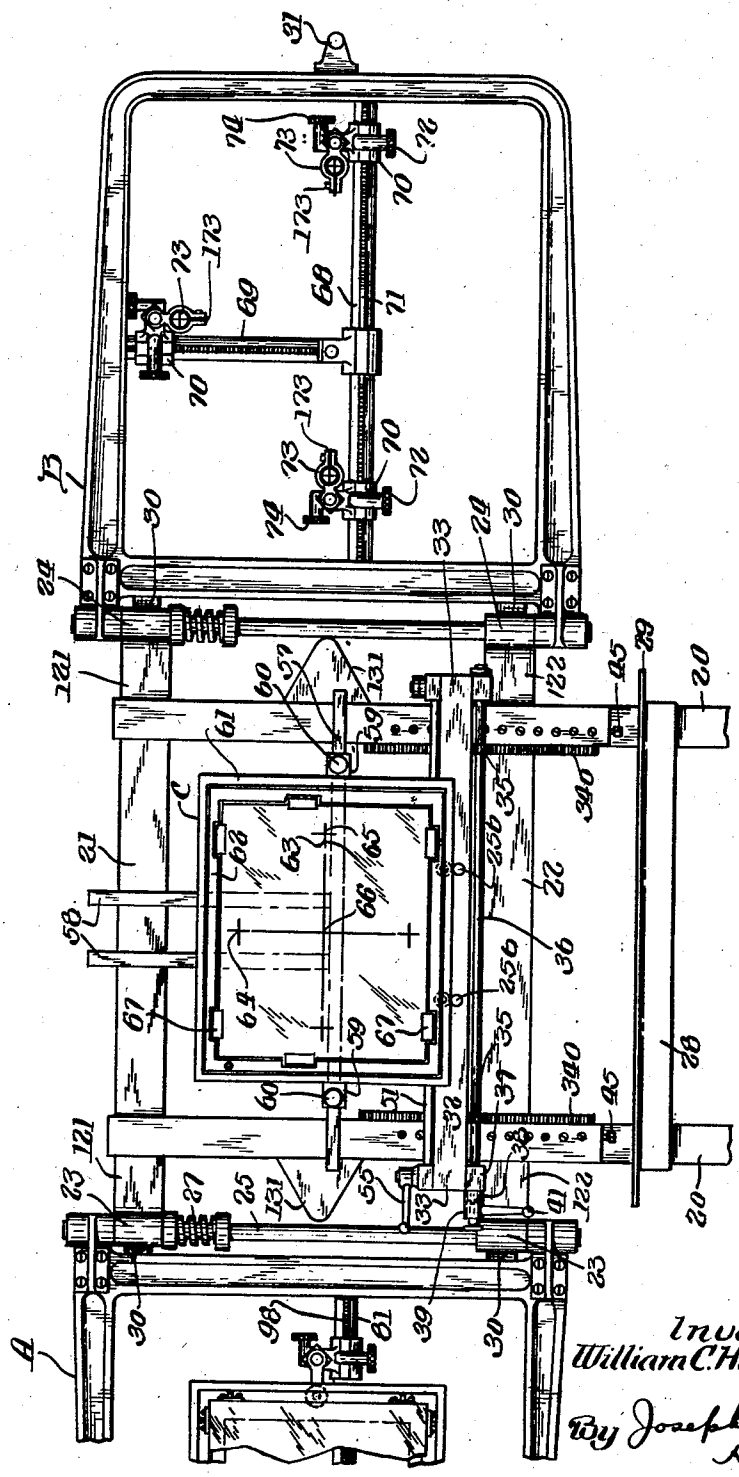
May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 1

Fig. 1.



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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 2

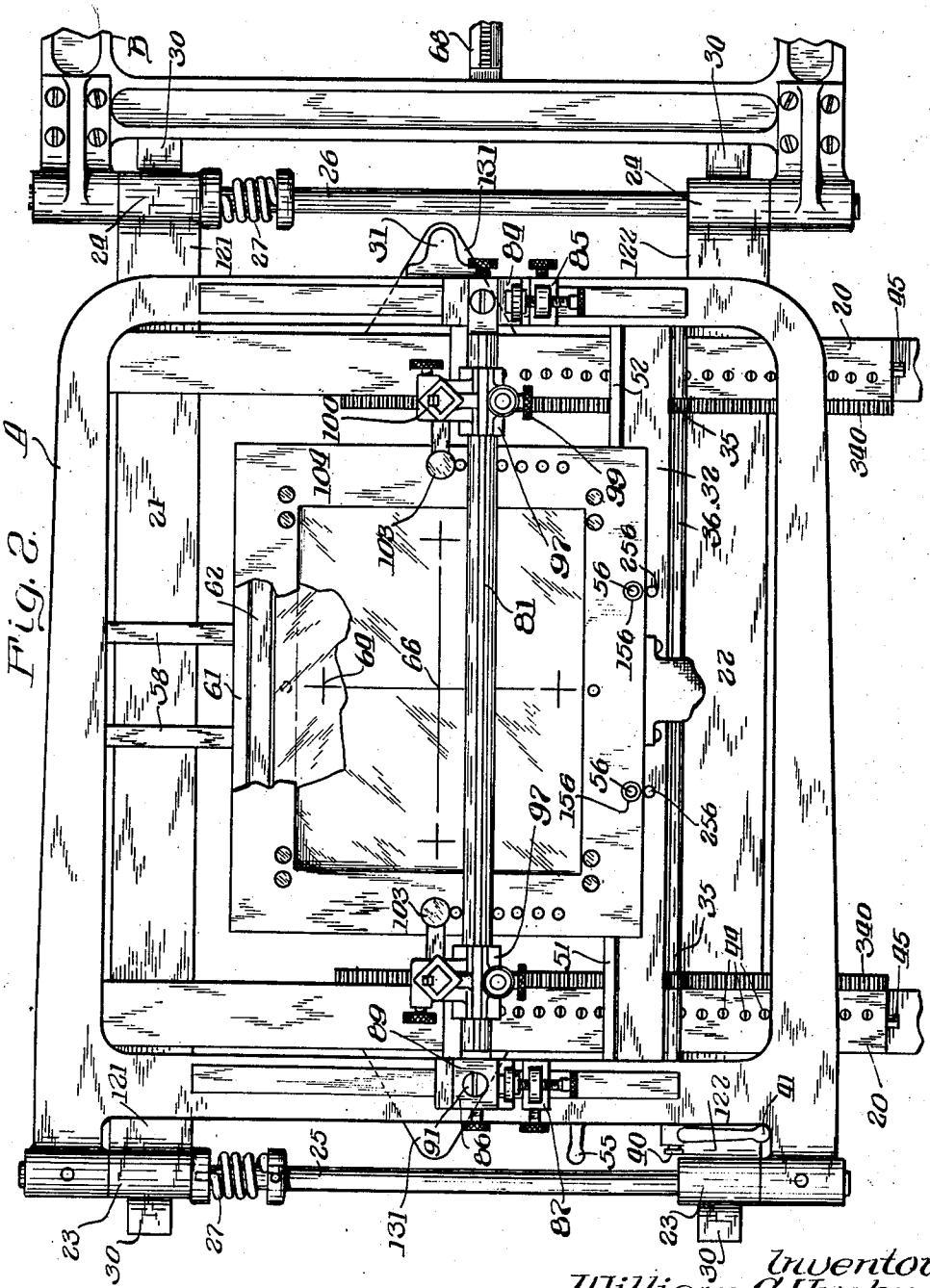


Fig. 2.

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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 3

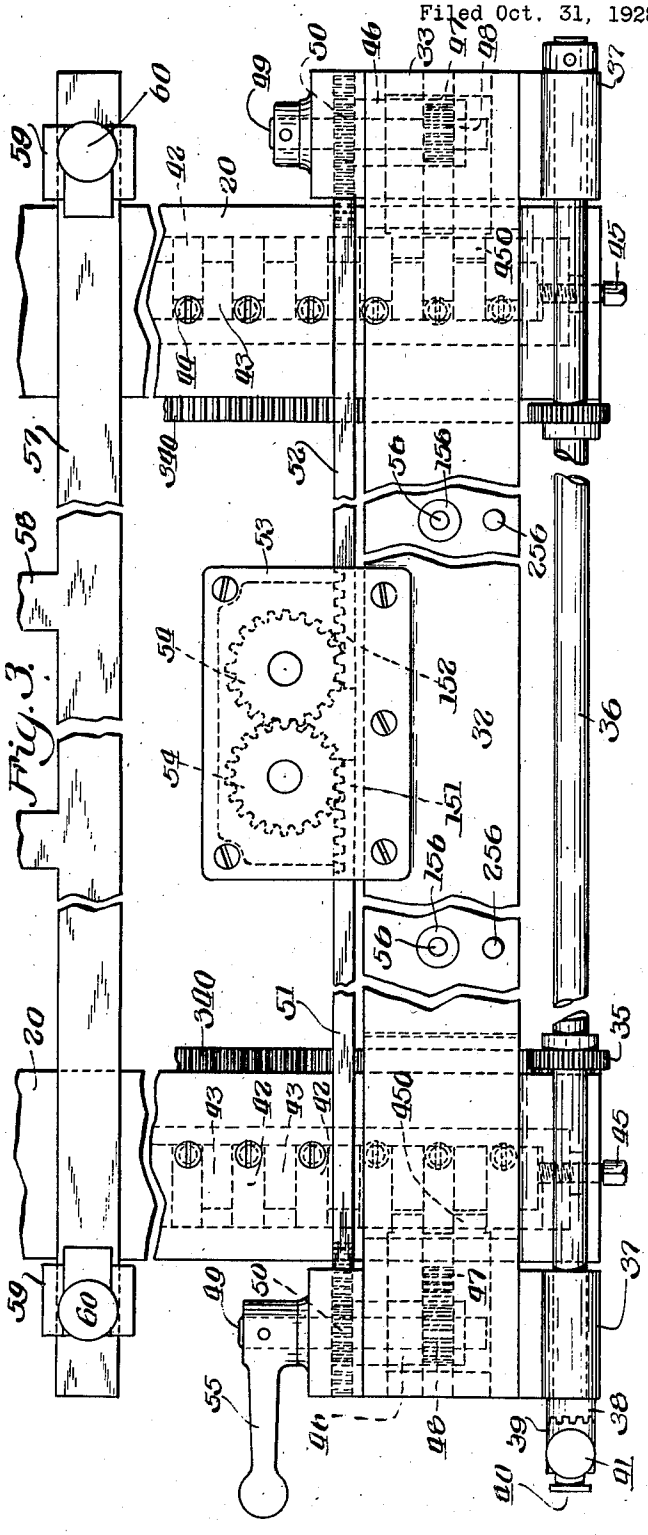


Fig. 3.

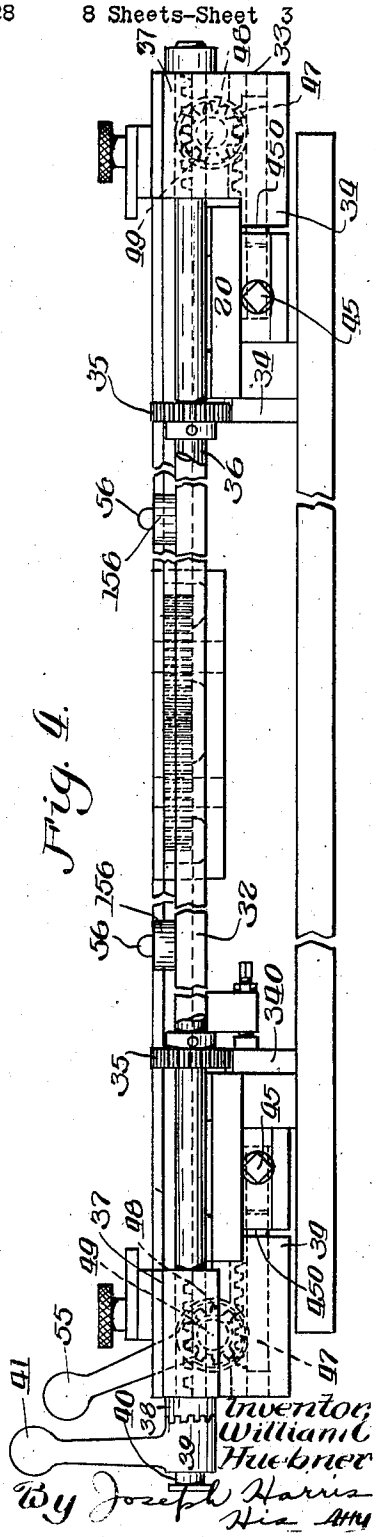


Fig. 4.

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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 4

Fig. 7.

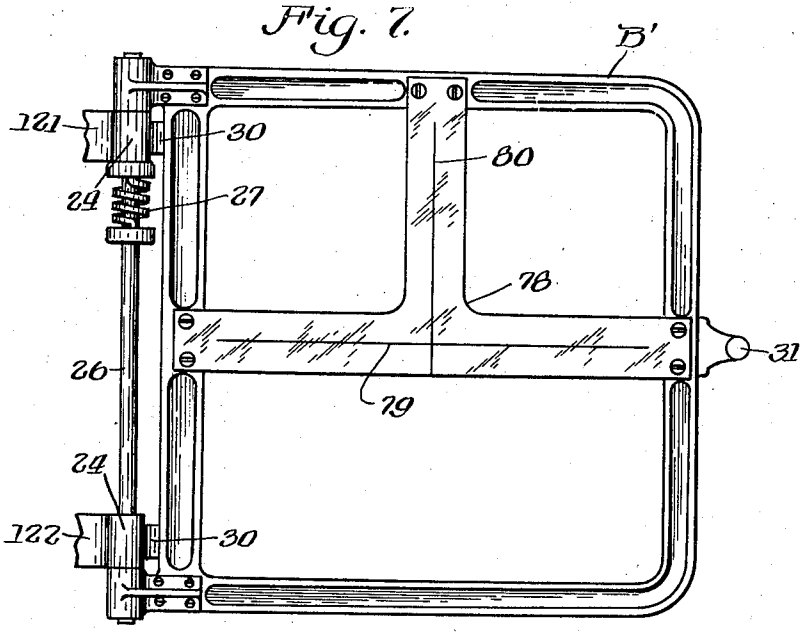


Fig. 6.

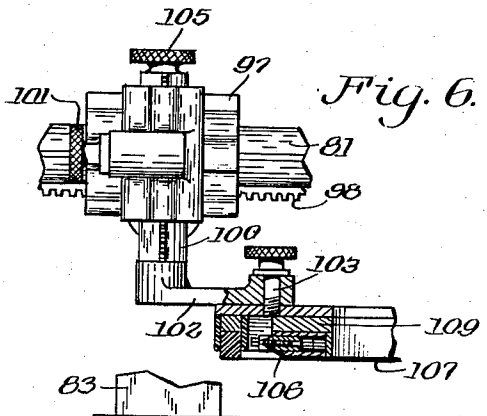
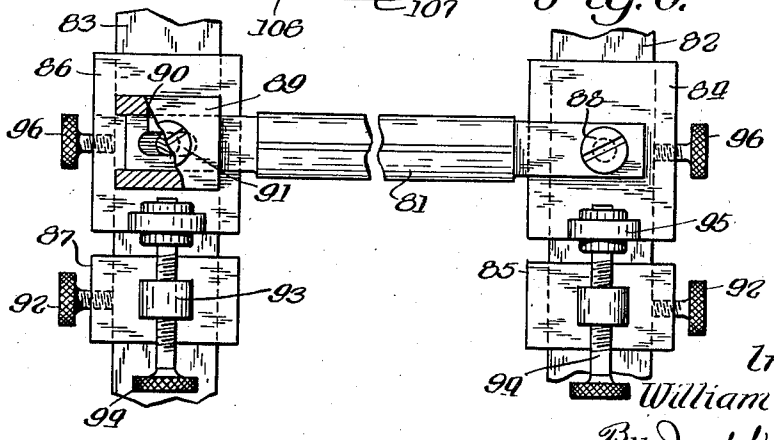


Fig. 5.



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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 5

Fig. 8.

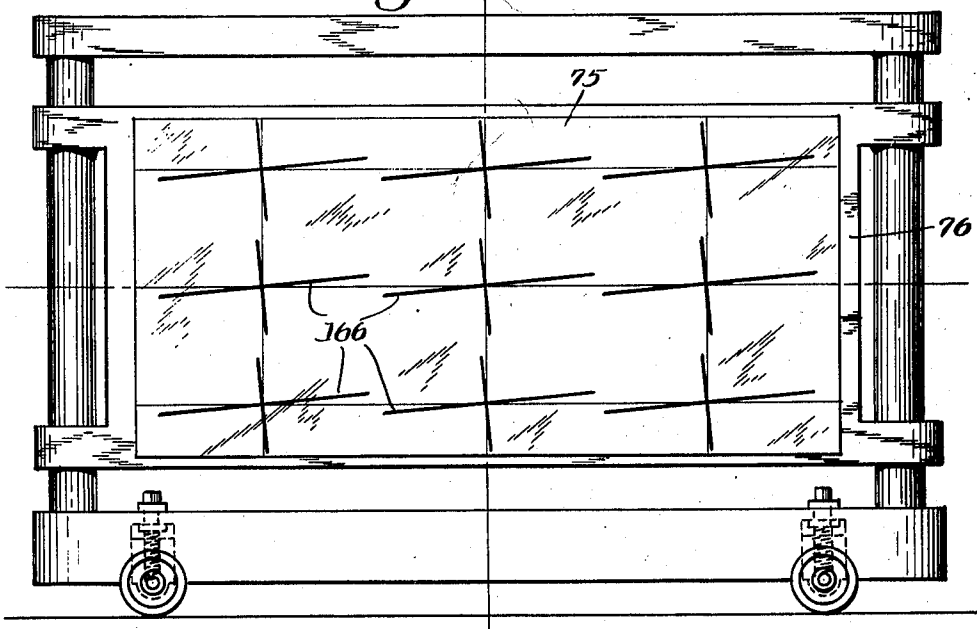
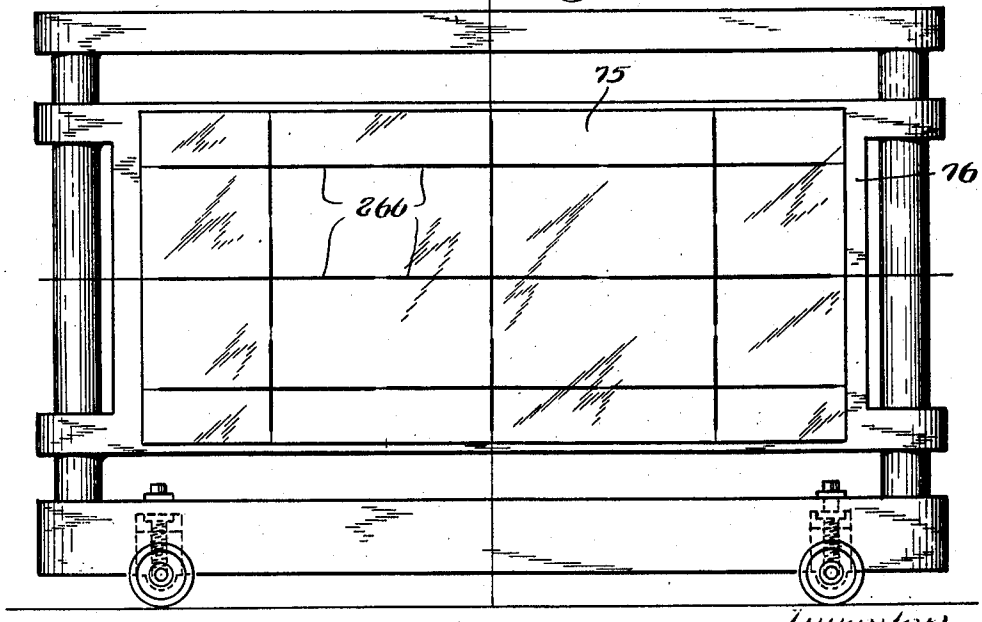


Fig. 9.



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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 6

Fig. 10.

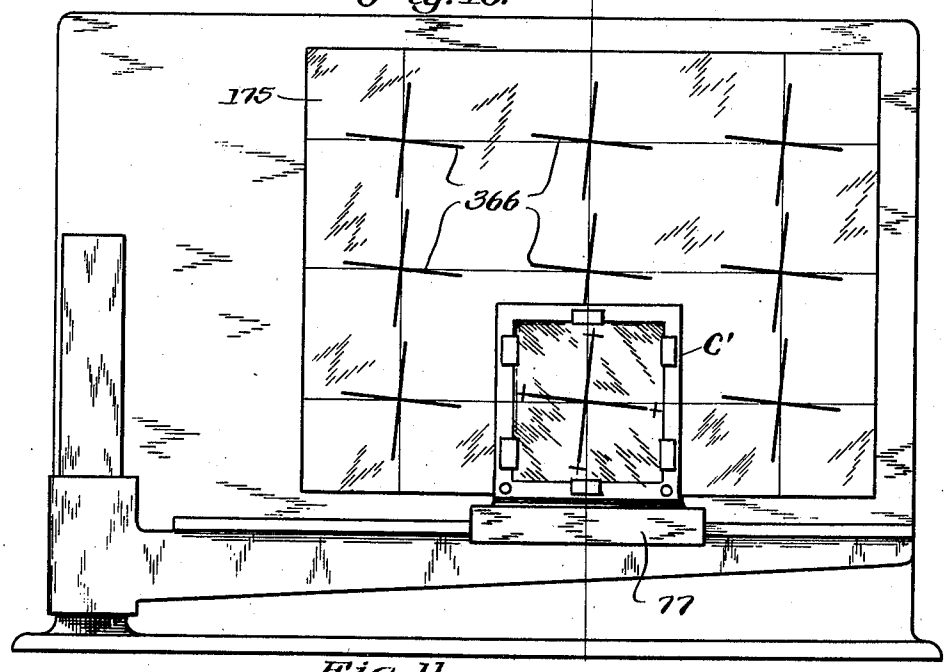
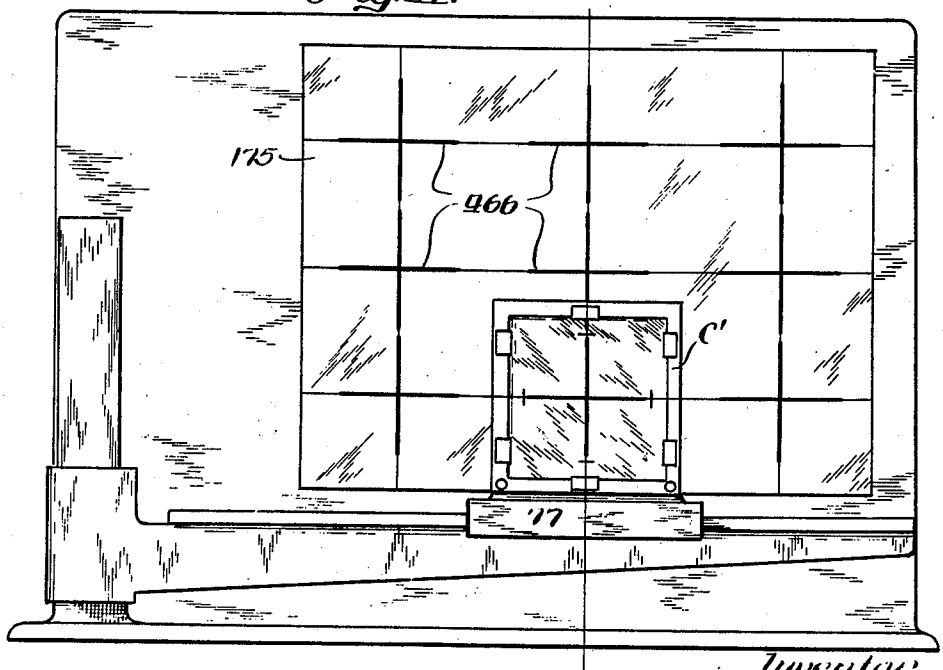


Fig. 11.



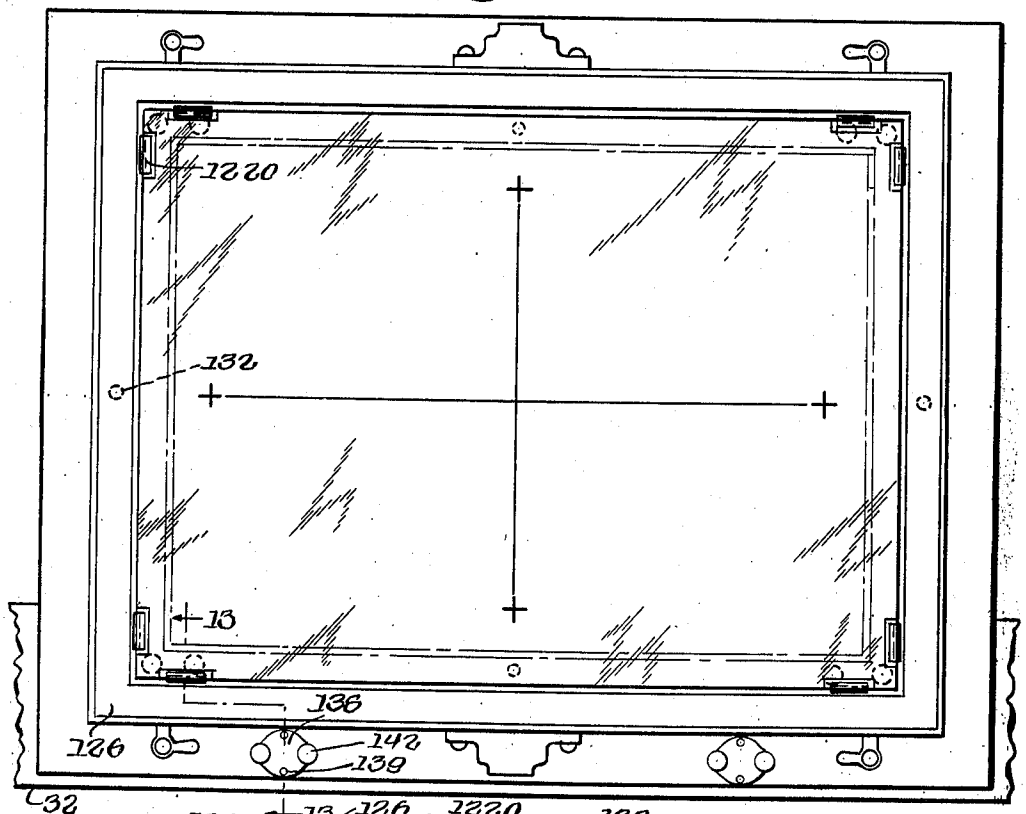
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May 31, 1932. W. C. HUEBNER 1,860,361

PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 7

Fig. 12.



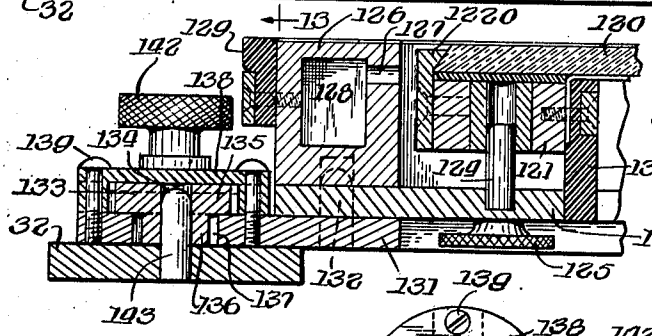


Fig. 13.

Fig. 14.

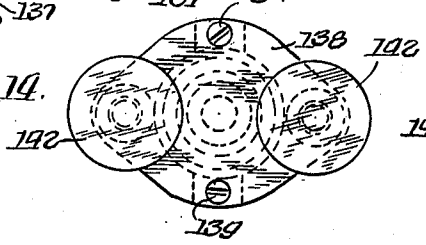
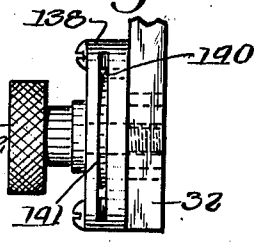


Fig. 15.



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PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Filed Oct. 31, 1928 8 Sheets-Sheet 8

Fig. 16.

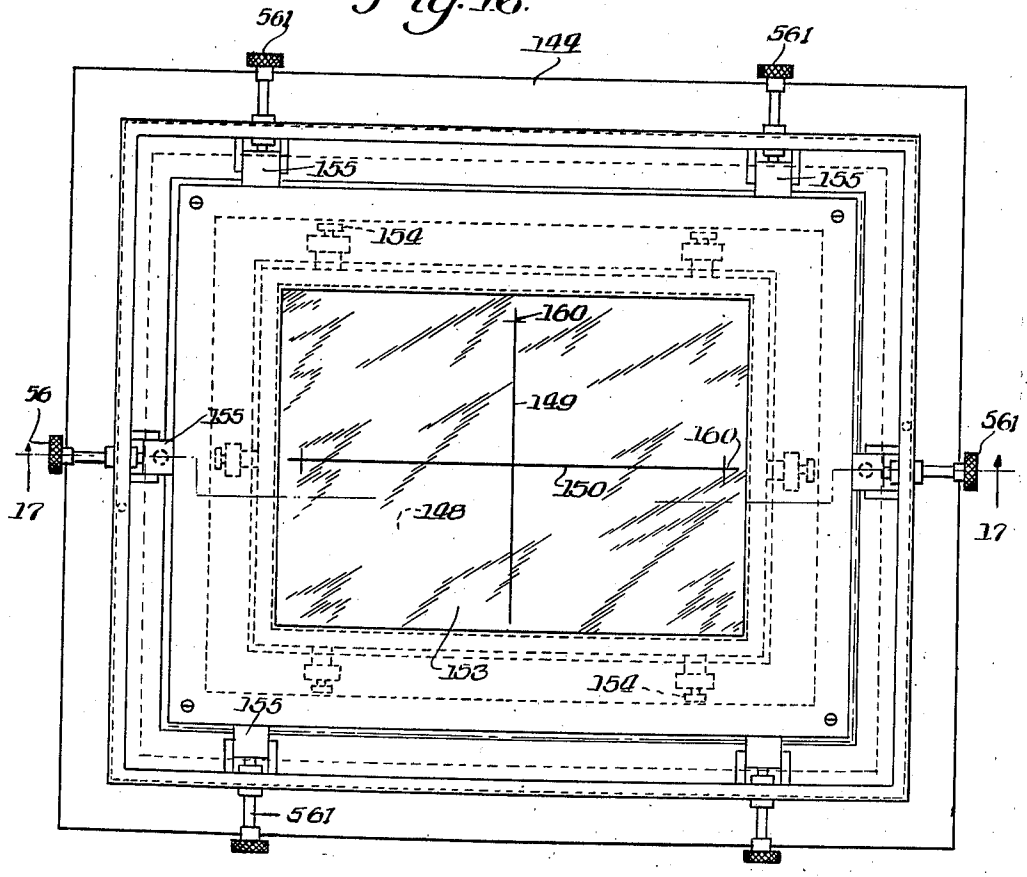
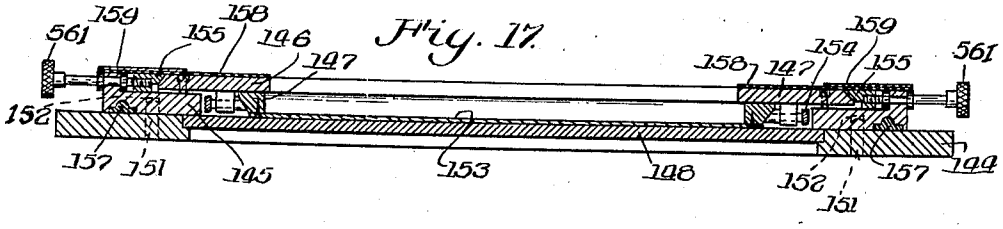


Fig. 17.



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UNITED STATES PATENT OFFICE

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PREREGISTERING MEANS FOR PHOTOCOMPOSER PRINTING PLATES

Application filed October 31, 1928. Serial No. 316,284.

This invention relates to improvements in preregistering means for photo-composer printing plates.

In the art of making press plates by photographic printing machines, commonly called "photo-composers", it is now substantially the universal practice to register, that is, accurately position and locate the image or subject on the negative with reference to the negative holder before the latter is attached to the photo-composing machine proper where it is attached in a known, definite, predetermined position with reference to the movable carriage of the machine. Such preregistering of the images or subjects with reference to the immediate holders must be done with great accuracy, particularly in color-printing, to insure that all the different color-separation prints of the same image or subject will be both positioned and located identically on the several color-press plates. Even in the case of preparing a single color-press plate, a similar degree of accuracy is necessary in order that the several prints or impressions on the press plate, whether of the same subject repeated or of a number of different subjects, will be in proper alignment and without visual overlapping or tilting.

The usual manner of effecting this predetermined register of the image or subject with respect to its holder is by means of cross marks or lines on the negative plate or film, which marks are so located that if the lines comprising the same are extended across the image or subject the extended lines will cross each other exactly at right angles at the center of the image, the said two lines being exactly parallel respectively to the usual longitudinal and lateral travel lines of the negative-supporting carriage on the photo-composer, whereby the location and position of the image, when in printing position on the machine, may be accurately determined as by the use of scales paralleling the longitudinal and transverse travel lines of the carriage. It also occasionally happens in this art that a negative or series of color-separation negatives will be found that do not have any register means or marks thereon of any character, and in such cases it has heretofore been extremely difficult to register such negatives, particularly in a color series.

One object of my invention is to provide an extremely accurate registering means for the images or subjects of negatives with respect to their negative holders, which means comprise relatively few parts comparatively inexpensive to manufacture, easily manipulated, and by which negatives of different sizes may be handled, whether said negatives are of the rigid class type or flexible film type.

Another object of my invention is to provide registering means for negative holders of that type wherein the holder is adapted to be positioned and located, both while in the registering means proper and in the photo-composer machine proper, by means confined to one side only of the holder.

Another object of my invention is to provide registering or preregistering means of the type indicated in the preceding paragraph, wherein the holder may be accurately adjusted with respect to the registering devices proper to compensate for differences in over-all width of the negative holder to the end that the horizontal center lines of the latter, regardless of size, will always be in identical position to thus insure accurate location of the images or subject with reference to the composing machine proper when the holder is positioned thereon.

A still further object of my invention is to provide means of the character hereinbefore indicated, wherein the image carried thereon, having a predetermined known position and location, may be brought into relatively close or actual surface contact with the negative or printing plate to be registered so as to thereby avoid the effects of parallax and obtain the desired accurate register.

A more specific object of my invention is to provide registering means wherein is employed a registering frame having a register sheet or plate marked or scribed in such a manner as to indicate the two intersecting travel lines of the composing machine, which sheet or plate may be brought into operative,

preferably face-to-face, contact with the negative to be registered.

Another specific object of my invention is to provide an arrangement whereby negative or printing plates having none of the usual register marks thereon may be accurately registered within or with respect to their holders so that, when the holders are attached to the composing machines, said images will occupy a predetermined position and location with respect to the machine.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a front elevational view of a registering means embodying my invention. Figure 2 is a view similar to Figure 1, upon a larger scale, showing one of the swing frames with a holder mounted thereon swung into operative position over the central registering device proper. Figure 3 is a front elevational view, parts being broken away, illustrating more particularly the arrangement for elevating, lowering and locking the monorail, said figure being upon an enlarged scale. Figure 4 is a bottom plan view of the construction shown in Figure 3. Figure 5 is an enlarged elevational view, certain portions being broken away and others shown in section, illustrating the means for adjusting the supporting bar on one of the frames. Figure 6 is an enlarged detailed view, partly in section, illustrating more particularly the means for adjusting one of the fastening or holding devices. Figures 7 is an elevational view of a modified form of the registering device proper. Figures 8 and 9 are more or less diagrammatical views, illustrating the results of incorrectly and correctly positioned and located negatives when multiple impressions therefrom are made on a press plate in those types of photo-composing machines where the press plates move in two directions at right angles to each other and relatively to a fixed negative holder. Figures 10 and 11 are views corresponding to Figures 8 and 9, respectively, illustrating the same features for those types of photo-composing machines where the negative holder moves relative to a fixed press plate. Figure 12 is a plan view of a modified form of registering apparatus. Figure 13 is an enlarged, broken, sectional view, corresponding approximately to the line 13—13 of Figure 12. Figure 14 is a plan view of the floating bushing used in the construction of Figures 12 and 13. Figure 15 is a side elevational view of the bushing shown in Figure 14. Figure 16 is a plan view, illustrating a still further modification of registering device particularly adapted for flexible films. And Figure 17 is a transverse sectional view, corresponding substantially to the line 17—17 of Figure 16, but with sheets of rubber and steel applied.

In said drawings and referring first to the construction illustrated in Figures 1 to 6, inclusive, the apparatus is shown as comprising an upstanding main frame having vertical uprights 20—20, upper and lower cross connecting members 21 and 22, the latter having extensions 121 and 122, respectively, at each side of the vertical uprights. Said extensions are formed with hinge butts 23 at one side and hinge butts 24 at the other side of the main frame and to which are pivotally connected an image frame A and a registering frame proper B, respectively, the connection being effected by heavy pivot bars or rods 25 and 26. Preferably coiled springs 27 are interposed between the stationary parts and the pivot rods in such manner as to be tensioned when the frames are swung to either full open or full closed position to thus minimize shocks. The main frame also preferably has a lower cross bar 28 having a shelf 29 to facilitate handling of the holders and to provide a temporary rest therefor when placing the same on the apparatus. The extensions 121 and 122 are further preferably provided with outstanding lugs 30—30 which act as stops to limit the outward swinging of the frames A and B. With the construction so far described, it is evident that the frames A and B are each adapted to be swung over the centrally disposed main frame of the apparatus and each of said frames A and B will always bear a definite predetermined relation with respect thereto.

When either frame A or B is swung to such operative position, it is stopped or limited by the cooperable engaging extensions 31 and 131 on the swing frame and main frame respectively.

As hereinbefore indicated, the apparatus is adapted to handle negative holders which are in turn adapted for attachment to the photo-composing machine along one edge only of the holder, and to that end the apparatus includes a vertically movable monorail or attaching member shown best in Figures 1, 3 and 4. As shown, said monorail comprises a main horizontally extending bar 32 on the front side of the uprights 20. At each end of the bar 32 there is provided a heavy block 33, the latter having inwardly extended sections 34 which engage behind the uprights 20 and thus adapt the cross bar 32 for vertical sliding movement with reference to the uprights. Fixedly associated with each of the uprights 20 is a rack bar 340, with which are adapted to engage pinions 35 secured to a transversely extending shaft 36 which is journaled at its ends in depending bearings 37—37 integral or rigid with the blocks 33. At one end, the shaft 36 carries a clutch element 38 with which is adapted to cooperate a corresponding clutch element 39

on the hub of a hand lever 41 slidably mounted on an extension 40 of the shaft. By rotating the shaft 36, it is evident that the monorail or cross bar 32 will be raised or lowered, due to the cooperative engagement of the pinions 35 and racks 340.

On the rear side of each of the uprights 20 is provided an accurate gauging rack and each of which consists of a plurality of blocks 42 and 43 of different lengths, the blocks 43 being alternated with the blocks 42, as shown in Figure 3. Said blocks 42 and 43 are of extremely accurate dimensions and preferably Johansson blocks and of half inch width. The blocks are held in assembled position by suitable means, such as the set screws 44 and a lower clamping screw 45.

Cooperable with each of the block racks just described and carried at each end of the monorail 32 are corresponding blocks 450, also preferably of the Johansson type, which blocks 450 are accurately spaced to interfit between the blocks 42. The blocks 450 are carried by a slide 46 horizontally slidably mounted within the corresponding end block 33 of the monorail, said slide 46 being provided with a short rack 47 with which meshes a pinion 48 attached to a short vertical shaft 49 journalled in the corresponding end block 33. Each shaft 49 carries also an additional pinion 50 with which cooperate slidable racks 51 and 52, respectively. At their inner adjacent ends, the racks 51 and 52 are slidably mounted in a housing 53 secured to the monorail 32 and within which are journalled two meshing pinions 54—54, each of the pinions 54 also meshing with racks 151 and 152, respectively. At one side of the machine, and preferably the side at which is located the operating lever 41, the vertical shaft 49 has attached thereto a second operating lever 55, so that upon rotation of the lever 55 the corresponding shaft 49 will be rotated, thus directly actuating the corresponding gauge blocks 450 at that end of the machine and indirectly, through the rack bar 51, pinions 54, rack bar 52 and shaft 49, operating the gauge blocks 450 at the opposite side of the machine. With the arrangement described, the monorail is given a rough adjustment vertically by manipulating the lever 41 and the position of the monorail is then accurately gauged by means of the interfitting blocks of the block rack and engaging blocks 450 in the manner above described.

To provide for attaching a negative holder, the monorail 32, on the front side thereof, has a pair of dowel pins 56—56 projecting outwardly beyond bushings 156—156. Said dowels are accurately spaced and located to correspond exactly with cooperable dowel holes in one side of the negative holders. The bushings 156 hold the negative holders outwardly spaced from the monorail 32 so that the rubber sealing gaskets which are employed on those negative holders of the vacuum type do not become fouled during the registry operation. Preferably, also, supplemental supporting pins 256 are employed on the monorail 32 in order to relieve the dowel pins 56 of the greater part of the weight of the holders.

Referring to Figure 1, C indicates broadly a negative holder shown attached to the monorail by the dowel pin and hole arrangement just described. The holder C is adapted to be backed to minimize tendency to tilt by a suitable backing frame which, as shown, comprises a cross bar 57 having a pair of vertically extending arms 58 secured thereto. The vertical arms 58 are fastened to the upper cross connecting member 21 and the horizontal bar 57 is attached to the vertical uprights 20. To further steady the holder C, the horizontal bar 57 has slidably mounted thereon cross heads 59 which may be brought up against the side edges of the holder C and locked in adjusted position by set screws 60.

The holder C, shown in Figure 1, is generally of that type shown in my pending application Serial No. 295,683, filed July 27, 1928, and, as there shown, comprises an outer main holder proper 61, a gap frame 62 and the glass negative proper 63. The latter is shown as provided with register marks in the form of crosses 64—65, there being two of the former in vertical alignment at the center and two of the latter in horizontal alignment at the horizontal center. A large cross is indicated at 66, which indicates conventionally the image or subject. The glass negative is adapted to be held in adjusted registered position by the clamps 67.

Referring now to the primary registering device proper on the frame B, the same comprises a horizontally disposed guide bar 68 and a vertical guide bar 69, both rigid with the rectangular frame B. Slidably mounted on the bar 68 are a pair of blocks 70, each of which carries a pinion (not shown) cooperable with a rack 71, the pinion being operated through the knurled wheel 72 whereby the block 70 may be adjusted back and forth on the guide bar. Slidably mounted on each block 70, in a direction perpendicular to the plane defined by the two guide bars 68 and 69, is a reticule 73, the inward and outward adjustment being effected by another knurled wheel 74 through the intermediary of a pinion and rack, as will be understood, although the details are not shown.

A simiar block 70 is slidably mounted on the vertical guide bar 69. The reticules 73 are so positioned that the two reticules carried by the horizontal bar 68 define or determine a horizontal line which coincides with one of the travel lines of the carriage of the photo-composing machine and is so located that said horizontal line will bisect, horizontally, a holder C when the latter is in proper

position on the registering apparatus. Similarly, the reticule 73 carried by the vertical guide bar 69 moves in a vertical line exactly at right angles to the line of movement of the other reticules 73, that is, exactly in accordance with the other travel line of the carriage on the photo-composing machine. Said vertical line of movement is also so located that it will bisect, vertically, a holder C when accurately positioned on the registering apparatus.

Each of the blocks 70 also carries a scribing needle or blade 173, the same being located exactly in line with the centers of the corresponding reticules, as shown in Figure 1. As will be understood, said scribers are normally retracted but may be adjusted perpendicular to the plane of the frame B so as to be brought into use for the purpose hereinafter described. For a more detailed description of the blocks 70, reticules, scribers and adjusting means, reference may be had to my prior Patent 1,452,078, granted April 17, 1923.

Register of a negative 63 is obtained in the following manner when using the register frame B. The holder C is attached to the monorail 32 by the dowel pin arrangement, it being understood that the monorail is in the proper horizontal position corresponding to the size of holder employed. The holder C will carry the negative 63 but, as will be understood, the latter is not at first in registered position. The frame B is then swung over the negative and the reticules 73 adjusted through the wheels 74 so as to bring the reticules closely adjacent and in substantially face-to-face contact with the surface of the negative 63. Thereupon, the reticules are adjusted back and forth on their respective guide bars and simultaneously the negative 63 is manipulated by hand (the clamps 67 having first been loosened for this purpose) until the two horizontal cross marks 65 of the negative are directly positioned beneath the two reticules 73 on the guide bars 68 and the upper vertical cross 64 brought directly under the reticule 73 carried by the vertical guide bar 69. When the negative has thus been adjusted to have the cross marks of the negative perfectly coincide, the negative is then locked or clamped in this adjusted position. As will be understood, the cross or register marks 64 and 65 will be placed on the negative so as to horizontally and vertically bisect the image or subject. When thus adjusted, it is evident that the vertical and horizontal center lines of the image on the negative, regardless of irregularities in the negative, will coincide exactly with the vertical and horizontal median lines of the holder proper C and, hence, when the holder C is transferred to the composing machine and attached thereto in proper position by the same dowel pin arrangement, the image or subject will be positioned properly with respect to the press plate and the center of the image will be definitely and accurately known.

In this connection, reference may be had to Figures 8 to 11, inclusive, which illustrate, conventionally, the results of proper register and misregister. In Figure 8, a press plate 75 is shown attached to a holder 76 which is adapted for both vertical and horizontal movement, as customary on some photo-composers. 166 indicates conventionally the reproduction or impression from a corresponding image 66 on the negative where the latter has been improperly positioned, that is, its horizontal and vertical center lines have not been registered to coincide exactly with the two horizontal and vertical travel lines of the press plate. As clear from Figure 8, the reproduced images on the press plate will be staggered or cocked and misregistered, even though the centers of the negatives are accurately placed. In color-printing, where several different color press plates are required, the effects of misregister will be evident, particularly when it is considered that another negative of the same series may be misregistered a similar amount but tilted in the opposite direction.

In Figure 9, the reproduced images 266 are shown, where the negative has been accurately registered both as to position and location, and in this instance all of the reproductions are perfectly true and square and there is no possibility of overlapping of the images on the press plate.

Figures 10 and 11 illustrate the same features, except that in this instance the carrier 77 for the negative holder C′ is itself universally adjustable with respect to the press plate 175. The same results will be obtained when misregister occurs, as shown by the reproduced images 366 in the case of Figure 10 and proper squared positioning of the reproductions as shown at 466 in Figure 11. As will be understood, the degree of misregister in Figures 8 and 10 has been exaggerated to more clearly illustrate the results thereof, but, in commercial practice, the misregister of more than three-thousandths of an inch is sufficient in most instances to cause rejection of a printed job in color work.

Referring to the modification shown in Figure 7, instead of using adjustable reticules, a single registering element 78 may be employed, fixedly attached to the frame B′ in such position that the scribed horizontal line 79 will coincide with one travel line of the machine and the other vertical scribed line 80 will coincide with the other travel line of the composing machine. The member 78 will be made of transparent material so that when the frame B′ is swung to operative position over the negative the operator may look therethrough and thereby bring the register

marks 64 and 65 of the negative into coincidence with the register lines 79 and 80.

In certain instances, negatives must be employed that do not have any register marks thereon. To register negatives of this character, I employ the image frame A. The latter is also of rectangular construction, similar to the frame B, and is provided with a cross bar 81. The latter, as best shown in Figure 5, is adapted to be adjusted vertically with extreme accuracy by the following arrangement.

Slidably mounted on each of the vertical arms 82 and 83 of the frame A are two cross heads or slides 84 and 85 on the arm 82 and two cross heads or slides 86 and 87 on the arm 83. The right-hand end of the bar 81, as viewed in Figure 5, is fixedly attached to the cross head 84 by suitable means such as the screw 88. The opposite end of the cross bar is horizontally, slidably, adjustably mounted within a housing 89 on the cross head 86, the bar being provided with an elongated slot 90 for this purpose and a set screw 91 extending therethrough for locking it in adjusted position. Each of the cross heads 85 and 87 are of like construction and the same are vertically slidable on the arms 82 and 83. Heads 85 and 87 are adapted to be clamped in adjusted position by knurled set screws 92—92. Each of said cross heads 85 and 87 is provided with an offset nut 93 in which is threaded a vertically extending screw 94 having swiveled connection in a lug 95 with the corresponding cross head 84 or 86. Each of the latter in turn is provided with a set screw 96. With this arrangement, upon loosening the set screws 92 and 96, the bar 81 may be adjusted roughly to the horizontal position whereupon the set screws 92 are engaged, thus locking the cross heads 85 and 87. The finer adjustment is then effected through the adjusting screws 94 and when the proper position of the cross bar 81 is obtained the cross heads 84 and 86 are then locked by the set screws 96.

Slidably mounted on the cross bar 81 are two similar cross heads 97, each of which has a geared connection with a rack 98 on the cross bar, as shown in Figure 1. Adjustment is effected back and forth by a suitable pinion and shaft arrangement, the latter having a knurled head 99. Slidably mounted in each cross head 97, in a direction perpendicular to the plane of the frame A, is a bar 100, the adjustment back and forth being effected by suitable rack and pinion arrangement operated through the knurled head 101. Rigid with each bar 100 is an inward laterally extended arm 102 (see Figure 6) which carries an attaching screw 103 adapted to engage with and secure a holding frame 104. The cross heads 97 are adapted to be locked in adjusted position by suitable set screws 105.

In the instance shown, the holder 104 is adapted for the carrying of a flexible film 107 suitably attached around its edges by means of clamping and stretching jaws 108 in turn mounted on a sub-holder 109, such as shown in my application hereinbefore referred to.

To obtain register of a series of negatives having no register marks, the following procedure is adopted: A holder C is taken and in it is clamped a plate similar to the negative 63 shown in Figure 1. With the plate in position in the holder and the latter mounted on the main frame, the register frame B is swung over it and then two marks are scribed on the plate by the scribers 173, and obviously these two scribed lines will locate the center on the plate with reference to the holder C. Next, a positive impression of the unmarked negative to be registered is mounted on the holder 104 carried by the swing frame A, this positive impression being preferably applied to the flexible film 107 carried by the holder 104, as previously described.

The frame A is then swung over the holder C having the scribed glass plate, and the holder 104, carrying the film with the positive impression of the image, is then adjusted relative to the scribed plate until the area of the image is quartered with reference to the two scribed lines of the plate, that is, the positive impression of the image will be adjusted as accurately as possible under the judgment of the operator until the positive image impression is centered and properly positioned. Thereupon, after swinging the frame A back to inoperative position, the scribed plate is removed from the holder C and one of the unmarked negatives to be registered is substituted therefor. The swing frame A is then swung over the holder C to operative position and the unmarked negative in the holder C adjusted within the latter until the image of the negative coincides in position and location with the positive impression of the image carried by the swing frame A. It is thus evident that all of the plates of a series of unmarked negatives can be registered within the holder C so that the positions and locations of all of the series of images will coincide. In the event the negatives are to be reused at any time in the future, each of the same will preferably be scribed with suitable marks outside of the area of the image by using the scribers 173, this marking being done after each negative has been registered with reference to the positive film.

In positioning the positive impression film carried by the swing frame A with reference to the first mentioned scribed plate, advantage is taken of the adjusting means for the holder 104 previously described.

Ordinarily, the holder 104 will be provided with a series of openings for attachment by the screws 103 and the attachment will be made to the nearest hole which will center the holder 104 vertically. The more accurate

and final adjustment vertically of the holder 104 is accomplished by the micrometer screws 94—94. The holder 104 is adjusted laterally when registering with the scribed plate by shifting the cross heads 97 back and forth until the desired position is reached.

Referring next to the modification illustrated in Figures 12 to 15, inclusive, 120 represents the negative to be registered, the same being secured to its immediate holder 121 by suitable clamps 1220. The said holder 121 is centered with respect to the negative frame 123 by two or more dowels 124 and the proper level of the negative is obtained by adjusting screws 125. The negative frame 123 is of the vacuum type and has an outer marginal frame 126 of hollow rectangular construction so that the vacuum may be effected entirely around the negatives, openings 127 leading from the passage 128 at intervals therearound. A rubber sealing strip 129 extends around the negative frame and an inner rubber sealing strip 130 is employed to effect the seal substantially the same as shown in Figures 12 and 13 of my said pending application Serial No. 295,683. In the present form, however, the negative proper is not intended to be adjusted for registration purposes with reference to the negative frame 123, the registration being accomplished in the manner about to be described.

In the present construction, the negative frame 123 is adapted to be accurately positioned on an auxiliary frame 131 by means of dowel pins 132. The auxiliary frame 131 is in turn provided along one edge thereof with two adjustable bushing devices. Each of these adjustable bushing devices comprises a bushing proper 133 having a dowel hole therein 134. Each bushing 133 has an upper section 135 of enlarged diameter seating upon the auxiliary frame 131 and a lower section 136 of reduced diameter positioned loosely within an opening 137 of the frame 131. The bushing 133 is held assembled with the auxiliary frame 131 by a housing plate 138 secured to the auxiliary frame as by screws 139 at diametrically opposite points thereon. At each end of the housing plate 138, the latter is slotted, as indicated at 140, so as to provide a resilient section 141 on the top. Extending through each of the slotted ends of the housing plate and threaded within the auxiliary frame 131 is a clamping screw 142. The bushings 133 are adapted to cooperate with the two dowel pins 143 carried by the monorail of the registering apparatus, a portion of said monorail 32 being shown in section in Figure 13.

Registration of the negative is effected in the following manner: The negative is first clamped in its immediate holder 121 and the latter then mounted on the negative frame proper 123 and adjusted to the proper level. The negative is located by eye as nearly central as possible. This assembly is then mounted on the auxiliary frame 131 by means of the dowel arrangement 132 above described.

The assembly of the auxiliary frame and negative frame is then applied to the monorail, the bushings 133 being loosened so as to permit the bushings to be placed on the dowel pins 143 of the monorail. With the parts in the registering apparatus thus mounted, the register frame proper B is swung into operative position and then the entire assembly of auxiliary frame 131 and negative frame 123 with the negative 120 clamped thereon is shifted and adjusted with reference to the reticules 73 until the register marks of the negative coincide with the reticules, as will be understood. When the image on the negative has thus been properly registered with the reticules, the clamping screws 142 are tightened, thus firmly locking the bushings 133 with reference to the auxiliary frame 131 and, of course, with reference to the negative frame 123 and negative 120, whereupon the assembly of negative frame and auxiliary frame may be taken from the apparatus and applied to the photo-composing machine.

Referring to the modification shown in Figures 16 and 17, 144 represents a portable registering frame; 145 a negative frame; 146 a negative holder proper; and 147 a film frame. In this construction the register frame 144, preferably of rectangular outline to conform to the negative holders, has fixedly secured thereto a register plate 148, the upper surface of which is flush with the upper surface of the frame. Said plate 148 is provided with a master image or register mark in the form of a large cross comprised of the vertical line 149 and horizontal line 150. Said lines 149 and 150 intersect exactly at right angles at the center of the register frame and are coordinated with the usual two travel lines of the photo-composer machine.

The frame 144 is provided with two or more dowel pins 151 adapted to cooperate with corresponding, accurately located dowel openings 152 in the negative frame 145, so that, when the latter is placed upon the register frame it will be accurately positioned and located in a predetermined manner with reference to the master image or register marks 149 and 150. The film frame 147 has a flexible film 153 tacked or otherwise secured thereto in a taut condition, said film frame being clamped to the holder 146 by any suitable means such as the plurality of adjustable clamps 154 located around the sides thereof. In this manner, the film, after attached to its frame, maintains a definite relation with the holder 146.

The holder 146 is adjustable within the frame 145 and is adapted to be clamped in adjusted position by means of a plurality of adjustable clamping jaws 155 operated by

screws 561. Where the film holder is adapted to be used with a vacuum system, the frame 145 will be provided with a rubber sealing strip 157 around the margins thereof, and on the other face will be provided with a rubber sheet 158 held in place by a thin plate 159 of steel or other suitable material.

In registering a film with the apparatus of this modification, the frame 145 is assembled with the frame 144 in the manner above described. The holder 146 is then shifted or adjusted until the register cross marks 160—160 on the film are brought into proper register with the master image or master register mark 149—150, whereupon the clamps 155 are tightened and the parts locked. In this connection it will be understood that the holder 145—146 is adapted to be mounted on a photo-composer having dowel pins corresponding to those referenced 151 on the register frame 144.

Although I have herein shown and described what I now consider the preferred manner of carrying out my invention, the same is by way of illustration only, and all changes and modifications are contemplated that come within the scope of the claims appended hereto.

I claim:

1. In a registering apparatus, the combination with a supporting frame; of an attaching member for a negative holder having means thereon for positioning and locating a holder with respect to the attaching member; registering means coordinated with the travel lines of the machine with which the holders are adapted for use; means whereby said registering means may be brought into predetermined relative position and location with respect to an attached holder; and means for effecting definite relative adjustments between said attaching member and registering means to thereby bring the center lines of a holder always in the same relation with respect to said register means.

2. In a registering apparatus, the combination with a supporting frame; of an attaching member for a negative holder having means thereon for positioning and locating a holder with respect to the attaching member; registering means coordinated with the travel lines of the machine with which the holders are adapted for use; means whereby said registering means may be brought into predetermined relative position and location with respect to an attached holder; and means for effecting definite relative adjustments between said attaching member and registering means to thereby bring the center lines of a holder always in the same relation with respect to said register means, said means including releasably interfitting blocks.

3. In a registering apparatus, the combination with a supporting frame; of a monorail attaching member having means for attaching a negative holder in predetermined position and location with respect thereto; means for adjusting said monorail rectilineally on said frame; and separable means for securing said monorail in accurately adjusted position.

4. In a registering apparatus, the combination with a supporting frame; of a monorail attaching member having means for attaching a negative holder in predetermined position and location with respect thereto; means for relatively roughly adjusting said monorail rectilineally on said frame; and means for securing said monorail in accurately adjusted position, said securing means including a rack composed of staggered, accurately dimensioned blocks on the supporting frame and a cooperable interfitting block slidably mounted on the monorail.

5. In a registering apparatus, the combination with a supporting frame; of a member having means for positioning and locating a negative holder thereon; means for adjusting said member rectilineally on said supporting frame; means for securing said member in adjusted position, including a rack comprised of staggered, accurately dimensioned blocks and a cooperable, interfitting, accurately dimensioned block; and a secondary frame carrying registering devices adapted to be positioned over a holder when mounted on said member.

6. In a registering apparatus, the combination with a main supporting frame; of means on said main supporting frame for supporting a negative holder in predetermined position and location with respect thereto; a register frame movably supported on said main frame and having registering means defining two travel lines of a photo-composing machine; and a second register frame movably mounted with respect to said main frame; a bar adjustably mounted on said second registering frame; and cross heads slidably mounted on said bar, said cross heads having means adjustable thereon for attaching a holder frame thereto.

7. In a registering apparatus, the combination with a main supporting frame; of a negative holder supporting and attaching member rectilineally adjustable on said frame for different size holders; means for accurately determining the adjustment of said member with respect to said frame; and a register frame adapted to be moved to operative position with respect to said main frame when a holder is supported thereon.

8. In a registering apparatus, the combination with a supporting frame; of a negative holder attaching and supporting member slidably mounted on said frame; means for effecting movement of said member relative to said frame; interfitting locking elements on said frame and member; means for actuating said locking elements; and regis-

tering devices cooperable with a negative when held by the holder.

9. In a registering apparatus, the combination with a support; of a negative frame proper adapted to have a negative secured thereto; of an auxiliary frame; means for detachably mounting the negative frame on the auxiliary frame in predetermined position with respect thereto; cooperable means on the support and auxiliary frame for detachably mounting the latter on the support the portions of said means on the auxiliary frame being adjustable with respect to the auxiliary frame and adapted to be retained in adjusted position; and registering devices adapted to be brought into cooperative relation with a negative secured to the negative frame proper whereby the negative frame proper and auxiliary frame, as a unit, may be adjusted to registered position through said attaching means of the auxiliary frame and support.

10. In a registering apparatus, the combination with a supporting frame; of dowel pins thereon for attaching a negative holder in predetermined position and location with respect thereto; of a secondary frame carrying scribers adapted to be moved to operative position with respect to a negative supported in said holder and scribe thereon, lines corresponding to the two travel lines of a photo-composing machine; another secondary frame movable to and from operative relation with respect to the negative holder; a pair of dowel pins for supporting a negative on said last named secondary frame, each of said pins being adjustable in lines parallel to said scribed lines whereby a negative free of register marks mounted in a holder on the last named secondary frame may be positioned over the scribed lines of the first named negative holder and adjusted with respect thereto and thereby registered.

In witness that I claim the foregoing I have hereunto subscribed my name this 27th day of October, 1928.

WILLIAM C. HUEBNER.