

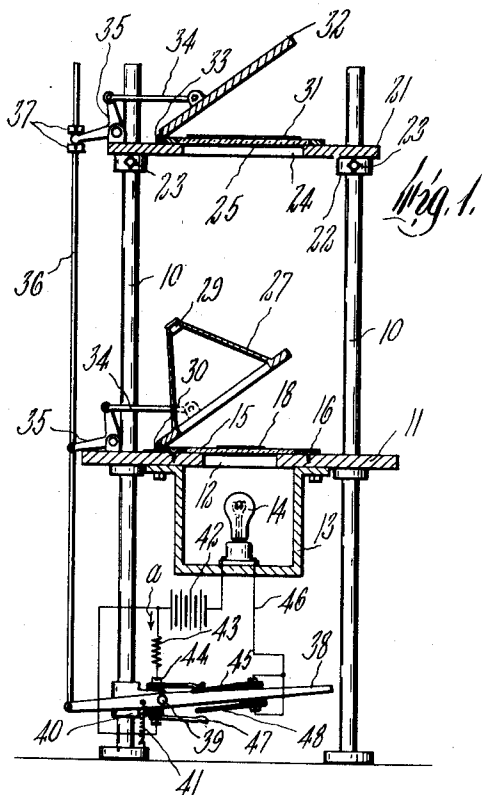
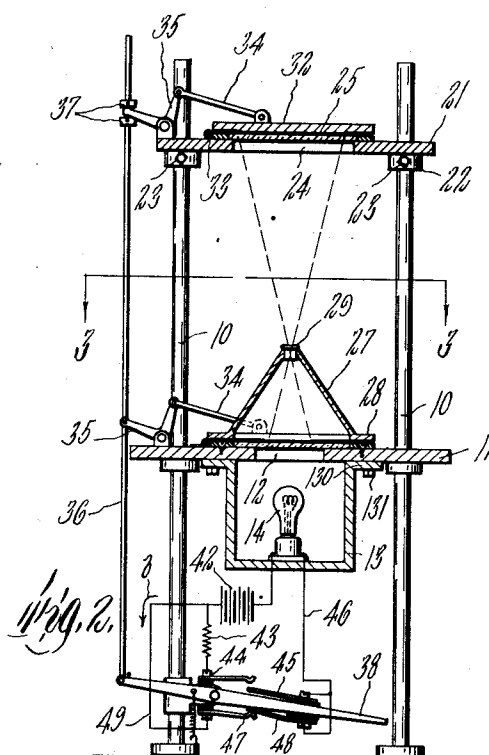
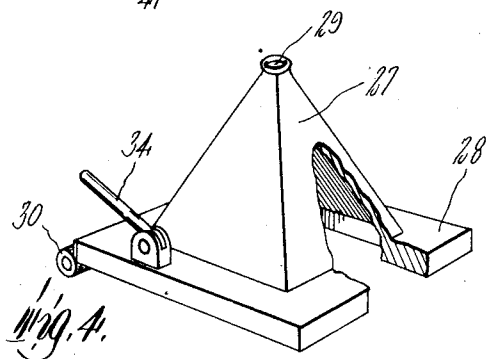
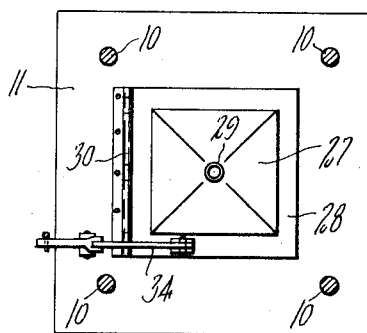
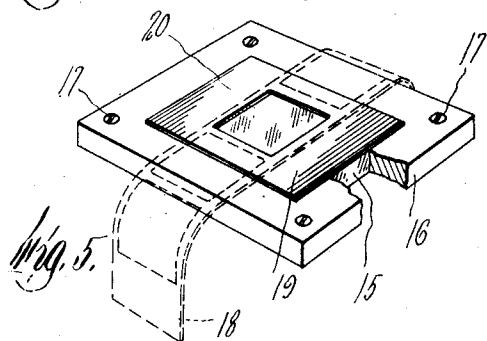
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PHOTO ENLARGING AND PRINTING MACHINE

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UNITED STATES PATENT OFFICE

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PHOTO ENLARGING AND PRINTING MACHINE

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This invention relates to a machine for enlarging and printing photographs directly from negatives or developed films carrying the image onto the usual sensitized printing paper. The general object of the present invention is to provide a machine which can be operated to advantage in connection with strip film, such as used in portable cameras, and which permits an operator to carry out the enlarging and printing or exposing work properly and expeditiously with a minimum of exertion.

The machine of the present invention includes a transparent, flat support, against which a negative may be placed so as to be initially exposed to the view of the operator, and a source of illumination in back of the support, which is normally dim but which may be intensified when exposure of the sensitized paper to the light transmitted through the negative is desired. It is also provided with a hood, which carries an enlarging lens and which is normally stationed out of hooded engagement with the support and negative. The hood is, however, adapted to be moved over the support and negative, so as to confine the passage of light through the lens and thereby to project and focus the enlarged image onto the sensitized paper, which can be quickly and accurately placed in image-receiving position in the machine. The machine is further equipped with means by which the hood may be moved into focusing position and by which the sensitized paper may be simultaneously clamped in image-receiving position. It also comprises means by which the intensity of illumination may be momentarily increased when the hood is brought into its focusing position, thereby causing the desired action of the light on the sensitized paper. The organization of the machine and the assemblage of its parts is such that it permits the operator conveniently and with little lost motion to view or examine the negative, to place the proper kind of sensitized paper in the machine for exposure, and to give the sensitized paper the desired period of exposure.

With the foregoing and other features and objects in view, the invention will now be

described in greater detail in conjunction with the accompanying drawing, wherein

Figure 1 represents a vertical section, partly in front elevation, of a machine embodying the present invention.

Figure 2 is a similar view showing the hood in focusing position.

Figure 3 is a section on line 3—3 of Figure 2, with the hood in focusing position.

Figure 4 shows in perspective the hood, partly broken away for the sake of clarity.

Figure 5 is a similar view of the film support.

The machine of the present invention should be operated in a dark room, for instance a room furnished with red light but otherwise sufficiently darkened to permit the desired work to be done. The machine frame may include four corner posts 10, which stand on the floor and to which a horizontal work table or film support 11 is anchored at a distance above the floor such that an operator may be seated in front of the machine and conveniently look down on the support. The work table has an opening 12 therethrough, communicating with a box or receptacle 13, which may be suspended from the bottom of the table. As shown, the upper end of the box has flanges 130, which are secured flush with the bottom of the table by bolts 131. The box 13 serves as an enclosure or housing for a source of illumination, herein shown as an electric lamp 14. Above the opening 12 is a transparent film support or window 15, which may, as shown, take the form of a rectangular piece of glass held in a frame 16, which is fastened as by screws 17 to the top of the table. The negative or developed film, which, as shown in dotted outline in Figure 5, may be a strip 18 carrying a series of photographs, is placed against the window 15, which may be masked by opaque paper or other suitable opaque material 19 to provide a light-transmitting area 20 of a size corresponding to that of each negative being enlarged. It is thus seen that the window is preferably an over-sized one, so that it can accommodate various sized negatives, the mask in each case being made for the particu-

lar size of negative. In actual practice, it is usually preferred to associate suitable condensing lenses (not shown), as is well known to those skilled in the art, with the lamp 14, and thereby to permit lamps of comparatively low intensity, say lamps of about 500 wattage, to be used in realizing the desired intensity of illumination to be projected through the window 15. This means that the time of exposure to the image necessary for the sensitized paper will be diminished, for, as is well known, the more intense the light projected through the film, the less is the time required for the exposure of the negative to the image. A horizontal table 21 for supporting the sensitized paper may be arranged above the table 11, so that it can be conveniently reached by the operator, preferably while in his seated posture. The posts 10 are shown passing through bosses or collars 22 located near corners of the table 21 and secured as by bolts 23 to the posts. The bosses 22, which may be integral with the table, are vertically slidable on the posts when the bolts 23 are loosened, thereby permitting the table 21 to be adjusted toward and from the table 11, as desired. This adjustment makes possible a variation in the enlargement of the image which is projected from the negative to the sensitized paper, as will presently be described. The table 21 also has an opening 24, above which is placed a window 25 held in a frame 26 suitably fastened to the top of the table. The window 25 serves as the support for the sensitized paper and may be masked like the window 15 to define the area over which the paper is to be placed by the operator.

The projecting means of the present invention consists of a hood 27, which, as best shown in Figure 4, may take the form of a four-sided pyramid having an outwardly extending flange 28 at its lower edge and carrying an enlarged lens 29 within an opening at its apex. It may, however, be of a conical or other suitable shape, and be made of any suitable opaque material. The hood shown may be hingedly secured at its rear edge 30 to the rear edge of the frame 16. The bottom face of the flange 28 is smoothly finished to make a nice fit with the top face of the frame 16, wherefore light transmitted through the window 15 and the negative placed thereon is confined through the hood and the enlarging lens 29 so as to be projected through the window 25 onto sensitized paper 31 placed on the latter window. The paper is, of course, in the path of the complete, enlarged image to be projected from the negative. In order to hold the paper 31 flat against the window 25 and thus to avoid distortion or blurring of the image received thereby, a flat plate 32 whose rear edge 33 is hingedly secured to the rear edge of the frame 26 may be arranged to come down on the paper after

it has been properly positioned on the window 25 by the operator. Both the plate 32 and the hood 27 are, however, normally tilted upwardly and rearwardly out of engagement with the paper and film supports, respectively, but may be simultaneously brought down over these supports at the proper time. To this end, the plate 32 and the hood 27 may each be pivotally secured to a link 34, which, in turn, is pivotally connected to one end of a bell crank 35 rockably fastened to each of the tables 11 and 21. Both the upper and lower bell cranks are actuated by a vertical rod 36 in back of the machine. The lower bell crank is pivotally secured to the rod 36, whereas the upper one has a bifurcated end portion loosely engaging the rod 36 between collars 37, which are vertically adjustable on the rod, thereby permitting a raising and lowering of the table 21. It is thus seen that a raising of the rod 36 will tilt both the plate 32 and the hood 27 into engagement with the paper and film supports, respectively, as shown in Figure 2, whereas a lowering of the rod 36 will raise them out of such engagement to the positions shown in Figure 1. They are normally kept in this latter position to permit the proper preliminary work to be done by the operator. To this end, the rod 36 projects downwardly below the table 11 and is pivotally secured near its end to a treadle 38, which is pivotally secured at an intermediate point 39 to a lug 40 extending from a rear post 10. The forward end of the treadle is adjacent to the front side of the machine, so that the operator has ready access thereto. A tension spring 41 is tied at its upper end to the rear end portion of the treadle, and at its lower end to the base of the post 10, in consequence of which the rod 36 is normally kept in a lowered position so as to keep the plate 32 and the hood 27 in the position shown in Figure 1. By depressing the forward end of the treadle 38, the operator simultaneously brings the hood 27 over the film support and the clamp 32 over the paper support, as shown in Figure 2. At this latter time, it is desirable that the illumination of the lamp 14 be sufficiently intense to have the desired action on the sensitized paper, whereas normally the lamp 14 should be sufficiently dim not to affect the sensitized paper. With the treadle 38 in its normal position, shown in Figure 1, the electric current is supplied to the lamp 14 from a suitable source conventionally indicated at 42 and takes the path of the arrows *a* through a resistance element 43, a contact piece 44 on the lug 40, a contact piece 45 on the upper side of the treadle, and thence through the wire 46 to the lamp. When the treadle 38 is depressed, however, as shown in Figure 2, the contact between the pieces 44 and 45 is broken, and contact is established between a contact piece 47, also secured to the lug 40,

and another contact piece 48, secured to the lower side of the treadle. This latter circuit is one wherein the resistance element 43 is shunted and wherein the flow of current is in the direction of the arrows *b* through the conducting wire 49, the switch members 47 and 48, and thence through the wire 46 to the lamp. With the resistance disconnected, the illumination of the lamp 14 is intensified sufficiently so that the desired action of the light transmitted through the hood 27 to the sensitized paper is had.

In operating the machine, the operator may be seated in front of the machine, in a position to depress the treadle 38 with his foot. He takes the film or developed negative and places it on the film support, as shown in Figure 5, with the photograph properly registering with the area 20, through which light is transmitted. Although the light 14 is dim at this time, it is of sufficient intensity to permit the operator to view the sharpness or distinctness of the image and thus to judge the particular kind of sensitized paper on which the image is to be projected, as well as the time of exposure necessary to realize the best printing of the image on the sensitized paper. Having examined the film, the operator then places the sensitized paper 31 on the paper support 25 and proceeds to depress the treadle 38 so as to bring the hood 27 into focusing position and the clamp 32 in clamping engagement over the sensitized paper. He keeps the treadle 38 depressed, so as to subject the sensitized paper to the desired period of exposure, whereupon he removes his foot from the treadle so as to dim the light 14 and otherwise restore the machine to normalcy. The sensitized paper 31 may then be removed and the operator may then repeat the operations, using other film and sensitized paper. The exposed paper is then developed as usual in a dark room and is finally set to complete the job of printing.

An embodiment of the present invention having thus been described, it will be apparent to those skilled in the art that various changes and modifications might be made therein without departing from the spirit or scope of invention as defined by the appended claims.

I claim:

1. Apparatus of the class described, comprising in combination a transparent, flat support against which a negative may be placed so as to be exposed to view, a source of illumination sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the passage of light through said lens, means for holding sensitized paper in the path of the light

transmitted through said lens, whereby the enlarged image projected from said negative through said lens may be received on said paper, means by which said hood may be moved over said support, and means for intensifying said illumination while said hood is held over said support.

2. Apparatus of the class described, comprising in combination a transparent, flat support against which a negative may be placed so as to be exposed to view, a source of illumination sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the passage of light through said lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive the enlarged image projected from said negative through said lens, means by which said hood may be moved over said first-named support, and means for intensifying said illumination while said hood is held over said first-named support.

3. Apparatus of the class described, comprising in combination a transparent, flat support against which a negative may be placed so as to be exposed to view, a source of illumination sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the passage of light through said lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive the enlarged image projected from said negative through said lens, means for adjusting the location of said second-named support relative to said lens so as to increase or decrease the enlargement of said image, means by which said hood may be moved over said first-mentioned support, and means for intensifying said illumination while said hood is held over said first-named support.

4. A machine of the class described, comprising in combination a transparent, flat support against which a negative may be placed, a source of illumination in back of said support, a hood carrying an enlarging lens normally out of hooded engagement with said transparent support and negative but adapted to be moved over said support and negative to confine the passage of light through said lens, a transparent, flat support against which sensitized paper may be placed and stationed in the path of the light transmitted through said lens, whereby the image projected from said negative through said lens can be received on said paper, a

plate for clamping said paper flat against said second-named support but normally held in non-clamping position, manually-operated means for simultaneously moving said hood over said first-named support and said plate into clamping position, and means for intensifying said illumination while said hood is held over said first-named support and while said plate is in clamping position.

5. Apparatus of the class described, comprising in combination a transparent, flat, horizontal support against which a negative may be placed, illuminating means under said support, a hood carrying an enlarging lens normally out of hooded engagement with said transparent support and negative but adapted to be moved over said support and negative to confine the passage of light through said lens, a transparent, flat, horizontal support against which such sensitized paper may be placed located above said first-named support and in the path of the light transmitted through said lens, whereby the image projected from said negative through said lens can be received on said paper, a plate for clamping said paper flat against said second-named support but normally held in non-clamping position, a rod to which both said hood and said plate are tiltably connected, spring means acting upon said rod to tilt said hood and said clamp simultaneously to their normal positions, said rod being manually movable to overcome said spring means and to cause a simultaneous-tilting movement of said hood over said first-named support and said plate into clamping position, and means for intensifying said illumination while said hood is held over said first-named support and while said plate is in clamping position.

6. Apparatus of the class described, comprising in combination a transparent, flat, horizontal support against which a negative may be placed, illuminating means under said support, a hood carrying an enlarging lens normally out of hooded engagement with said transparent support and negative but adapted to be moved over said support and negative to confine the passage of light through said lens, a transparent, flat, horizontal support against which such sensitized paper may be placed located above said first-named support and in the path of the light transmitted through said lens, whereby the image projected from said negative through said lens can be received on said paper, a plate for clamping said paper against said second-named support but normally held in non-clamping position, a rod to which both said hood and said plate are tiltably connected, spring means acting upon said rod to tilt said hood and said clamp simultaneously to their normal positions, a treadle arranged below said first-named support and operable to actuate said rod so as to cause a simulta-

neous tilting movement of said hood over said first-named support and said plate into clamping position, and means for intensifying said illumination while said hood is held over said first-named support and while said plate is in clamping position.

7. Apparatus of the class described comprising in combination a transparent, flat support against which a negative may be placed so as to be exposed to view, a source of illumination sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be stationed over said support and negative to confine the passage of light through said lens, means for holding sensitized paper in the path of the light transmitted through said lens, whereby the enlarged image projected from said negative through said lens may be received on said paper, means for causing relative movement between said hood and said support to bring said hood into hooded engagement with said support and to confine the light passing through said negative and lens, and means for intensifying said illumination while said hood is held over said support.

8. A photographic printing and enlarging apparatus comprising a transparent, flat support against which a negative may be placed and illuminated so as to be exposed to view, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the light passing through said negative and lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive an enlarged projected image of the negative, a movable clamping member adapted to clamp the sensitized paper onto said second-named support, and means for simultaneously bringing said first-named support and said clamp into clamping engagement with said second-named support.

9. A photographic printing and enlarging apparatus comprising a transparent, flat support against which a negative may be placed and illuminated so as to be exposed to view, a source of illumination in back of said support sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the light passing through said negative and lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive an enlarged projected image of the negative, a movable clamping member adapted to clamp the sensitized paper on

said second-named support, means for simultaneously bringing said hood into hooded engagement with said first-named support and said clamping member into clamping engagement with said second-named support, and means for intensifying said illumination while said hood is held over said first-named support.

10. A photographic printing and enlarging apparatus comprising a transparent, flat support against which a negative may be placed and illuminated so as to be exposed to view, a source of illumination in back of said support sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the light passing through said negative and lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive an enlarged projected image of the negative, a movable clamping member adapted to clamp the sensitized paper onto said second-named support, and means for simultaneously bringing said hood into hooded engagement with said first-named support and said clamping member into clamping engagement with said second-named support and for intensifying said illumination.

11. A photographic printing and enlarging apparatus comprising a transparent, flat support against which a negative may be placed and illuminated so as to be exposed to view, a source of illumination in back of said support sufficient to render visible the photograph carried by said negative, a hood carrying an enlarging lens normally stationed out of hooded engagement with said support but adapted to be moved over said support and negative to confine the light passing through said negative and lens, a transparent, flat support located in the path of the light transmitted through said lens and against which sensitized paper may be placed to receive an enlarged projected image of the negative, means for adjusting the distance between said first-named support and said second-named support, a movable clamping member adapted to clamp the sensitized paper onto said second-named support, and means for simultaneously bringing said hood into hooded engagement with said first-named support and said clamping member into clamping engagement with said second-named support and for intensifying said illumination.

In testimony whereof I have affixed my signature.

JACOB RODMAN.