is very conveniently sampled at a few times per second. A frequency of 30 cycles, or a signal the variation of which is slower than 30 per second, can be easily recorded by about 150 samples per second. In recording the wave shape the rate at which the sampling is to be taken should be carefully studied and the value kept to as low a figure as is practical. Thus, if 5 samples per cycle for the highest frequencies to be recorded is sufficient the rate of sampling is 5 times the frequency. In many cases it has been found that the frequency can be definitely brought out if only as few as three samples per cycle are taken for highest frequency recorded. With this type of recording the paper is often advanced only .010" per sample so that the consecutive samples record as a line and the rate of paper advance will correspond to the rate of sampling.

Since the helix type of construction does not use stylii, it is possible to put in several overlapping traces on the same record without interference and the question of how many simultaneous traces per record is therefore determined only with regard to the convenience of the observer and not with regard to any limitations of the apparatus. The grouping of the different traces is also determined by the convenience of observer.

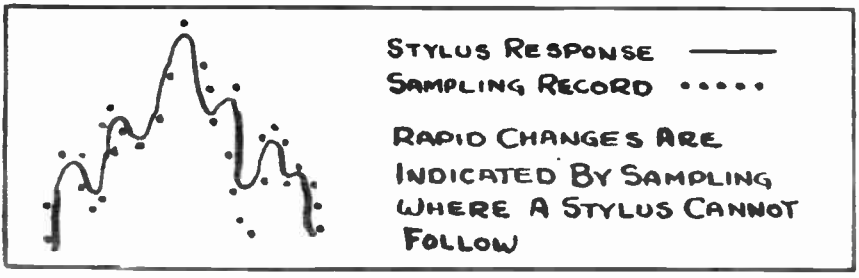
There is no advantage in sampling at rates in excess of that with which changes may take place in the particular phenomenon. Thus, for example, if the particular quantity measured rises during one second from a minimum to a maximum, and only the fact of rising needs to be recorded, the rate of sampling could be 1 per second and still give the necessary information. If, however, the rate at which the rise is taking place in the beginning and in the end of this rise also is of interest, then the number of samples should be increased and 5 or 10 samples per second would give a closer analysis of the phenomena. (These rates of sampling give the most logical time scales by simple gear reduction from standard motors. A number of recorders are also available which were built to meet F.C.C. broadcast facsimile regulations and therefore have a 360 R.P.M. helix drive which would provide 6 samples per second.)

With this method of recording two consecutive samples may be at opposite

sides of the paper and no matter how fast the sampling is done the recording will be achieved without any inertia effects, delays, or any other types of distortions. The principle factors determining the accuracy of such recording are the width of the trace, the width of paper, and the accuracy of electronic circuits. It is evident that with 10" wide paper and .010" trace you can get an accuracy of .010/10 or 1/10 of 1% of full scale. To match this the electronic system must also provide signals with a timing accuracy of .1 of 1%. (To illustrate overall accuracies of such a system a telegraph test recorder has been developed which will record and measure to an accuracy 33/1,000,000 of a second using a 10" recorder operating at 1,200 R.P.M.)

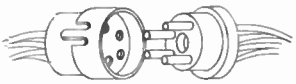
BECAUSE A RECORDER SHOWS A CONTINUOUS LINE PEOPLE ARE OFTEN CONFUSED INTO THINKING THAT IT IS GIVING CORRECT, INSTANTANEOUS INFORMATION, BUT THIS IS NOT NECESSARILY TRUE.

For a completely correct presentation rapid departures or transients from the curve must also be recorded.



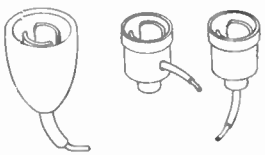
The stylus with its inertia blends the transients in with the slower changes in producing a continuous recording. However, this recording although continuous does not give a true picture of what is actually happening. With sampling even though it may not be continuous every point plotted will be a true point on the wave shape.

These questions and above information are intended to guide your thinking toward providing the essential information. Additional data or factors which you consider of importance can be sketched below.



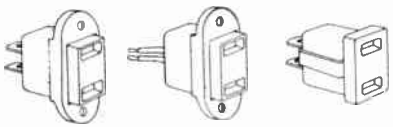
Connectors for breaking circuits- all types including regular size, miniaturized - shielded - locking.

Alden Captive Screws that hold mechanical as well as electrical units.

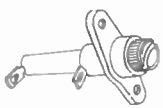


Tube Caps with leads for all tubes, voltages, and frequencies.

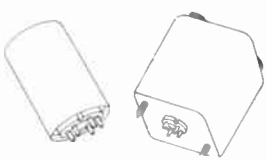
Pilot Lights - simplest possible dependable construction.



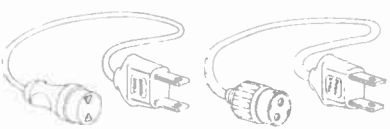
Power Outlets using smallest internal space.



Fuseholders - suited to fast production mounting.



Dress up cans for ugly transformers and making plug-in or housing oscillators or any circuit devices.



A. C. Plugs and Detachable Line Cords that individualize your equipment.

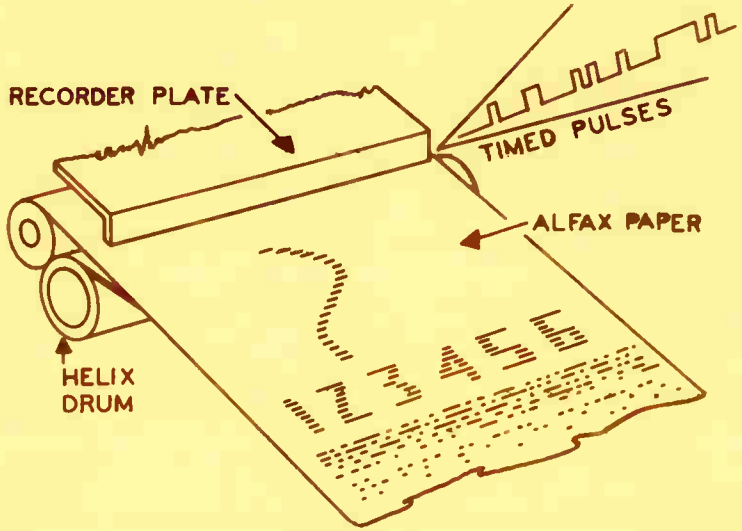
Nearly anything can be better connected than it is - Have Aldenwork with you on anything to which wires are attached.

P.S. Part of the policy of the Alden Products Company is not only to make custom-made equipment where required, but will be to furnish component parts to those who care to build or design their own recorder. These parts will include paper feeds, photocells, modulators, helices, printer bars, motor amplifiers, motors, etc.

Information as to detail is being organized and will come from the printers in May.

We would appreciate hearing from you if you would want to receive this price list or have possible needs that are immediate and urgent.

ALDEN PRODUCTS CO.



STANDARD ALFAX ROLL SIZES

Normal Width	Length of Roll	Diam. of Roll	Core Length	Core O.D.	Core I.D.	Experimental Price / Roll* Type "A"	Type "OO"
1/4"	100'	2-3/4"	3/8"	1/2"	3/8"	$1.00	$ 1.25
11/16"	100'	2-3/4"	TICKER TAPE WIDTH			1.00	1.25
2"	50'	1-1/2"	2-1/8"	1/2"	3/8"	1.00	1.25
4"	34'	1-3/8"	4-3/8"	1/2"	3/8"	1.00	1.25
6"	45'	1-1/2"	6-1/2"	1/2"	3/8"	3.50	3.85
8"	120'	2-3/4"	8-3/4"	3/4"	5/8"	3.50	3.85
18"	100'	2-1/2"	19	7/8"	5/8"	25.00	-
72"	200'	3-1/2"	78	2-1/2"	2"	100.00	-

We are glad to make paper of special sizes and characteristics to suit your needs.

*These prices are based on producing pilot run lots and if you are considering volume uses write us for specific quotations on your quantities.

SEND ONE DOLLAR NOW FOR EXPERIMENTAL ROLL OF ALFAX PAPER AND "QUESTIONS AND ANSWERS ON ALFAX RECORDING PAPERS."

Better still, send $10.00 for LABORATORY ASSORTMENT (Includes 2 rolls each of 1/4", 11/16" and 4"; one roll 8"; and 25 feet of 18" Type "A" papers) a $16.10 value.

Engineering Department
ALFAX PAPER AND ENGINEERING CO.
39 Riverside Ave.
Brockton, Mass.

A TIMED PULSE IS ALL YOU NEED

To Record——

- 100 CHARACTERS*/SEC. AND MORE
- WRITING SPEEDS 300"/SEC. AND UP
- HIGH SPEED COMMUNICATIONS
- ANY VARIATION IN PROCESSING
- RADAR, SONAR, LORAN, INFRA-RED
- MEMORY
- ALL KINDS OF TELEMETERING
- ALL TYPES OF MONITORING

DIRECTLY, INERTIALESSLY, PERMANENTLY
WITH YET UNHEARD OF SENSITIVITY

*Interpretable characters such as letters or symbols

ALFAX PAPER

A TIMELY TIP ON RECORDING

A..... HAVE YOU A TIMED PULSE?

B..... SURE, IF I HAVEN'T, I KNOW HOW I CAN GET SOME.

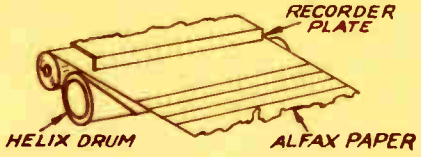
A..... Good. Now with these timed pulses you can record anything from a newspaper - through computer outputs at 100 characters per second - through instrument recording, monitoring, radar, sonar, etc., down through simple on-off monitoring.

B..... HOW?

A..... With Alfax Electrosensitive recording paper in use with a helix recorder.

B..... HOW'S THAT?

A..... A helix recorder rotates in one direction at any speed desired, as it rotates the raised portion on the drum - that is the helix, actually describes a line across the paper as it makes contact through the electrosensitive recording paper. Feeding the paper will separate these lines as shown. In so doing the paper is marked - Now a series of such pulses properly timed and separated in reference to the drum rotation will record their own picture. Such electrical pulses properly spaced will produce the characters 12345, instrumentation  , Geiger counter pulses  , or any conceivable thing you wish to represent.



B..... SOUNDS EASY.

A..... The actual marking is easy, direct, permanent, and inertialess with Alfax. However, some thinking has to go into electronics which will time and space these pulses.

B..... HAS ANYTHING BEEN DONE ON THIS THINKING?

A..... Yes. A system is presently being worked out by computer men to change the binary code from a computer to a timed pulse code for recording at least 100 characters per second. Facsimile recording is a working model of timed pulses. Alden translator will record any variations converted into voltage as they occur - These are just a few examples.

B..... VERY GOOD!!! HOW COME WE ARE TOLD ONLY NOW?

A..... In the past, we provided Alfax papers to those who had a recording problem which could only be solved with these electrosensitive recording papers. These groups included government agencies, research departments, and special interest people. We are now telling our story to all since this previous work has shown that these papers can often simplify existing recorders and the Alfax recording often provides more interpretable information about the signal.

B..... ALFAX PAPER HAS DONE THIS, THEN?

A..... TO BE SURE AND WE'RE PROUD TO MAKE IT AVAILABLE TO YOU!

B..... WHAT DO I DO TO GET STARTED?

A..... You can order immediately a sample roll of Alfax for experimenting or the laboratory assortment described on back cover. With your order we will send you basic information on how to work with Alfax. Write us immediately what you are trying to do, indicating time, speed, or anything else you'd like us to know so that we can provide information on recorder construction and where you may obtain parts if you are building your own recorder, or where you may be able to purchase a complete recorder to do the job.

It's New! It's Fast! It's Electrosensitive!

It's ALFAX!

• THE NEW RECORDING PAPER •

Here's an Ad we've placed in leading instrument and electronic journals and magazines to tell our new story

ALFAX
ELECTROSENSITIVE PAPER

Now available to Laboratories, Instrument Manufacturers, and Experimenters. Will Modernize your Recording Methods.

ALFAX RECORDS PERMANENTLY WITHOUT PEN OR INK.

ALFAX RECORDS DIRECTLY WITHOUT PHOTOGRAPHIC DELAYS.

ALFAX RECORDS WITHOUT INERTIA AT HIGH SPEEDS.

WITH HELIX TYPE RECORDERS Alfax Paper will record the signal the instant it occurs without overshooting—No need for compensation or damping—IT IS INERTIA FREE—Records at Writing Speeds to 300"/SEC. and UP.

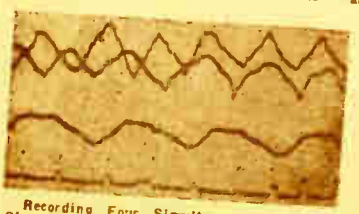
GROUPS OF RELATED SIGNALS are recorded without the problems of multiple pens and their maintenance.

ALFAX PAPERS differentiate the transient or stray signals from the true signals. The density of recording depending upon the amount of signal.

WITH HELIX RECORDER AND ALFAX PAPER signals of unusual amplitude can not damage the recorder or result in false readings as in D'ARSONVAL movement and pen type recorders.

ALFAX ENGINEERING includes making special papers or developing electronic circuits and electrode materials to emphasize any portion of wave form or signal. Recordings are easily interpretable even where noise to signal ratio is greater than one.

NEW APPLICATIONS ADAPTING ALFAX PAPERS - Computers - Radar - Sonar - Telemetering - Duplicators - Business Forms - and Monitoring.



Recording Four Simultaneous Signals Signals Can Overlap With No Difficulty

Send one dollar now for sample roll plus latest data on "Recording with Alfax".

ALFAX PAPER AND ENGRG. CO.

46 Riverside Avenue Brockton, Mass.

To -

- ENGINEERS
- RESEARCH GROUPS
- INSTRUMENT MFGRS.
- INDUSTRY

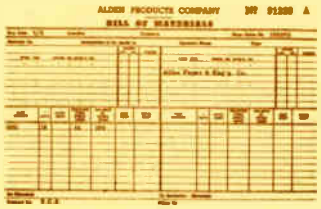
Proving of Special Interest

- TO PRODUCE
  - Memories
- TO RECORD
  - Computer Totals
  - Radar Signals
  - Sonar Signals
  - Infra Red Signals
  - Telemetered Data
- TO DISPATCH
  - Business Records & Information
- TO MONITOR
  - Any operation
  - Any process
- TO PROVIDE
  - Information for analysis studies

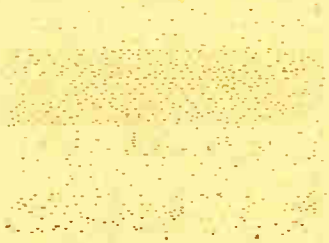
ALFAX PAPER PAVES THE WAY FOR NEW DEVELOPMENTS

Alfax Paper and Engineering Company is now making available to instrument manufacturers, engineers, research groups, and industry - a series of recording papers which enables them to do things never done before. The uniqueness of these papers is that they record directly and permanently over a wide range of writing speeds, retaining their extreme sensitivity at high speeds--and--they record without delicate pens or stylii--and without specially compensated mechanical movements or magnetic actions.

A FEW EXAMPLES - INERTIA FREE RECORDING POSSIBLE BECAUSE OF SUPER RESPONSE OF ALFAX ELECTROSENSITIVE PAPERS



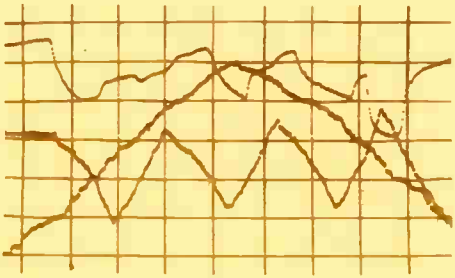
A complete business form transmitted and duplicated in 30 seconds, 180 sq." per minute.



Geiger Counter Pulses as they occur at 120 microseconds.

1234567891012345 1234567891012345
1234567891012345 1234567891012345
1234567891012345 1234567891012345
1234567891012345 1234567891012345
1234567891012345 1234567891012345

Direct recording at rate of 100 characters per second.



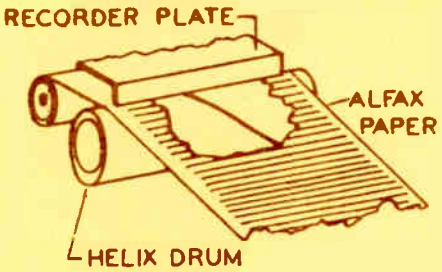
Overlapping multitrace recordings with self-calibrating time scales.

Previously there have been recording papers - sensitive to arcs, electrical discharges and heating. There have also been electrolytic papers which responded directly to electric current. Such papers have had varying sensitivity, with the markings often fading in the background, or the background of the paper deteriorating over a short period of time or after exposure to light. Also in this same category there have been papers which were made electrosensitive immediately prior to recording by passing through a chemical bath. Then there have been photographic films and paper that required developing.

Now the Alfax Paper and Engineering Company has developed a low voltage, current sensitive paper which records directly and permanently. It has a wide range of response so it can take a saturated signal and right along side of it the faintest signal. The recording paper can be moving slowly, yet high speed transients will be recorded, or again, the paper itself can travel at a very high speed, recording the principal signal with all its variations and easily recording transients of 30 microseconds duration.

Not only does Alfax have these unusual response characteristics but the paper has none of the old-time stability limitations. As a matter of fact it is packaged so that its sensitivity is controlled to the point of use so that it records satisfactorily whether it be in the tropics, arid regions or at high altitudes.

ALFAX USED WITH THE HELIX WILL BE THE BASIS OF MUCH MODERN RECORDER DESIGN. THE HELIX METHOD IS SIMPLE AND RUGGED. IT HAS NO PIVOTS OR DELICATE MECHANICAL MOVEMENTS - NEEDS NO DAMPING - NO SPRINGS - NO SHOCKMOUNTS - DOES NOT OVERSHOOT



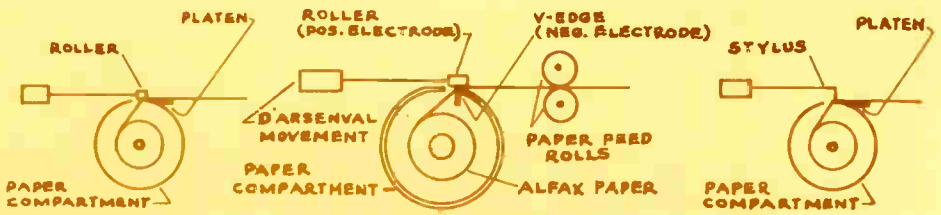
In the simplest helix type of recorder a cylindrical drum with a single spiral turn forms one recording electrode. The paper then passes between this helix and a narrow-edged strip of metal called the recorder plate. Current passes from the recorder plate through the paper, to the helix - thus marking the paper in a small contact spot. Continuous current will produce lines as shown in sketch at left.

The weak signals, the strong signals, the transients or stray signals - all paint their own picture. Sudden stray signals or overloads do not overshoot or injure the equ ipment; they only increase the density of the recording.

ALFAX PAPERS ARE USED IN EXISTING STYLUS RECORDERS

Whereas many of the new recording possibilities tie in with the use of helix-recorder plate recorder, existing stylus recorders can use Alfax directly or can be adapted to make use of the tremendous possibilities inherent in these new papers.

Naturally stylus or pen type recorders are adequate for many purposes, but often Alfax can be used to advantage in such recorders. It may also be desirable to replace the stylus with a roll to produce a wider, more easily read recording.

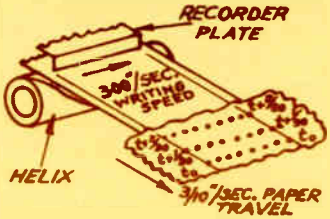


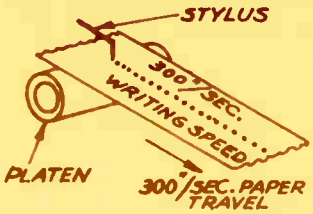
To design a recorder of the stylus type we suggest that you provide a compartment for the paper which is packaged to have a uniform response under all variations of humidity. Because it is always difficult to raise moisture content of paper, we have chosen to package Alfax paper with a high moisture content and its package maintains this controlled sensitivity in storage and transit. All you have to do is provide a compartment in your recorder which maintains this control to the point of recording.

This is how Alfax records information continuously against time in a helix recorder, at high writing speeds, yet very low paper advance rates.

CONSIDER A PROBLEM OF RECORDING AT 300" PER SECOND

HELIX RECORDER VERSUS STYLUS RECORDER





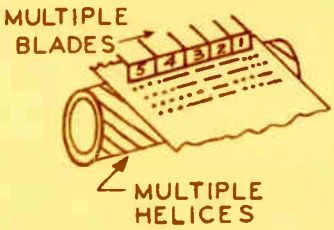
HELIX

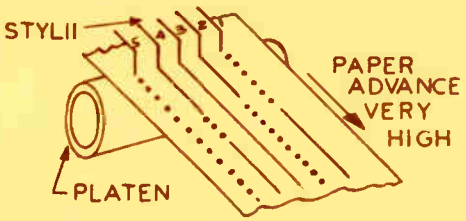
With the helix recorder high writing speeds are obtained at low paper advance rates. Marking then takes place across the width of the paper and as illustrated above, an hour's operation would use up only 90 feet of paper, a roll about 2-1/2" in diameter.

STYLUS

To obtain the same high writing speeds with a stylus the paper advance rate must be tremendous. For example at the writing speeds shown, an hour's continuous operation will use up 90,000 feet of paper which would be a roll 6 feet in diameter. Memories on magnetic tape and wire are spread out over such lengths needlessly. Alfax paper with helix recorder will provide memories with the same 1000 to 1 saving. Lengthwise recording of wire or paper is wasteful during intervals when there is no recording unless recording is suddenly stopped and started - while transverse recording has neither the problem of waste nor stop start.

A FURTHER ILLUSTRATION OF HELIX RECORDING AGAINST TIME

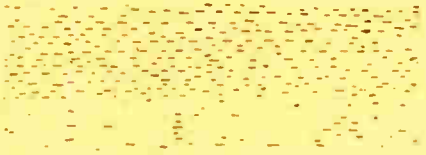




In the case of multiple channel recording as shown above, again the helix type recorder with Alfax paper does the job with ease and simplicity. In this case multiple helices and printer bars replace the multiple stylii - and record the same information at much less paper consumption and the recordings are made inertia free with little power consumption.

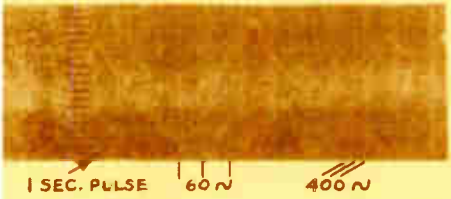
When Alfax papers are used in conjunction with the helix recorders, the recording is a result of the intensity and timing of the signal. Now any phenomena, whether it be the output of a computer or the output of a thermistor or facsimile output of a scanner, naturally supplies such information to the recorder in this form, pulses or signal variations against time. Dependent on the nature of these pulses or variations, curves, characters, or pictures will be recorded.

HERE ARE SOME ACTUAL EXAMPLES



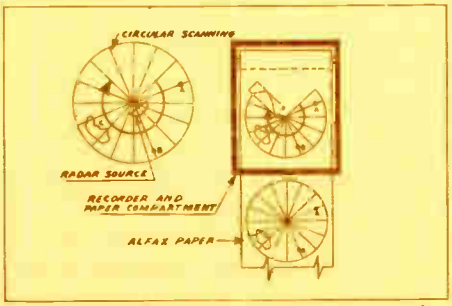
MICROSECOND PULSES DIRECTLY

A geiger counter rate indicator may present information audibly and on a meter in counts /sec. or in a conventional recorder as a varying amplitude trace. Using the simple helix recorder and feeding the amplified pulses directly to the electrodes, we present an actual picture recording, in which each pulse is visible and a direct comparison of field strength can be made. A true picture of deterioration or decay rate is thus permanently available for analysis. Alfax papers are self-calibrating - thus grids can be superimposed electronically at any chosen time interval to give an even more complete picture and to give a quick appreciation of acceleration and deceleration.



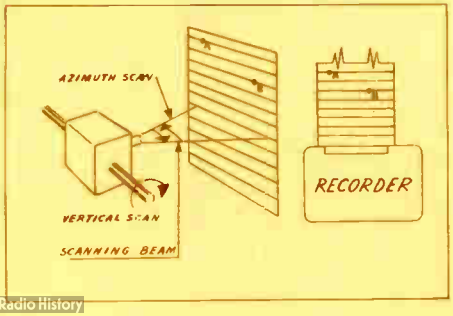
This illustration is a record of monitoring radio station WWV made with Alfax papers to determine the accuracy of a synchronous drive. If the helix drum is not driven with absolute synchronism, the amount of displacement of one of these recorded pulses from a straight line is a direct measure of the absolute inaccuracy of the drive. Although the writing speed of the recorder used was only 28"/sec., an accuracy of 1 part in 10,000,000 was obtained. As a result of the extreme sensitivity of the paper you will also note the pattern produced by the 400 cycle tone which was simultaneously transmitted. A 60 cycle hum and random atmospheric noise is also clearly evident. This is an EXAMPLE of UNEXPECTED EXTRAS that can often be useful beyond the original purpose of the recording.

FOR RECORDING FROM INFRA RED, RADAR, OPTICAL UNITS, facsimile or any scanning head the recorder helix can rotate synchronously or in step with the scanning or detecting device and in this way plot information in the same relative position seen by the scanner.



Where oscillating or sector scanning principles are used, the recording helix is made with special configurations to match the scanning action, such as sinusoidal, logarithmic, or exponential in shape. The recorder in this case is of a type similar to a facsimile recorder with paper speed matching the speed of vertical scanning.

Where information is obtained from a rotating scanning head such as in radar systems the recorder helix with its printing mechanism can be revolved to stimulate azimuth of scanning head by a synchronous motor or servo mechanism while the helix itself makes one turn on its axis for each range scan.



Sometimes in thinking if direct recording of Radar is possible with Alfax people get confused and think in terms of the high pulse repetition rate (For example, 1500 per second), instead of realizing that what they want to record is what the eye sees. Actually Alfax has such sensitivity and ability to respond to both the transients and the true signals that it makes possible sampling and recording the radar signals directly. - Or where a Radar scope is used instead of photographing the scope to get a record, it's possible to get an immediate direct record by scanning the information presented on the Radar scope, feeding these pulses into a recorder, and record this same information directly to Alfax.

Today's equipment operates at speeds faster than what is needed to produce a complete RADAR recording on one complete turn of the antenna with typical PPI Resolution. ($1/2^{\circ}$ or 720 lines).

SPECIAL JOBS ALFAX CAN DO

Alfax's extreme sensitivity to minute variations of signal current allows the persistent signal of any pattern to be interpreted even though it is intermingled with noise or extraneous signal pulses of equivalent or even greater value.

*MAXIMUM LEGIBILITY OF SIGNALS RESULT FROM ALFAX PAPERS AND SELECTED ELECTRODE MATERIALS

The paper when used with suitable electrodes will optically rectify the signal so that this can be another means of emphasing a peculiar signal and recording the particular pip or wave form desired.

ALFAX ENGINEERING GIVES THIS HIGHLY DESIRABLE OPTICALLY RECTIFIED RECORDING

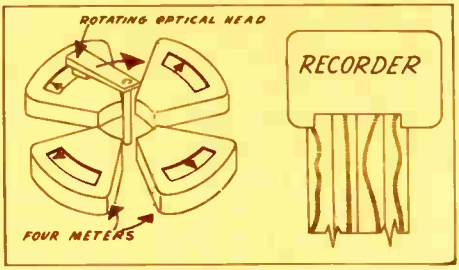
This extreme sensitivity plus special electronic equipment enables the paper to be selective and to either emphasize, suppress or eliminate various portions of signals as desired. As shown only the positive information part of the signal was recorded and negative loops which in normal recording would mask the information are eliminated.

*This is an example of how a problem was solved by Alfax engineering. During the war one of the Armed Services called upon Alfax to develop direct recording paper for use with some specialized equipment. The final paper needed was one which gave a readily interpretable recording even though the signal to noise ratio was less than one. By simultaneous study of paper and combination of electrodes Alfax solved the problem through optical rectification.

Simple photoelectric scanners can also be used to obtain results previously possible only by directly photographing meters or equipment, and thus avoid delay and inconvenience of film development.

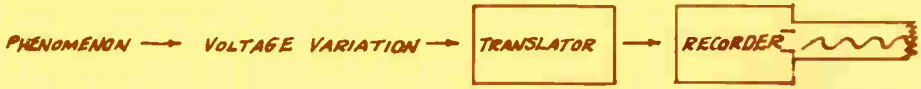
Optical scanning head rotates and scans the meters.

Recording helix rotates in synchronism with scanning head and produces a simple, direct recording.

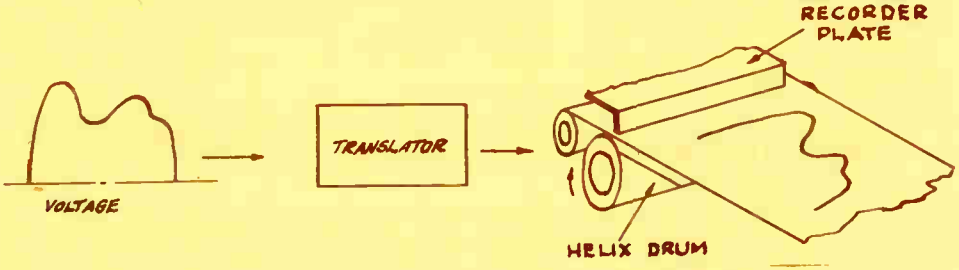


IMPULSE OR INSTRUMENT RECORDING

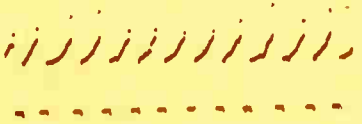
Any phenomenon can be translated into a voltage and any voltage can be recorded on Alfax. Voltage variations can therefore be recorded graphically as direct wave shape variations.



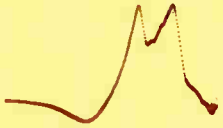
Using a translating amplifier of the type manufactured by the Alden Products Company of Brockton, Mass., (their 9070-A), voltage wave shapes will be recorded as wave shape patterns on the simple helix recorder.



HERE ARE SOME ACTUAL RECORDINGS



A Multivibrator Action



Temperature changes picked up by Thermistor

Variation in A.C. Power Line Voltage

SEVERAL TYPES OF CIRCUITS MAY BE USED TO FEED ELECTRICAL ENERGY INTO ALFAX PAPER

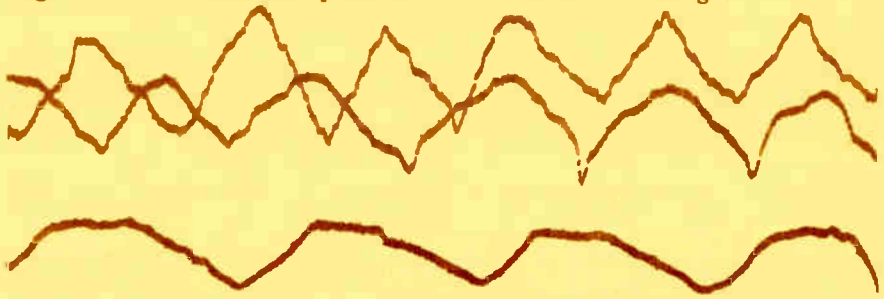
(1) A controlled circuit which carries a variable value of direct current will activate a relay which switches on and off the needed printing current.

(2) A low impedance vacuum tube may be used with the printing elements connected either in the plate circuit or in the cathode circuit whichever is more convenient.

(3) An electronic control circuit may supply a variable intensity A.C. carrier; this is passed through a matching transformer to a rectifier, preferably full wave, which supplies the necessary printing current.

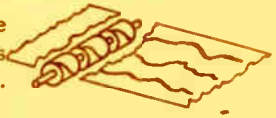
MULTI-TRACE RECORDING

The ability of this paper to respond in density whenever current is flowing makes it possible to feed signals from several channels simultaneously into a single helix recorder and produces multi-trace recordings.



MULTIPLE TRACES ARE RECORDED SIMULTANEOUSLY ON CONVENTIONAL RECORDERS--USING ONLY A SINGLE HELIX AND SINGLE RECORDER PLATE

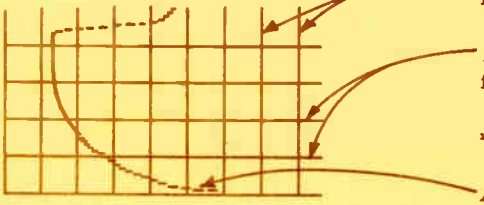
Or if desirable, a whole series of helices can operate on a common shaft thus producing a side by side series of recordings rather than a super-imposed presentation.



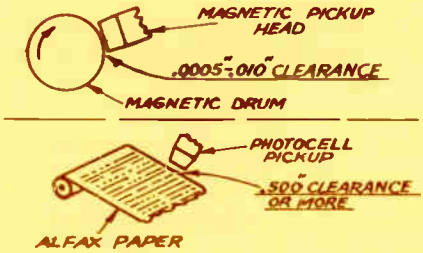
It is also possible to record with a common helix and more than one recorder plate as still another means of making possible simultaneous recordings.

The same ability to respond in density to the amount of current flowing makes it possible to introduce standard signals which will make the record self-calibrating. The recording below is a single trace with a 60-cycle calibration introduced simultaneously into the recorder and with timing signals also introduced at 10-second intervals.

A SELF-CALIBRATED ALFAX RECORDING



USE OF ALFAX RECORDING PAPERS AS MEMORIES

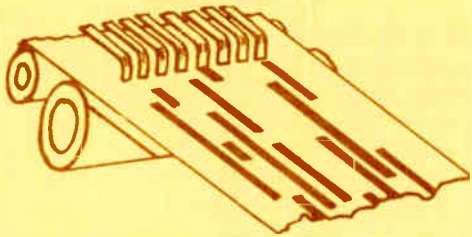


ALFAX IS A VISUAL MEMORY

Reading Alfax memories, electric eyes avoid the close mechanical tolerances normally associated with magnetic and magnetic tape recording. Alfax does the job easier with optics - Visual checks can be made to assure correct recording at any time, and the recorded trace can be any width you desire for legibility.

Helix recorders with Alfax allows you to spread the information across the width of the paper so that a minimum space is used for these records thus saving storage space. With present helix-recorders with writing speeds of 300 inches per second frequencies up to 15KC are being recorded.

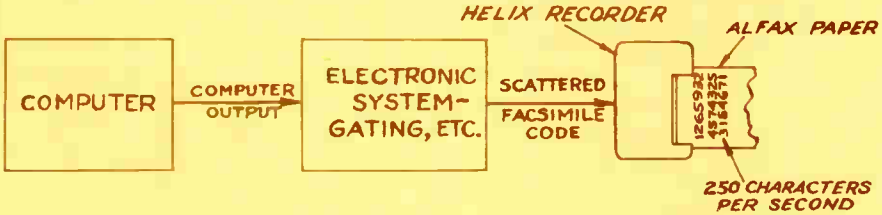
Alfax with the electric eye can be used to replace punched tapes because it is faster and more versatile and does away with the mechanical maintenance problem - thus it opens up new fields of automatic machinery. For example lathes will be operated automatically after once the manual operation is recorded on Alfax.



COMPUTER RECORDING

Workers in the computer field realize that the speed of their computers is capable of producing answers in hundreds of characters per second, but they have been using a recording means such as the electric typewriter limited to low speeds and mechanical troubles.

Alfax Recording Papers are insofar as we know the only direct recording media suitable at the extremely high recording speeds needed in computer work. Their extreme sensitivity with the helix-printer bar recorder allows characters to be recorded at speeds not attainable with existing systems. In present day recording equipment Alfax papers are now recording at the rate of 250 characters or more per second. A simple block diagram will illustrate how Alfax is being considered along the lines of computer recording.



THE FLEXIBILITY AND RESPONSE OF ALFAX PAPERS KEEPS UP WITH COMPUTER OUTPUT.

FACSIMILE WITH ALFAX - FASTER THAN TELEPHONE

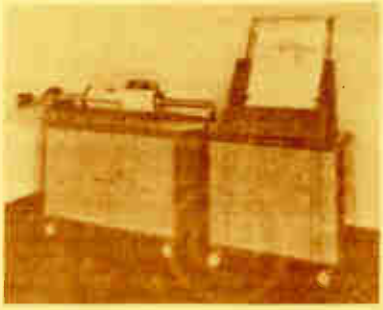
One thinks of speech as the fastest means of communication until one realizes that you can read at least twice as fast as you can talk - and here again is where Alfax opens up a whole new field - its extra sensitivity and low voltage requirements lends itself to use in portable equipment and many places where facsimile was not previously considered feasible.

Supplementing facsimile with sound you call attention to important parts of transmission. With such multiplexing (sound with facsimile) your presentation is extra effective.

POTENTIAL POSSIBILITIES OF ALFAX FOR BUSINESS PURPOSES ARE FANTASTIC.

The simplicity of Alfax recording equipment over typewriters, teletypes, is but one interesting factor. More important is that most business systems call for copying, copying, and copying and then distribution of the copying, part of the copies to go to one place and part to other places. Thus Alfax makes possible the system where instead of recopying information it is put in the scanner, recopied as many times as needed on the spot or instantly where it is to be used. Because the binary code or other codes can record directly, not only can answers of computers be recorded, but Alfax makes possible the development of electronic typewriters, bookkeeping machines, inventory control banks and these machines can be located wherever the information that they present is most needed or most desirable. Electrical information into these machines will be fed directly from the points where it originates.

FACSIMILE RECORDING EQUIPMENT



In the reproducing of photographs and halftones by facsimile, Alfax Type "A" - sepia paper insures pleasing tone shade response over a wide range of contrast control settings, and facial shadows are reproduced not as dirty grays but as warm sepia tones. Thus, automatic, unattended operation of recording equipment results in uniformly acceptable recordings - not too harsh, not too flat.

With Alden facsimile equipment and Alfax Recording Paper, "Gone With The Wind" can be transmitted and recorded over existing low frequency channels without waiting for channels that don't exist. No photographic developing is necessary to achieve the final copy which is directly readable without viewers, projectors, or further photographic process if you require copies.

SECONDS ARE VITAL - ACCURACY IS NECESSARY
USE ALFAX IN FACSIMILE FOR QUICKEST AND BEST RESULTS
- OFFICE - STATIONS - AIRPLANE - AT HOME - MOBILE UNITS -

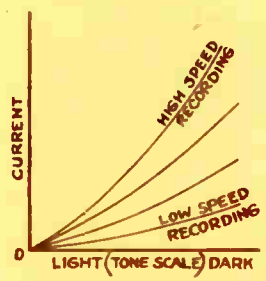
FACTS ABOUT ALFAX

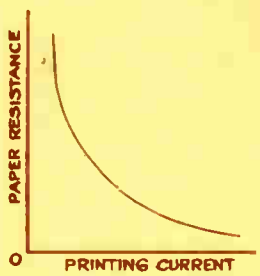
Alfax papers are now available in three types--Type "A" is the most sensitive high speed paper. It records a sepia brown trace on a white background and is being used at speeds up to 18000"/min.

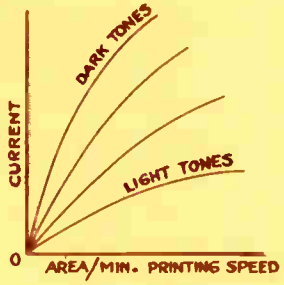
Alfax Types "OO" and "NO" record a black trace on a white background and are used at writing speeds up to 700" per minute. Approximate paper impedance varies from 500 ohms at low writing speeds to 200 ohms at speeds in the order of 18000"/min.

The amount of power required to mark the paper depends on the speed of writing and the degree of density needed in the final mark. At slow speeds a few milliamperes of current will produce legible traces, at 28 square inchee of area per minute -2 or 3 watts of power at 20-30 volts will produce dense solid areas - while high speeds such as 180 square inches of area per minute may require 25-30 watts for solid dense recording.

GENERAL CHARACTERISTICS







STANDARD SIZES

Normal Width	Length Of Roll	Diam. Of Roll	Core Length	Core O.D.	Core I.D.	Experimental Price Per Roll* Type "A"	Type "OO"
1/4"	100'	2-3/4"	3/8"	1/2"	3/8"	$ 1.00	$ 1.25
11/16"	100'	2-3/4"	TICKER TAPE WIDTH			1.00	1.25
2"	50'	1-1/2"	2-1/8"	1/2"	3/8"	1.00	1.25
4"	34'	1-3/8"	4-3/8"	1/2"	3/8"	1.00	1.25
6"	45'	1-1/2"	6-1/2"	1/2"	3/8"	3.50	3.85
8"	120'	2-3/4"	8-3/4"	3/4"	5/8"	3.50	3.85
18"	100'	2-1/2"	19"	7/8"	5/8"	25.00	-
72"	100'	2-1/2"	77"	2-1/2"	2"	100.00	-

We are glad to make paper of special sizes and characteristics to suit your needs.

*Volume use of Alfax paper of any one type has not as yet been developed, so present prices are based on pilot run quantities or on custom lots. If contemplating eventual use of large quantities of paper disregard the present prices much as you would have the early prices of Nylon, Lucite, Teflon and other new developments. It, however, is not reasonable to expect electro-sensitive paper to be as cheap as the cheapest unprocessed paper. Its first uses should be where it does something of value that is not readily done by other means.

SEND ONE DOLLAR NOW FOR EXPERIMENTAL ROLL OF ALFAX PAPER AND "QUESTIONS AND ANSWERS ON ALFAX RECORDING PAPERS."

Better still, send $10.00 for LABORATORY ASSORTMENT (Includes 2 rolls each of 1/4", 11/16", and 4"; one roll 8" and 25 feet of 18" Type "A" papers) A $16.10 VALUE FOR $10.00.

FOR DIRECT RECORDING AT ANY SPEEDS USE THE HIGHLY SENSITIVE ALFAX PAPERS

---ANY WIDTH---ANY LENGTHS---BLACK OR BROWN---

"PEEWEE"
RECORDS 2" LINE
60 LINES/HR.

"WORKHORSE"
RECORDS 4" LINE
360 LINES/MIN.

"SPEED DEMON"
RECORDS 8" LINE
30 LINES/SEC.

THESE ARE A FEW OF THE MANY RECORDERS USING ALFAX PAPER showing the wide range of operation possible with these highly sensitive papers. Any phenomena can be recorded permanently by Alfax with relative ease and simplicity.

USE ALFAX FOR • COMPUTER WORK • MEMORIES • RADAR • SONAR • MONITORING OF FREQUENCIES, OFF - ON - TIME STUDIES.

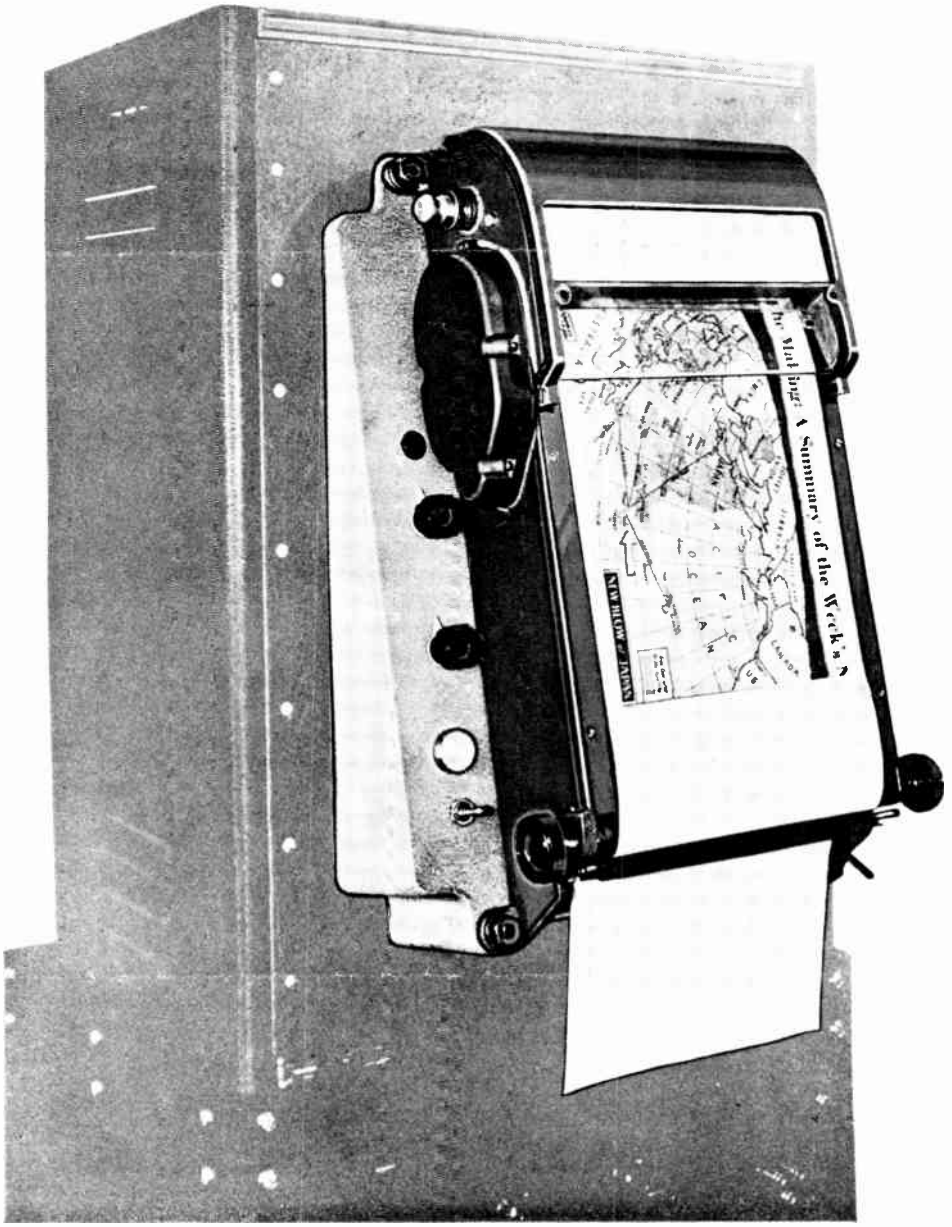
Write to us NOW and let us know what you think might be done with this paper and your suggestions.

We are particularly anxious to work with those who see new applications as well as those who wish to improve existing recording.

"BROADSIDE"
RECORDS 18" LINE
360 LINES/MIN.

ALFAX PAPER AND ENGINEERING CO.
40 Riverside Ave.
Brockton, Mass.

Facsimile



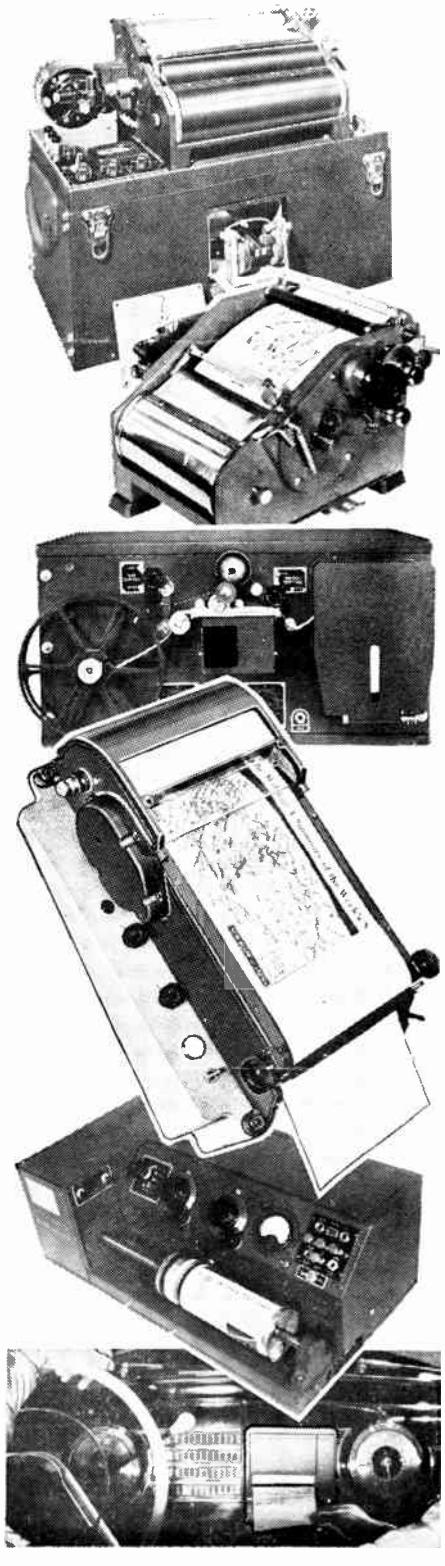
JUL 2 1945

New Developments

IN FACSIMILE AND IMPULSE RECORDING EQUIPMENT BY ALDEN PRODUCTS COMPANY

ALDEN

for Graphic Recording of any kind



OUR YEARS OF EXPERIENCE, and cumulative skills, in the designing and production of RADIO COMPONENTS, are now being used in making equipment which covers ***the entire field of FACSIMILE.***

Actual service, as found in war and communication work under all conditions, has given a PRACTICAL quality to our equipment which, under ordinary conditions, would not have been obtained in years of engineering with limited application.

ALDEN PRODUCTS COMPANY is manufacturing practically ALL TYPES AND SIZES of facsimile and impulse recording equipment—using all the varied recording mediums; Photographic Paper, Film, Electrolytic Paper, Teledeltos, and Ink.

ALFAX IMPULSE RECORDING PAPER

•

By "COVERING THE ENTIRE FIELD," we mean . . .

1. Some of our equipment has been used for the transmitting and receiving of photographic pictures of reasonably high resolution (such as the war pictures now appearing in the news).

2. Continuous Recorders—of the type whose value has been proven on National and International news service circuits—are now on their way to the Orient, to be used for the receiving of the so-called "picture" languages. They use ALFAX paper.

3. Also, through the use of ALFAX (the first high-speed black and white permonent recording paper), HIGH-SPEED Signal Analysis Equipment has been made possible for various laboratories and Government Deportments. Other equipments have employed Teledeltos Paper for message work and other purposes.

4. For outlying posts, where servicing equipment is an impossibility, or, where radio or wire links are of poor quality and power, ALDEN Tape Recorders (recording medium, ink)—have been designed to operate with a minimum of trouble and adjustments, ond hove PROVED MOST SATISFACTORY.

5. The ability of ALFAX Paper and ALDEN Machines to record impulses *as they occur*, without the inertia problems of mony previous methods, has made possible other recarders at vorious speeds (including slow). They will record a whole day's history of related phenomena, with time indicated, and often—with self-calibrated linear reference morks for ready interpretation.

ALDEN PRODUCTS COMPANY

117 North Main Street

BROCKTON [64F1], MASSACHUSETTS

• • • • • • •

FACSIMILE

The BUILDING of the EQUIPMENT shown on the opposite page has solved most of the problems (as well as providing us with adaptable UNITS and SUB-ASSEMBLIES) in the design and making of models that are in their advanced stage for:

HOME RECORDERS—that are simple—attractive—and which produce clear black and white copy.

★

DISPATCH RECORDERS—which use a minimum of panel space; for Railroads, Emergency Service Cars, Aircraft, Police Cars, Taxis, etc., etc.

★

LARGE AREA CONTINUOUS RECORDERS—for maps on paper that is readily drawn on, for interpretation or notes, and, which can be made translucent for the making of duplicate prints.

★

INTER-DEPARTMENT, or INTER-COMPANY MESSAGE, DESK SIZE RECORDERS—for memorandum or sketch dispatch, using ordinary typewriting for the scanning, but enlarged one and a half times, for legibility.

★

We do not want to miss an opportunity to discuss with you any interest you may have in . . .

FACSIMILE or IMPULSE RECORDING

. . .

WRITE . . . or, better still,

VISIT US by appointment!

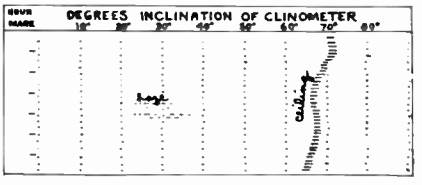
ALDEN

PRODUCTS COMPANY

117 North Main Street

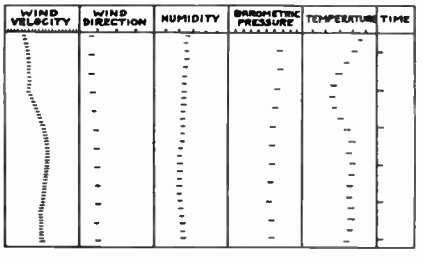
BROCKTON [64F1], MASSACHUSETTS

CATCHING THE CATHODE RAY SIGNALS IN A PERMANENT RECORD • Probably one of the greatest advances in all engineering is the application of the cathode ray tube to make visible high frequency current for study and analysis. Now, Alfax paper and Alden recorders are the next step, making possible a permanent record on paper of what can be seen instantaneously on the cathode ray tube screen.



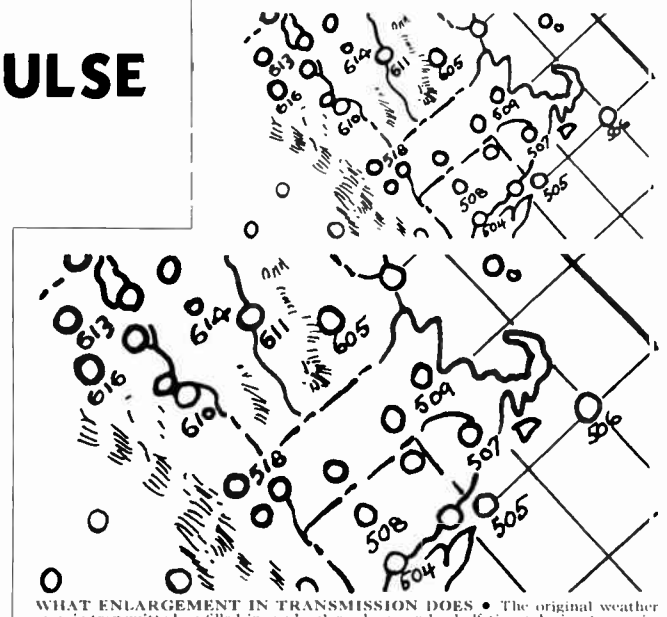
REFERENCE MARKS MAKE IT EASY TO INTERPRET RECORDING • This type of recording shows how standard or definite reference marks are recorded vertically for the accurate interpretation of received signals, whose intensity is indicated by shade and width of mark. Time intervals are impressed laterally.

ALFAX



HOW AN HOUR BY HOUR HISTORY OF FIVE RELATED PHENOMENA IS RECORDED • The above record will suggest the possibilities of recording several different types of phenomena conditions or values (usually related) which need to be recorded or studied together with time indicated. For instance, in process control, recording rate of flow, pressure, velocity, temperature, humidity is recorded day by day or hour by hour nearby or at a remote center.

ALFAX



WHAT ENLARGEMENT IN TRANSMISSION DOES • The original weather map is transmitted as filled in, and enlarged one-and-a-half times during transmission. It shows the possibility of closely written information being received so it can be easily read, and on paper on which further drawing or writing can be added. In this instance, the forecaster can draw his own interpretation of the isobars. Again Alfax paper can be made translucent for printing or overlaying.

SOME TYPICAL EXAMPLES

OF

Alden Skill

The development and production of FACSIMILE units is a logical result of Alden's years of experience in the design and manufacture of many radio and other electronic components. Alden means ENGINEERING CRAFTSMANSHIP that consistently comes up with the PRACTICAL ANSWERS

ANALYZER PLUGS AND ADAPTORS

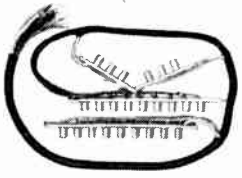
adopted as standard test equipment by Signal Corps. Our adaptor experience plus tools, molds, contacts, dies at hand make any adaptor problem easy.

UNKNOWN CONDITIONS

(high voltage operation in sub-stratosphere) was required of this single-circuit connector. First sample, submitted in one week, met all rigid tests.

UNDERWRITERS OBJECTED

to fuseholders loosening in service. Alden's fuseholder is riveted or eyeleted to panel to prevent this. Assembled to set with usual radio assembly tools.



A COMPLETE ASSEMBLY

for a juke box. Provided bracket mounting for 24 dial lights with minimum of parts, labor, soldering. Sold as complete unit, wires cabled, ready for assembly by manufacturer.

CATHODE RAY TUBE CONNECTOR

made at urgent request of television manufacturer. We met schedule with assembly now used for all types of radar and test equipment. Safety factors far exceed actual requirements.

CANADIAN GOVERNMENT SPECIFICATIONS

for telegraph keys were met by modifying American parts, to allow set contractors to meet schedules. Integrated departments made us an excellent source for keys to government specifications.

NEW CONTACT

that overcomes difficulties in soldering the conventional terminal on AN or other government specification connectors (such as the PL-114) provides for mechanical holding leads, complete insulation. Our experience making all types of contacts is indispensable in designing new components.

Alden **PRODUCTS COMPANY**

117 NORTH MAIN STREET • BROCKTON [64F1], MASSACHUSETTS

ALDEN PRODUCTS COMPANY

Manufacturing Product Engineers

RADIO NA-ALD PRODUCTS

117 NORTH MAIN STREET
BROCKTON • 64 • MASSACHUSETTS

June 19, 1945

Mr. F. D. Fallain
Flint Broadcasting Co.
Flint, 3, Michigan

Gentlemen:

You will probably be interested to know that we have reached a point where we can actually take orders for facsimile equipment for delivery after July 1st.

There are broadcasting and newspaper interests that feel they should have first-hand information on various phases of the facsimile problems and rather than wait for perfected equipment, they are anxious to have their Engineering and other departments determine various phases of the problem.

To aid in this development work, we have decided to make available a scanner which we built for our own use. It is a versatile scanner, made especially for proving out our various types of recorders. We built it to produce a quality scanning signal - free from gear hash or vibration effects, at the same time to accommodate drums of various sizes and with various feed speeds.

This is not a single-purpose machine, nor one that the broadcaster will eventually use, but it will enable him to put a good signal on the air to prove out various types of recorders.

We are also prepared to supply continous recorders of the following widths - 4", 6",8" and 18" Delivery dates are now being scheduled. Again, these recorders may not be the ultimate that will be wanted in quantity. We are making them available to allow the judging of consumers' reaction to recordings of various sizes, speeds, contents and detail. For experiments in facsimile -- the actual program composition -- for determining coverage and for working out many other transmitting and receiving problems, these recorders will be invaluable.

Now, the equipment is not particularly cheap, will be made in comparatively small quantities, will involve more-or-less engineering, and require the ability of our best mechanics

and technicians. The immediate quantity that we can produce is limited, as it must be fitted into a high priority program of recorders being made for the Armed Forces. We do have the capacity to manufacture equipment such as this for which most of the problems have been solved. We will produce units in limited quantity for those who are anxious to get going rapidly, and to whom the expense is not an important factor.

Before July 1st, we can add to our orders for the initial lot of scanners described above. We can also bring through soon, 8" page recorders of a type used by various brances of the government in proving out principles.

We will also have available other units for synchronizing and scanning as well as a dispatch scanner and recorder. This, in turn, is going to be released - not in its final form - but in its early design stage so that its possibilities and limitations can be determined and that final designs may incorporate the necessary changes and features to make this equipment most satisfactory for the particular work for which it is intended.

If you are interested and want more information, I suggest contacting the writer at the earliest possible moment.

Very truly yours,

ALDEN PRODUCTS COMPANY

M Alden
President

M. Alden - H

P.S. To give you a better idea of our manufacturing setup, we are sending you under separate cover a booklet entitled "Manufacturing Product Engineers". Watch for it.

AP104 Fellow FCC Govt

WASHINGTON--THE FEDERAL COMMUNICATIONS COMMISSION HAS AUTHORIZED FM BROADCAST STATIONS TO OFFER FACSIMILE TRANSMISSION SERVICE ON A COMMERCIAL BASIS, EFFECTIVE JULY 15TH.

FACSIMILE RADIO HAS LONG BEEN IN THE EXPERIMENTAL STAGE. IN VOTING TO GIVE IT A COMMERCIAL STATUS, WHICH MEANS THAT CHARGES MAY BE MADE FOR IT, FCC SAID TODAY THAT POSTWAR IMPROVEMENTS IN TECHNICAL DETAILS WARRANTED FACSIMILE'S REMOVAL FROM THE EXPERIMENTAL CLASSIFICATION.

FACSIMILE BROADCASTING, COMMONLY CALLED "FAX," INVOLVES THE TRANSMISSION OF STILL PICTURES, OR PRINTED OR WRITTEN TEXTS. SPECIAL SENDING AND RECEIVING EQUIPMENT IS REQUIRED.

THE COMMERCIAL TRANSMISSION AUTHORITY IS LIMITED TO FM STATIONS. THERE WILL BE TWO TYPES OF SERVICE--SIMPLEX AND MULTIPLEX.

IN SIMPLEX TRANSMISSION, THERE IS NO AUDIBLE RECEPTION. IN THE MULTIPLEX OPERATION, THE FACSIMILE IMAGE IS ACCOMPANIED BY AUDIBLE BROADCASTING, THE VISUAL AND AURAL SIGNALS MOVING SIMULTANEOUSLY.

THE COMMISSION LIMITED SIMPLEX FACSIMILE TRANSMISSIONS TO ONE HOUR IN EACH DAY BETWEEN 7 A.M. AND MIDNIGHT, WITH NO LIMIT BETWEEN MIDNIGHT AND 7 A.M.

MULTIPLEX FACSIMILE MAY BE TRANSMITTED FOR A MAXIMUM OF THREE HOURS BETWEEN 7 A.M. AND MIDNIGHT, WITH NO LIMIT BETWEEN MIDNIGHT AND 7 A.M.

THE OPERATION WILL BE LARGELY IN BLACK AND WHITE, BUT THE COMMISSION SAID THAT THOSE WHO BELIEVE THEY HAVE THE TECHNIQUE FOR COLOR TRANSMISSION ON A SATISFACTORY BASIS MAY USE IT.

THERE ARE 11 STATIONS IN THE COUNTRY PRESENTLY AUTHORIZED TO ENGAGE IN EXPERIMENTAL FACSIMILE BROADCASTING, MUCH OF WHICH HAS BEEN DONE AFTER REGULAR BROADCAST HOURS.

FACSIMILE HAS BEEN SUCCESSFULLY USED FOR REPRODUCING WHOLE NEWSPAPERS, AND FOR TRANSMISSION OF LENGTHY BOOKS AND MANUSCRIPTS.

JA209PED 10

AP105