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PHOTOCOPYING AND PHOTOPRINTING APPARATUS

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3 Sheets-Sheet 1

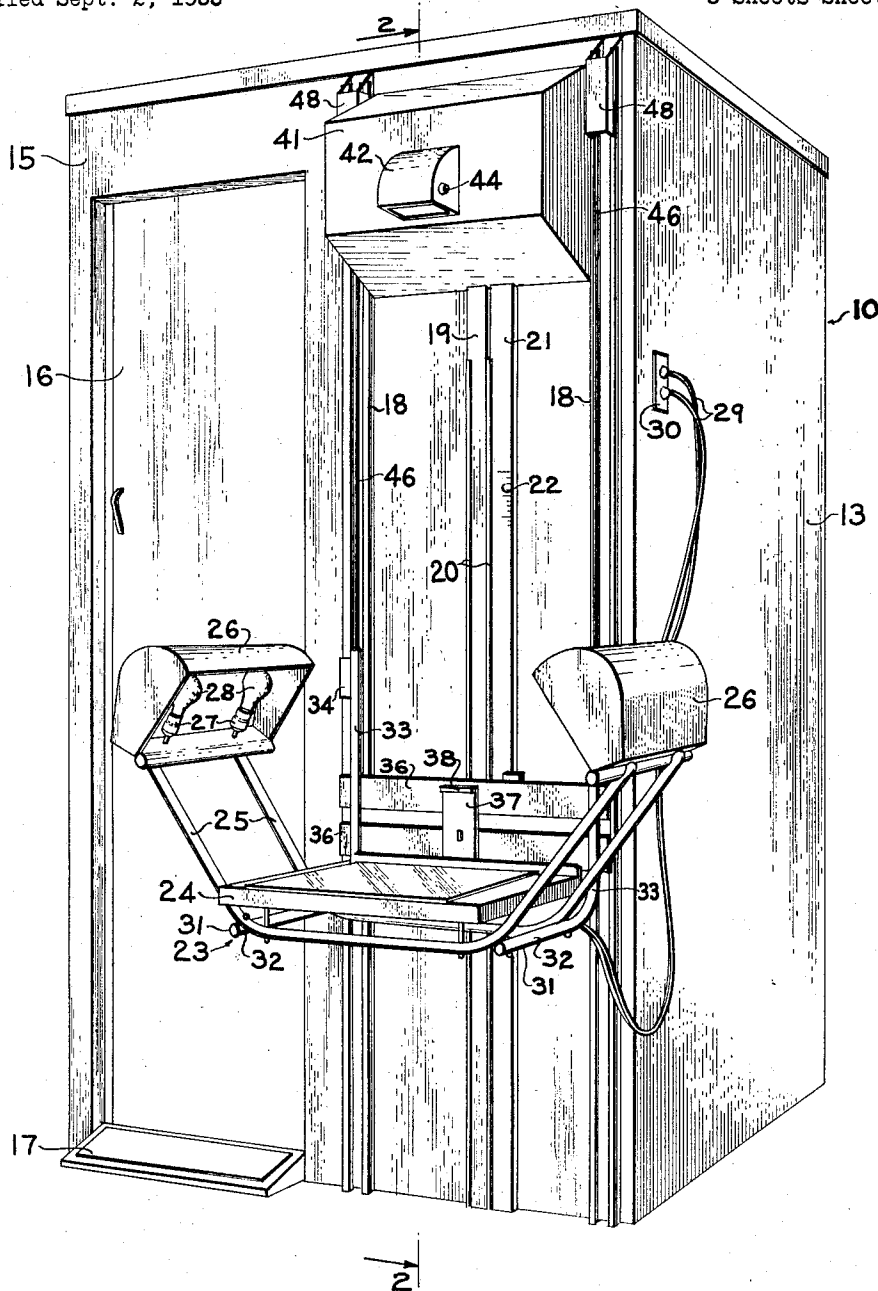


FIG. 1.

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3 Sheets-Sheet 2

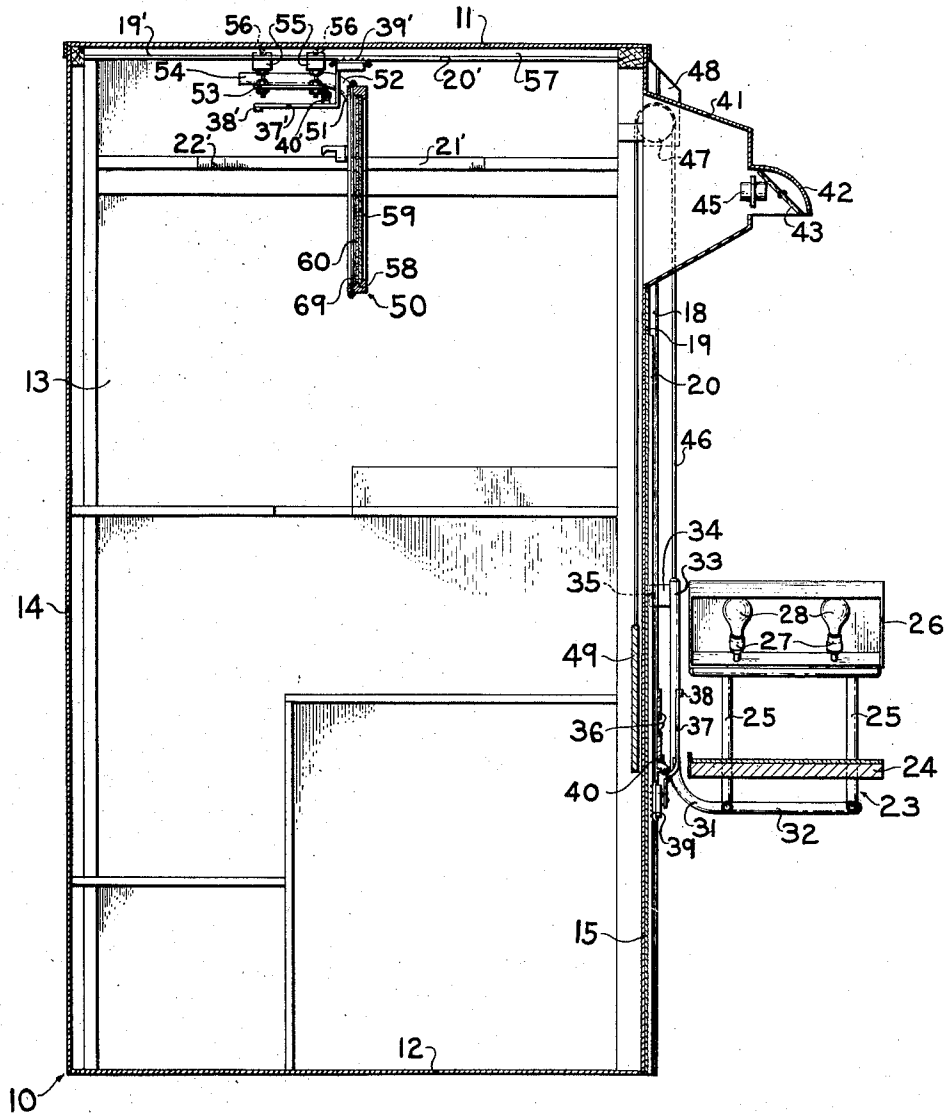


FIG. 2.

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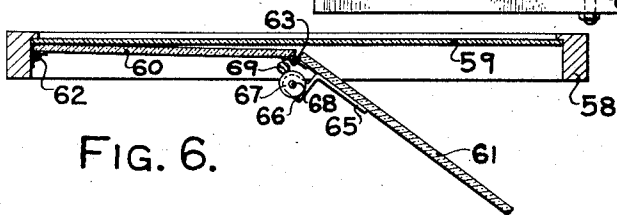
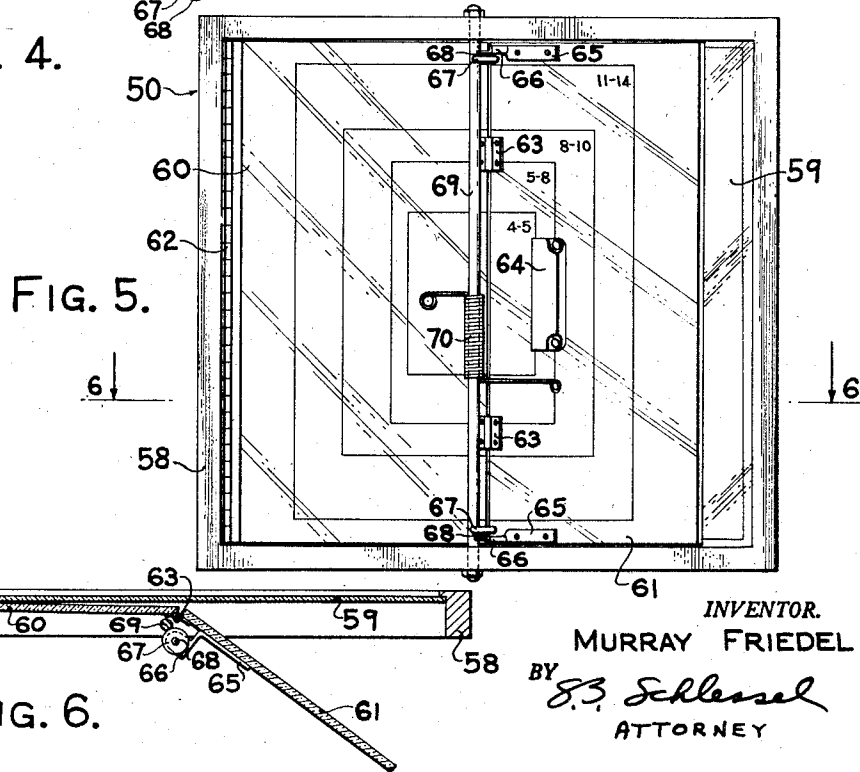
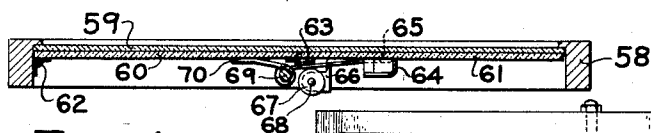
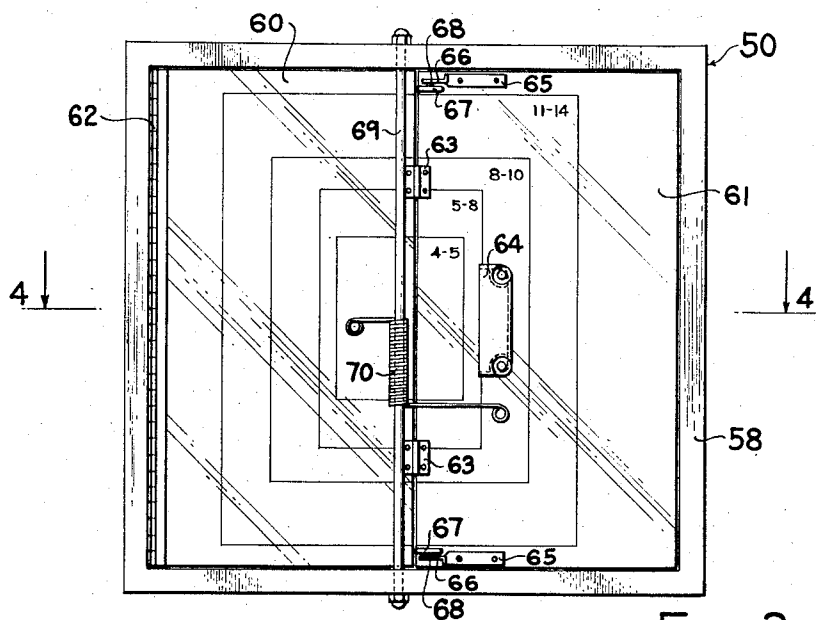
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3 Sheets-Sheet 3



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PHOTOCOPYING AND PHOTOPRINTING APPARATUS

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3 Claims. (Cl. 88—24)

This invention relates to photocopying and photoprinting apparatuses and has for its object the provision of a photocopying or photoprinting machine integral with a developing dark room as a single, compact and portable unit, whereby the operator can set up the print to be copied outside the unit and then enter into the dark room portion of the unit where he can set up the sensitized paper in a size equal to the size of the print desired, and both see and control the entire operation.

In the present state of the art of photoprinting or photocopying, the sensitized paper is made up into a large roll which is inserted into the photocopying machine, supported on rollers therein. When a print is desired a large expanse of sensitized paper is exposed to the lighted print to be copied for the required time interval. The shutter is then closed, the roll of sensitized paper turned and cut and the exposed sheet of sensitized paper is removed and developed. One of the disadvantages of this type of machine is that the sensitized paper cannot be seen during the operation and frequently it is over-exposed or under-exposed, resulting in an unsatisfactory print and necessitating a repetition of the operation. Another disadvantage is found in the fact that a print is usually developed on only a portion of the sensitized paper exposed, resulting in a considerable waste of sensitized paper. A third disadvantage is found in the time and labor wasting process of cutting and trimming the developed print out of the section of sensitized paper. Other disadvantages will be apparent from comparison with my invention, hereinafter described.

One of the principal objects of my invention, therefore, is to provide a compact, portable photocopying unit combining the photocopying machine and the developing room in a minimum of space, and adapted to be moved, as desired.

A second important object of my invention is the provision of a photocopying unit wherein the sensitized paper is visible to and controllable by the operator during the entire photocopying process.

A third important object of my invention is the provision of a photocopying unit adapted to use sensitized paper in exact size of the print desired, eliminating waste of paper and of the time and labor of cutting out and trimming the finished print.

A further important object of my invention lies in the provision of a novel printing frame for holding the sensitized paper to be exposed.

Other salient objects, advantages and functional features of my invention, together with the novel features of construction, combination and arrangement of parts, will more readily appear from an examination of the following description, taken with the accompanying drawings, wherein:

Fig. 1 is a front, perspective view of a preferred embodiment of the photocopying apparatus, showing the outer elements thereof;

Fig. 2 is a cross-sectional view, taken on lines 2—2 of Fig. 1;

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Fig. 3 is a front view of the printing frame, showing inner arrangement of parts located within the unit, in closed position;

Fig. 4 is a cross-sectional view, taken on lines 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3, but showing the holding panels of the printing frame open to receive a sheet of sensitized paper; and

Fig. 6 is a cross-sectional view, taken on lines 6—6 of Fig. 5.

Similar reference characters designate similar parts throughout the different views.

Illustrative of the embodiment, shown by Figs. 1 and 2, the photocopying or photoprinting apparatus, which I call the "Statmaster," comprises a room or housing 10 provided with a roof 11, raised floor 12, side walls 13, rear wall 14 and front wall 15. This housing 10 may be of any necessary size for compactness and convenience. I have used for my embodiment a housing 10 having inner measurements of 4 feet square and 7 feet in height.

The front wall 15 is provided with a sliding door 16 in one half thereof, which, when closed, effectively seals the inside of the housing 10 from outer light. A slanted step 17, with its upper edge flush with the floor 12, is provided for entrance into the housing 10. On the other one-half of the wall 15 there are provided a pair of parallel, U-shaped channels 18 extending vertically the height of the wall 15, the edges of the channels 18 being formed T-shaped, as shown, and adapted to act as rails. Parallel to and intermediate the channels 18 there is provided a runner 19 comprising a pair of parallel rubber tubes 20 secured together intermediately, and, adjacent thereto and parallel therewith, a vertical bar 21 provided with a calibrated scale 22.

The carriage 23 comprises a holder plate 24 seated upon and secured to a pair of tubular supports 25, extending laterally therefrom, upwardly and outwardly, and provided at each end with a reflector 26. Light sockets 27 are secured within each reflector 26 and adapted to receive and hold light bulbs 28, the wiring therefore extending through the hollow tubular supports 25 into electric cables 29 adapted to be plugged into an electrical socket to provide current for lighting the bulbs 28 by operating a switch (not shown) located within the housing 10. A pair of L-shaped tubular supports 31 are provided with their horizontal sections 32 secured to and across the tubular supports 25 beneath the holder plate 24 of the carriage 23, and their vertical sections 33 parallel to and adjacent the wall 15. Each of the vertical sections 33 is provided with a pair of channel members 34 to which are secured roller bearings 35 adapted to fit within the T-shaped recesses of the vertical channels 18 to hold the carriage 23 to the channels 18 and allow raising of the carriage 23 along the wall 15 and lowering thereof thereon, the channels 18 acting as rails for the carriage 23. A pair of cross-bars 36 are secured to the vertical sections 33 of the tubular supports 31 to provide further rigidity for the carriage 23 and for the further purposes to be hereinafter explained.

A plate 37, provided with a finger piece 38 at the top thereof, is pivotally secured to the carriage 23, and is provided at its bottom below the pivot with a clamp 39 having a serrated face, which is pivotally tensioned against the rubber tubes 20 by means of a spring 40, to resist movement of the carriage 23 along the channels 18. Pressure against the plate 37 pivotally raises the clamp 39 from the runner tubes 20 and permits raising and lowering of the carriage 23 along the channels 18.

An enclosed extension 41 is provided along the upper surface of the wall 15, directly over the holder plate 24, outwardly closed and opening rearwardly into the hous-

ing 10. The extension 41 is provided centrally with an arc-shaped hood 42, entirely enclosed excepting its base which is centered directly over the holder plate 24. A prism or mirror 43 is pivotally secured within the hood 42 and is adapted to be rotated when desired to change its angulation by means of outside knob 44 located on the outer surface of the hood 42. Directly behind the prism 43 there is provided in the rear wall of the hood 42 the lens 45 necessary for focusing of the image reflected in the prism 43 from the print on the holder plate 24, into the interior of the housing 10.

As shown by Figs. 2-6, within the housing 10 there ends of the vertical sections 33 of the supports 31, and are mounted upon pulleys 47 secured to the upper end of the wall 15 beneath the cover elements 48, entering into the housing 10 and secured therein to either end of a counterbalance weight 49 having the same weight substantially as the carriage 23, so as to permit raising and lowering of the carriage 23 along the channels 18 with ease when the clamps 39 are separated from the runner tubes 20.

As shown by Figs. 2-6, within the housing 10 there is provided a printing frame 50 centered directly in front of the opening in the wall 15 provided by the extension 41 and the hood 42, so that light entering through these openings, reflected by the prism 43 through the lens 45 is focused directly upon the printing frame 50.

The printing frame 50 is mounted upon and secured to the vertical sections 51 of a pair of angle tubes 52. A cross-plate 53 is secured to the horizontal sections 54 of the angle tubes 52 and provided on its upper surface at each end thereof with a pair of U-shaped channel members 55 to which are secured roller bearings 56. The inner surface of the housing roof 11 is provided with a pair of parallel, U-shaped channels 57, the extended arms of which are shaped in the form of an inverted T, and adapted to receive the roller bearings 56 to support the angle tubes 52 carrying the printing frame 50, and permit sliding movement of the printing frame 50 back and forth along the channel members 57. A runner 19', similar to the runner 19 on the wall 15, is secured to the inner surface of the roof 11, parallel to and intermediate the channels 57, and is provided with similar runner tubes 20', as shown. Likewise, a plate 37', similar to the plate 37 attached to the carriage 23, is pivotally secured to the cross-plate 53, provided at one end with a finger piece 38' and at the other end attached to a clamp 39' provided with a serrated face adapted to be pivotally tensioned against the runner tubes 20' by means of a spring 40', and adapted to be pivotally raised therefrom by pressure against the plate 37' so as to permit lateral movement of the printing frame 50 along the channel members 57. Adjoining the runner 19' there is provided a calibrated scale 22', similar to scale 22, on a scale bar 21', to measure the distance from the printing frame 50 to the opening in the wall 15.

The printing frame 50 comprises a square framework 58 in the front surface of which is secured a transparent panel 59, of glass, plastic or the like. A pair of translucent panels 60 and 61, made of plastic or like material, sand-blasted on the front surfaces to make the reflected image from the prism visible thereon, are provided in back of the front panel 59, adapted to be pressed firmly together to engage a section of photo-sensitized paper between them, the rear panel 60 being pivotally secured to the side of the framework 58 by a hinge 62 extending the full length of the side thereof, and the panel 60 being secured to the back panel 61 at its opposite side by a pair of hinges 63, as shown. The panel 61 is further provided with a finger piece 64 centrally thereon, and a pair of L plates 65 secured thereto, one adjacent the top and the other adjacent the bottom of the panel 61, the vertical sections of the plates 65 each having an extension 66 to which a roller bearing 67 is secured by means of a pin 68, the roller bearing 67 being raised and adjacent the

edge of the rear panel 60, as shown. A rod 69 is bolted vertically into the framework 58 of the printing frame 50 directly behind rear panel 60 adjacent to the edge thereof hinged to the rear panel 61, and is provided with a spiral spring 70 mounted thereon, one end of which is tensioned against the rear panel 60 and the other end against the rear panel 61, holding rear panels 60 and 61 firmly against the front panel 59 to hold securely between them a section of sensitized paper for photoprinting. The panels 60 and 61 are provided with centralized border markings to designate the particular sizes of sensitized paper to be inserted, all of which are centered with respect to the printing frame 50 and the lens 45 through which the image to be photographed is projected, such as 4" x 5", 5" x 8", etc. The holder plate 24 is similarly marked (not shown).

In the operation of the printing frame 50, the rear panel 61 is lifted against the tension spring 70, by means of the finger piece 64, away from the front panel 59 until the bearings 67 are pressed against the rod 69, whereby the rod 69 acts as a pivot to raise the rear panel 60 from contact with the front panel 59. The sensitized paper is then inserted between the front panel 59 and rear panel 60 until its side, top and bottom edges register with the markings for that particular size of paper. The panel 61 is then slowly released until the roller bearings 67 leave the rod 69 at which time the panel 60 is firmly pressed against the front panel 59, holding the sensitized paper firmly in the position selected. The rear panel 61 is then released and tensions the other one half of the sensitized paper against the front panel 59.

The photocopying apparatus is provided within the housing 10 with all of the usual equipment for taking and developing photoprints, such as timer, tank of developer, etc., all of which is well known in the art and, since it forms no part of the invention, not further described. Instead of the roll of sensitized paper commonly used in photocopying machines, however, a drawer or series of drawers is provided, containing sensitized paper in all specific sizes necessary or desirable for use with the apparatus.

In the operation of the photocopying apparatus the photo or print to be copied is placed face up on the holder plate 24 with a flat glass plate superposed thereon to keep it flat. The plate 37 is then pressed inwardly to release the clamp 39 from the rubber tubes 20, and, by means of the finger piece 38 the carriage 23 is swiftly raised or lowered along the channels 18 until the holder plate is at the proper distance from the prism 43 for the particular size of copy desired, whether of the same size, larger or smaller, as determined by reference to the scale 22. The carriage 23 is then fixed in this position by release of the plate 37, causing the clamp 39 to be tensioned against the rubber tubes 20. The operator then enters into the housing 10 and seals it from light by closing the door 16. The printing frame 50 is then moved laterally along the channels 57, after releasing the clamp 39' from the rubber tubes 20' in the manner above described, until the printing frame 50 is the proper distance from the prism 43, as measured on the scale 22', corresponding to the distance of the holder plate 24 from the prism 43 on the outside of the housing 10, and the printing frame 50 is locked in this position by releasing the plate 37'. A piece of sensitized paper in the exact size of the print to be made is then inserted into the printing frame 50, fitted into the size markings thereon for the size of print to be made, and locked in place in the manner heretofore described. The operator then switches on the reflector lights 28 for the proper time interval, in the meantime observing the exposure of the sensitized paper to the reflector lights 28. After the proper time lapse for exposure, the reflector lights 28 are switched off, and the sensitized paper removed and developed within the housing 10.

It is to be noted that my invention thus requires no shutter, the turning on and off of the reflector lights

28 effectively acting as a shutter, and that sensitized paper and film may be interchangeably used. It is also to be noted that because of the novel structure of my invention the same piece of sensitized paper or film may have the same operation expose different parts thereof for different time intervals. For, example, assume that a part of the sensitized paper is to be exposed to light for 9 seconds, whereas the other part is to be exposed for 15 seconds. After 9 seconds of exposure the operator can cover the first portion with an opaque material and leave the balance exposed for an additional 6 seconds, before switching the light off. The results thereby obtained cannot be obtained by use of the present methods and apparatus for photocopying. It is further to be noted that because of its compactness and novel arrangement my invention requires a minimum of space and is portable when desired.

The embodiment shown and described is by way of illustration only, and various changes may be made in the construction, composition and arrangement of parts without limitation upon or departure from the spirit and scope of the invention or sacrificing any of the advantages thereof inherent therein.

Having described my invention, I claim:

1. A photocopying apparatus comprising a light-proof housing, adapted to receive the operator therein, a pair of parallel channels secured vertically to the housing wall, rubber tubes secured to the housing wall parallel to and intermediate the channels, a calibrated scale adjacent the rubber tubes, a carriage mounted in the channels and movable longitudinally therein, the carriage provided with a holder plate and light reflector means, a pair of cables secured to the carriage and extending along the channels into the housing, a pair of pulleys secured to the housing and adapted to carry the cables, a counter-balance weight within the housing secured to the cable ends, a plate pivotally secured to the carriage, a finger piece secured to the top of the plate, a serrated clamp provided at the end of the plate, a spring secured to the plate and adapted to tension the clamp against the rubber tubes, an extension integral with the housing above the carriage and provided with a projecting hood, a lens and prism secured within the hood, the prism disposed directly over the holder plate and adapted to reflect an image

thereon through the lens into the housing, a printing frame within the housing, means for lateral movement of the printing frame with respect to the prism, tensioning means to lock the printing frame at selective distances from the prism, the printing frame comprising a framework provided with a transparent front panel and a pair of translucent, image-retaining rear panels, means for tensioning the rear panels against the front panel, means for separating the rear panels selectively from the front panel, guide lines provided on the rear panels for centering sensitized paper in the printing frame, a calibrated scale adapted to measure the distance of the printing frame from the prism and reflector light control means disposed within the housing.

2. A photocopying apparatus, according to claim 1, the means for lateral movement of the printing frame comprising a pair of horizontal channels provided with flanged arms secured to the roof of the housing and channel-engaging members secured to the printing frame, the channel-engaging members provided with roller bearings adapted to be engaged to and within the horizontal channels and movable laterally therein.

3. A photocopying apparatus, according to claim 2, the tensioning means for locking the printing frame from lateral movement comprising a pair of rubber tubes secured to the roof of the housing parallel to and intermediate the horizontal channels and a plate pivotally secured to the printing frame, the plate provided with a finger piece at one end thereof and a serrated clamp at the other end, a spring secured to the plate and adapted to tension the clamp against the rubber tubes whereby the printing frame is locked against lateral movement.

References Cited in the file of this patent

UNITED STATES PATENTS

1,141,704	French	June 1, 1915
1,193,584	Martin	Aug. 8, 1916
1,208,071	Wynkoop	Dec. 12, 1916
1,252,513	Tyrrell	Jan. 8, 1918
1,929,508	Meyer	Oct. 10, 1933
2,066,898	Palfreeman	Jan. 5, 1937