

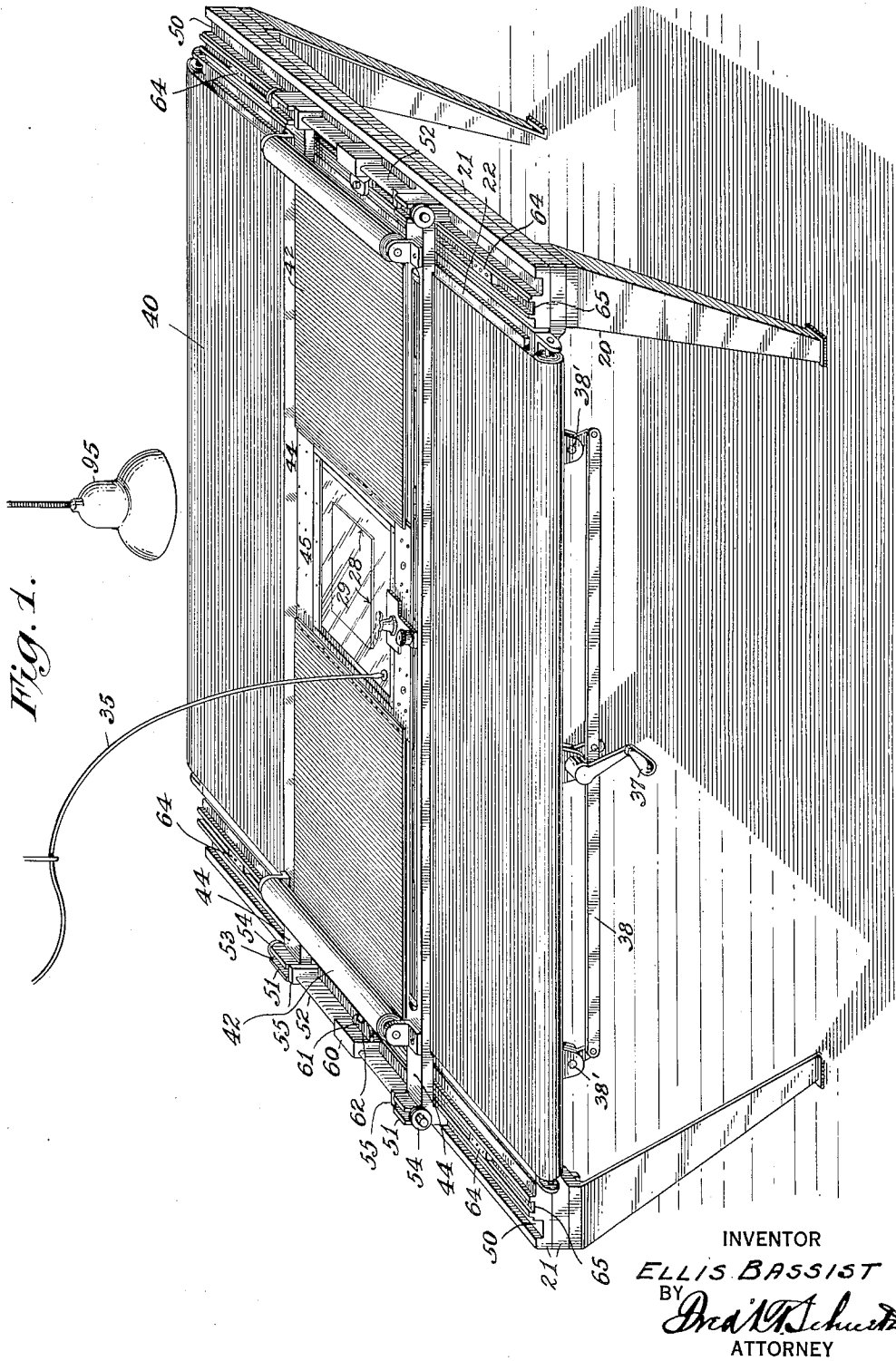
March 11, 1930.

E. BASSIST

1,750,294

STEP AND REPEAT PRINTING APPARATUS

Original Filed June 2, 1925 4 Sheets-Sheet 1



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STEP AND REPEAT PRINTING APPARATUS

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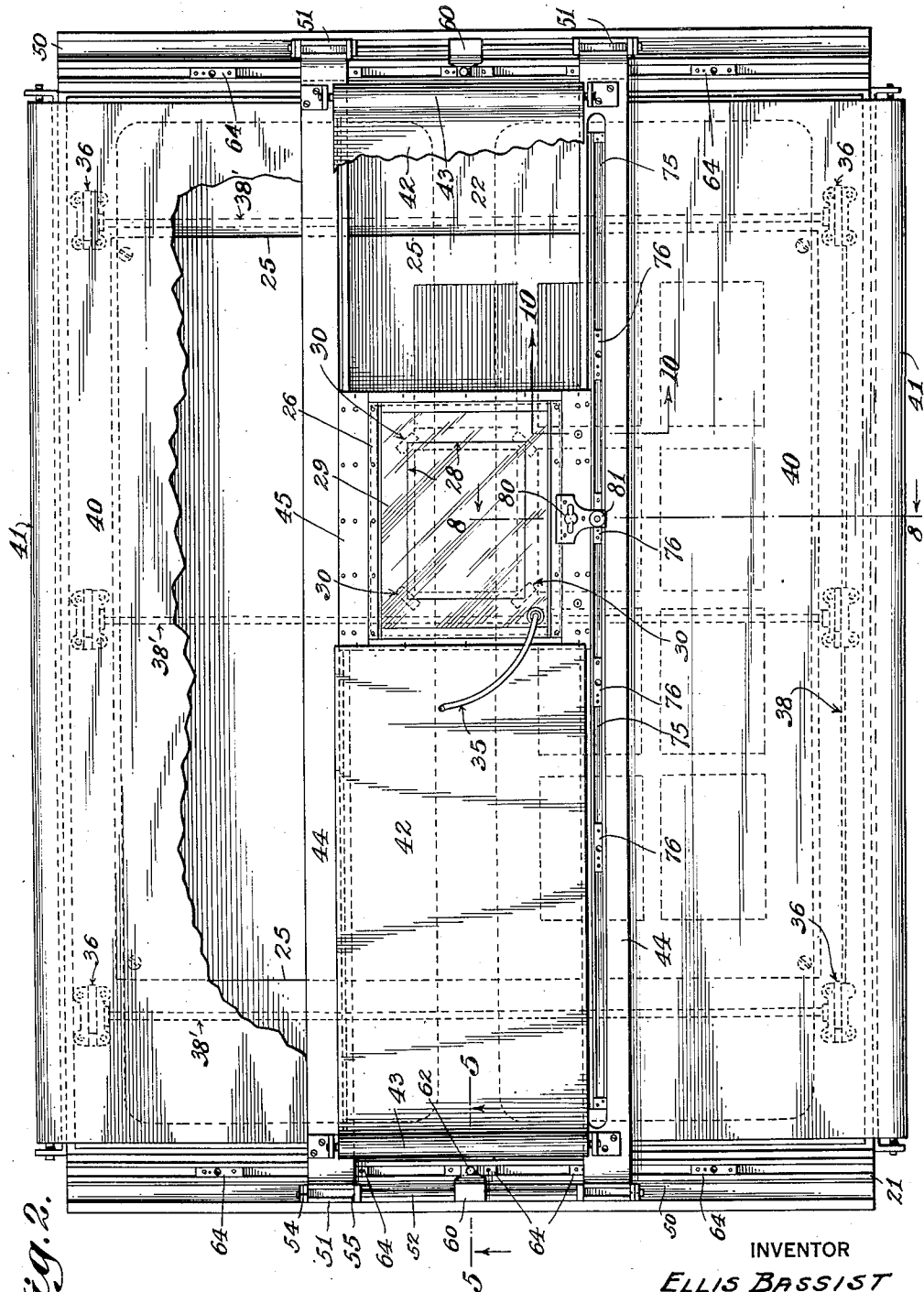


Fig. 2.

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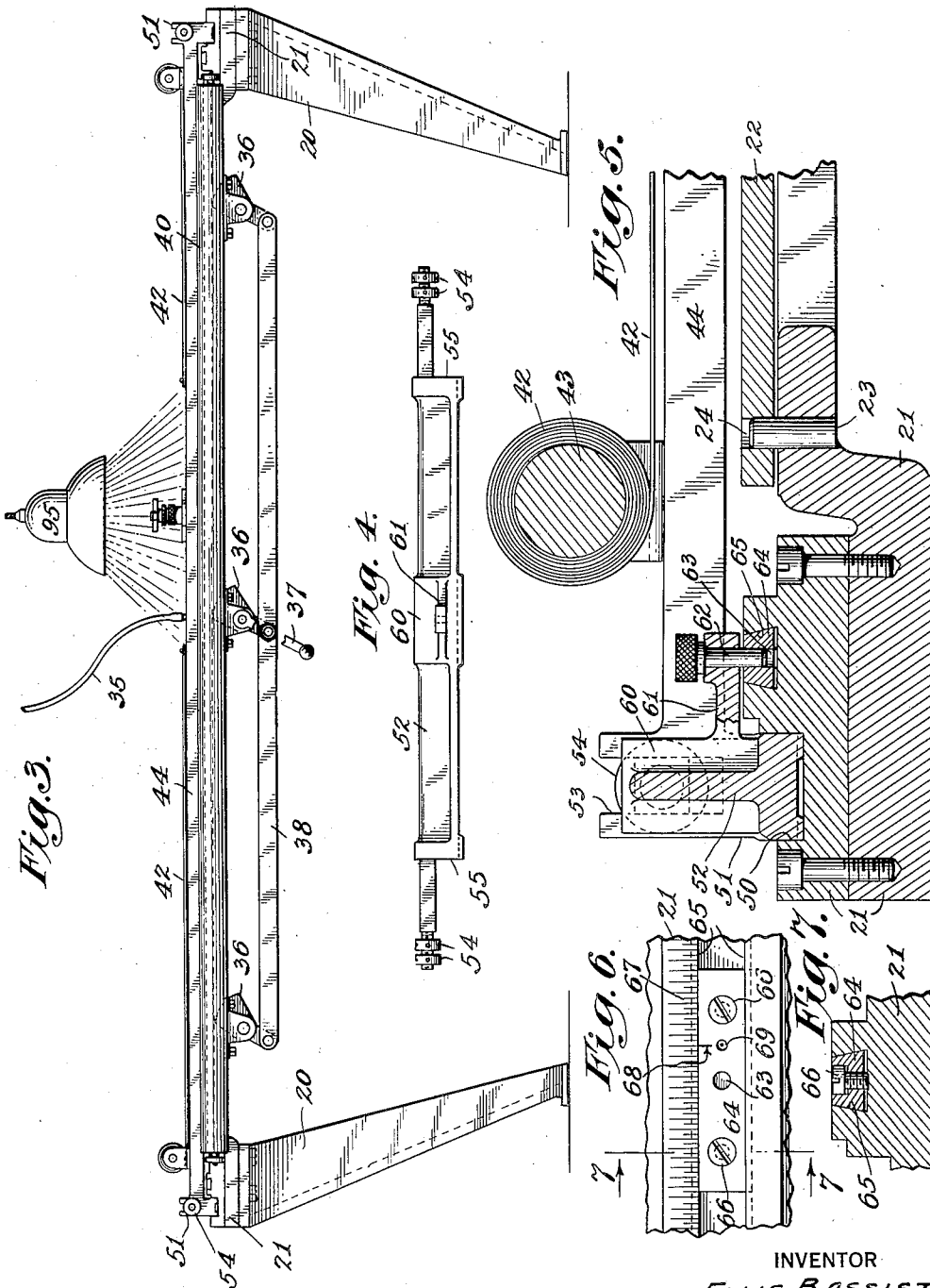
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STEP AND REPEAT PRINTING APPARATUS

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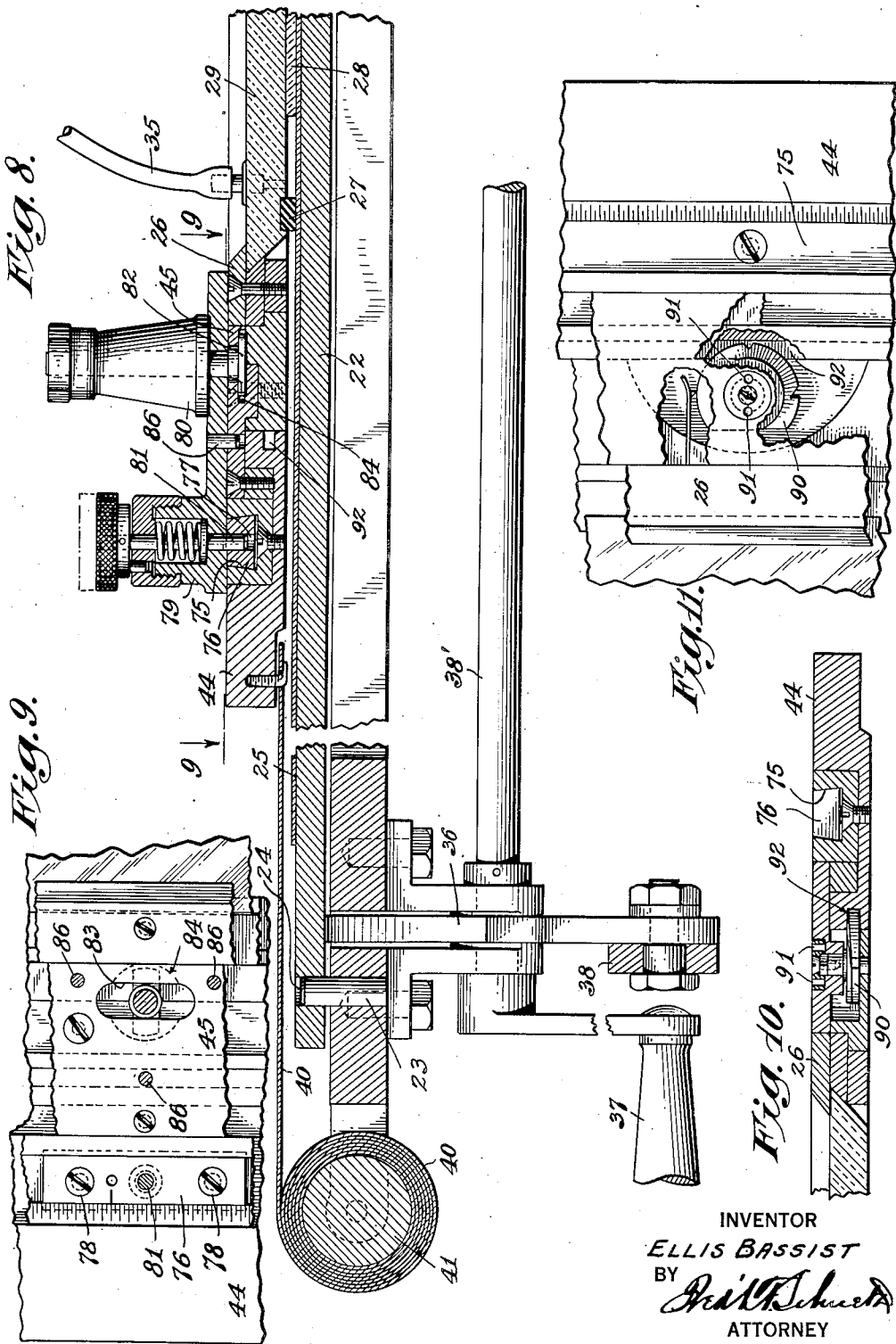
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STEP AND REPEAT PRINTING APPARATUS

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STEP AND REPEAT PRINTING APPARATUS

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The invention relates to step and repeat printing apparatus for use in process work and photographic reproduction, more particularly in the reproduction of a multiplicity of prints, arranged in symmetrical relationship from a single negative, or a multiple transfer.

It has for its object in a printing apparatus of this character to afford means for accurately placing or locating a negative (positive) from which a plurality of prints are to be taken, as well as of replacing with corresponding accuracy further negatives in registry therewith for providing additional printing plates, or repeatedly finding the relative positions of the medium used for the exposure as in the printing of different colors. A further object of the invention resides in a printing apparatus wherein both the sensitized plate and the negative may be supported horizontally upon a common table or support, arranged for vacuum pressure contact, and wherein the negative holder may be moved from one position to another over the sensitized plate which is maintained in fixed position relatively thereto. The invention has for its object, furthermore, a construction which will admit of manipulation of the negative holder by one possessing ordinary skill only, and in which the initial settings for determining the negative positions are readily effected so that the subsequent location of the negative holder may quickly and accurately be effected with the least possible skill.

A still further object of the invention resides in a construction wherein a portion of the supporting frame or bed for the sensitized plate is made adjustable to bring the said plate into close proximity to the negative after the latter has properly been positioned, thus enabling negatives of different thicknesses to be accommodated.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings in which—

Fig. 1 is a perspective view of the improved apparatus set up ready for operation.

Fig. 2 is a plan thereof, with portions broken away.

Fig. 3 is a front elevation of the printing apparatus.

Fig. 4 is a detail elevation of a spacing bar of the movable bridge member employed to support the negative holder.

Fig. 5 is a fragmentary detail longitudinal vertical section taken on the line 5—5, Fig. 2, and looking in the direction of the arrows.

Fig. 6 is a detail fragmentary plan of a gauging member for the negative holder; and Fig. 7 is a vertical transverse section thereof taken on the line 7—7, Fig. 6.

Fig. 8 is an enlarged, fragmentary transverse vertical section taken on the line 8—8, Fig. 2, looking in the direction of the arrows.

Fig. 9 is a fragmentary horizontal section taken on the line 9—9, Fig. 8, looking in the direction of the arrows.

Fig. 10 is an enlarged fragmentary transverse vertical section taken on the line 10—10, Fig. 2; and Fig. 11 is a detail plan of the clamping member for the negative holder frame with portions broken away to disclose the interior.

Referring to the drawings, 20 designates a suitable table or support for the novel printing apparatus and is provided with a top 21. Immediately above this top is positioned a bed plate 22 for slight vertical movement relatively thereto, the same being guided on pins 23 which fit corresponding perforations 24 of the bed plate. The latter is designed to carry a suitable sensitized medium 25 as a plate of zinc, aluminum or other suitable material and upon which exposures are to be made according to the particular layout desired, said sensitized plate being screwed or otherwise rigidly secured to the bed plate 22. For example, in making a set of printing plates for four colors, four pictures might be made in one column on said plate and four rows thereof, from one negative which has been obtained thru one of the color separating filters—Fig. 2 of the drawings indicates in dotted lines two rows completed and the apparatus in position for making the second exposure for the third row. Thereupon, the particular printing plate is removed and a

corresponding set of exposures run off with a second negative obtained thru a different color filter. Similarly, the two remaining sets are to be made. It will be appreciated, that not only in the succession of exposures from one negative must the arrangement be symmetrical; but in repeating the exposures with a new negative and new sensitized plate 25, extreme accuracy in registering the same must be secured in order that when the finished printing plates are to be employed in printing the colored print, registry of the various portions will be assured.

To insure a substantially air-tight joint between said plate and the negative holder 26, a rubber gasket 27 is interposed about the negative 28 between its holder and the plate, the negative being secured to a transparent plate of glass 29 of the holder 26, as by means of strips 30 of adhesive tape or other suitable devices, and being also properly adjusted and centered with extreme accuracy in its holder in any well-known or special manner. The holder is then adapted to be brought, in manner hereinafter set forth, into proper registration with the sensitized plate; and is provided with a vacuum connection 35 to insure a more perfect contact between the negative and its plate, as is well understood, the gasket 27 sealing off the negative during the printing operation. Said negative is brought into intimate contact with the top of the sensitized plate 25 thru the elevation of the latter with its supporting bed plate 22. This movement may be readily effected by a plurality of cams 36 operated from a common crank handle 37 at the front of the frame, all of the cam members being united by a bar 38 and transverse rods 38' common thereto and adapted to cause the cams to act simultaneously over the lower face of the bed plate.

The sensitized plate, moreover, is covered over or provided with a special curtain arrangement for masking the parts of said plates which are not to be exposed, a pair of spring drawn curtains 40 for the purpose being mounted upon suitable rollers 41 at opposite sides of the frame, as well as by a pair of spring drawn curtains 42 carried by rollers 43 at the opposite ends of a supplementary frame or bridge 44. The opposite ends of the curtains 42 are secured to a frame 45 for the plate holder 26 while the opposite ends of the curtains 40 are secured to the respective sides of the bridge member 44, the one curtain of a pair unwinding as the other rolls up in accordance with the movement of the respective carrying members over the table top, as is well understood.

Heretofore, it has been the practice to adjust the negative holder over the top, or rather over the sensitized plate supported thereon, as by means of feed screws which require micrometer adjustments for each setting, which mechanism naturally calls for ex-

tremely accurate and expensive construction and necessitates, furthermore, highly skilled labor in the operation of locating the negative successively in its different positions. After the first print has been made, it becomes necessary to shift the negative, for example, longitudinally until a row is completed; and in view of this shifting, it becomes further necessary each time to accurately relocate the negative in its new position.

In accordance with the present invention, no feed screws or the like are employed, for this purpose, but simple means are provided for initially setting certain stop members on the frame to which the negative holder is quickly locked with absolute certainty as to position, merely by releasing the frame for such negative holder and sliding the same from one position to the next. Absolute accuracy in placing in identical position in the repeated locating of the holder is thereby insured and no particular skill is required as the negative holder can fit in the particular position selected and none other, it being understood also that the shifting operations are to be conducted in more or less subdued daylight or suitably screened artificial light. The novel arrangement provides for absolute certainty of location and repeatedly finding the position of exposed area, the accurate spacing of which in symmetrical relation being secured as follows—

There is provided along two opposite sides of the table top 21, ways 50 for guiding end blocks 51 of the cross bars of the bridge member 44, which bars extend longitudinally over the top of the table above the sensitized plate 25 and carry the rollers 43, as shown more particularly in Figs. 1 to 3. Said bridge, therefore, has a movement from front to rear over the table; and the free ends of the curtains 40 are secured to the respective sides of the cross bars 44, of said bridge, thereby following same in its movement across the table to keep covered the particular portion of the plate 25 thereunder. Spacing bars 52 are provided at each end of the bridge and fit within slots 53 in the tops of the respective blocks 51 to secure the desired separation of the bars 44, lock nuts 54 being provided over the threaded ends of the spacing bars projecting beyond the slots and shouldering against the sides of said blocks to lock the bridge members to the spacing bars, which latter at their inner portions are further provided with shoulders 55 to abut the sides of the blocks 51 opposite the nuts 54. In this manner, the bridge member 44 may be securely set up to the desired width of the negative holder 26 to be employed therewith; and by providing spacing bars of various lengths, the bridge member may be accommodated to negative holders of different sizes, it being necessary merely to unloosen the nuts 54, draw the spacing bar up-

wardly out of the slots 53 and insert and lock a new one to the blocks 51.

Each spacing bar, furthermore is provided intermediate its ends with a locking block 60 having an inwardly projecting arm 61 in which fits a pin 62 free to be pushed therethru when brought in position to register with an opening 63 in a tapered block 64, the latter slidably fitting in a tapered groove or way 65 of the table top 21 located parallel to the way 50. These tapered blocks 64 are located at various points along the sides of the table in the corresponding ways 65 in accordance with the disposition of the prints to be made upon the sensitized plate. When once properly located they are securely fixed in position by means of a pair of screws 66 (Figs. 6 and 7) passing thru each block, upon opposite sides of the opening 63 therein, to the bottom of the way and serving to jam the tapered block upwardly against the side walls of the way. To assist in accurately locating these blocks, the top of the adjoining top of the table 21 may be provided with suitable graduations 67 and the top of a block with an indicating mark 68; also, each block may be provided with a center punch mark 69 for checking, as with calipers, the setting between successive blocks.

Similarly, one of the cross bars 44 of the bridge is provided with a longitudinal groove or way 75 in which are set blocks 76 with openings 77 and jamming screws 78 for holding the same in position. Over said way there extends an arm 79 of a handle member 80, which arm carries a spring-pressed pin 81 to register with and fit into the opening 77 of the blocks.

The handle 80 may be locked on its inner end to the negative holder frame 45, being provided with a bayonet lock 82 which fits thru a slot 83 of the said frame 45 into an undercut or recessed portion 84 thereof, said end when turned in one direction locking the handle and frame together, but permitting withdrawal of the former thru slot 83 when the same is turned in the reverse direction. This allows of the handle being detached entirely from the frame portion 45 to permit of lifting the negative holder 26 bodily out of its said frame 45 as in replacing a negative, as well as permitting, if desired, the application of the sensitized plate from above rather than from beneath the negative as set forth. The underface of said handle member, moreover, may be provided with dowels 86, fitting into the top of the frame 45, to further insure a hold thereon; and in sliding the frame to a new position, it is necessary merely to lift the spring-urged pin 81, to the dotted position indicated in Fig. 8, out of the opening 77 of the particular block with which it was in engagement, giving it a slight turn to hold the elevated position, and then moving the frame 45 along the bridge in

grasping the handle 80. When the proper position has been reached, pin 81 is released to fit in the opening 77 of a block to positively locate the position of the holder frame and, if desired, the latter may be further secured in the position to which it has thus been set. This may be effected, for example, by a cam disk 90 rotatable in the frame 45 thru two diametrically opposed openings 91 adapted to receive a spanner wrench (not shown), said disk fitting into a longitudinal groove 92 of the bridge member 44 (Figs. 10 and 11).

In operating the novel printing apparatus, a negative 28 which has been properly centered in its holder 26, is placed with holder in the frame 45 and the latter shifted longitudinally of its carrying bridge 44 from one position to the next, the gauging blocks 76 and 64 having initially been accurately set to the desired points. Proper exposure is made at each position to the light, for example, of a suitable lamp 95, the remaining portion of the sensitized plate 25 being masked by the curtains 40 and 42, and it being understood that after each exposure and during the shifting from one position to the next, the light will be shut off. After the completion of one row of exposures, the bridge 44 is moved across the table for the next row, the position of which is accurately determined by the blocks 64 as hereinbefore set forth.

I claim:—

1. In printing apparatus of the character set forth: a table or frame providing a horizontally disposed base; means to retain thereon a sensitized plate and including a bed plate, guide pins extending therethru from said table and on which said bed plate may move vertically; a plurality of cams bearing against the under face of said bed plate, and means to move said cams; a source of light to which the sensitized plate may be exposed; intermediate adjustable masking means; and a negative carrier associated therewith and adapted to be located in consecutive positions over the sensitized plate.

2. In printing apparatus of the character set forth: a movable bridge member comprising two bars provided with slotted ends; two removable spacing bars having threaded ends and fitting into the slotted ends of said bridge bars to shoulder against the same; and nuts about the respective threaded ends of the spacing bars to secure the same in said slotted ends of the bridge bars.

3. In printing apparatus of the character set forth: a movable bridge member comprising two bars provided with slotted ends; two removable spacing bars having threaded ends and fitting into the slotted ends of said bridge bars to shoulder against the same; and nuts about the respective threaded ends of the spacing bars to secure the same in said slotted ends of the bridge bars; a negative

holder; a frame for same, and means to retain the holder to the said frame; and means to lock said frame to the bridge member.

4. In printing apparatus of the character set forth: a table or frame, a bridge member movable thereover, and means to lock said bridge member to the table, comprising a block adjustable in a longitudinal way of the table and provided with an opening, a screw passing through the block to jam the same in its way, and a locating pin carried by the bridge member and adapted to fit within the said opening of the block.

5. In printing apparatus of the character set forth: a table or frame, a bridge member movable thereover, a negative holder, a frame for said negative holder and carried by said bridge member; and means to locate said frame with reference to the bridge member, comprising a block adjustable in a longitudinal way of the bridge member and provided with an opening, a screw passing through the block to jam the same in its way, and a member attached to the negative holder frame and having a pin to fit said opening of the block.

6. In printing apparatus of the character set forth: a movable bridge member; a negative holder; a frame for said negative holder and carried by said bridge member; means to locate said frame with reference to the bridge member, comprising blocks adjustable along one side of the bridge member and provided with an opening; and a member provided with an upwardly extending handle and attached to the negative holder frame and having a pin to fit said opening.

7. In printing apparatus of the character set forth: a table or frame, a bridge member movable thereover, a negative holder, a frame for said negative holder and carried by said bridge member; and means to locate said frame with reference to the bridge member, comprising a block adjustable in a longitudinal way of the bridge member and provided with an opening, a screw passing through the block to jam the same in its way, and a handle member removably attached to the negative holder frame and having a pin to fit said opening of the block, said handle member having also an extension overhanging the negative holder.

8. In printing apparatus of the character set forth: a movable bridge member; a negative holder; a frame for said negative holder and carried by said bridge member; means to locate said frame with reference to the bridge member, comprising blocks adjustable along one side of the bridge member and provided with an opening; a removable handle member having dowels adapted to fit into the negative holder frame and a spring pressed pin adapted to fit the openings of the blocks of said way of the bridge member; and means

to lock said handle member to the negative holder frame.

9. In printing apparatus of the character set forth: a movable bridge member; a negative holder; a frame for said negative holder and carried by said bridge member; means to locate said frame with reference to the bridge member, comprising blocks adjustable along one side of the bridge member and provided with an opening; a removable handle member having dowels adapted to fit into the negative holder frame and a spring-pressed pin adapted to fit the openings of the blocks of said way of the bridge member; and rotatable means carried by the said negative holder frame to clamp the bridge member thereto.

10. In printing apparatus of the character set forth: a negative holder frame; and a movable bridge member for same; comprising two bars, one of which is provided with a longitudinal tapered way, blocks adjustable in said way and screws passing therethru to jam same in the way, each of said blocks being also provided with an opening for receiving a locating pin carried by the said negative holder frame.

11. In printing apparatus of the character set forth: a supporting table having two oppositely disposed sides provided with longitudinal ways therein; locating blocks slidable in said ways and provided with an opening; screws passing thru the blocks to jam the same in the way; a bridge member movable over said sides transversely thereof, and intermediate spacing bars for said bridge member; and pins carried by said spacing bars for fitting the openings of the said blocks of the ways to locate the bridge member with reference to the sides of the table.

12. In printing apparatus of the character set forth: a table or supporting frame; means to retain thereon a sensitized plate including a movable support or bed plate therefor, and means to move same; a source of light to which the sensitized plate may be exposed; intermediate adjustable masking means; a negative holder and frame therefor associated with the masking means and adapted to be located in consecutive positions over the sensitized plate; a movable bridge extending over the base above said plate, adapted to support the negative holder and frame and attached to a portion of the masking means, the remainder of which is attached to said frame; blocks slidable transversely of the table, and means to lock the same thereto, said blocks having openings into which pins extending from the bridge are adapted to fit to locate said bridge and thereby said negative holder in one direction; blocks adjustable longitudinally of the bridge and having openings; a handle member removably attached to said negative holder frame; and a pin extending therefrom to fit within an open-

ing of a bridge block for locating the negative holder on the bridge in a direction at right angles to its direction of movement over the table.

5 13. In printing apparatus of the character set forth: a table or supporting frame providing a horizontally disposed base; means to retain thereon a sensitized plate including a vertically movable support or bed plate
10 thereof, and means to move same; a source of light to which the sensitized plate may be exposed; intermediate adjustable masking means; a negative holder and frame therefor associated with the masking means and
15 adapted to be located in consecutive positions over the sensitized plate; a movable bridge extending over the base above the said plate, adapted to support the negative holder and frame and attached to a portion of the mask-
20 ing means, the remainder of which is attached to said frame; blocks slidable transversely of the table, and means to lock the same thereto, said blocks having openings into which pins extending from the bridge
25 are adapted to fit to locate said bridge and thereby said negative holder in one direction; removable means for determining the width of the bridge to accommodate different size negative holders; blocks adjustable lon-
30 gitudinally of the bridge and having openings; a handle member removably attached to said negative holder frame; and a pin extending therefrom to fit within an opening of a bridge block for locating the negative
35 holder on the bridge in a direction at right angles to its direction of movement over the table.

In testimony whereof I affix my signature.