A. K. TAYLOR.

METHOD OF AND APPARATUS FOR PREPARING REGISTERING IMPRESSION FORMS.

APPLICATION FILED NOV. 25, 1914.

1,199,942.

Patented Oct. 3, 1916.

4 SHEETS—SHEET 1.

FIG. 1.

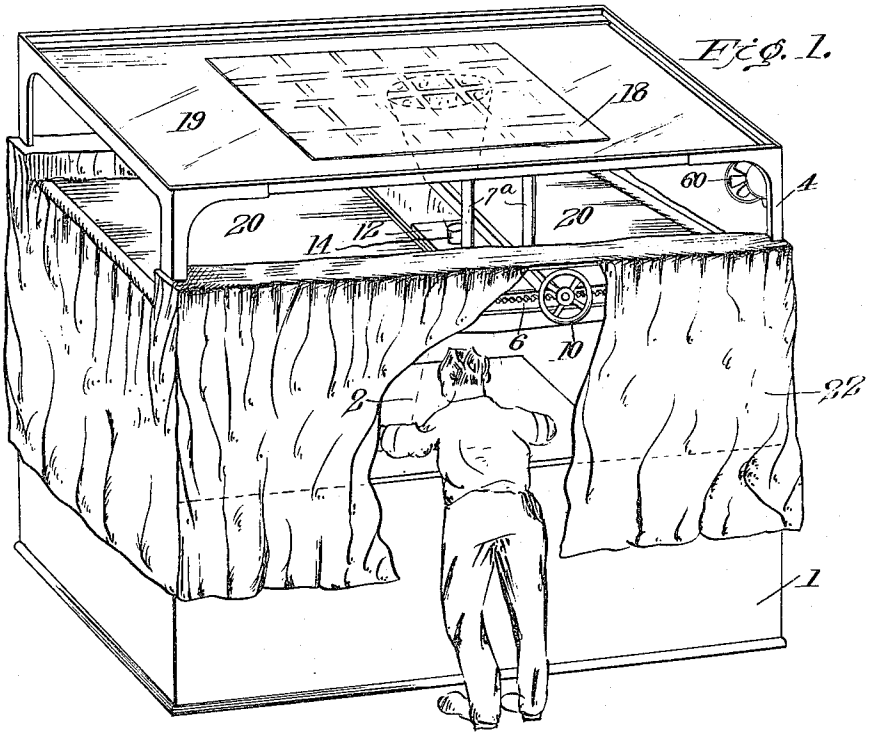
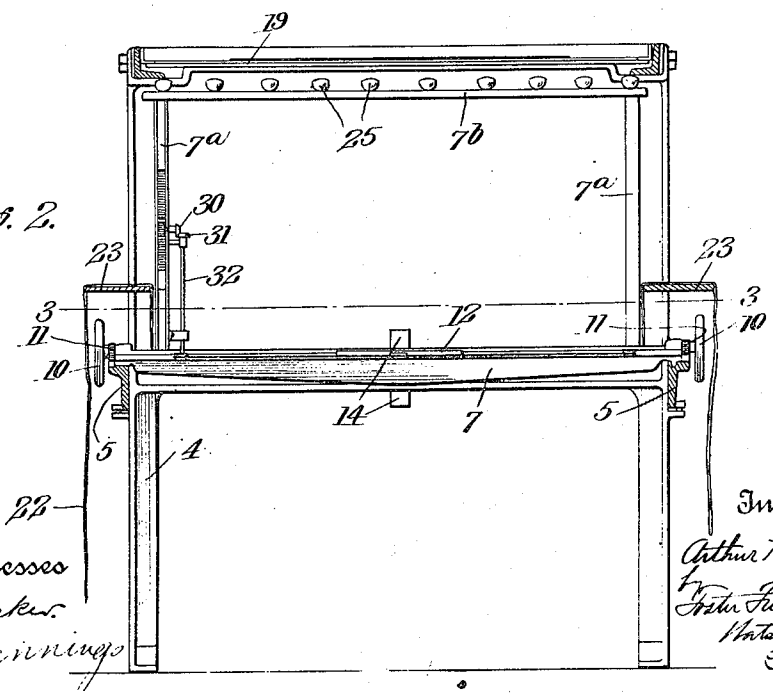


FIG. 2.



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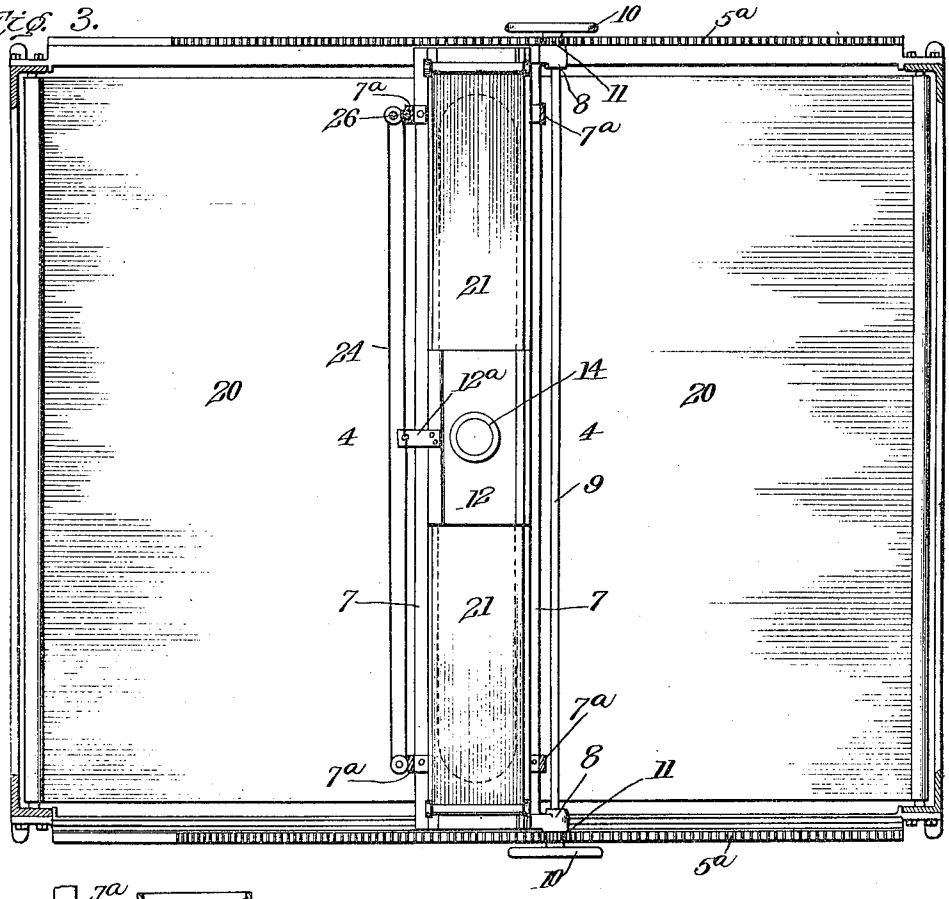
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4 SHEETS—SHEET 2.

Fig. 3.



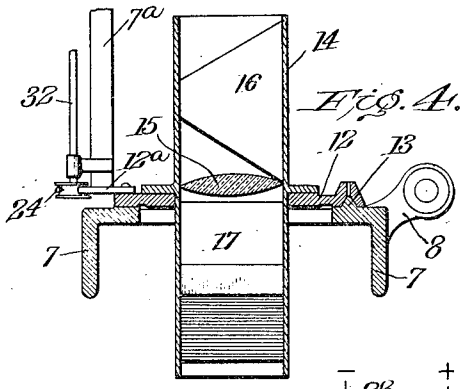


Fig. 4.

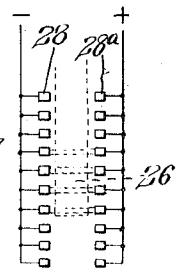


Fig. 7.

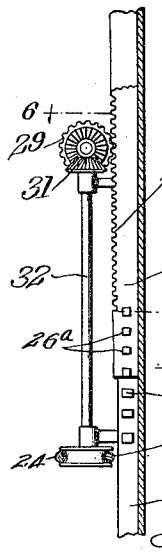


Fig. 5.

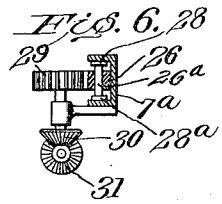


Fig. 6.

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4 SHEETS—SHEET 3.

Fig. 11.

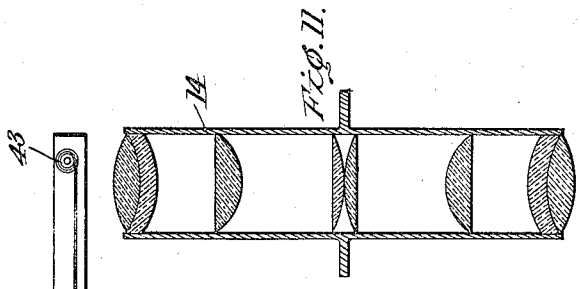


Fig. 8.

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4 SHEETS—SHEET 4.

Fig. 9.

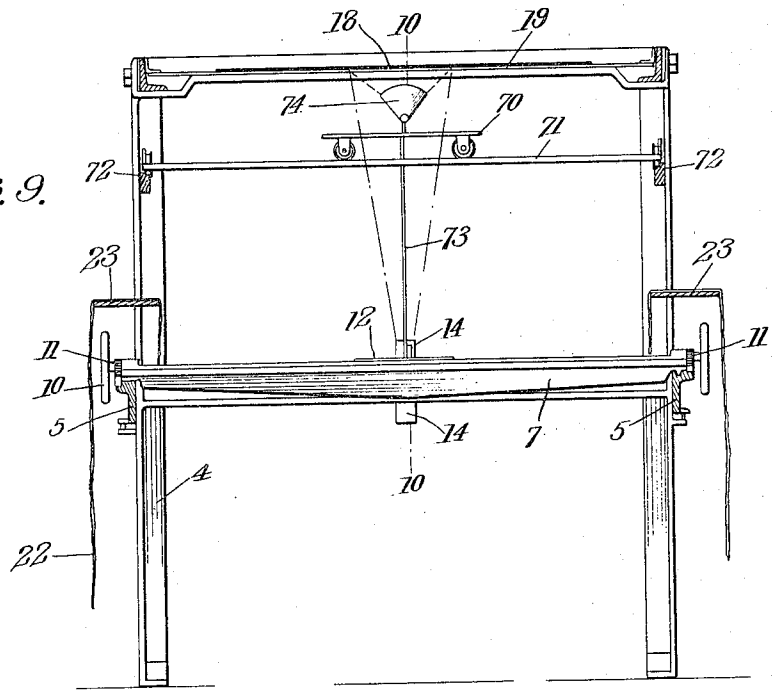
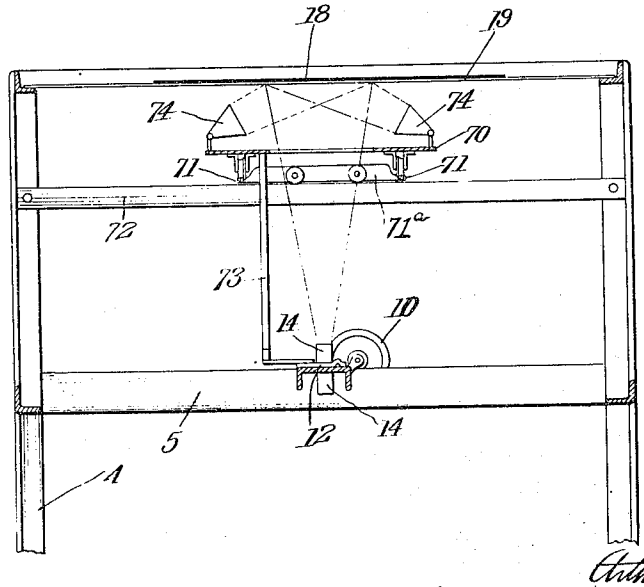


Fig. 10.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR PREPARING REGISTERING IMPRESSION-FORMS.

1,199,942. Specification of Letters Patent. Patented Oct. 3, 1916.

Application filed November 25, 1914. Serial No. 873,997.

To all whom it may concern:

Be it known that I, ARTHUR K. TAYLOR, a citizen of the United States, and resident of Baltimore, Maryland, have invented certain new and useful Improvements in Methods of and Apparatus for Preparing Registering Impression-Forms, of which the following is a specification.

The present invention relates to an improved method of and apparatus for use in making up registering forms for use in printing, embossing, dieing and creasing lithography or similar work.

The object of the invention is to provide a method and means by which any "impression form" may be quickly prepared with all of the movable or separate elements thereof properly positioned to insure correct registry of impressions therefrom with or in impressions from other forms.

The invention is particularly adapted for use in preparing forms for multi-color printing, or positioning printing forms, plates, cuts or transfer impressions, or for positioning dies for embossing, cutting or creasing paper or other blanks, which have been or are intended to be printed.

The term "impression form" as herein employed is intended to include any holder, container or base adapted to receive one or more movable members and retain the same in any adjusted position so that impressions can, by aid of a suitable press, be obtained therefrom.

In the accompanying drawings, Figure 1 is a perspective view illustrating, more or less conventionally, an apparatus including an embodiment of the invention; Fig. 2 is a transverse vertical sectional view; Fig. 3 is a plan view substantially on the line 3—3 of Fig. 2; Fig. 4 is a view on an enlarged scale partly in section on the line 4—4 of Fig. 3; Fig. 5 is a detail view of a portion of the automatic means controlling the illuminating devices; Fig. 6 is a sectional view on the line 6—6 of Fig. 5; Fig. 7 is a diagrammatic view of the electric circuits for the illuminating devices; Fig. 8 illustrates a slightly modified form of apparatus; Fig. 9 is a transverse sectional view illustrating a slightly modified form of illuminating means; Fig. 10 is a vertical sectional view substantially on the line 10—10 of Fig. 9; Fig. 11 illustrates a modified form of lens system.

Referring to the drawings 1 designates an imposing table or support for an imposing stone on which the "impression form" 2 is supported while being made up. On or about the table 1 is provided a rectangular shaped frame, comprising corner posts or uprights 4 connected at their upper ends by suitable side and end members. Said frame includes parallel track or guide rails 5 extending throughout the length of the frame and each provided on its upper surface with a rack 6. On said rails 5 is mounted a carriage comprising side members 7 which rest on and are supported by the frame rails and are suitably connected at their ends. In bearings 8 projecting from opposite ends of one of the carriage rails 7 is mounted a shaft 9 provided at its ends with hand wheels 10 and also having pinions 11, which engage the racks 5^a on the frame. By means of either hand wheel 10, therefore, the carriage can be moved longitudinally of the supporting frame over the table 1.

On the carriage is mounted a projecting apparatus which as shown is carried by a slide 12 that rests on the horizontal surfaces of the side members 7 of the carriage. One of the carriage members 7 is preferably provided with an upwardly extending rib 13 and the slide 12 is correspondingly grooved adjacent one edge to engage this rib so that the slide will be caused to move in a straight line and be held from lateral turning or twisting. Through an aperture in the slide 12 extends a tubular lens holder 14 within which is arranged a lens system adapted to project upon the table, below the lower end of the tube, an exact image of an object positioned above the upper end of said tube. It will be evident that the invention in this regard is not dependent on any particular arrangement or number of lens elements. Fig. 4 of the drawing illustrates an arrangement which has been by practical experience found to be very satisfactory, the same comprising a double convex lens 15 arranged substantially midway of the length of the tube 14 and two prisms 16, 17, arranged respectively above and below said lens and in the relative positions shown. A slightly differently constituted lens system is illustrated in Fig. 11.

The frame 4 is provided at its upper end with means for supporting a sheet or plate 18 bearing the necessary "registering detail." Said sheet or plate may, for example, be of paper having delineated thereon, by any

suitable means, the outlines of the space or spaces to be occupied by the several members of an impression form or may be a primary impression form, for example. A plate or sheet of celluloid or other transparent material may be used and the term "sheet" as hereinafter employed in this connection is intended to include any device, means or object, the projection of an image of more or less of which, as hereinafter described, is adapted to enable the operator to properly position a movable impression surface or member within the form 2 on the table 1. As shown, the frame is provided with a transparent top 19 on which the "sheet" 18 rests. The top 19 can be formed of a single plate of glass adjustably supported at its edges by the side and end members of the frame.

The slide 12 which directly supports the projecting devices is adapted to move on the carriage between the members 7 thereof or in a direction transverse to the direction of its movement with the carriage over the table 1 and relative to the sheet 18. By this arrangement it is possible to readily position the projecting lens system so that an image of the necessary part of any section of the sheet 18 will be projected on to the form 2 and a relatively small device only is required for working with forms of large size.

It is preferable to exclude from the chamber or space within the supporting frame between the carriage and the table 1, all light except that which passes through the tube 14. As shown each said member 7 of the carriage is connected with one end of an opaque curtain 20 that extends from one side of the supporting frame to the other; and the other ends of said curtains are secured to spring actuated rollers mounted on the corner posts of the frame. The carriage itself is provided with similar curtains 21 extending from rolls adjacent the ends of the carriage to the slide 12. It will be understood that as the carriage or slide is moved the curtains 20, 21, in the direction of movement will be wound upon their proper rollers and be correspondingly unwound from the rolls at the sides or ends of the frame from which the movement takes place. A curtain 22 is provided for inclosing the sides of the space between the table 1 and carriage supporting rails 5. As shown this side screen or curtain extends over horizontal strips 23 attached to the end posts of the supporting frame above the carriage, said strips being of sufficient width to cause the curtain 22 at the sides of the frame to be carried out beyond the carriage manipulating wheels 10 so that the operator standing within said curtain can readily engage the adjacent wheel 10 to move the carriage as desired.

The carriage may be provided with any suitable means for enabling the operator to adjust the slide 12 and projecting means thereon. As shown said slide has a lateral arm 12^a to which are secured the ends of an endless cord or chain 24 that extends about pulleys or sprockets supported on the carriage. It will be seen that the parts are so positioned that an operator while standing in position to adjust the members of the impression form 2 can readily manipulate the carriage controlling hand wheel 10 and slide actuating means 24 to position the projecting devices as desired.

It is desirable to illuminate the portion or area of the sheet 18 that is to be projected on to the form 2. For this purpose a series of electric lamps and reflectors may be supported by the carriage relatively close to the support for the sheet 18. For example, as shown, the carriage may be provided adjacent its ends with uprights 7^a connected at their upper ends by cross bars 7^b on each of which is arranged a series of concave reflectors 25 each having therein an electric lamp, the reflectors being so positioned that the rays of light from the lamp will be thrown against the sheet 18 at the proper angle to best illuminate the surface thereof. As will be evident it is only necessary or desirable to project on to the form 2 an image of a relatively small portion of the total area of the sheet 18 and it is of course unnecessary and undesirable to illuminate portions of such sheet that are not necessary for the particular work in hand. Therefore means are provided by which the lamps carried by the carriage are lighted in groups depending on the adjustment of the slide 12 and projecting tube 14 relative to the carriage.

The lamps at each side of the carriage are connected in series and a commutator or switch moved by the slide 12 is provided for bringing the desired lamps into the circuit. The switch or commutator shown comprises a bar 26 of insulating material which is mounted in a channel formed in one of the uprights 7^a of the carriage and connected with a rack 27. Through the bar 26 extend a plurality of contact pins 26^a each adapted to electrically connect contact plates 28, 28^a, of lamps positioned at opposite sides of the carriage. In practice it has been found sufficient to provide four of such circuit closers so that in each adjustment of the slide 12 and projecting tube 18, eight of the lamps will be operative, the others being out of service. To automatically move the rack 27 and circuit closing device 26, said rack is engaged by a pinion 29 at one end of a short shaft which is provided at its opposite end with a bevel pinion 30 with which engages a corresponding pinion 31 on the upper end of a shaft 32, the lower end of which is provided with a pulley or sprocket engaged by the slide actuating member 24. To prevent the illuminating means from unduly heat-

ing the sheet 18 or its support the fan 60 is preferably mounted on one of the uprights 4 adjacent the top of the machine, as shown in Fig. 1.

Fig. 8 illustrates a slightly modified form of the apparatus herein before described. In this embodiment of the invention the carriage 40 supports both the projecting tube or casing 41 and the sheet containing the registering detail, said sheet being in this embodiment of the invention connected at its ends to rollers 42, 43, and being adapted to be wound from one roll to the other as the carriage is moved longitudinally of its supports 50 on the frame. The operative section of the sheet 44, as well as the projecting means 41 and illuminating devices 45, are inclosed in a casing 46 having an opening 47 in alinement with the projecting casing 41. A reflector 48 is suitably mounted on the carriage to direct the image projected by the apparatus downwardly on to the impression form on the table 1. As shown the projecting means 41, illuminating device 45 and reflector 48 are adjustably supported on the carriage 40 so that they may be bodily adjusted transversely of said carriage to position the projecting means opposite different, widthwise, portions of the sheet 44. The parts referred to are supported on a plate or slide 51 resting on rails 52, 53 on the carriage 40 and by means of a hand wheel 54 and suitable rack and pinion mechanism between said slide and carriage 40 the desired lateral adjustment can be readily effected. The slide 51, as shown, extends through a slot in one wall of the casing 46 and the opening 47 in said wall is made in the form of an elongated slot which may, if desired, be closed throughout its length except that portion directly opposite the projecting casing 41 by curtain-like screens such as 21. The slide 51 and carriage 40 are suitably apertured to permit the rays of light striking the reflector 48 to fall upon the table 1.

Figs. 9 and 10 illustrate a slight modification of the means provided for illuminating the detail containing sheet. In this form of the invention a supplemental carriage 70 is mounted on the side bars or rails 71 of the rectangular frame, the ends 71^a of which are provided with wheels or rollers running on tracks 72 attached to the main frame, above the projector slide 12. Said slide and supplemental carriage are connected by a bar or tie rod 73. The supporting frame for the carriage 70 is adapted to move with the lower carriage as the hand wheel 10 is actuated and said supplemental carriage will move with the slide 12 as the latter is shifted by the endless cord or chain 24. On the carriage 70, which is provided with a central aperture, are mounted two reflectors 74 each having therein suitable illuminating means. As shown, the reflectors 74 are so positioned that the rays thereof will be directed against and illuminate a section of the sheet 18 and as the reflector carriage 70 moves with the slide 12 it is only necessary to employ two illuminating devices instead of a larger series, such as shown in Fig. 2 and hereinbefore particularly described.

The manner of using and advantages of the invention will be understood from the foregoing description in connection with the drawings. The invention, in its broadest aspect, can be embodied in various forms of apparatus other than the one illustrated and except where such details are specifically described, it is not intended to limit the invention to the particular embodiment thereof selected for illustration.

Having thus described the invention what is claimed is:—

1. The combination with a support for an impression form, of a frame mounted on said support, means carried by the frame for supporting a sheet bearing suitable registering detail for indicating the proper position of a movable member in a form on the support, and means adjustably mounted on the frame adapted to project onto such a form an image of a sufficient portion of said registering detail, for the purpose described.

2. The combination of a frame adapted to be mounted on a support for an impression form, means on the frame for supporting a representation of registering detail indicating the proper position of a movable member in a form on said support within the frame, and means adjustably mounted on the frame for projecting onto the said form an image of a sufficient portion of said registering detail, for the purpose described.

3. The combination of a frame adapted to be mounted on a support for an impression form, means on the frame for supporting in horizontal position a sheet bearing suitable registering detail to indicate the proper position in said form of a movable member, means supported by the frame for projecting on the form an image of a sufficient portion of said registering detail, and means for excluding light from the space about the form except through the projecting means, for the purpose described.

4. An apparatus for the purpose described comprising a frame adapted to support a sheet bearing suitable registering detail above an imposing stone or table, a carriage mounted on guides at opposite sides of said frame, means on the carriage for projecting onto the table an image of a portion of the sheet, and light excluding means extending from said carriage to both ends of the frame.

5. An apparatus for the purpose described comprising a frame adapted to support a

sheet bearing suitable registering detail above an imposing stone or table, a carriage mounted on guides at opposite sides of said frame, a projecting means on the carriage and adjustable thereon in a direction transverse to the path of movement of the carriage, and means for excluding light from the space within the frame beneath the carriage guides.

6. The combination of a frame adapted to be arranged about an impression form on a suitable support, means on the frame for supporting a sheet bearing registering detail indicating the proper positions in the form of a pluralty of movable members, means for illuminating a portion of the sheet, and means for projecting onto said form an image of the illuminated area of the sheet, for the purpose described.

7. The combination of a frame adapted to be arranged about an impression form on a suitable support, means on the frame for supporting a sheet bearing registering detail indicating the proper positions in the form of a plurality of movable members, and means on the frame adapted to project onto said form an image of the registering detail necessary to position one or more of the movable impression members, said projecting means and sheet being relatively movable, for the purpose described.

8. The combination of a frame adapted to be mounted on a support for an impression form so that such a form may be placed on the support within said frame, means on the frame for supporting a sheet bearing suitable registering detail for indicating the proper location in a form on the support within the frame of a movable member, means for illuminating the sheet, means for projecting onto the form within the frame an image of a portion of the sheet, the sheet and projecting means being relatively movable, and means controlling the illuminating devices whereby only the section of the sheet that is in operative relation to the projecting means is illuminated.

9. The combination of a frame adapted to be mounted on a support for an impression form so that such a form may be placed on the support within said frame, means on the frame for supporting a sheet bearing suitable registering detail for indicating the proper location in a form on the support within the frame of a movable member, means for illuminating the sheet, means for projecting onto the form within the frame an image of a portion of the sheet, and means for shifting the projecting and illuminating devices relative to the sheet, whereby any desired section of the sheet may be illuminated and an image of the illuminated section projected onto said form.

10. An apparatus for the purpose described comprising a frame adapted to support a sheet bearing suitable registering detail above an imposing stone or table, a carriage mounted on the frame, means on the carriage for projecting onto the table an image of a portion of the sheet, and means on the carriage for illuminating the projected section of the sheet.

11. An apparatus for the purpose described comprising a frame adapted to support a sheet bearing suitable registering detail above an imposing stone or table, a carriage on the frame, a lens system on the carriage adapted to project onto the table an image of a portion of the sheet, said lens system being adjustable on the carriage in a direction transverse to the path of travel of the carriage, means on the carriage for illuminating the sheet, and means controlled by adjustment of the lens system on the carriage for limiting the illuminated area of the sheet.

12. The combination with a support for an impression form, of a frame rising from said support and surrounding a space thereon adapted to receive an impression form, means on the frame for supporting in horizontal position a sheet bearing registering detail for indicating the proper relative position in a form of a movable member, a projecting lens system arranged to travel in a horizontal plane between the sheet and support, means for excluding light from the space between the lens system and form support except that passing through the lens system, and means for illuminating the portion of the sheet in operative relation to the lens system, for the purpose described.

13. In an apparatus for the purpose described, the combination with a support for an impression form, of a lens system mounted to move horizontally above said support and to project thereon an image of an object positioned adjacent one end thereof, means for excluding light from the top and sides of the space between the other end of the lens system and said support except that passing through the lens system, and means movable with the lens system for illuminating the object the image of which is to be projected.

14. In an apparatus for the purpose described, the combination of a frame adapted to be positioned on or about an imposing stone or table, a carriage mounted on horizontal rails at opposite sides of said frame, means for moving the carriage on said rails, means extending over the spaces between the carriage and both ends of the frame to prevent the passage of light through said spaces in all positions of the carriage, a projecting means extending vertically through the carriage and adjustable thereon in a direction transverse to the direction of travel of the carriage, means for supporting ad-

jacent the upper end of said projecting means an object the image of which is to be projected onto the table, and light excluding means inclosing the portion of the frame between the carriage rails and imposing stone or table.

15. In an apparatus for the purpose described, the combination of a frame adapted to be positioned on or about an imposing stone or table, a carriage mounted on the frame to move horizontally over the table, a support for a sheet bearing suitable registering detail above the carriage, means on the carriage for projecting onto the table an image of more or less of said sheet, means extending from the carriage to the frame for preventing light from passing downwardly onto the table except through said projecting means, and light excluding means inclosing the portion of the frame between the table and the plane in which the carriage moves.

In testimony whereof I affix my signature in presence of two witnesses.

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