

Sept. 13, 1938.

W. C. HUEBNER

2,129,768

PHOTOGRAPHIC PRINTING APPARATUS

Filed Nov. 13, 1936

5 Sheets-Sheet 2

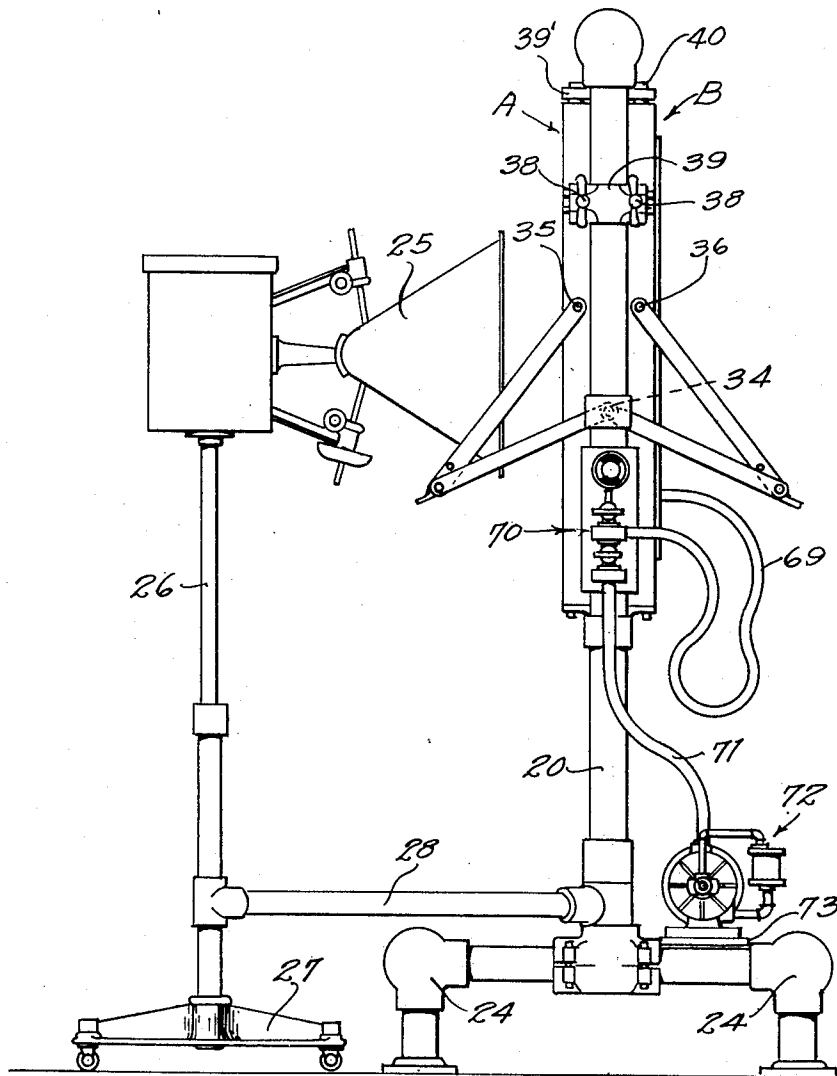


Fig. 2.

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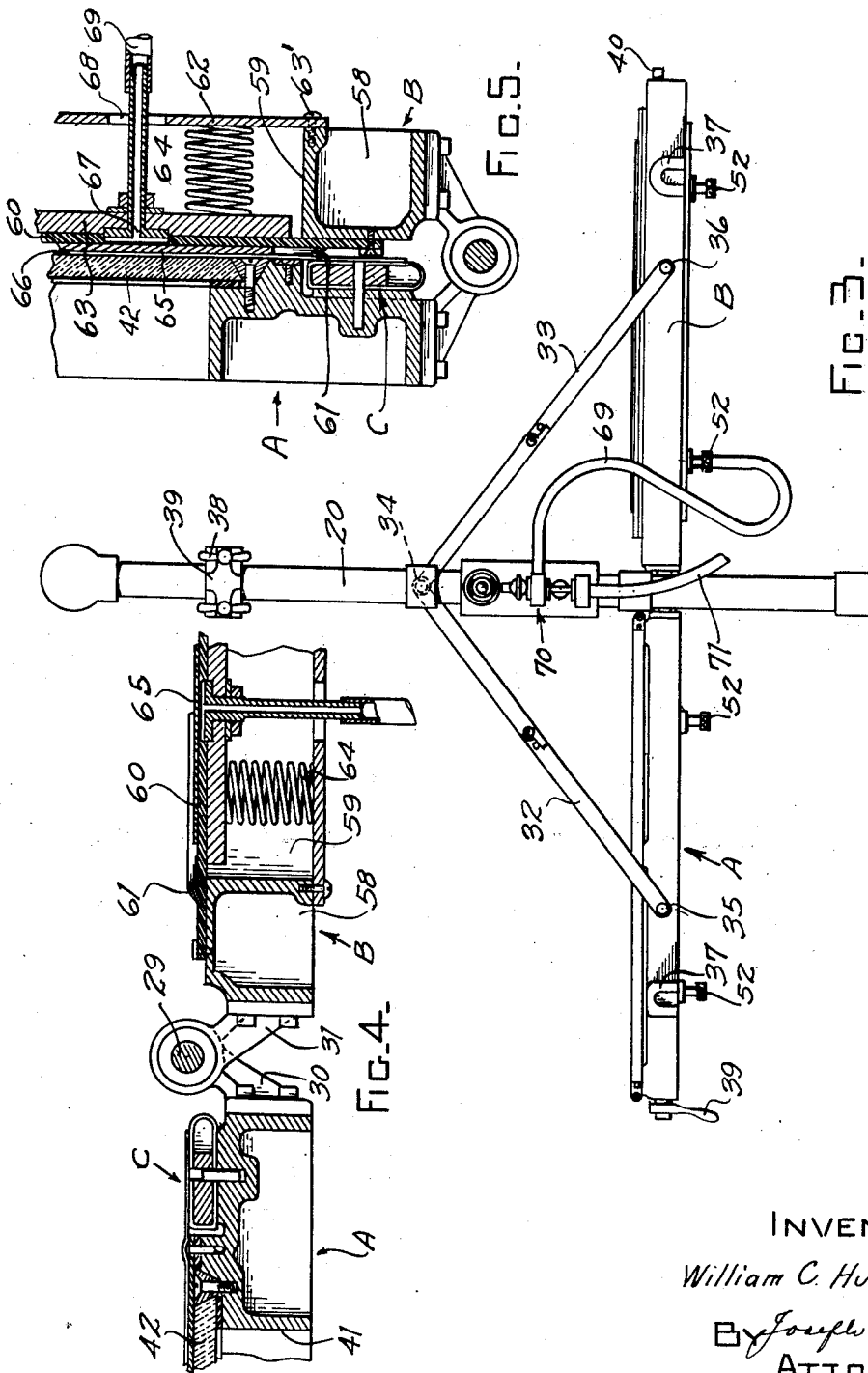
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PHOTOGRAPHIC PRINTING APPARATUS

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5 Sheets-Sheet 3



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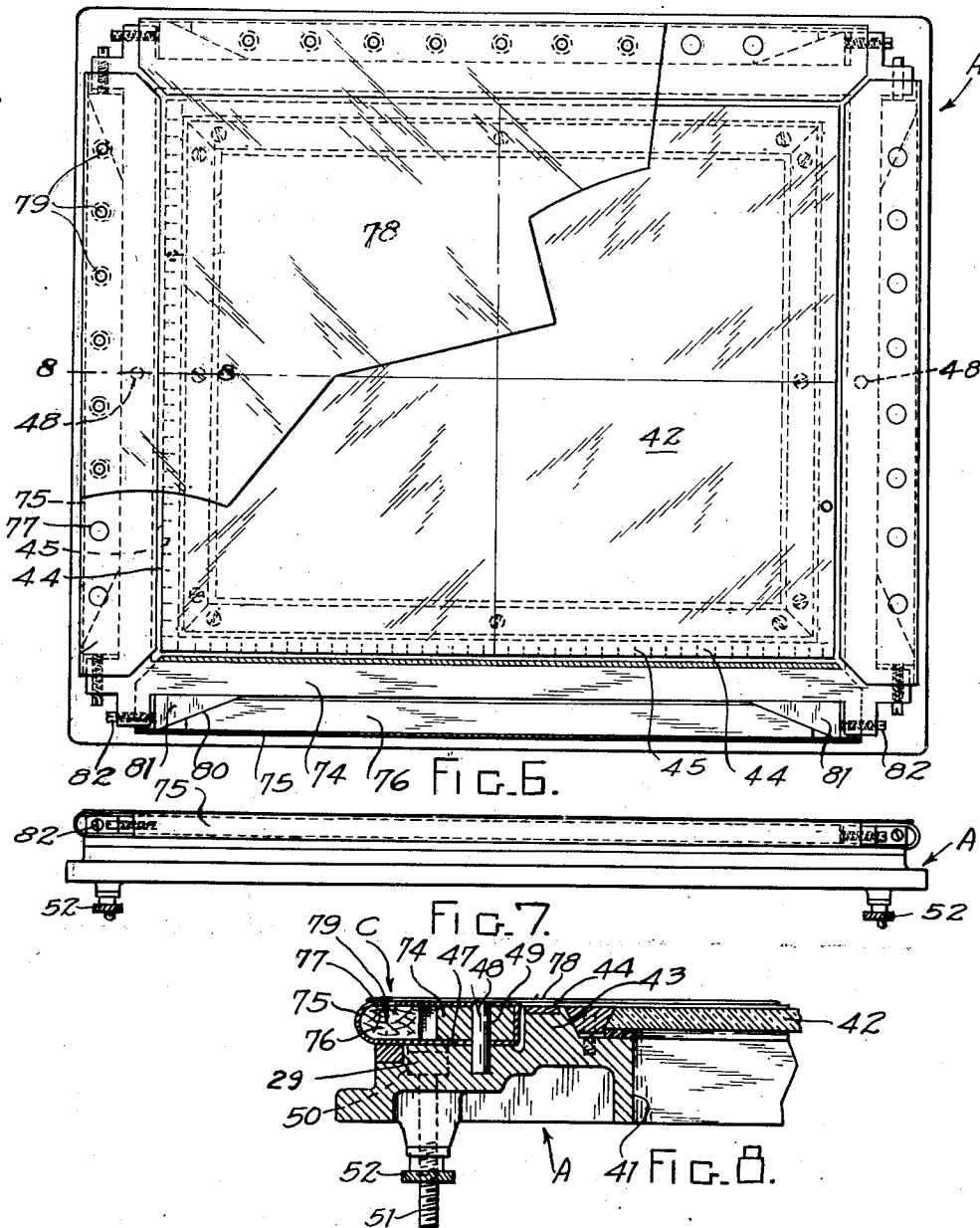
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PHOTOGRAPHIC PRINTING APPARATUS

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5 Sheets-Sheet 4



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PHOTOGRAPHIC PRINTING APPARATUS

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5 Sheets-Sheet 5

Fig. 9

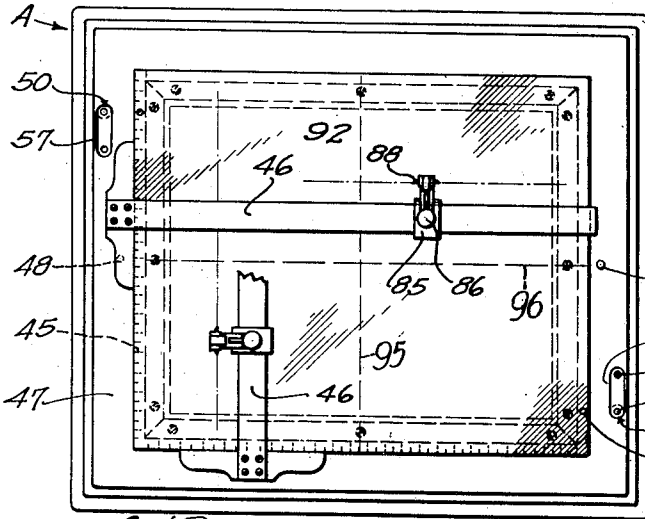


Fig. 10

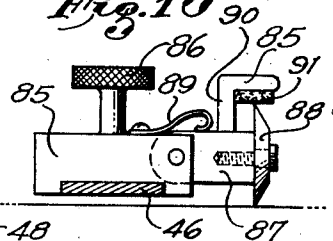


Fig. 11

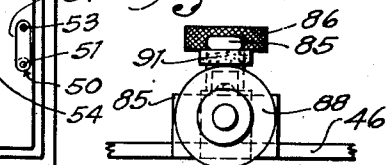


Fig. 12

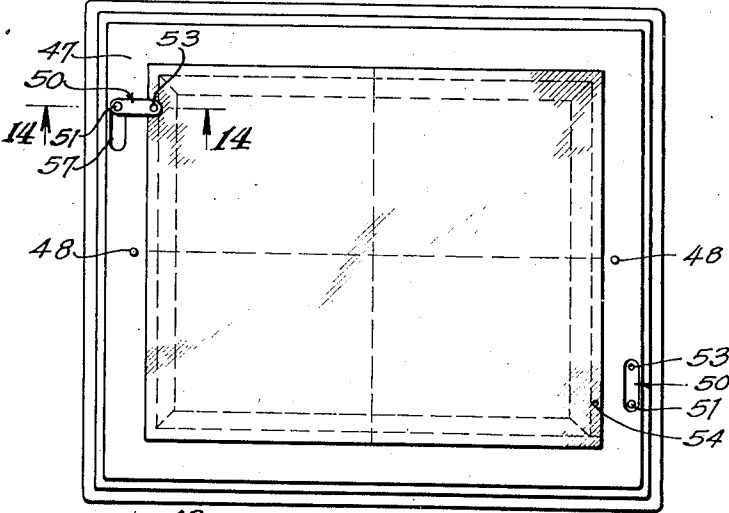


Fig. 13

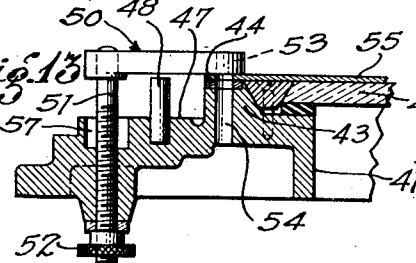
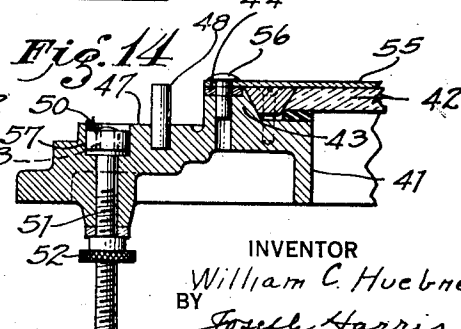


Fig. 14



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2,129,768

PHOTOGRAPHIC PRINTING APPARATUS

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Application November 13, 1936, Serial No. 110,656

10 Claims. (Cl. 95—76)

This invention relates to improvements in photographic printing apparatus.

One object of the invention is to provide a relatively simple, rugged and efficient apparatus for making photographic impressions under vacuum on sensitized press plates and the like, the apparatus being characterized by the fact that the necessary manipulative steps may be performed more easily and rapidly and with assured better results than prior devices intended for similar purposes.

Another object of the invention is to provide a photographic printing apparatus so constructed and arranged that, in conjunction with coordinated register chases, the same may be utilized in combining type and half tone negatives or positives on offset press plates by separate exposures without the usual costly stripping and combining of negatives; in obtaining step and repeat exposures with unusual speed; and in preparing color separation plates with perfect register.

Other and more specific objects of the invention are: to provide an apparatus of the character indicated in the preceding which may also be utilized in preparing lay-outs; to so arrange the parts that the holding frames for the printing and sensitized elements are individually adjustable to convenient horizontal work positions for inserting and removing said elements; and to so arranged the construction that either holding frame may be brought down over the other and the vacuum applied to maintain the contact and relative positions of the printing and sensitized elements prior to and during the movement thereof to exposure position, thus adapting the apparatus for a wide range of work with either glass or film printing elements.

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

In the drawings forming a part hereof, Figure 1 is a front elevational view of a photographic printing apparatus embodying the improvements showing the parts in position ready for making an exposure. Figure 2 is a side elevation of the construction shown in Figure 1. Figure 3 is a side elevational view of the printing apparatus proper, showing the open or work position of the printing element and sensitized element-holding frames, the lighting apparatus of Figure 2 being omitted. Figure 4 is a transverse sectional view, upon an enlarged scale, showing details of construction of the two holding frames, the frames being shown in their open or work position. Figure

5 is a view similar to Figure 4, but showing the two frames in their vertical, face to face or operative positions. Figure 6 is a top plan view of the printing element-holding frame, shown detached from the support and hinge butts and with a film-holding chase in register position therewith, parts being broken away and parts being shown in section, to more clearly illustrate the details of construction. Figure 7 is an edge elevational view of the structure shown in Figure 6. Figure 8 is a detail sectional view, upon an enlarged scale, corresponding substantially to the line 8—8 of Figure 6. Figure 9 is a top plan view, similar to Figure 6, on a smaller scale, but with the film-holding chase removed and with a layout sheet thereon in conjunction with associated T squares to illustrate the manner of laying out a layout sheet. Figures 10 and 11 are detail views, upon enlarged scales and at right angles to each other, illustrating certain features of construction of a cutter or trimmer attachment utilizable with the T squares in preparing a film. Figure 12 is a similar view to Figure 9 with the T squares and attached cutters removed and showing the manner of preparing a layout sheet for repeated use. Figures 9 and 12 are also illustrative of a coordinated layout table that may be used supplementary to the photographic printing element. And Figures 13 and 14 are detail sectional views, corresponding substantially to the line 14—14 of Figure 12, illustrating two conditions of the means for perforating and retaining a layout sheet in registered position on the printing element holding frame.

In said drawings, the apparatus is shown as preferably comprising a vertical support having spaced tubular uprights 20—20 connected by a top cross-brace 21 and bottom cross braces 22 and 23 all supported on base standards 24—24, thus providing a rectangular open framework for reception and manipulation of the holding frames hereinafter described. For convenience, there is preferably permanently associated with the printing apparatus proper, an arc light indicated conventionally at 25, which is supported on a vertically adjustable standard 26 having a roller castor base 27, said arc light standard being adjustably connected to the main supporting framework by a bar 28 pivotally connected with one of the uprights 20. With this construction, it is evident that the arc light may be brought into desired position in front of the printing apparatus proper or swung to one side when an exposure is not being made.

In carrying out the invention, the main sup-

port is provided with an intermediate, horizontally extending hinge bar 29 on which are pivotally mounted the printing element-holding frame designated generally by the reference A and the sensitized element-holding frame, designated generally by the reference character B. Said two frames are hingedly connected to said bar 29 by hinge butts 30 and 31, respectively, and which are so designed and positioned that the two frames may be swung downwardly on opposite sides of the main support to horizontal position, as shown in Figure 3, or to vertical position, as shown in Figure 1. For supporting the frames A and B in their horizontal work positions, suitably jointed link connections 32 and 33 are provided at each side, the terminals of the links being pivotally connected to the uprights 20 and the frames respectively, as indicated at 34, 35 and 36. To retain each of the frames A and B in vertical operative position, each of said frames is preferably provided at each side thereof with a recessed plate 37 with which are adapted to cooperate spring influenced locking bolts 38, horizontally positioned in blocks 39 carried by the support uprights 20. With this construction, it is evident that by withdrawing the locking bolts 38, the frames may be individually released and by letting them in, the frames may be locked in vertical position and in face to face relation. The two frames A and B may also be securely locked together when an exposure is to be made, as by the pivoted clamps 39' carried by one of the frames and which are adapted to cooperate with lugs 40 carried by the other frame at the tops thereof. As will be apparent, the hinged mounting of the frames A and B is such that the two frames will always keep the same positions relative to each other when the same are locked together.

Referring now more particularly to the printing element-holding frame A, as best shown in Figures 4, 6, 7 and 8. Said frame A preferably comprises a relatively light casting of rectangular outline with a large central light passage opening 41 over which is permanently positioned a transparent pressure glass backing wall 42. Surrounding the glass backing wall 42 is an upstanding rib 43 which, on at least two sides of the opening 41, has fixed thereon a straight edge 44 provided on its upper surface with suitable scale marks 45 so that said two straight edges 44 may be used in conjunction with a T square such as indicated in Figure 9 at 46 for the purpose of making a layout on a layout sheet, as hereinafter described.

Around the rib 43, the casting of the frame A is provided with a relatively wide horizontal shelf or ledge 47 on which is adapted to be seated the chase indicated generally by the reference character C, more particularly described hereinafter. Said shelf or ledge 47, as clearly shown in Figure 8, is depressed below the level of the supporting surface provided by the backing wall 42, an amount corresponding to the thickness of the film chase C intended to be used therein, so that the film carried by the chase will lie against the surface or backing wall 42. On opposite sides, as best shown in Figures 6 and 8, the frame A is provided with register devices, preferably in the form of dowel pins 48—48 which are definitely coordinated with the travel lines of a photo composing machine and with the corresponding coordinated register devices of the film frame C in the form of dowel pin openings 49.

Referring now more particularly to Figures 9,

12, 13 and 14, the frame A, preferably near diagonally disposed corners thereof, is provided with jigs 50 carried by bolts 51 vertically loosely mounted in the frame, said bolts 51 carrying at their lower ends beneath the frame, nuts 52. The jigs 50 are provided with guide holes 53 so located that, when the jigs are in the position shown in Figure 13, said guide holes 53 are brought over corresponding holes 54 in the frame and in which position, the jig may be securely locked by tightening up the nut 52. With this construction, when a layout sheet such as indicated at 55 is laid over the surface of the frame A, the sheet may be drilled or punched and thereafter detachably and removably held in registered position on the holding frame as by pins 56. When not in use, the jigs are in retracted position in recesses 57, as shown in Figure 14, in which retracted position they may be retained by screwing up the nuts 52 as shown.

As will be evident from the foregoing, whenever it is desired to employ a layout sheet a number of different times, as for instance when making multi-color prints, as hereinafter described, the layout sheet may be replaced on the frame A always in the same definite registered position.

Referring now more particularly to the sensitized element-holding frame B, as best illustrated in Figures 3, 4 and 5, said frame also preferably consists of a relatively light metal rectangular casting 58 with a large central opening 59. Extending over the opening 59 and secured around its edges to the casting 58, is a flexible or yieldable backing wall 60, preferably of moderately thick rubber, the same being formed with an upstanding air sealing rib 61 therearound just outside the edge of the opening 59. Said rib 61 is also so located, that when the two frames A and B are brought to vertical face to face position, as shown in Figure 5, said rib will bear against the frame of the film holder C so as to insure a firm backing for the sealing rib 61 and in turn insure an air sealed area within the rib 61.

Over the opening 59 on the bottom or outer side of the frame B is secured a plate 62 as by the screws 63'. To provide a proper support for the sheet rubber backing 60, the latter has secured thereto on its outer side a rigid plate 63 between which and the plate 62 are interposed a plurality of coiled springs 64, thus providing a cushioned yieldable backing for the wall 60 and preventing collapse or undue distortion thereof, while at the same time providing for the necessary flexibility to insure pressure contact between the sensitized element such as a press plate indicated at 65 and the printing element or film 66, when the exposure is being made. The sensitized element or press plate 65 will be retained in position on its supporting backing 60 of the frame B by any suitable means, as for instance by taping the same down.

To enable a vacuum to be created within the space sealed off by the sealing rib 61, the supporting backing wall of the frame B is provided with an exhaust outlet 67 which extends through a suitable opening 68 in the plate 62 and is connected by flexible hose 69 to the control valve 70 mounted on one of the uprights 20. From the control valve 70 extends another tube 71 to the vacuum pump 72 mounted on a cross board 73 carried by the base standards 24.

The improved photographic printing apparatus proper, is adapted to be used in conjunction with a film-holding register chase C that pref-

erably is of the character shown and claimed in my prior Patent No. 1,860,389, granted May 31, 1932. Said chase, briefly, comprises a relatively light metal rectangular frame 74 on each of the sides of which is slidably mounted toward and from the center of the chase, a light sheet metal bar 75 of elongated U cross section. Carried by each of the bars 75 on the interior thereof is a wood strip 76, the metal bar being provided with a series of perforations 77 therealong so that an acetate film 78 may be tacked to each of the bars along its several edges as by the tacks 79. The wood fillers 76 are wedge shaped at their ends, as indicated at 80, and cooperable therewith, at each end, are adjusting wedges 81—81 adapted to be shifted longitudinally by adjusting screws 82—82 threaded in corner extensions of the frame 74. With the construction described, it is evident that the film 78 may first be stretched taut by hand over the chase and tacked to the several adjusting bars and then the final stretching of the film effected individually on all four sides of the frame by adjusting the wedges 81.

In order that the chase may be utilized with the combination layout-register-printing element-holding frame A, the chase is provided with the register dowel openings 49, hereinbefore referred to.

When the work top of the frame A is utilized as a layout table, as indicated in Figures 9, 10 and 11, one or more T squares 46 are employed as there shown. For squaring margins and cutting masking paper, the cutters shown in said figures may be employed. Each of said cutters comprises a block 85 slidable on the arm of the T square, said block having a knob 86 to facilitate moving the same back and forth on the T square, as will be understood. Pivottally mounted on one side of the block 85 is an arm 87 having a cutter disk 88 pivoted thereto, said arm being spring influenced downwardly by the spring 89. A bracket 90 is secured to the arm 87, said bracket overlying the cutter and preferably having a wood or other relatively soft material insert 91 on the inside thereof so as to enable the operator to press the cutter down while moving the same back and forth.

As will be apparent from Figures 2 and 3 of the drawings, the two holding frames A and B are adapted to be positioned horizontally so as to enable the operator to easily place on and remove from, the printing element or film and the sensitized element or press plate. When doing ordinary work not requiring the use of the film frame, the operator after placing the press plate in position on the rubber blanket of the frame B while the latter is in its horizontal work position, may then locate a negative or film over the press plate while the latter is face up and then swing the other frame A over onto the frame B and lock the two together. The two frames, thus locked, may then be swung up to vertical position and latched to the main support and the vacuum applied or, the vacuum may be applied prior to swinging the two frames up to vertical position to insure retaining the negative and press plate securely together without danger of relative slippage.

Where the film frame or chase C is being employed, it will be placed on the holding frame when the latter is in the position shown in Figure 3 and the press plate secured on the holding frame B while the latter is in its horizontal position. Both the frames are then swung up to

vertical position and latched and locked together and the vacuum thereupon applied preparatory to making the exposure. Obviously, also, the reverse procedure of that first described may be employed, that is, by placing the negative on the frame A and then swinging the frame B with the press plate attached thereto up through the vertical and then down horizontally onto the frame A and locked to the latter. The operator is thus allowed to use the apparatus in the manner best suited for the particular type of work in hand.

Additional features of the improved apparatus and manner of using the same are found in the following. For the preparation of an ordinary layout sheet to be used only once, the sheet 92 may be taped down on the work top of the frame A as shown in Figure 9. With the aid of the T square in conjunction with the straight edges of the frame A, the layout obviously can readily be drawn on the sheet. With the layout sheet still in place on the work top of the frame, the register chase C may then be placed over the work top in register position by means of the register dowels or pins 48 and cooperable dowel holes 49 with the acetate film of the chase directly superimposed on the layout sheet. Such negative films as it is then desired or necessary to apply, are applied to the film 78, it being evident that the same may be applied in exact register governed by the layout sheet therebeneath, each negative being placed in its corresponding position called for by the layout sheet.

In the case of multiple exposures or when combining type matter and half tones, a layout sheet such as 55 is prepared with the register holes by means of the jigs 50. After the layout has been drawn thereon, the negative films which it is first desired to print from, are applied to the acetate film 78 of the chase which has been placed on the work top of the frame A in registered position, as will be understood. Such masking paper as may be required is then applied to the acetate film and taped down, after which the chase and the layout sheet are removed and the chase replaced with assured registered location of the negatives. Exposure is then made, after which the layout sheet 55 is replaced and the additional films applied to another acetate sheet 78 of the same or another register chase and the steps repeated for a second exposure, again with assured registered location of the negatives with respect to the layout called for.

Step and repeat work may also be carried out in a very simple manner by the register chase. With the layout sheet in place, the negative of the desired image is applied to the acetate film of the chase in one of its positions and an exposure made in the usual manner. By rotating the chase 180° in its plane and again registering it on the holding frame A, a second exposure may be made. After the second exposure, by replacing the layout sheet and applying the negative film to the acetate film in a second position, two more exposures may be made in a similar manner and so on for the desired number of repeat images.

As hereinbefore indicated, while Figures 9 and 12 indicate plan views of the work top of the printing element holder A, said figures are also clearly representative of what may be a separate layout and register table of identical character. While the preparation of layout sheets and registering of negative films on the acetate film of the chase, may be carried out on the frame A as hereinbefore described, ordinarily a separate layout

and register table of the character referred to will preferably be employed so as to utilize the printing apparatus proper to its maximum capacity by preparing the layouts and chase films on a separate apparatus. Where a separate layout and register table is employed, the same may have the glass work top thereof additionally provided with master register lines, as indicated by the dotted lines 95 and 96 in Figure 9 inscribed thereon at exact right angles to each other and intersecting at the center of the glass with the horizontal line 96 exactly in line with the centers of the register dowel pins 48 to thus coordinate said register lines with the travel lines of a photo composer. With master register lines on a separate layout and register table, such table may be employed in applying the usual register marks, generally in the form of small crosses to films or negatives, as will be understood.

With the improved apparatus herein shown and described in conjunction with the register chase, it is possible to carry out a single system for the production of offset press plates for either single color or multiple color work and, also, type and half tones may be combined on the same press plate by double exposures, entirely eliminating the usual stripping and combining of negatives heretofore deemed necessary in offset plate making. Various other advantages will be evident to those skilled in the art.

Although there has herein been shown and described what is now considered the preferred manner of carrying out the invention, the same is by way of illustration and not by way of limitation. All changes and modifications are contemplated that come within the scope of the claims appended hereto.

What is claimed is:

1. In an apparatus of the character described, the combination with a supporting framework including a pair of spaced uprights; of a pair of holding frames; means pivotally attaching said frames to said framework to swing about a fixed and common horizontal axis, each of said frames being movable, independently of the other, from a substantially horizontal position at one side of the uprights, between the uprights, and to a substantially horizontal position on the opposite side thereof; means providing an air seal between said frames when in face to face relation; and means for exhausting air from between said frames, one of said frames being provided with register devices for detachably receiving a register-coordinated film chase thereon.

2. In an apparatus of the character described, a frame having a transparent flat surface back for supporting a film, said frame having also a shelf located outwardly of and extending around said supporting surface, said shelf being depressed below the level of the supporting surface for a depth corresponding substantially to the thickness of a film-holding chase adapted to be positioned thereon; fixed physical register devices on said frame cooperable with complemental physical register devices of a register-coordinated chase; a second frame having a supporting backing wall; a support; and means pivotally attaching each of said frames to said support, said frames being pivotally movable to and from face to face position and, when in face to face position, always occupying the same position relative one to the other.

3. In an apparatus of the character described, the combination with two frames, one having a transparent flat supporting surface to allow

transmission of light therethrough and the other an opposed opaque supporting surface when the two frames are in face to face position; of means for locking said two frames in face to face position always in the same relation to each other, the frame with the transparent supporting surface, having a shelf depressed below its supporting surface an amount corresponding substantially to the thickness of a film chase which is adapted to be used in conjunction therewith; register devices on said shelf cooperable with coordinated-register devices of a film chase; and means, on the other of said frames, cooperable with a film chase when the latter is mounted in registered position in the apparatus, to provide an air seal around said supporting surfaces when locked in face to face position whereby air may be exhausted from between said surfaces.

4. In a photographic printing apparatus, the combination with a support; of two frames pivotally mounted on said support to swing about a common and fixed axis and to and from face to face position, each of said frames being independently swingable about its pivot to a substantially horizontal position with its work face uppermost and accessible, one of said frames having a flat, transparent and the other an opaque backing wall, the frames with the transparent backing wall being provided with a supporting shelf outside of and depressed below the surface of its backing wall and having also register devices, said depressed supporting shelf being adapted to accommodate a film chase between the two frames when the latter are locked in face to face relation; means providing an air seal between a film chase mounted in the apparatus and the frame opposed thereto when the two frames are locked in face to face relation; and means for exhausting air from within the sealed area.

5. In an apparatus of the character described, the combination with a support; of a printing-element holding frame pivotally attached to said support, said frame having a transparent backing wall and a supporting ledge therearound depressed below the surface of said backing wall, said frame being provided with register devices for registering a chase placed on said supporting ledge; a sensitized element holding frame also pivotally attached to said support to swing about the same axis as that of the first named frame whereby the two frames may be swung to and from face to face position, said sensitized element holding frame having a flexible backing wall and yieldable supporting means therefor, said frame being provided also with an air sealing element adapted to engage a chase when the latter is mounted on said supporting ledge and the two frames are brought in face to face position, to thereby provide a sealed-off area, said sensitized element holding frame having an air discharge passage communicating with said area.

6. In an apparatus of the character described, a printing element holding frame having a transparent flat backing wall and a supporting ledge located outwardly of and depressed below the surface of said backing wall, said frame being provided with registering means in said supporting ledge for the detachable reception, in registered-position, of a film chase having cooperable complemental registering means, said cooperable sets of means being of male and female formation, said frame being provided also with separate additional means for detachably retaining, always in the same position, a layout sheet posi-

tioned on said flat backing wall whereby said frame is adapted to support, simultaneously, a layout sheet and a superposed film chase in predetermined relation.

5 7. In an apparatus of the character described, the combination with a support; of a printing-element holding frame pivotally attached to said support, said frame having a transparent backing wall and a supporting ledge therearound
10 fixedly disposed below the surface of said backing wall, said frame being provided with register devices for registering a chase placed on said supporting ledge; a sensitized-element holding frame also pivotally attached to said support to swing
15 about the same axis as that of the first named frame, whereby the two frames may be swung to and from face to face position, said sensitized-element holding frame having a flexible backing wall and provided also with an air sealing element adapted to engage a chase when the latter
20 is mounted on said supporting ledge and the two frames are brought in face to face position, to thereby provide a sealed off area, one of said frames having also an air discharge passage communicating with said area.

25 8. In an apparatus of the character described, the combination with two frames, one having a transparent flat supporting surface to allow transmission of light therethrough and the other an opposed opaque supporting surface when the
30 two frames are in face to face position; of means for locking said two frames in face to face position always in the same relation to each other, register dowel pins on one of said frames adapted
35 to detachably receive a film chase having co-operable register dowel openings thereon; an air sealing gasket on the other of said frames and located thereon to engage a film chase when registered on that frame having the register
40 dowel pins and when the two frames are in locked face to face position, said sealing gasket co-operating with the film chase and film carried thereby to provide a sealed off area; one of said frames being provided also with an air discharge
45 passage communicating with said area.

9. In an apparatus of the character described, the combination with a support; of a printing-element holding frame movably connected to said support, said frame being provided with a transparent backing wall and provided outside of said
5 backing wall with register pins, two of the edges of said frame at right angles to each other constituting straight edges for cooperation with a T square for laying out a layout sheet; said frame being provided additionally, inwardly of said
10 register pins, with means for detachably securing a layout sheet on said transparent backing wall; a sensitized-element holding frame also movably mounted on said support and adapted to be brought in face to face relation with said printing-element frame; means providing an air seal
15 between said two frames when in face to face relation; and means for exhausting air from within the sealed off area.

10. A photographic printing apparatus comprising: a supporting framework including a
20 pair of spaced uprights; sensitized-element and printing-element holding frames; common pivot means attaching said frames to said framework whereby each of said frames, independently of
25 the other, is movable from a substantially horizontal position at one side of the uprights to a substantially horizontal position on the opposite side thereof; said printing-element holder having a transparent backing wall and a supporting
30 ledge therearound, said ledge being fixed with respect to said supporting surface and depressed therebelow, said ledge being provided with register dowel pins for the reception thereon of a film holding chase having co-operable register
35 dowel openings; said printing-element holding frame being provided with a flexible backing wall and an air sealing gasket therearound adapted to engage a film chase when the latter is registered on the printing-element holding frame and
40 the two frames are in face to face relation and thereby provide a sealed off area; and means for exhausting air from said sealed off area.

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