July 7, 1936. H. PFANNENSTIEHL 2,046,697

RECORD PROJECTOR

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FIG. 1

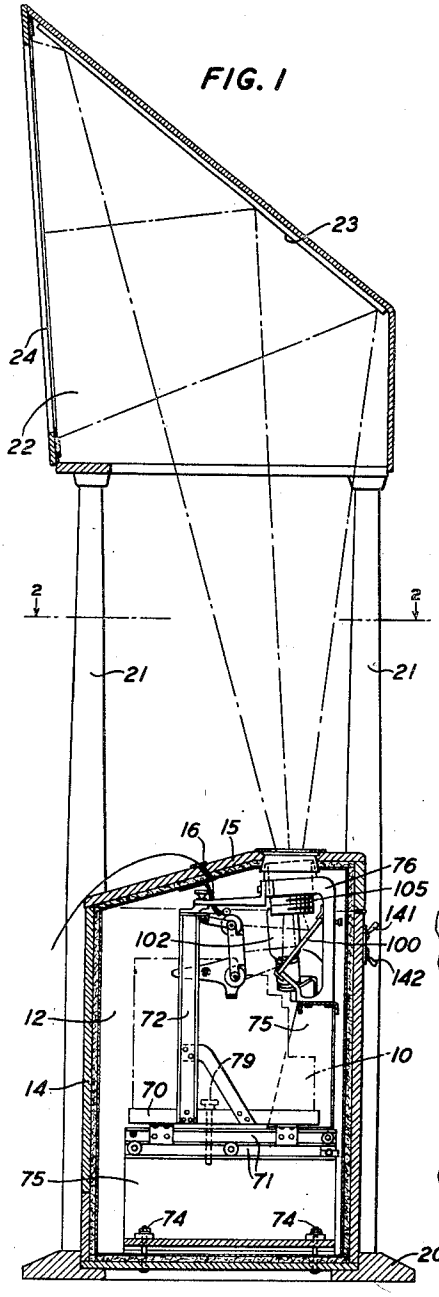


FIG. 2

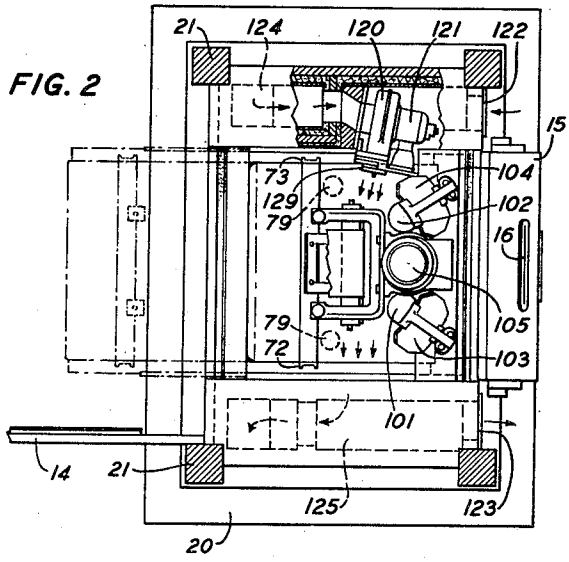
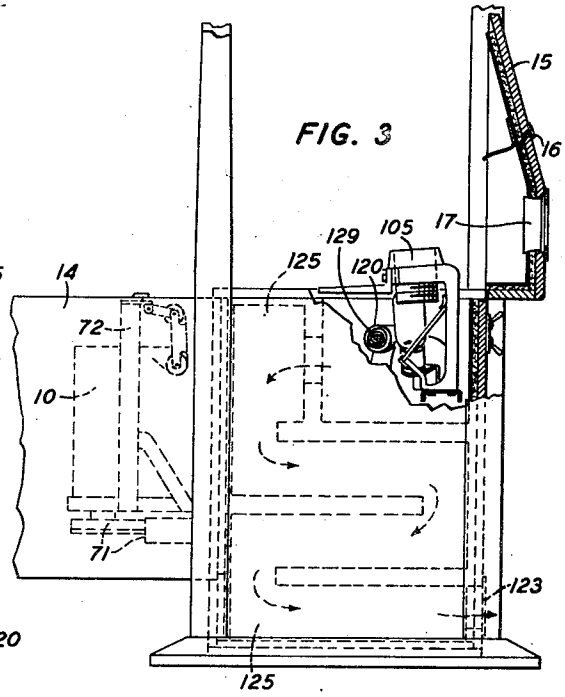


FIG. 3



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FIG. 5

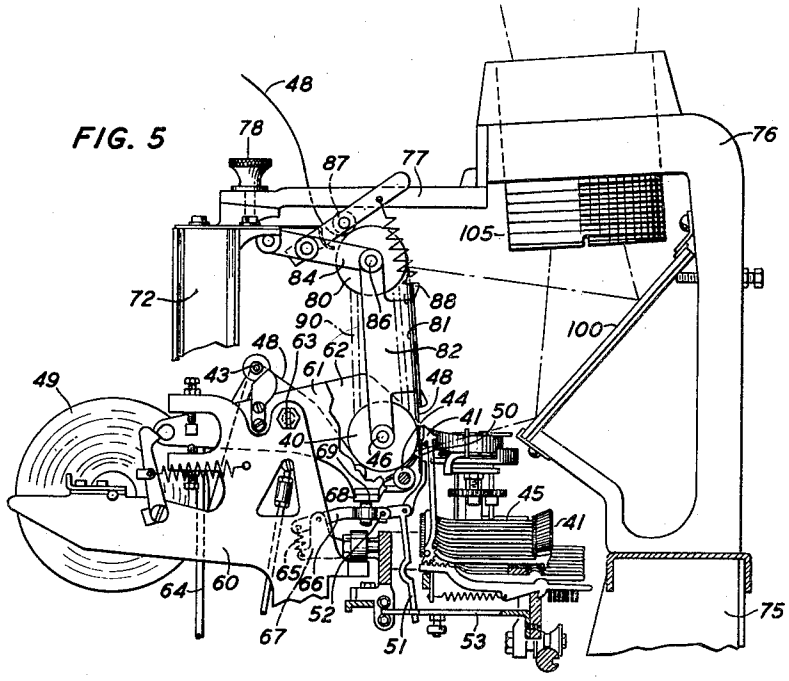
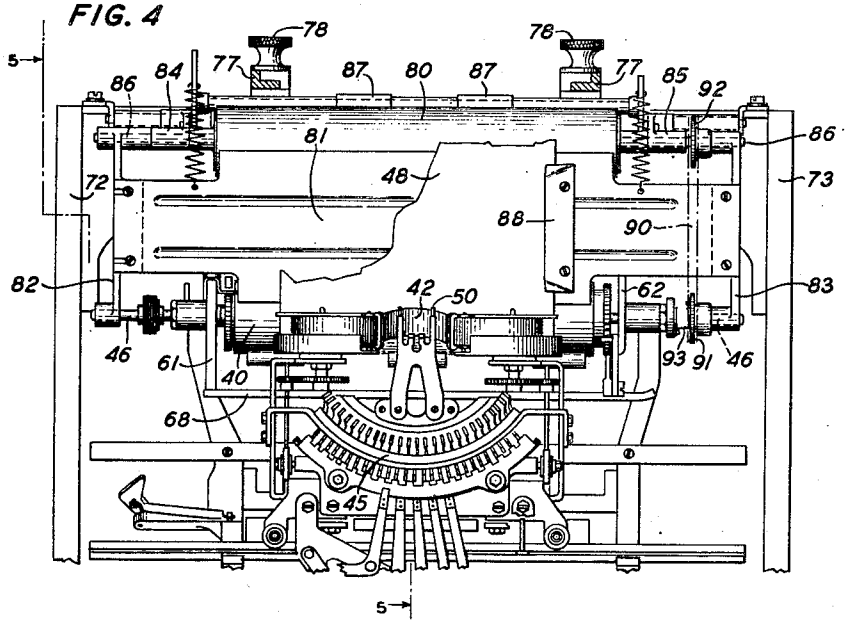


FIG. 4



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FIG. 6

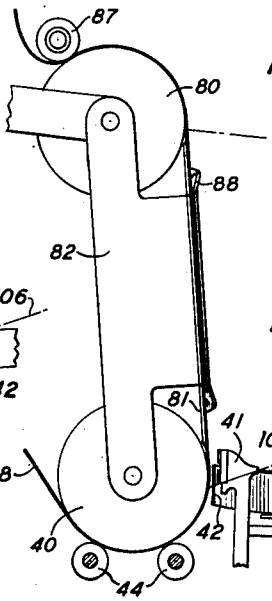


FIG. 7

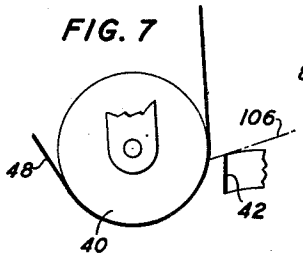


FIG. 9

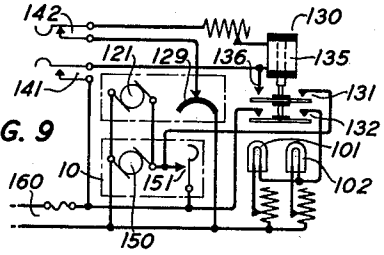


FIG. 10

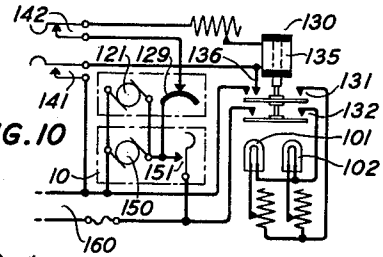
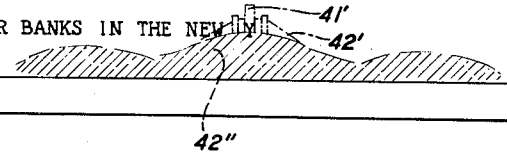


FIG. 8

CONDITION STATEMENT

WASHINGTON - THE FEDERAL RESERVE BOARD'S CONDITION STATEMENT OF WEEKLY REPORTING MEMBER BANKS IN 91 LEADING CITIES OF FEB. 14, SHOWS INCREASES FOR THE WEEK OF $207,000,000 AND NET DEMAND DEPOSITS OF $105,000,000 IN RESERVE BALANCES WITH FEDERAL RESERVE BANKS AND $10,000,000 IN LOANS AND INVESTMENTS, AND A DECREASE OF $28,000,000 IN TIME DEPOSITS.

LOANS ON SECURITIES DECLINED $51,000,000 AT REPORTING MEMBER BANKS IN THE NEW



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UNITED STATES PATENT OFFICE

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RECORD PROJECTOR

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Application December 26, 1934, Serial No. 759,163

3 Claims. (Cl. 88—24)

This invention relates to improvements in record projectors, and particularly in telegraphic news display projectors of the type employed, for example, in brokers' offices where it is desirable to display the recorded characters as quickly as possible after their reception.

An object of the invention is to provide an arrangement for displaying messages recorded by a telegraph printer having character types arranged in upper and lower cases.

Another object is to provide an arrangement whereby a plurality of recorded lines of a message recorded in page form may be simultaneously displayed so that the line being printed will be included in the displayed image.

A further object is to provide an arrangement whereby the point of printing in a telegraph recorder is projected for display, so that parts of the recorder will appear in the displayed image in the act of printing a character.

The invention may be looked upon as an improvement on earlier efforts to provide arrangements of this type, such as disclosed in Patent No. 936,497 issued to H. M. Webster on October 12, 1909, the principal object of the invention being to provide a commercially feasible news display projector which will conform to present day requirements for high efficiency and high speed and to the standard service and maintenance requirements of the modern telegraph plant.

A still further object thus is to produce an image of the recorded message by reflected light so that standard paper in standard rolls may be used for the recording strip.

A more specific object is to provide an optical arrangement by which the displayed image will be interfered with to a minimum by parts of the printer mechanism and will be clear and legible to an observer.

In accordance with the invention the telegraph message display device comprises a recording telegraph page printer which has a stationary platen, arranged for line feed and case shift and a traveling type basket arranged with oscillating color ribbon to provide what is usually termed "visible printing", i. e., so arranged that each character is revealed upon being printed before the next character is printed.

The device further comprises an optical system for viewing a portion of the message recorded on the recording paper and projecting it to a visible surface some distance from the recorder, where the magnified image may be observed by a comparatively large audience, the optical system being focused upon the message to include within its field of observation the point of printing on the recorder.

In accordance with one feature of the invention, the recording strip is of opaque material, such as the paper strip ordinarily used in telegraph page printers, and the strip is guided to form a plane area containing several lines of the message including the line being printed, the plane being slightly tilted backwards from the vertical to receive illumination over the said plane including the line being printed and to present the illumined area for projection by reflected light to the optical system, the tilt of the exposed plane serving to change the lines of vision of the optical system so as to practically eliminate interference with the image of the line being printed by parts of the printer mechanism, except the intermittent intrusion into the image of individual type bars during their printing action, which has a desirable effect.

In accordance with a more specific feature of the invention, the device comprises guiding means for the recording paper cooperating with the platen roller to expose a portion of the recorded message, including the line of printing and several preceding lines, to the optical system, and partaking in the shift movement of the platen in order to maintain a sharp focus of the exposed portion in both upper and lower cases.

In accordance with still a further feature of the invention the display device constitutes a unitary structure having a lower compartment containing the recorder equipment and the viewing elements of the optical system, and having an upper compartment one side of which is formed by a translucent display screen which is slightly tilted forward to be in direct line of vision for a seated audience and to reduce interference by daylight or by other illuminants in the auditorium.

These and other features, capabilities and advantages of the invention will appear from the following description of one specific embodiment of my invention, which is illustrated in the accompanying drawings in which:

Fig. 1 is a vertical sectional view of a projector constructed according to my invention;

Fig. 2 is a sectional view of the device of Fig. 1 taken along the line 2—2 in Fig. 1, showing the front door of the cabinet open and the lid raised in order to illustrate the illuminating means and the ventilating means;

Fig. 3 is a side elevation of the portion illus-

trated in Fig. 2 with parts of the cabinet broken away to more fully illustrate certain features;

Fig. 4 is a front view of the telegraph page printer, with the additional guiding means for the record strips;

Fig. 5 is in part a sectional view taken along the line 5—5 in Fig. 4;

Fig. 6 is a fragmental view showing the guiding means for exposing the recorded message and showing the printing action;

Fig. 7 is a view of a portion of Fig. 6 showing the color ribbon in the normal position relative to the printing platen;

Fig. 8 is an elevation of the translucent screen showing the image thereon of a portion of a message;

Figs. 9 and 10 are circuit diagrams showing two alternative sets of connections for the lamp control.

In general, my invention comprises a framework consisting of a lower closed compartment containing a suitable recording device, such as a telegraph page printer, together with an optical system for observing the recorded message and projecting it upward into a second compartment which is placed directly above the lower compartment at a fixed distance therefrom, so that the recorded message can be reproduced on a vertical screen where it may be viewed from the front by an assembly of people.

The projector is adapted for cooperation with a data recording device, such as a standard telegraph page printer with a supply roll of standard opaque printing paper. Such a device, suitable for the purposes of the invention, is fully described in United States Patent 1,904,164 to S. Morton et al., issued on April 18, 1933, and only such details of the recording device will be referred to herein as are necessary for an understanding of the invention and its operation.

Referring to the drawings, the projector comprises a general structure, preferably of wood, having a lower compartment 12 and an upper compartment 22. The lower compartment 12 is provided with a door 14 and a lid 15 both suitably hinged to the compartment 12. This compartment contains the telegraph page printer 10, a ventilating system including a blower 120 with soundproofed air-passages to the outside, and two illuminating lamps 101 and 102; other electrical equipment such as relays, fuses, condensers and connecting blocks may conveniently be located in the bottom space of this compartment. The upper compartment 22 is open at the bottom and contains the inclined mirror 23 and the translucent screen 24, which is slightly tilted forward to be in direct line of vision for a seated audience and to reduce interference by daylight or other illumination in the auditorium. The mirror 23 and the screen 24 may be supported in any suitable manner in the compartment 22. Compartment 22 is detachably supported above compartment 12 by means of the four posts 21 which combine the two compartments into a structural unit supported on the base frame 20.

As already stated, the printer 10 is of a type particularly suited for the present purpose in that it has a printing roller or platen 40 which is stationary except for the case shift and line shift motions, which both can be observed in the image on the screen 24, and in having visible printing which permits the optical system to observe the actual printing of the messages as readily as can a typist operating an ordinary typewriter, and which consequently permits the audience to observe the type hammers 41 from the traveling type basket 45 as well as the oscillating color ribbon 42 in the very act of printing.

The printer carries a supply roll 49 of standard opaque paper strip 48 of sufficient width for page printing, and the paper is led over the paper straightening rod 43 and about the platen 40 in the usual manner; pressure rollers 44 serve to press the paper against the platen, so that the paper will be positively fed along every time the platen is turned a step for line d in response to proper telegraph signals. The paper is then passed behind the color ribbon 42 at the line of printing.

In the printing operation, the color ribbon guide 50 is reciprocated up and down through the medium of bell crank 51, pivoted at 52, each time the striker bar 53 operates a type 41.

The platen 40 is journaled in two reciprocable end-plates 61, 62 which in turn are hinged at 63 in the main printer frame 60, and are operated through the medium of the rod 64 in response to case shifting signals into shift and unshift positions. A lever 66 is pivoted in a bracket 67 which is mounted to travel with the type basket 45; the lever 66 carries a roller 69 which by means of the spring 65 is held in engagement with a cross-bar 68 connecting the end plates 61 and 62 together, so that lever 66 will follow the shift movements of the platen structure. The ribbon oscillating bell crank 51 is pivoted at 52 on the lever 66 in order that the ribbon shall retain its relation to the platen in both case positions. In this manner it is insured that the printing will be equally visible to the projecting system whether the recording be in the upper or the lower case.

The printer 10 is for convenience mounted on a movable steel frame 70 which is supported on telescoping racks 71 carried by a stationary steel frame 75 mounted in the bottom of the compartment 12, thus permitting the printer to be readily drawn part way out of the cabinet for inspection, to a position as indicated in dotted lines in Fig. 3.

Special guiding means for the paper strip have been attached to the platen structure of the standard telegraph printer 10 in order that the paper may form an area for simultaneous projection and display of several recorded lines, including the line being printed.

The guiding means consist of a backing plate 81, which is mounted rigidly on the brackets 82 and 83 in any suitable manner, and a guide roller 80 pivoted in parallel levers 84, 85 which in turn are hinged to two steel uprights 72 and 73 forming part of the removable frame 70. The lower end of each of the brackets 82 and 83 is pivotally attached to the platen shaft 46 and the upper end is pivotally attached to a shaft 86 which carries the guide roller 80. The guide roller 80 is substantially similar to platen 40 and is mounted for parallel movement with the platen 40 during case shifting by means of the arrangement of brackets 82, 83 and levers 84, 85.

The recording strip 48 is fed across the backing plate 81, which is tangential to the platen 40 at the line being printed, for exposure to the optical system of several lines of the message including the line being printed. The recording strip is then passed over the guide roller 80 and under a set of pressure rollers 87 to insure move-

ment of the strip with the roller 80 at line feed, thence upward and through a slot 16 in the lid 15. In this manner, the exposed area of the record strip which, in a manner yet to be explained, is always kept taut between the platen 40 and the roller 80, is moved up and down substantially in its own plane during the shifting operations, so that an accurate focus may be maintained in both upper and lower cases.

The guide roller 80 is driven from platen shaft 46 by suitable means such as a chain 90 connected to sprocket wheel 91 on the platen shaft 46 and to the sprocket wheel 92 on shaft 86 of roller 80. In order to keep the recording strip 48 taut during line shift, the gearing is such that the guide roller 80 turns slightly faster than the platen 40, and the power is supplied to the guide roller 80 through a helical spring 93, so that a sudden slack in the paper across the plate 81 at line shift will be taken up instantaneously by the roller 80 and the focus will be retained.

The optical system comprises a viewing mirror 100 or other reflector, such as a prism, placed opposite the exposed area of the record strip 48 at a 45° angle with the normal to said area, so that an inverted image of the area will be reflected upward through the objective or lens system 105 which extends through the lid 15. The image is received by the mirror 23 in the upper compartment 22 which is placed at a 45° angle with the axis of the lens 105, so that the image will be inverted again and thrown, greatly enlarged, on the translucent screen 24.

The light source for this optical system comprises two incandescent lamps 101, 102 placed nearly in line with the viewing mirror 100 in front of the exposed record area, so that the image will be obtained by light reflected by the record strip. The light from the lamps 101, 102 is intensified by curved reflectors 103, 104 placed behind the lamps, which are designed in well-known manner to blur the image of the lamp filaments on the paper strip so that the record will appear evenly illuminated on the screen 24.

The general arrangement is such that the exposed area of the record is clear of all parts of the printer and may be fully exposed to the lamps, as well as to the observing mirror 100. The exposed area may include about ten printed lines including the line being printed, and will appear on the screen 24 about as shown in Fig. 8. There will be only a slight, hardly noticeable obscuration of the last line due to the appearance of the images of the type bars 41 and the color ribbon 42 in the act of printing; however this has been found to add a desirable animation to the view, and to give the observer assurance of the freshness of the recorded data.

Referring particularly to Figs. 6 and 7 it will be seen that, as a type bar 41 of the telegraph printer 10 is operated, the color ribbon 42 reciprocates vertically so that, while a character is being printed, the color ribbon 42 will be properly interposed between the face of the type bar 41 and the recording strip 48, as shown in Fig. 6. As the type bar 41 enters the field of observation it becomes illuminated and its image 41' as well as the shadowy image 42' of the ribbon 42 will appear on the screen 24 before the audience, in the manner shown in Fig. 8. As soon as the type bar 41 disappears into the type basket 45, the color ribbon 42 will be withdrawn to the position as shown in Fig. 7, thus exposing the printed character on the recording strip 48 to the mirror 100. The color ribbon 42 will continue to appear on the translucent screen 24 as a shadow 42''.

In order further to aid in clearing the line of printing for view over the upper edge of the color ribbon, when the ribbon is in its normal position shown in Fig. 7, the relation of the guide roller 80 to the platen 40 is such that the exposed area is given a slight tilt back from the vertical, amounting to from 5° to 10° or preferably 7°; this tilt requires that the viewing mirror 100 be raised appreciably in order to maintain the 45° angle with the normal on the exposed area, and results in that the lower viewing line 106 from the bottom of the last printed character to the objective image in the mirror will practically clear the top edge of the lowered color ribbon 42.

The close proximity of the lamps 101, 102 to the exposed area of the printing paper in front of the guide plate 81 necessitates the use of a ventilating system, which in the disclosed embodiment comprises a blower 120 run by a small electric motor 121 whenever the projector is operated. The blower takes air in through an opening 122 at the base of the cabinet 12 and directs the air flow into the space between the plate 81 and the lamps 101, 102; the hot air is forced out again through the opening 123 at the other side of the cabinet 12.

In order to prevent that the air-stream disturb the exposed part of the paper strip, the plate 81 carries a protecting strip 88 which overlaps the edge of the paper nearest the blower; the air pressure thus only has a tendency to keep the paper smooth against the plate 81, thus permitting sharp focusing.

A bimetal thermostat contact 129 is arranged near the output nozzle of the blower. The contact 129 is connected to control the lamp circuit in such a manner, that the lamps will be extinguished should the blower fail to operate, as will be explained hereinafter.

The stationary frame 75 is built up in the rear of the cabinet 12 and carries suitable brackets for the mounting of the mirror 100, the lamps 101 and 102 with their reflectors 103 and 104, and for the blower unit 120, 121 with its thermostat 129. These parts are grouped about the printer in such a manner that they in no way interfere with the withdrawal of the printer on the telescoping racks 71. The printer is fixed in position for proper focusing by means of a pair of readily removed finger screws 79, 79 bolting the movable steel frame 70 to the stationary steel frame 75.

The objective lens system 105 is mounted in a bracket 76 also fastened to the stationary steel frame 75 so that it too remains in position when the printer is removed. However, it has been found advantageous to provide a pair of connecting bars 77, 77 extending from the lens bracket 76 and bolted for easy detachment by finger screws 78, 78 to the uprights 72 and 73 which are integral with the movable steel frame 70, in order that the printer with its exposed record area and the optical system including the objective 105 may vibrate as a unit, due to the printer operations, and in order that the vibrations may be damped to become practically unnoticeable in the image on the screen 24.

The lower compartment 12 is made generally noiseproof and fire-proof.

Thus to confine the noise from the printer an intake ventilating passage 124 and an output ventilating passage 125 are included in the ventilating circuit to introduce tortuous paths with

padded walls from the interior of compartment 12 to the ventilating openings 122 and 123, respectively, for absorbing the printer noise. The side walls of the compartment 12 and the passages 124 and 125 are built up of layers with sound-proofing padding, and the lid 15 has a hole 17 lined with padding which comes down tight around the objective 105 when the lid is closed.

The whole apparatus structure is fastened by the frame 75 to the bottom of compartment 12 in well-known manner by padded bolts 74 to reduce noise transmission.

To reduce fire hazard the inner lining of the compartment 12 is of fire-proof material, such as hard pressed asbestos plates, which also will serve as sound reflectors.

Referring now particularly to the circuit diagrams in Figs. 9 and 10 showing the control or the power supply to the lamp circuit, it should be understood that it is not necessarily desirable that the high wattage lamps 101 and 102 shall be lighted whenever the printer operates, inasmuch as the recorded messages may be read directly off the paper strips by individuals as soon as the record leaves the slot 16 in the lid 15.

In the modern ticker, as exemplified by the device disclosed in Patent 1,904,164 already referred to, there is provision for starting and stopping the printer motor from a remote transmitting station; this involves the impression on the line circuit of certain selective conditions which cause a set of contacts in the printer to respectively close or open the motor circuit, thereby rendering the printer operative or inoperative; for further information about this arrangement references may be had to the said patent.

The present lamp control circuit includes manually operated switches 141 and 142, normally open and closed, respectively, for lighting and extinguishing the lamps, respectively, when momentarily operated these switches are conveniently located on the outside of compartment 12. The switches may obviously be replaced by relays for remote control by switches located at one or more points within the building in which the projector is installed.

The circuit further includes a power relay 130 for directly closing and opening the power supply circuit to the lamps in response to the operation of the switches 141 and 142, respectively, contingent upon, however, whether or not the printer is conditioned for operation by incoming control signals, as already explained.

The thermostat contact 129 is adapted to open whenever the temperature in the cabinet 12 becomes excessive. In the present projector it has been found desirable to place a bimetal operating element for the contact 129 immediately in front of the blower nozzle, where it will be subject to the high temperature from the lamps and the cooling blast from the blower, and consequently will open quickly in case the blower should fail when the lamps are lit, thereby causing the lamps to become extinguished. If desired the contact 129 may be operated by a set of vanes holding the contacts closed when subject to the wind from the blower, and opening the contact when the blower stops or fails, irrespective of whether or not the lamps are lighted.

The operation of the circuits, shown in Figs. 9 and 10, is the same, except for a single difference.

Assuming that printer control contact 151 should be automatically closed by the reception of the proper signal over the telegraph line, not shown, the printer motor 150 and blower motor 121 will be set running by current over the automatic control contact 151 in the printer from the power supply circuit 160; this insures that contact 129 will be closed. The printer may now receive and record messages on the paper strip and feed the paper out of the compartment 12 once for every line feed operation.

When it becomes desirable to display the messages on the screen, switch 141 is momentarily operated, manually or over a separate remote control circuit, closing the power circuit through the magnet winding 135 of relay 130 over contacts 141, 142 and 129. Relay 130 operates to close its two sets of contacts 131 and 132, thereby lighting the lamps 101 and 102; the relay also closes a locking circuit for itself over contact 131 and conductor 136, which includes the contacts 142, 129 and 151.

Thus relay 130 may be released to extinguish the lamps, either by momentarily opening the switch 142, manually or over a separate remote control circuit, whenever it no longer should be desired to display the messages, or by the opening of contact 129 whenever the blower 120 should fail, or by the automatic opening of contact 151 whenever the proper stop signal is received over the telegraph line for stopping of the printer motor 150 and the blower motor 121, which latter operation will again place the circuit in normal or rest position.

The circuit shown in Fig. 10, different from that in Fig. 9, is so arranged that the lamps cannot be lighted by closing of switch 141 until the printer control contact 151 has been closed.

The circuit shown in Fig. 10 may be modified by permanently short-circuiting the contact 141, thereby causing the relay 130 to operate and light the lamps as soon as the printer contact 151 closes to put the printer in condition for reception. By this arrangement, the lamps may be fully controlled from the remote transmitting station.

What is claimed is:

1. In combination, a telegraph page printer and an optical display projector therefor, said printer having a stationary platen and a traveling type basket, guiding means connected to said platen for cooperation therewith to line-feed the printed page and for guiding a portion of the printed page in a plane inclined a small angle with respect to the vertical for complete exposure to the optical system of the line being printed and of several preceding lines on the printed side of the page, said optical system including a display screen slightly inclined from the vertical towards the observer and a lens system focused on said plane for projecting by reflection an image of the printed side of the exposed record on to said screen as the recording progresses.

2. A telegraph printer adapted for visible printing having a stationary platen shiftable for two cases of printing and rotatable for line feeding, a traveling type basket and oscillating color ribbon, a guide roller parallel to said platen and spaced therefrom to guide a portion of the printed paper substantially in a plane tangential to said platen at the line of printing

and including the line of printing, and driving connection between said platen and said guide roller for maintaining said portion of the paper taut during line feeding and case shifting, and optical means for illumining said portion of printed paper on the printed side and displaying an enlarged image thereof.

3. A record display projector comprising a telegraph page printer arranged for visible printing of incoming messages on paper, optical projecting means for displaying said message for observation at a distance from said display projector, and a cabinet structure for said printer and said projecting means including a large visibly mounted translucent display screen, said printer including a stationary platen for printing of parallel lines and arranged in a platen frame for case shift and line shift, a continuous paper base for printing including a supply roll, a guide frame connected to the platen frame for case shift therewith and including a guide roll substantially similar to and parallel with said platen for guiding an unwound portion of said paper base through a plane area tangential to said platen at the line of printing for exposure of several lines of the message including the line being printed to said optical projecting means, driving means common to said platen and said guide roll, and a traveling type basket having disappearing type bars and an oscillating color ribbon for printing the message on the front side of said paper base, and said optical projecting means including a plurality of light sources for illumining substantially uniformly the front side of said plane area of the paper base, a first mirror for transmitting by reflected light from said source an inverted image of a large portion of said plane area including the line being printed, a second mirror for transmitting said image reinverted for direct observation on to the back of said translucent screen, and a set of lenses for focusing and enlarging the image.

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