

April 26, 1938.

W. BANCROFT ET AL

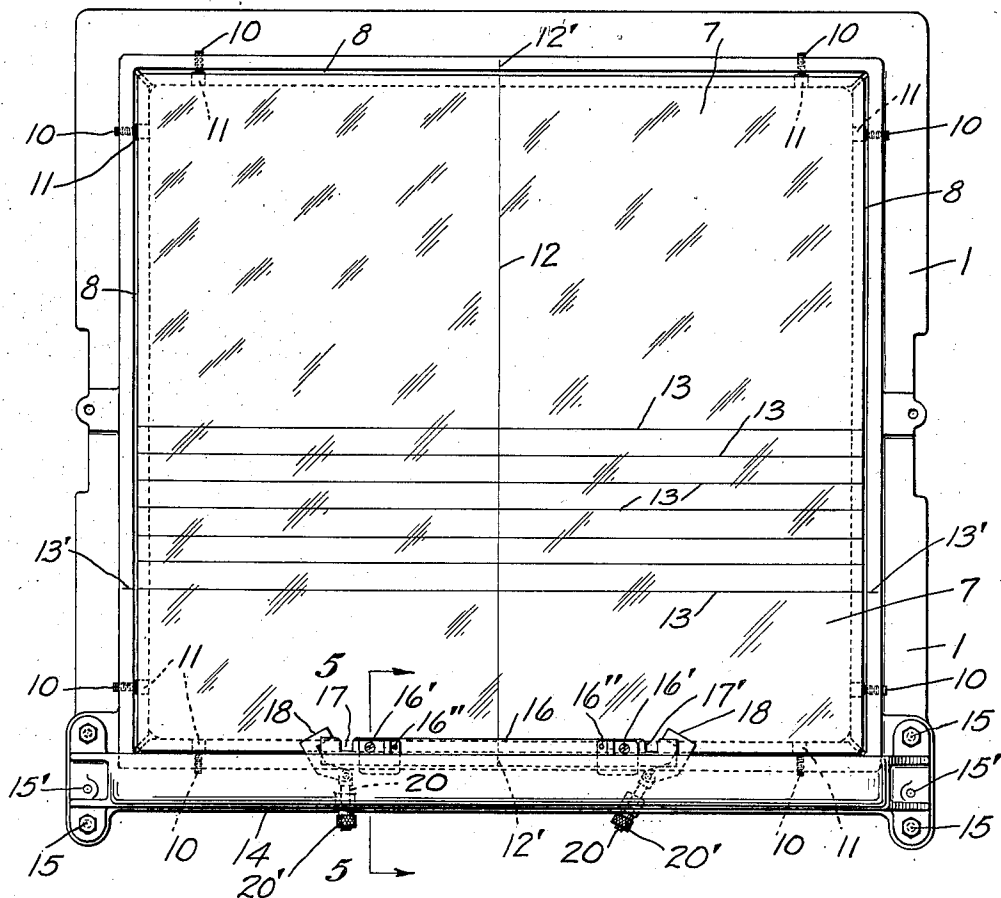
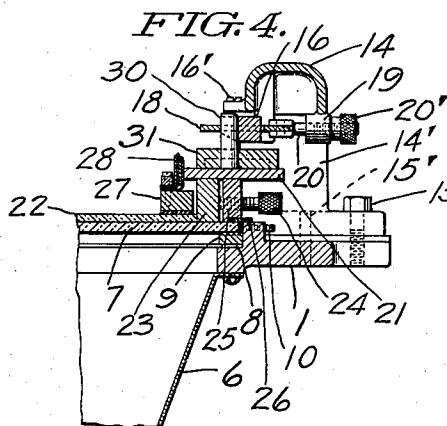
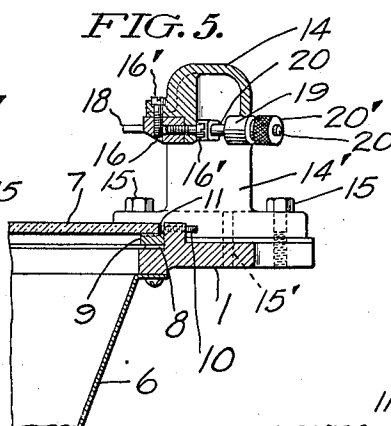
2,115,357

REGISTERING MECHANISM

Filed Nov. 2, 1935

2 Sheets-Sheet 1

FIG. 1.



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FIG. 2. ← 3

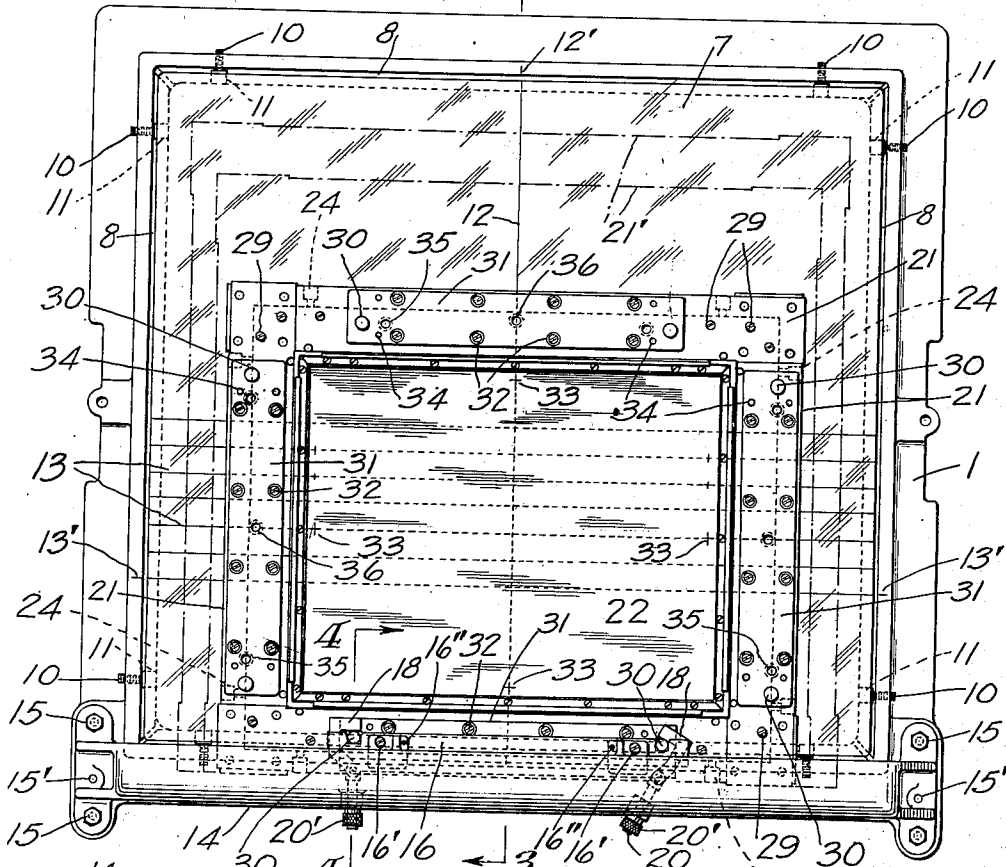
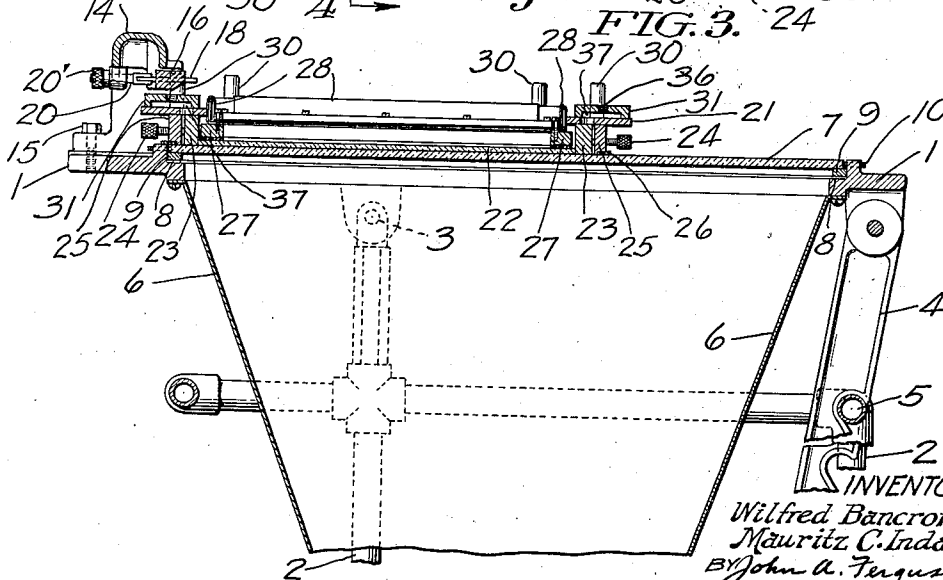


FIG. 3.



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UNITED STATES PATENT OFFICE

2,115,357

REGISTERING MECHANISM

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Application November 2, 1935, Serial No. 47,924

17 Claims. (Cl. 33—184.5)

The present invention relates to registering mechanism, particularly for registering photographic negatives or positives in holders to precise position therein so that when the holders are subsequently used in connection with photo composing machines, the images will be located with the utmost accuracy, a condition of special importance when color reproduction work is being done. One of the objects of the invention is to provide a construction of the registering equipment such that its parts are fixed definitely and rigidly in position as a feature of its manufacture and cannot be altered or adjusted subsequently thereto, whereby precision is built in and unalterable; another object is the provision of such construction that a series of holders of different sizes may be registered as to their negatives without changing, relocating or adjusting any of the parts of the mechanism; another object is to provide means by which the holder is definitely positioned without possibility of error, on the registering table; another object is to provide a holder with positioning devices fixed on plates, the latter being movable with respect to the holder until precisely located by a gage and then fixed immovably on the holder; another object is to provide cooperating positioning devices on the registering table and on the holder of such construction that cooperation of said devices is accomplished by movement of the holder in a plane parallel to the surface of the table bearing the registering lines; other objects will be hereinafter pointed out or will otherwise appear in connection with the following description of the embodiment of the invention shown in the accompanying drawings in which

Fig. 1 is a plan view of a registering table,

Fig. 2 is a similar view of the table with a negative holder in position for registering thereon,

Fig. 3 is a vertical section approximately on line 3—3, Fig. 2,

Fig. 4 is a vertical section approximately on line 4—4, Fig. 2, and

Fig. 5 is a similar section approximately on line 5—5, Fig. 1.

The registering table has a rectangular top frame 1, supported at a convenient height for the operator on legs 2 (Fig. 3) and arranged, if desired, to be tiltable thereon at the point 3, the rear edge of the top frame being moved up to tilted position and held there by the lever 4 pivoted to the frame and provided with notches to engage the horizontal leg brace 5. The frame is shown in horizontal position. It is also provided with a depending light shield or hood 6, in or

near the bottom of which may be provided a source of light, its rays being directed in a well known manner upwardly through the plate 7 forming the top proper of the table, which plate, herein called the glass plate or top, may be of glass or any other suitable transparent or translucent material. Conveniently, it may be of glass which is ground on its under surface.

This glass top 7 is rectangular in shape and is laid loosely on the top frame 1, the latter being recessed on its four inner sides at 8 (Figs. 4 and 5) so that the top surface of the glass will be slightly higher than or at least as high as the frame. In practice, the glass is supported on thin wood inserts 9 laid in these recesses. It is held in relatively centered position with reference to the frame by horizontal screws 10 threaded in the frame, between the inner ends of which screws and the edges of the glass are placed thin copper sheets 11 to prevent injury to the glass, these sheets being bent under the glass, as shown in dotted lines in Fig. 1 and slight recesses being formed in the wood strips to hold them in place.

The glass 7 is provided with registering lines, as the centering line 12 extending from back to front and referred to as a vertical line, this line being very accurately produced in any suitable manner as by cutting, grinding or engraving. It is also provided with registering horizontal lines 13 at right angles to the vertical line 12 and extending from side to side of the frame. These registering lines may be filled with a suitable pigment or the like to make them easily visible. The horizontal lines 13 are spaced so that each becomes a horizontal centering line for one of a series of sizes of negative holders and negatives, as will be made clear hereinafter. Extending over the front edge of the frame 1 and generally parallel thereto is a bar or bridge 14, the central span of which is of rigid and unyielding construction and is, as shown, spaced above the said edge slightly more than the thickness of a negative holder to allow the latter to extend under the bridge. The ends of the bridge extend downwardly from the horizontal position thereof to form legs 14' which are flanged at their lower ends to accommodate screws 15 by which the bridge is secured to the table frame 1.

The rear face of the bar 14 is provided with a positioning bar 16 preferably of hardened steel, which is set in a suitable recess in the bar 14 and held in place by vertical and horizontal screws 16' (Fig. 5). When lined up parallel to the length of the bar 14, holes are drilled for the accom-

modation of pins 16'' (Fig. 1) so that the bar 16 is held immovable on bar 14. The bar 16 forms the rear edge of the bar 14 and is provided with locating devices in the form of a pair of spaced 5 dowel slots or recesses 17 and 17', the former slot being slightly wider than the cylindrical dowel pin on the negative holder, which pin is to enter said slot, and the latter slot being an exact fit for its pin. To ensure firmly holding the negative 10 holder while registering the negative, two horizontal hooks or clips 18 may be mounted in suitable bosses 19 in the bar 14. These clips each comprise a screw shank 20 and a pivoted hook-shaped member adapted to embrace the dowel 15 pin or similar positioning or locating devices on the holder when positioned in the dowel slots. These clips are shown in open position in Fig. 1 and in closed, dowel embracing position in Fig. 2. It is obvious that turning the knurled nut 20' located on the front side of the boss 19 and screw threaded on the shanks 20, will draw these hook members against the rear of the dowels and anchor them tightly in the dowel slots 17 and 17'. The clip for the slot 17' is placed at an angle 25 so that its action will not only draw the corresponding dowel against the bottom wall of the slot 17', but will also draw it laterally against the inside wall of said slot. Thus, even if the dowel pin is not an exact fit in the slot 17 because of 30 wear, for example, its positioning will be definite and precise. The negative holder is thus positioned with extreme accuracy at all times.

When the bridge or bar 14 is secured by the bolts 15 on carefully smoothed pads on the frame 35 1, it is lined up, as by a suitable gage, so that the bottoms of the dowel slots in the bar 16 are exactly parallel to the horizontal lines 13 on the glass table top and the side walls of said slots are perpendicular thereto. Reference lines 12' 40 and 13' are now marked on the table frame 1, these lines being extensions of the line 12 and one of the lines 13 engraved on the glass top 7. In this position holes are drilled in the bridge and table frame 1 for the accommodation of driven 45 pins 15' which result in making the bridge immovable and non-adjustable on the table. In this way, the rear edge of the positioning bar 16 and particularly the bottoms of the dowel slots 17, 17', and the table top lines 13 are exactly 50 parallel and may not be changed by the operator from such condition of parallelism, with the single exception that the glass top 7 may be moved slightly by manipulating the screws 10. This adjustment is necessary only when assembling 55 the glass on the table in the user's plant, because the two parts are necessarily shipped separately, and when applying a new glass 7 to the table frame on account of accidental breakage. The reference lines 12', 13' on the table frame 60 ensure the proper positioning of the glass. When the glass is properly located, the screws 10 are never adjusted in connection with the regular and normal operation of the register table and the latter may be referred to as one which has no 65 adjustable features, which is sturdily built and pinned together so that it is at all times absolutely accurate and cannot get out or be adjusted out of order. The same is true of the negative holder, the embodiment of which shown 70 in plan in Fig. 2 will now be described.

The negative holder may be of any suitable construction so far as its capability of holding and centering a negative is concerned, the term "negative" including a positive and being of glass 75 or any other suitable material. Any negative

holder is suitable which comprises a rectangular frame provided with suitable locating devices which, as shown, comprise two dowels 30 projecting upwardly from one of the uppermost sides 5 of the frame when the latter is laid on the glass top 7 with its negative in proper contact with said top, said dowels being of such diameter and location as to fit accurately and cooperatively within the dowel slots 17, 17' previously referred 10 to. The holder also should be provided with devices for moving the negative in the plane of the top for registering with the line 12 on the top and one of its lines 13, the registering or indicating lines with which the negative is customarily provided. A suitable negative holder 15 may be of the construction shown in Letters Patent of the United States, No. 1,978,493, issued to W. C. Huebner on October 30, 1934. The negative frame 21 is rectangular in form and it will be understood that there will be normally a series 20 of holders of different sizes usable on the register table; there is illustrated in dot and dash lines in Fig. 2 a holder 21' of larger size than the holder 21 to make clear that a variety of sizes can be accommodated. Inside of the frame and 25 adapted to be placed in contact with the glass top 7 is the negative or its equivalent 22 which is held by bars 23 movable against the edges of the negative by screws 24 threaded in a fixed frame 25 30 which where it contacts with the glass 7 is provided with a rubber vacuum strip 26; above the negative as it rests on the glass top 7 is an inner frame 27 and a surrounding frame 21 contacting with a rubber vacuum device 28 secured to the inner frame 27. The back frame 21 is secured 35 to the frame 25 by a series of screws 29 (Fig. 2). This construction does not require detailed description herein, as it will be clearly understood by those skilled in the art and is or may be of the general construction of the device shown in the 40 patent above mentioned.

The holder of this invention, however, is provided with locating devices in the form of dowel pins 30 nonadjustably secured to a dowel plate 31, the latter being preliminarily adjustably secured to one side of the frame 21 by screws 32, 45 so that the dowel pins will project upwardly as shown in Fig. 3 and be located so that they will enter the dowel slots 17, 17' of the bridge 14. There are shown four such plates 31, one on each 50 side of the holder, each being identical in construction and being for the purpose of registering from each side of the holder, as is sometimes required in commercial operation. Each plate carries two spaced dowels 30 and is loosely attached 55 to the holder by the screws 32, the holes therefor in the plate being slightly larger in diameter than the diameter of the screw shanks, and the holder is provided with a negative or master glass 22 having cross markings thereon such as the marks 60 33, Fig. 2, the glass being approximately centered in the holder and held there by the screws 24. The holder and the plate are then placed on the table glass 7 and drawn forwardly in the plane of the table top to cause the dowels 30 to enter the 65 dowel slots 17, 17'. Then the clips 18 are manipulated to cause their hooks to embrace the dowels 30, as shown in Fig. 2, and the knurled nuts 20' are turned to cause the dowels to be firmly seated and held on the bottom of the slots 17, 17' and 70 the right hand dowel 17' to be positioned also against the inner wall of the slot 17; that is, the wall nearest to and parallel to the vertical line 12 of the glass top. The cross-marks 33 are then observed and if they do not register accurately 75

with the vertical line 12 on the glass 7 and with one of the horizontal lines 13 thereon, the holder is moved relatively to the seated dowels 30 and dowel plate 31 by striking it with a lead hammer or otherwise moving it until accurate registration of the markings has been accomplished. Then the screws 32 are tightened and finally holes are drilled and pins 34 inserted to immovably fasten the dowel plate 31 to the holder frame 21. The holder is then turned 180 degrees and the opposite plate 31 and its dowels are positioned in the same manner, after which the two side plates and dowels are individually adjusted in the same way, all being pinned in final precise positions. The holder is thus reversible and may be used in any of four positions. So far as the holder is concerned, the registration of a negative is accomplished without any movement or adjustment of any part, the negative itself being the only element movable, and the precision of the holder is maintained in all four positions on the table to which the holder may be turned.

It will be observed that the horizontal cross-marks 33 of the negative plate 22 shown in Fig. 2 register with the third line from the bottom of the series of lines 13 of the glass table top. The holder shown in dot and dash lines on Fig. 2 would carry a negative to register with the sixth line from the bottom. The lines 13 are drawn, of course, to correspond with the series of holder sizes commercially found desirable, and since they are commonly made in sizes differing in inches, the lines 13 are correspondingly drawn one inch from each other. Holders varying one inch in size with respect to the negatives therein actually vary one-half inch as to the position of their frame sides measured from the median line of the holders. Therefore, the dowels 30 are capable of being positioned at one-half inch distances from the horizontal cross lines of the negatives in the holders or in other words, from the horizontal median line of the holder. To accomplish this, the dowel plates 31 are each made reversible and the dowels 30 thereon are offset one-quarter inch from the longitudinal center line of the plate. This is clearly shown in Fig. 2, in which the dowels 30 on the top and bottom plates are located on the inside of or offset with respect to the said longitudinal center or median lines of the plates 31, say one-quarter inch inside and the dowels in the side plates are located on the outside of said median lines. If, in assembling, anyone of the plates 31 is turned 180 degrees, the screw holes for the screws 32 will accommodate such reversal since they are symmetrically arranged with respect to said longitudinal center line, but the dowels will be moved one-quarter inch outside or inside, as the case may be, of said center line, the dowels being thus moved one-half inch or twice the amount of offset from their previous position with respect to the horizontal center line of the negative. In this way, one-half inch variations of the dowels are possible to accommodate one inch variations in the sizes of the series of holders. Of course, reference to inches, one-half inch and one-quarter inch is for the purpose of example only, any unit of measurement and any fraction thereof being employed without departing from the scope and spirit of this invention.

When the glass top 7 and the bridge 14 have been positioned in the manner set forth with the latter pinned to the table frame 1 by the pins 15' and the bar 16 pinned to the bridge 14 by the pins 16'', the vertical line 12 of the glass will be

precisely normal to or at right angles to the bar 16 and particularly to the bottoms of the positioning slots 17, 17' therein and the horizontal lines 13 will be exactly parallel to the bottoms of said slots. Nothing is adjustable on the part of the operator in the normal use of the device. Moreover, when the negative holder has its dowel plates 31 pinned by the pins 34 to the frame thereof and is provided with a negative therein, nothing is adjustable so far as the holder is concerned. The negative is adjustable by the screws 24 for the sole purpose of registration of the negative. The holder is placed face down on the glass top 7 and is slid forwardly thereon or in a plane parallel thereto until the dowels 30 seat in the slots 17, 17', then the clamps 18 are moved to closed position, the knurled nuts 20' are tightened and the holder is located in a single definite position on the table top. There now only remains for the operator to manipulate the negative positioning screws 24 to cause exact registration of the negative's cross lines 33 with the vertical line 12 and the appropriate horizontal line 13 of the glass top 7. The negative is now properly registered and the clamps 18 may be withdrawn, the holder removed from the table and applied to a photo composing machine provided with positioning devices such as dowel holes which correspond with the dowels on the holder. In this way, exact location on the photo composing machine of the image on the negative is assured and it may be duplicated with extreme precision as many times as may be necessary for color reproductions or other purposes, as will be readily understood by those skilled in the art. The dowel plates 31 may be provided with screw holes 35 (Fig. 2) for securing the holder to the composing machine and with vacuum holes 36 and passages 37 (Fig. 3) for co-operation with suitable vacuum producing mechanism commonly associated with the photo composing machine, it being understood that with four dowel plates on a holder, only one hole 36 is adapted to be used, the others being temporarily corked or plugged in any suitable way. It will also be understood that such vacuum operates between the rubber dam 26 in contact with the glass top 7 and the rubber vacuum device 28 to cause atmospheric pressure to force a close contact of the negative against the press plate of the photo composing machine.

It is to be understood that the dowels and dowel slots may be interchanged or replaced by other suitable positioning devices and in general that the terminology of this specification is not to be interpreted as limiting the invention, the scope of which is defined by the appended claims.

We claim:

1. In a register device for photographic negatives and the like in combination with a series of negative holders of different sizes, each negative therein having vertical and horizontal registering marks thereon, of a table including a glass plate, means for definitely positioning any one of these series of holders on the table at a single side thereof, a vertical line formed on the glass and extending normally with respect to the positioning side of the table whereby the vertical marks on each negative of the series may be registered with said vertical line, and a series of horizontal lines on the glass and so disposed and spaced that the horizontal marks on each negative may be registered with one of the horizontal lines of the glass.

2. A register device comprising a table, including a top therefor, a positioning bar fixedly

secured to the table and extending from side to side thereof across one edge thereof, said bar being provided with locating devices, in combination with a negative holder, adjusting means thereon, whereby a negative may be adjusted in its holder, said holder being provided with locating devices to cooperate with the locating devices on the bar, a vertical centering line formed on the top and a plurality of parallel horizontal centering lines also formed on the top, whereby the holder may be located in a single definite position on the table top and its negative may be adjusted to register its reference marks with the vertical centering line and one of the horizontal centering lines on the table top.

3. A register device comprising a table, including a top therefor, a positioning bar fixedly secured to the table and extending from side to side thereof across one edge thereof, said bar being provided with a pair of locating devices, in combination with a negative holder, adjusting means thereon, whereby a negative may be adjusted in its holder, said holder being provided with a pair of locating devices to cooperate with the locating devices on the bar, a centering line formed on the top perpendicular to the line joining the pair of locating devices of the bar and a plurality of parallel centering lines also formed on the top, perpendicular to the said first mentioned line, whereby the holder may be located in a single definite position on the table top and its negative may be adjusted to register its reference marks with the vertical centering line and one of the horizontal centering lines on the table top.

4. A register device comprising a table, including a top therefor, a positioning bar fixedly secured to the table and extending from side to side thereof across one edge thereof, said bar being provided with locating devices, in combination with any selected one of a series of negative holders of different sizes, adjusting means whereby a negative may be adjusted in its holder, said holder being provided with locating devices to cooperate with the locating devices of the bar, a vertical centering line formed on the top and a plurality of parallel horizontal centering lines also formed on the top, the horizontal lines being located to correspond each to the center line of a different one of the series of holders, whereby any selected holder may be located in a single definite position on the table top and its negative may be adjusted to register its reference marks with the vertical centering line and the horizontal centering line which corresponds to the center line of the selected holder.

5. A register device comprising a table, including a glass top therefor, screws for moving and holding said top in position on said table, a rigid bridge or bar doweled to the table and extending from side to side thereof in the vicinity of the lower, horizontal edge of said top, said bar being provided with a positioning bar pinned thereto and having dowel slots in its rear edge, in combination with a negative holder provided with dowels to cooperate with said dowel slots, hooks provided in said bridge for embracing said dowels when seated in said slots and screws associated with said hooks for drawing said dowels firmly against the bottom walls of said slots and holding them in such position.

6. A register device comprising a table, a glass top thereon provided with register lines and a rigid bridge or bar extending from side to side of the table across one edge thereof, said bar be-

ing non-adjustably fixed at each end to said table and being provided with non-adjustable locating means, in combination with a negative holder comprising a frame provided with locating means non-adjustably fixed thereto, the holder being positioned on the table top with its locating means in cooperative position with respect to the locating means of said bridge and means for adjusting the negative in its holder to register the negative with the register lines of the glass top, no part of the register table and its bridge being adjustable and no part of the negative frame being adjustable.

7. A precision register device comprising a table having a glass top, a rigid bridge or bar extending from side to side of the table across one edge thereof and being pinned fixedly to each end to said table, said bridge being provided with locating devices, said glass being provided with a vertical register line normal to said bridge and a horizontal register line parallel thereto, in combination with a negative holder comprising a frame and locating devices immovably fixed in said frame, the holder being positioned on the glass with its locating devices in the locating devices of the bridge to square the holder precisely with the bridge and means for adjusting the negative in the holder to register the negative with the lines on the glass, no part of the table or its bridge being adjustable and no part of the negative frame being adjustable.

8. A precision register device comprising a table having a glass top, a rigid bridge or bar extending from side to side of the table across one edge thereof and being pinned fixedly at each end to said table, said bridge being provided with positioning dowel slots, said glass being provided with a vertical register line normal to said bridge and a horizontal register line parallel thereto, in combination with a negative holder comprising a frame and positioning dowels immovably fixed in said frame, the latter being positioned on the glass with its dowels in the dowel slots of the bridge to square the holder precisely with the bridge and means for adjusting the negative in the holder to register the negative with the lines on the glass, no part of the table or its bridge being adjustable and no part of the holder being adjustable.

9. In a register device, in combination with a table having a glass top provided with cross lines and a bridge or bar extending across the glass top, said bar being provided with positioning dowel slots, of a negative holder resting on the glass top and comprising a rectangular frame, means for adjustably holding a glass therein provided with positioning marks, a dowel block on one side of said frame and having positioning dowel pins extending outwardly from the block at right angles to the frame and in position engaging the said dowel slots of the bar, said block being doweled or pinned to said frame in its position on the glass top with the dowels seated in the dowel slots and the positioning marks of the glass in register with the cross lines of the glass top.

10. A negative holder comprising a rectangular frame, means for holding a negative therein and adjusting it to gaged position, a locating plate on one side of the frame and provided with a plurality of spaced locating devices in the form of dowel pins secured to said plate and extending upwardly therefrom perpendicularly to the plane of the frame, in combination with a register table comprising a top provided with gage

lines, a positioning bar provided with dowel slots corresponding in dimension and location to said dowel pins, said locating plate being secured to the holder frame in its gaged position as determined on said register table.

11. A negative holder comprising a rectangular frame, means for holding a negative therein and adjusting it to gaged position, a plurality of locating plates, each on one side of the frame and each provided with a plurality of spaced locating devices in the form of dowel pins secured to said plate and extending upwardly therefrom perpendicularly to the plane of the frame, in combination with a register table comprising a top provided with gaged lines, a positioning bar provided with dowel slots, corresponding in dimension and location to said dowel pins on each of said plates, each of said plates being individually secured to the holder frame in gaged position as determined on said register table.

12. A negative holder comprising a rectangular frame, means for holding a negative therein and adjusting it to gaged position, four locating plates each on one side of the frame and each provided with a plurality of spaced locating devices in the form of dowel pins secured to said plate and extending upwardly therefrom perpendicularly to the plane of the frame, in combination with a register table comprising a top provided with gaged lines, a positioning bar provided with dowel slots, corresponding in dimension and location to said dowel pins on each of said plates, each of said plates being individually secured to the holder frame in gaged position as determined on said register table.

13. A negative holder comprising a rectangular frame, means for holding a negative therein and adjusting it to gaged position, a locating plate on one side of the frame and provided with a plurality of spaced locating devices in the form of dowel pins secured to said plate and extending upwardly therefrom perpendicularly to the plane of the frame, said pins being offset to or at one side of the median line of said plate, in combination with a register table comprising a top provided with gaged lines, a positioning bar provided with dowel slots corresponding in dimension and location to said dowel pins, said locating plate being secured to the holder frame in either of two reverse positions in its gaged position as determined on said register table, whereby the distance to the dowels measured from the median line of the holder, which line is parallel to said first mentioned median line, is varied to the extent of twice the offset distance of the dowels.

14. A register device for photographic negatives

and the like comprising a table provided with a glass top, a positioning element fixedly secured to the table at one edge thereof, said element being provided with fixed locating means common to a series of negative holders of different sizes, the upper surface of the glass being in a plane lying above all portions of the table except the said element for accommodating negative holders of such large size as to extend without obstruction beyond the lateral edges of the glass, in combination with any one of a series of negative holders of different sizes each having adjusting means thereon for adjusting the negative in its holder and each being provided with fixed locating means for cooperation with the locating means on said element and vertical and horizontal centering lines on the glass for centering said negatives.

15. A register device for photographic negatives comprising a table having a vertical centering line and a plurality of horizontal centering lines in parallel relation, a positioning element provided with locating means common to all sizes of negative holders and fixed to the table in prearranged relation to the vertical and horizontal centering lines, a plurality of negative frames or holders, said frames being of different sizes for holding negatives of different sizes and being provided with identical locating means for cooperation with said first named locating means to fix the relationship of the holders with respect to the centering lines of the table and for cooperation also with identical locating means on the photo composing machine to which the holder is transferred after its negative has been registered, vertical and horizontal markings on each negative, means on each holder for moving the negative relatively to the holder in a horizontal direction when the holder is positioned upon the table, to bring one of said markings on the negative into register with said vertical line of the table and means on the holder for moving the negative vertically to bring the other of said markings into register with one of said horizontal lines on the table.

16. A register device for photographic negatives as in claim 15 wherein said horizontal centering lines are spaced from each other and from the locating means of the table variable distances according to the sizes of the negatives to be registered.

17. A register device for photographic negatives as in claim 15 wherein the horizontal markings on the negatives are arranged according to the size of the negative for cooperation with the appropriate horizontal centering line of the table.

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