

March 12, 1935.

M. I. SHWARTZ

1,994,091

ENLARGING PRINTER

Filed Oct. 7, 1933

4 Sheets-Sheet 1

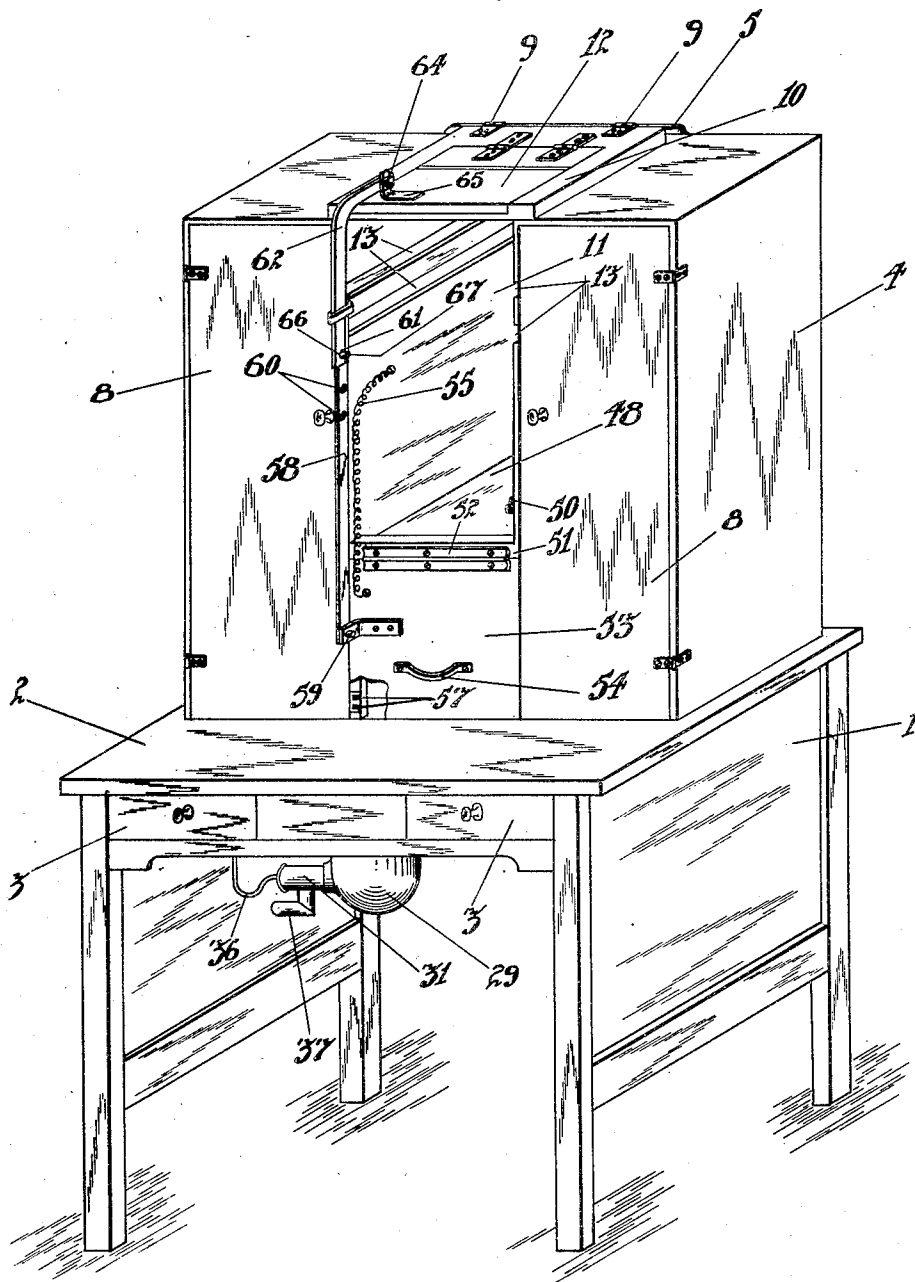


Fig. 1.

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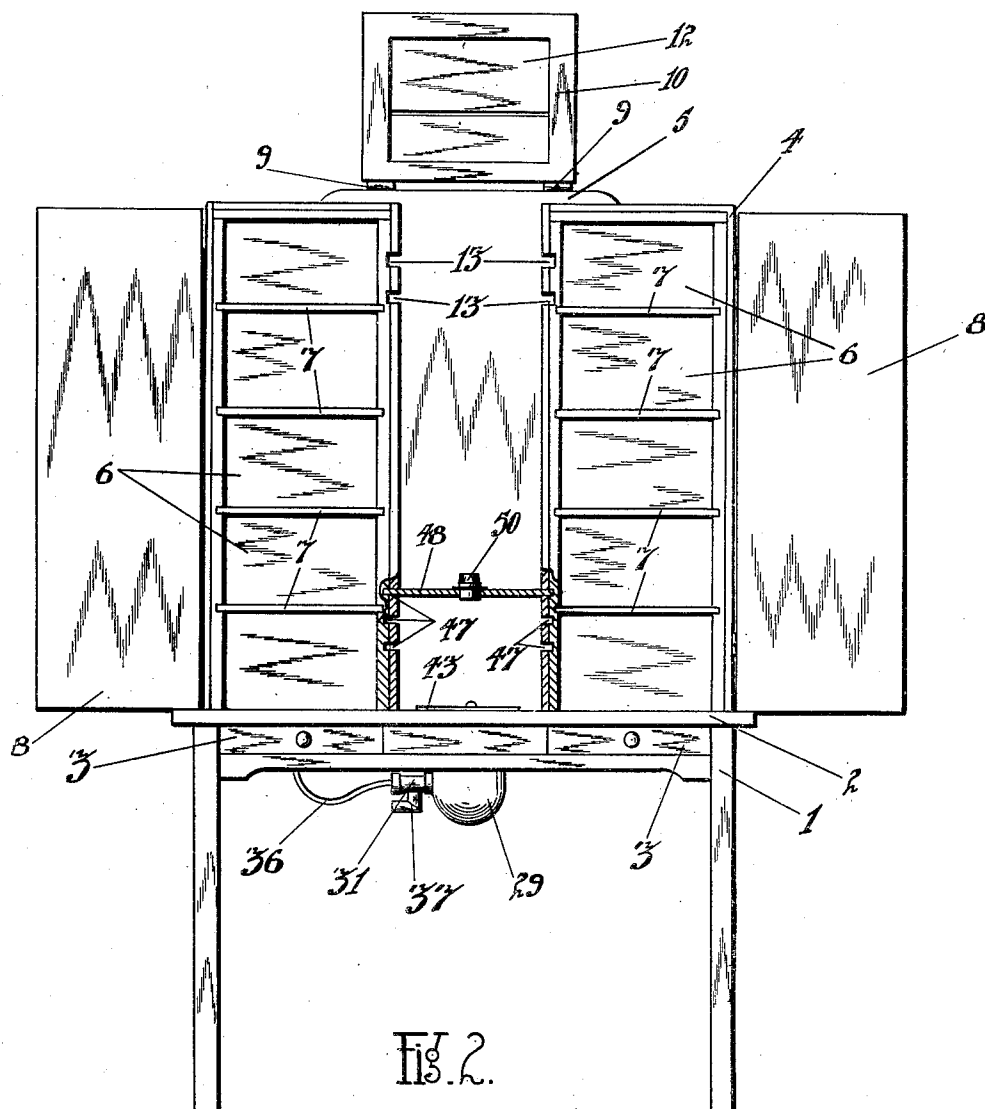
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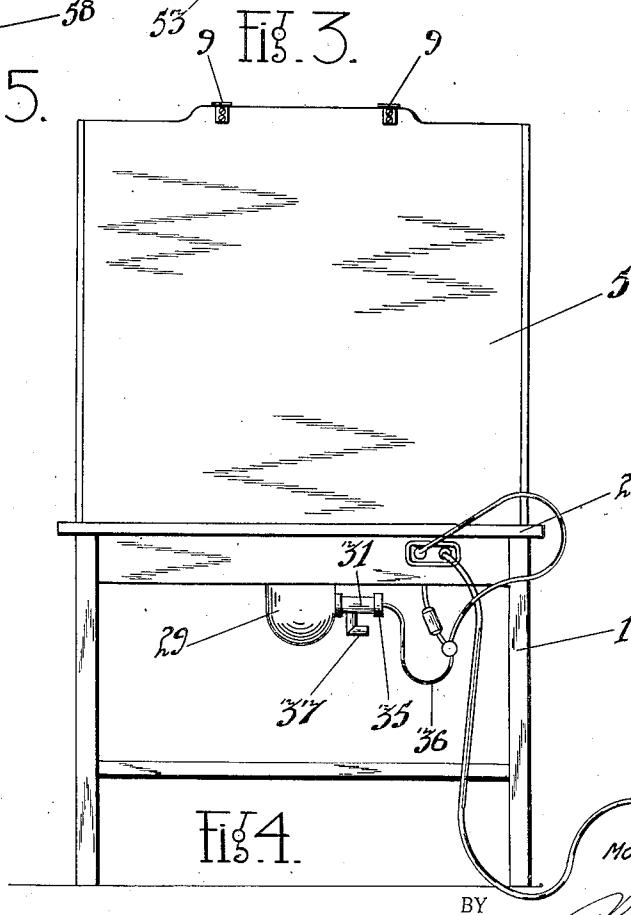
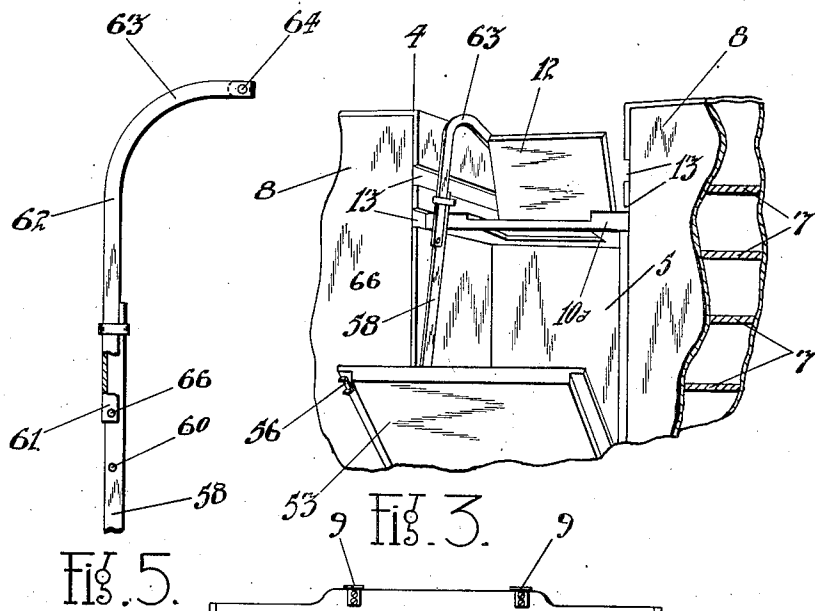
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4 Sheets-Sheet 4

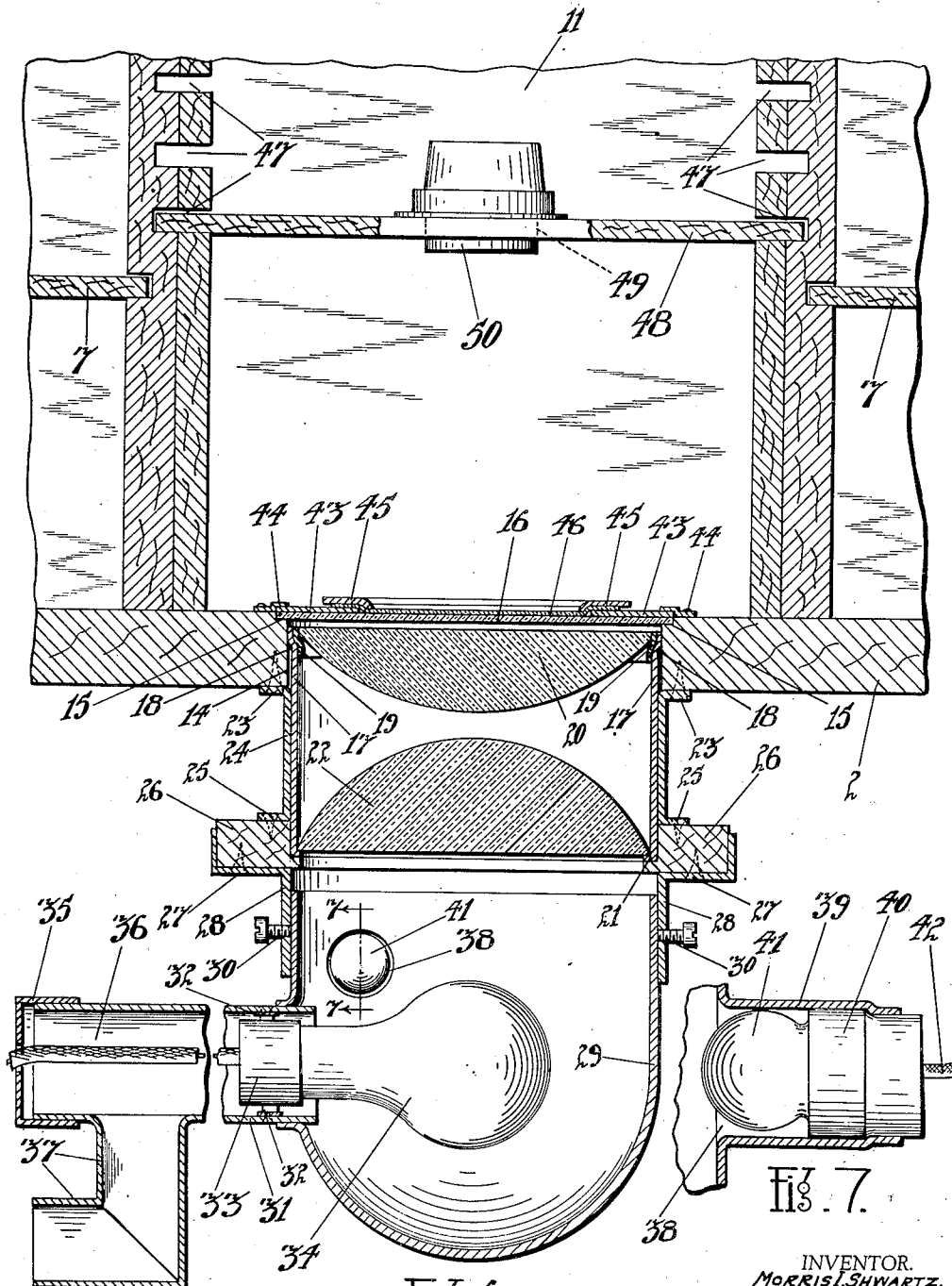


Fig. 6.

Fig. 7.

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1,994,091

ENLARGING PRINTER

Morris Israel Shwartz, Providence, R. I.

Application October 7, 1933, Serial No. 692,627

6 Claims. (Cl. 88—24)

My invention relates to an enlarging printer and is designed particularly for the enlarged printing of photographic negatives in a very simple and economical manner.

One of the principal objects of my invention lies in the provision of an arrangement of operating parts which provides a maximum amount of simplicity in operation as well as accuracy and efficiency.

An important object lies in the provision of an adjustable paper holding platen and an adjustable lens board permitting ready use of the printer for different sizes of enlarged prints.

Still another object of my invention lies in the provision of novel adjustable connecting means between the platen or paper holder and the closure and electric contact making member associated with the negative chamber or compartment.

Still another object lies in the provision of a novel arrangement of constant illuminating means for the negative whereby an even illumination is provided for the negative.

Other objects and advantages will be apparent as the description proceeds, reference now being had to the figures of the accompanying drawings forming a part of this application and wherein like reference numerals indicate like parts.

In the drawings:

Figure 1 is a perspective view of my enlarging printer illustrating its supporting elements and general arrangement of parts.

Figure 2 is a front view of the printer with the cabinet doors open showing the shelf space provided for convenience.

Figure 3 is a detail perspective view of a portion of the upper part of the cabinet illustrating the cooperation between the closure door and the platen, certain parts being broken away for clearness.

Figure 4 is a rear view of the printer.

Figure 5 is a detail view illustrating the adjustable connecting member between the platen and the closure door, certain parts being broken away for clearness.

Figure 6 is an enlarged cross sectional view of the optical unit and illustrating its relation to the lens and negative holder.

Figure 7 is a detail sectional view of the negative illuminating means taken on the line 7—7 of Figure 6.

The reference character 1 indicates generally a supporting table or desk provided with the top 2 and with suitable drawers 3. Supported upon this table top and preferably adjacent the rear

edge thereof to provide a working surface and space at the front, is a cabinet 4 having a back 5 extending across its width. Provided on each side of the cabinet 4 are storage compartments 6 divided by suitable shelves 7, such compartments being provided with door closures 8. Obviously any desired arrangement of the shelves and storage space may be provided.

In the space provided between the storage compartments, the projection of the image to be printed occurs. This projection is upward and so arranged as to be in easy and full view of the operator during the printing operation. Hinged to the top of the cabinet 4 as at 9, is a platen 10 directly overlying the projection space 11 between the storage compartments. This platen 10 is provided with the usual hinged presser plate 12 beneath which the sensitized paper or film for receiving the projected image is placed, preferably supported by a glass plate carried by the platen in the usual manner.

The side walls of the projection printing space 11 adjacent the upper end thereof, are provided with aligned grooves 13 adapted to slidably receive alternative platens such as 10a in Figure 3. This is to provide means whereby when a change in the size of the projected image is desired from that of the platen 10, such platen may be hinged upwardly out of the way and an auxiliary platen placed in the selected groove 13 corresponding to the desired size, the size of course, depending upon the distance between such platen and the negative image being projected. It will be clear, of course, that if desired, the hinged platen 10 may be omitted and a groove similar to grooves 13 provided at the appropriate place for the maximum size of projected image desired. Obviously also with this arrangement one platen may be adapted for use in any of the fixed positions or there may be provided platens having different sized printing openings one for each size desired, these being substituted one for the other in the appropriate grooves 13 as a change in size is required.

The table top 2, at a point in alignment with the projection space 11 and the platens 10 or 10a, is provided with an opening 14, the upper edges of which are recessed as at 15 to receive a glass cover plate 16, the upper side of which is flush with the table top. Suitably secured within this opening 14 and extending downwardly therefrom is a casing 17, the upper end of which lies directly beneath and closely adjacent to the glass cover plate 16 as shown clearly in Figure 6. The upper edge of this casing 17 is shouldered as at 18 to re-

ceive a similarly shouldered supporting ring 19 in which is supported a condenser lens 20. The arrangement just described permits the removability of the condenser lens 20 for cleaning or the like. The lower edge of the casing 17 is provided with an inwardly turned flange 21 by which is supported a second condenser lens 22 lying directly below and in alignment with the condenser lens 20.

Suitably secured as at 23 to the underside of the table top 2 and surrounding the casing 17 is a supporting ring 24 to which the casing 17 is rigidly secured in any suitable manner. The lower end of this supporting ring 24 is flanged as at 25 and has secured thereto a ring 26 of heat insulating material such as wood, fiber, or the like. Suitably secured as at 27 to the underside of the insulating ring 26 is a flanged casing 28 forming in effect an extension or section of the supporting ring 24 but insulated therefrom by means of the ring 26. Slidably fitted within the extension casing 28 is the upper end of a reflector casing 29 adjustably secured to the casing 28 by means of set screws 30 or the like. Thus the casing 17 and its supporting ring 24 and the reflector casing 29 are separated by means of the heat insulating ring 26 whereby any heat accumulated from the light source by the reflector casing will not be transmitted to the casing 17.

The interior of the reflector casing 29 is preferably highly polished and of a shape designed to provide a maximum amount of reflection of light upwardly through the condenser lenses 22 and 20. This reflector casing 29 is provided at one side with an opening into which extends a lamp supporting tube or housing 31 suitably secured in such opening. Provided in the tube 31 at spaced points are socket engaging means 32 for securing therein a lamp socket 33 of the conventional screw type and from which into the reflector casing 29 projects the lamp bulb 34 providing the light source for the printing operation. The spacing of the holding devices 32 and the engagement thereof with the socket 33 at points only, reduces the transmission of heat from such socket to the tube 31 and the reflector casing 29. The end of the tube 31 opposite the lamp 34 is closed by cap 35 through which may extend the wire conductors 36 to a suitable source of current for the lamp 34. The tube 31 is also provided with an angular ventilator extension 37 opening to the atmosphere by means of which additional dissipation of heat from the lamp and socket is provided.

By this arrangement an exceptionally cool means of illumination is provided for the printer.

The reflector casing 29 is also provided at a suitable point with a second opening 38 concentric with an outwardly extending casing 39 adapted to receive a lamp socket 40 and a bulb 41, such bulb lying substantially within the casing 39 directly adjacent the end thereof opening into the reflector casing 29. A suitable conductor 42 is provided for this lamp 41 with, of course, appropriate connections to the source of current.

It is contemplated, of course, that during the use of the printer this lamp 41 will be illuminated at all times, the light therefrom entering the reflector casing 29 through the opening 38 and being reflected upwardly through the condenser lenses 22 and 20. The position of the lens 41 outside of the reflector casing 29 eliminates the possibility of filament reflection upwardly through the condenser lenses and assures an even illumination for the negative positioned above the condensers as about to be described.

This positioning of the lamp 41 outside of the reflector casing 29 substantially eliminates interruption of the reflecting surface thereof and provides even illumination for better judging of quality of negatives.

Mounted directly upon the glass plate 16 and in alignment with the reflector casing 29 and condenser lenses is a negative holder 43 preferably removably secured in position as by the spring clips 44. This negative holder may be any desired type or construction but is preferably provided with a hinged portion 45 adapted to directly engage a negative 46 placed on the glass 16 and to hold the same in proper alignment with the condenser lenses and the platen 10. This negative holder forms no part of this invention and has, therefore, not been shown nor described in detail. Obviously many types of negative holders may be used with facility.

At a point suitably spaced above the glass plate 16 and the condenser lenses are a second set of grooves 47 provided in the side walls of the projection compartment 11 adapted to slidably receive a lens board 48 provided centrally with an opening 49 to removably receive a lens mount 50. It will be obvious, of course, that depending upon the size of projected image desired for printing and consequently upon the position of the platen 10 or 10a in one of the upper grooves 13, the lens board 48 will be positioned in the corresponding and appropriate groove 47 whereby the image of the negative 46 will be properly focused upon the sensitized paper on the platen.

Thus a very simple and easy adjustment is necessary for changing the size of enlargement desired, the operations requiring essentially changing the lens board and the platen to the appropriate grooves or positions for the desired size.

With reference now to Figure 1, it will be noted a supporting strip 51 is provided extending across the front of the projection space 11 at a point slightly above the upper groove 47 for the lens board 48 and to this strip is hinged as at 52 a downwardly depending closure door 53 provided with a suitable handle 54 by means of which the door 53 may be moved upwardly or downwardly at will by the operator. A coil spring 55 anchored at one end to one of the side walls of the projection space 11 and at its opposite end secured to the door 3 serves to normally urge the door upwardly to the position shown in Figure 3. This door 53 when closed covers the negative 46 and thus obscures any light therefrom except that from the reflector casing 29. It will be obvious, however, that when the door 53 is opened in its normal position, the negative 46, illuminated by the lamp 41 is in full view of the operator normally seated at the table whereby such operator may gauge the printing value of the negative and of course, adjust its position properly and accurately in the holder 43. Carried by the door 53 adjacent one edge thereof is a contact member 56 adapted to cooperate when the door is moved to closed position with contact members 57 fixed to one side wall of the projection space 11, such contact members serving as a circuit maker and breaker for the printing lamp 34 in the reflector casing 29, there being, of course, suitable conductor connections provided between the contacts 57 and the lamp 34 including the source of current. Thus when the door 53 is moved to closed position, the contact 56 on the door closes the bridge or gap between contacts 57 thus lighting the lamp 34 for printing

purposes. The light from this lamp passes through the condenser lenses 20 and 22 which strongly and evenly illuminate the negative 46, the image thereon being projected upwardly by the lens 50 in proper focus to the platen positioned at the top of the projection compartment and of course, to the sensitized material positioned therein. After the required printing time has elapsed, the operator merely opens the door 53, thus breaking the printing light contact and at the same time opening pressure plate 12, and the sensitized material is then removed from the platen for development.

One of the principal features and advantages of this invention comprises a connection between the door 53 and the hinged portion 12 of the platen whereby simultaneously with the closing of the door and the lighting of the lamp 34, such hinged portion would be moved into tight holding position with respect to the sensitized material in the platen. This connection comprises an arm 58 pivotally connected as at 59 to a bracket 60 mounted on the outside of the door 53. The upper end of this arm 58 is provided with a plurality of openings 60 corresponding in number to the number of positions provided for the platens and the lens board, and this perforated upper end of the arm slidably engages within the channeled lowered end 61 of an arm 62 formed at its upper end as at 63 to overlie the hinged portion 12 of the platen. This overlying end of the arm is pivotally and removably secured as at 64 to a bracket 65 provided on the top of the hinged portion 12 of the platen. The lower channeled end 61 of the arm 62 is also provided with aligned openings 66 adapted for adjusted alignment with the openings 60 in the upper end of the arm 58 whereby a removable pin 67 may be passed through said aligned openings thus connecting the arms 62 and 58 in their adjusted relation. Obviously therefore, when the door 53 is raised or lowered, the hinged portion 12 of the platen will likewise be raised or lowered.

In the operation of my invention, when the size of enlargement desired is determined, the lens board and platen are adjusted to the proper position for such enlargement, the arms 58 and 62 being adjusted to accommodate the position of these elements. The negative 46 is then placed in the holder and the sensitized material placed in the platen whereupon the operator merely closes the door 53, thus illuminating the printing lamp 34 resulting in projecting the image of the negative upwardly through the lens 50 to the platen. Upon completion of the exposure the door 53 is opened and, simultaneously therewith, the hinged portion 12 of the platen is raised whereupon the exposed sensitized material can be removed and a new one placed in position.

Thus it will be seen that my invention provides a printer capable of speedy operation and which lends itself to accurate results inasmuch as the arrangement of the parts enables the operator to view the negative at all times except when actually making the exposure. The upper portion of the projector space 11 being open at the front, the operator can likewise observe clearly the projected image on the platen. The use of apparatus of this character is naturally made in subdued light so that there is little danger of fogging the sensitized material used in the platen. The storage space provided by the shelves 7 afford a convenient place for keeping the paper to be used, the extra platens, lenses and other accessories which

may be useful in the operation of an apparatus of this character.

It will be understood, of course, that changes may be made in details of construction and arrangement of parts without departing from the spirit and scope of my invention. I do not limit myself, therefore, to the exact form herein shown and described other than by the appended claims.

I claim:

1. An enlarging printer comprising a light source and a projection compartment, a negative holder, a lens, and a platen for sensitized material, all in aligned registry in said compartment at all times, said platen having a hinged holding portion, said platen and said lens being adjustable to a plurality of predetermined positions for different sized enlargements, a second hinged member comprising a closure door for a portion of said compartment adjacent said negative holder and having means thereon operable in closed position to actuate said light source and in open position to render visible and accessible said negative holder, the projected image of a negative in said holder being simultaneously visible on said platen, and an adjustable connection between said hinged door and said hinged platen portion whereby the same operate simultaneously with respect to the sensitized material and the light source.

2. An enlarging printer comprising a light source and a projection compartment, a negative holder, a lens and a platen for sensitized material aligned in said compartment with said light source, a hinged portion on said platen, a hinged closure for a portion of said compartment provided with contact means for actuating said light source in one position of said closure, and an adjustable connection between said hinged platen portion and said closure member whereby the same operate together, said hinged closure being so arranged that when in open position said negative holder and the projected image of a negative therein are both visible.

3. An enlarging printer comprising a light source and a projection compartment, a negative holder, a lens and a platen for sensitized material aligned in said compartment with said light source, a hinged portion on said platen, a hinged closure for a portion of said compartment provided with contact means for actuating said light source in one position of said closure, an adjustable connection between said hinged platen portion and said closure member whereby the same operate together, and means normally urging said platen and closure to open position, said hinged closure being so arranged that when in open position said negative holder and the projected image of a negative therein are both visible.

4. An enlarging printer comprising in aligned registry a light source, negative holder, lens and platen for sensitized material, a reflector casing for said light source, condenser lenses between said light source and said negative holder, a casing for said lenses, said casing comprising two sections secured to and separated by a heat insulating member, and said reflector casing being adjustably connected to one of said sections.

5. An enlarging printer comprising in aligned registry a light source, negative holder, lens and platen for sensitized material, a reflector casing for said light source, condenser lenses between said light source and said negative holder, a casing for said lenses, said casing comprising two sections secured to and separated by a heat insulating member, said reflector casing being ad-

justably connected to one of said sections, and a ventilator tube connected to said reflector casing.

- 5 6. An enlarging printer comprising a light source, a negative holder spaced above said source, a lens spaced above said holder, a pivoted platen for sensitized material spaced above said lens, all of said elements being in aligned registry, means for adjusting said platen and said lens
10 board to a plurality of predetermined positions

with respect to said negative holder for different sized enlargements, the space between said negative holder and said lens being enclosed, a door for said enclosure provided with contact means for actuating said light source in one position of said door, and means connecting said platen and said door whereby said door is closed simultaneously with the movement of said platen to sensitized material engaging position.

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