C. E. WELTMER.

PRINTING FRAME.

APPLICATION FILED APR. 26, 1908.

917,696.

Patented Apr. 6, 1909.

6 SHEETS—SHEET 1.

Fig 1

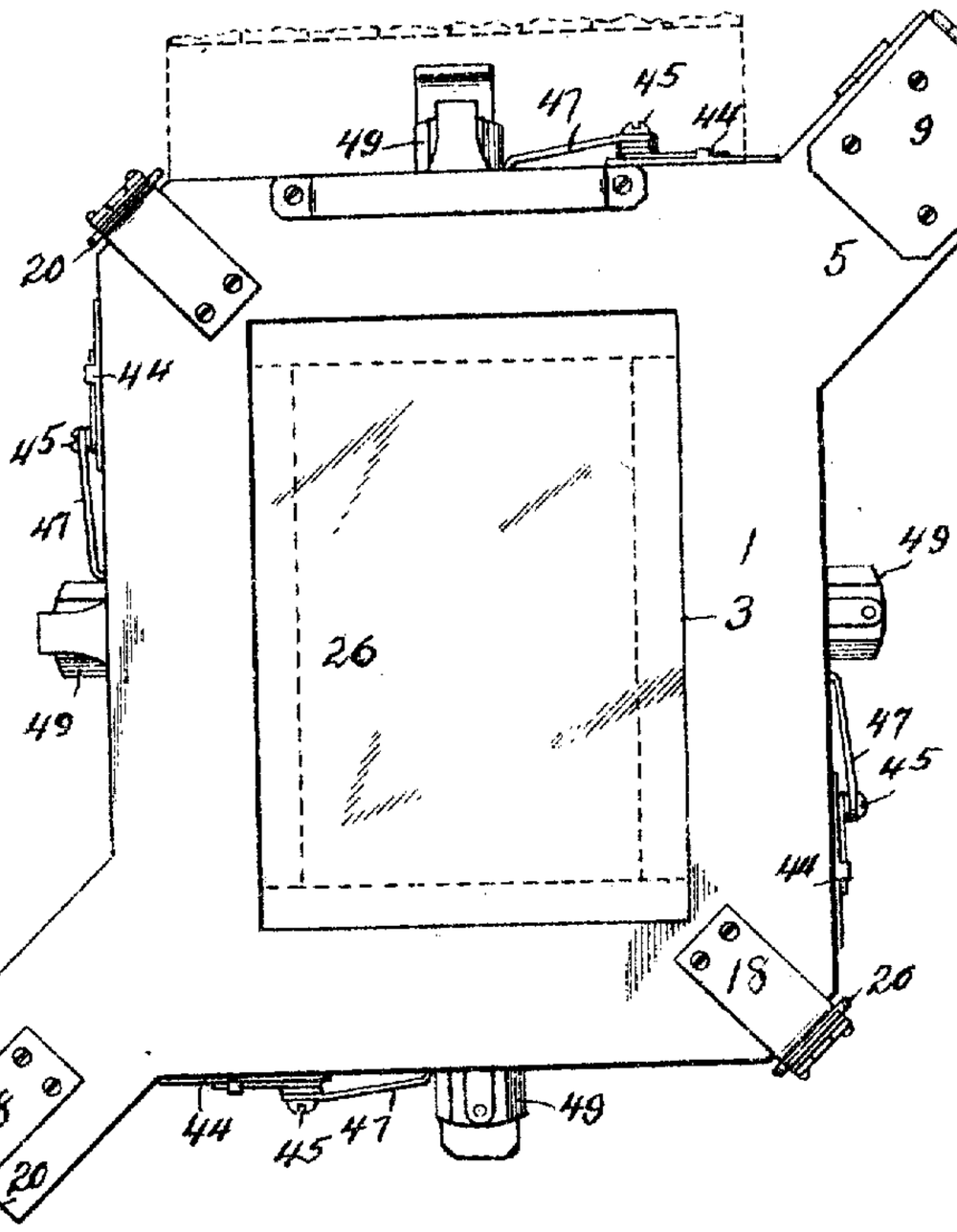


Fig 2

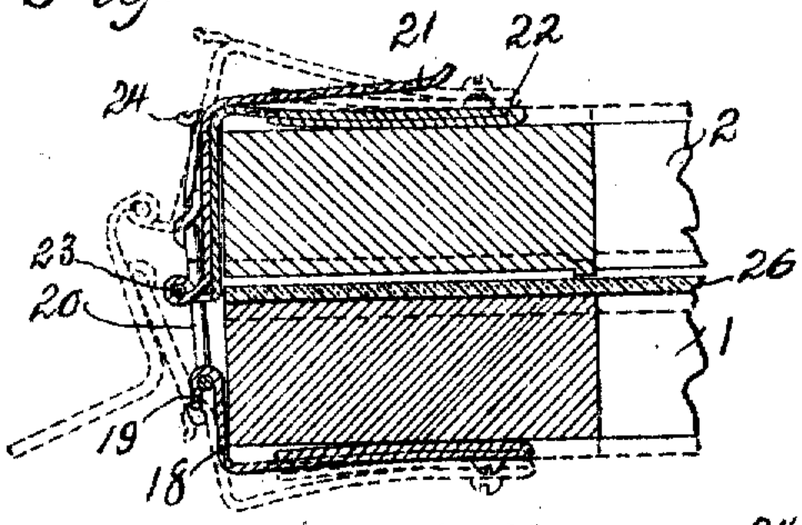


Fig 3

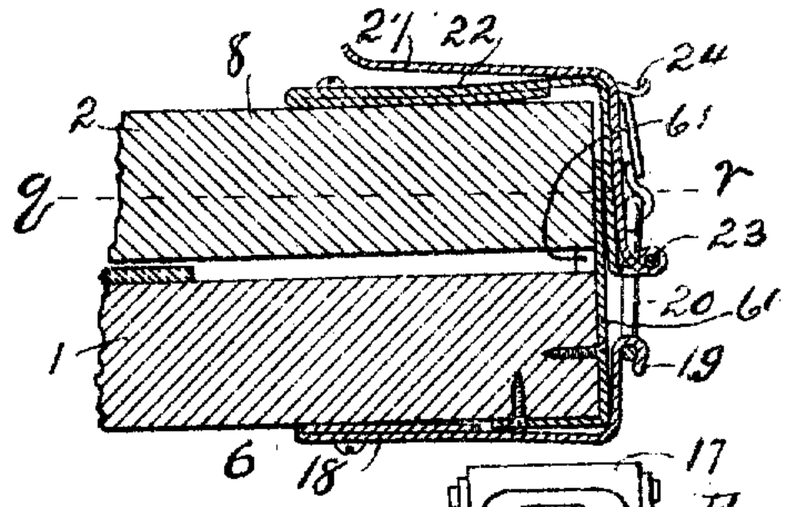


Fig 4

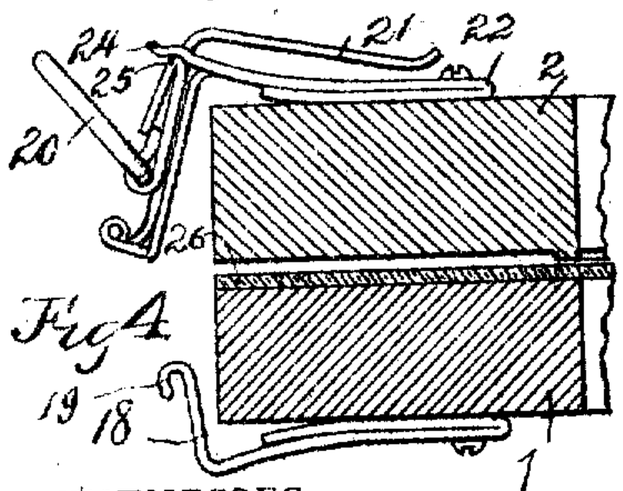


Fig 5

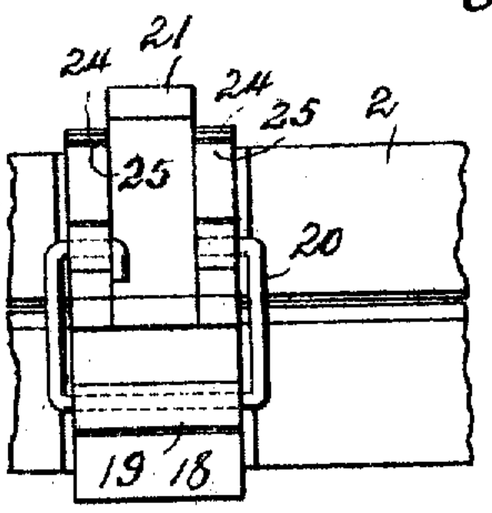
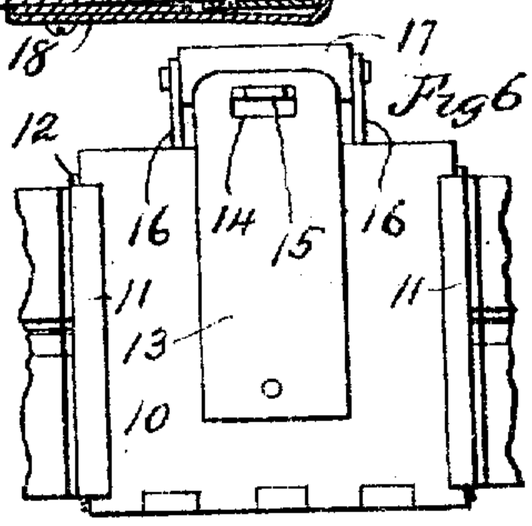


Fig 6



WITNESSES:

R. C. Hamilton.

E. B. House

INVENTOR.

C. E. Weltmer

BY Warren D. House.

His ATTORNEY.

C. E. WELTMER.

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5 SHEETS—SHEET 2.

Fig 7

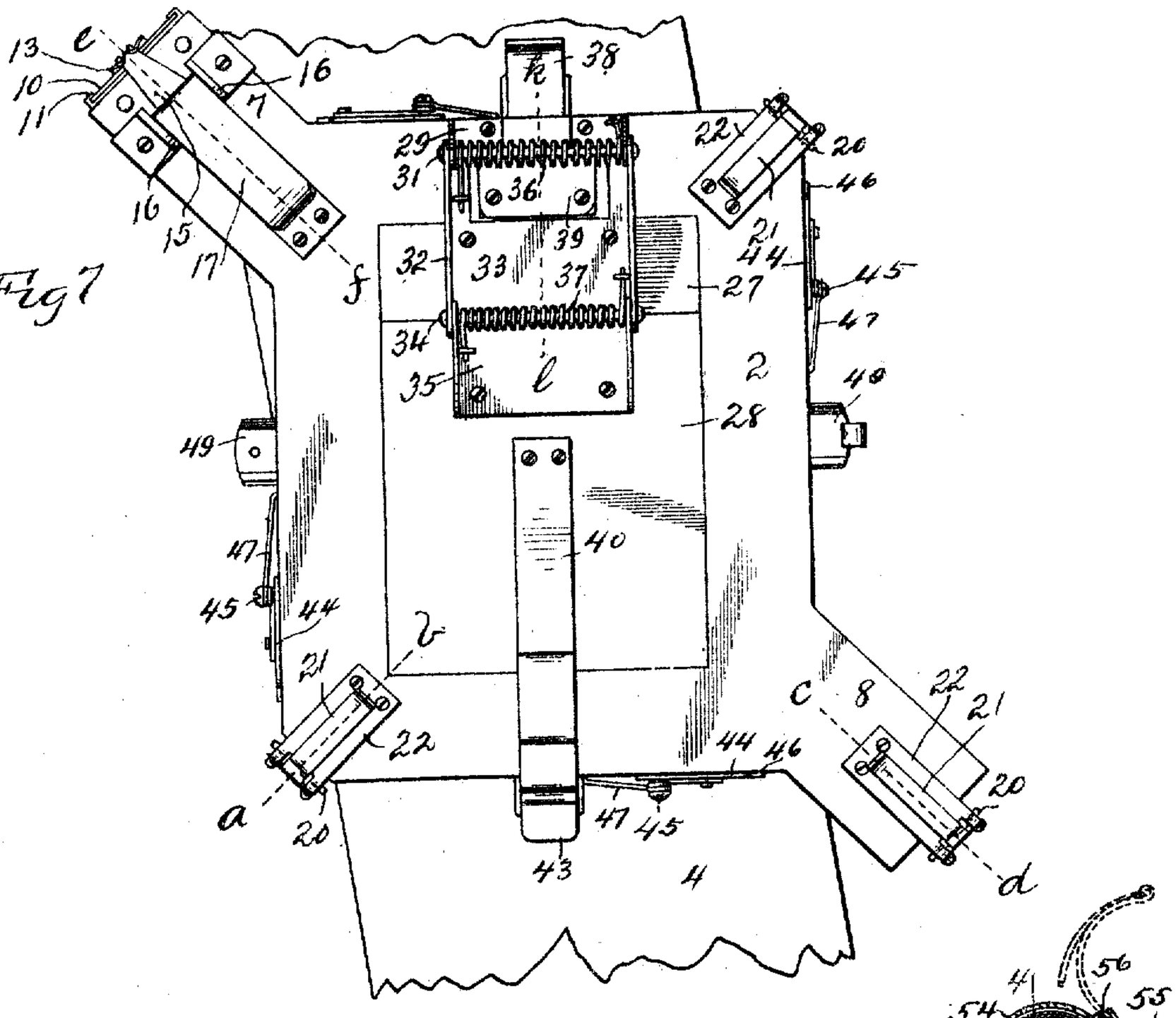
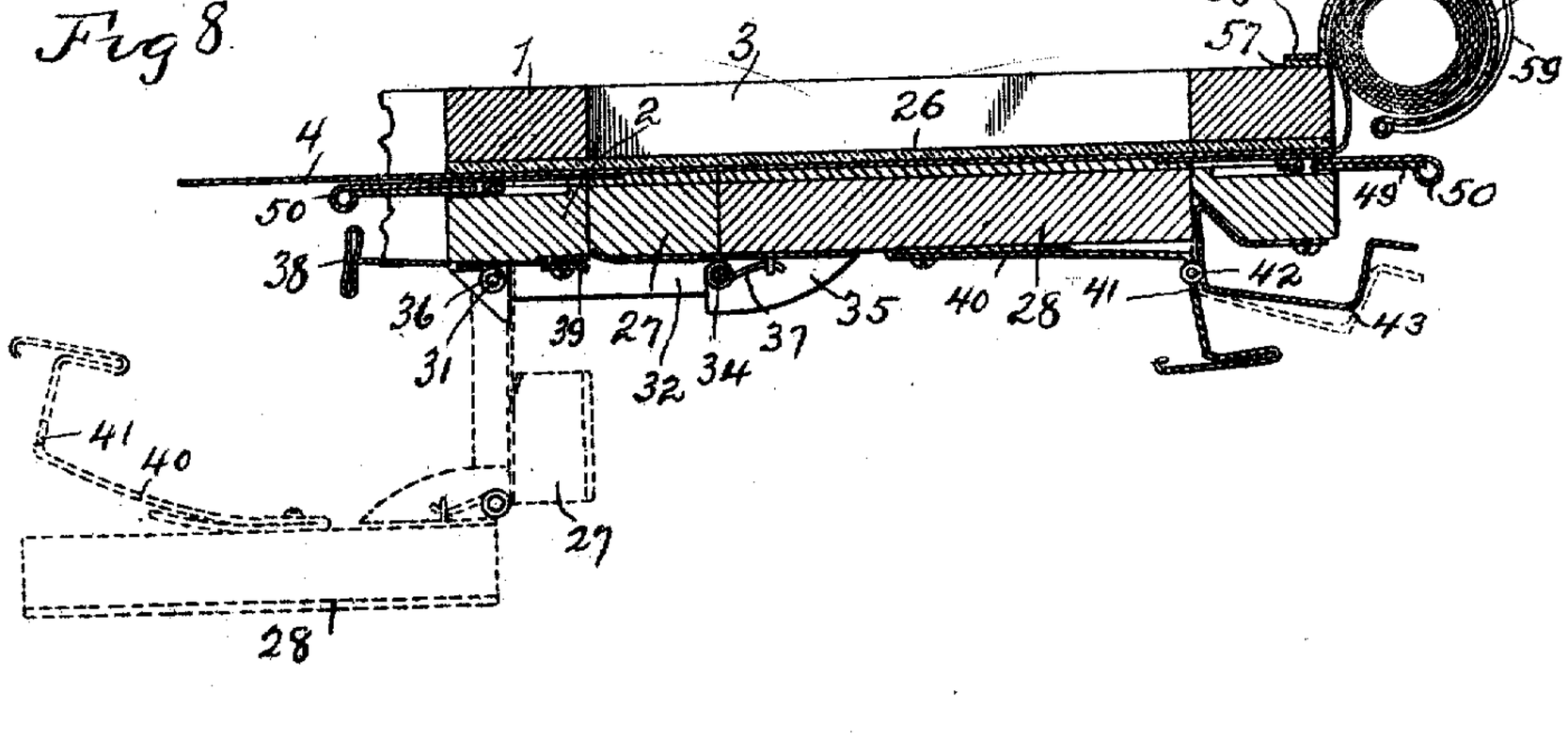


Fig 8.



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BY

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His ATTORNEY.

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5 SHEETS—SHEET 3.

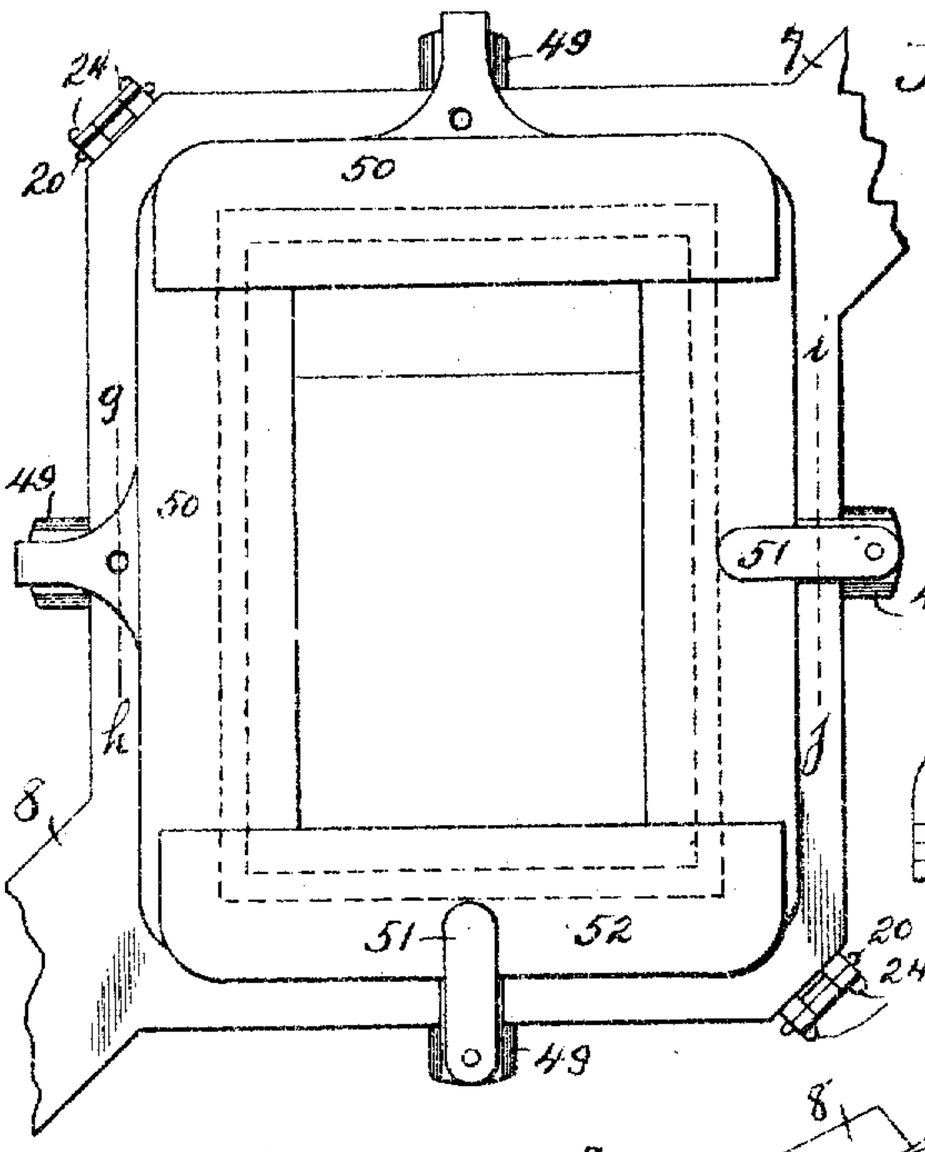

Fig 9

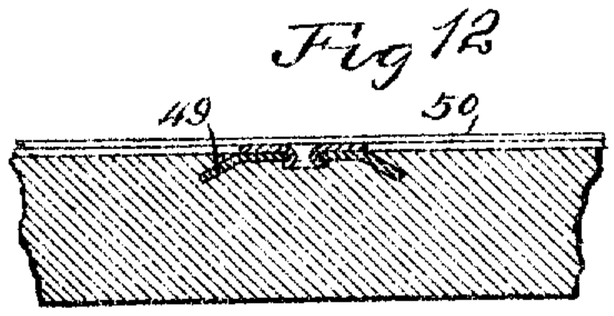

Fig 12

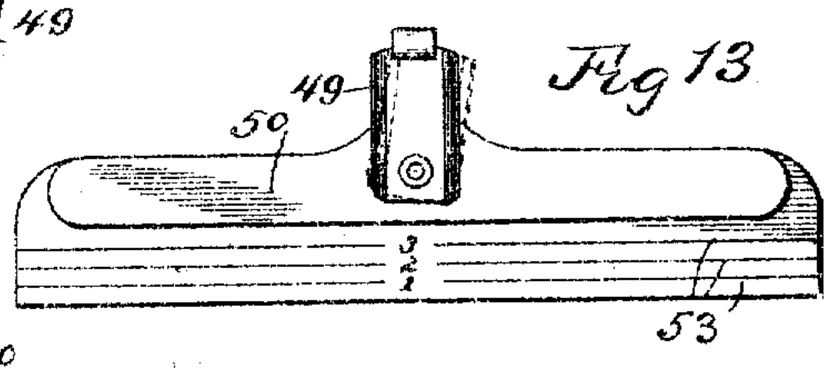

Fig 13

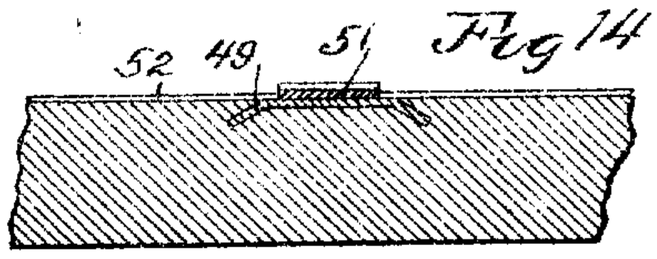

Fig 14

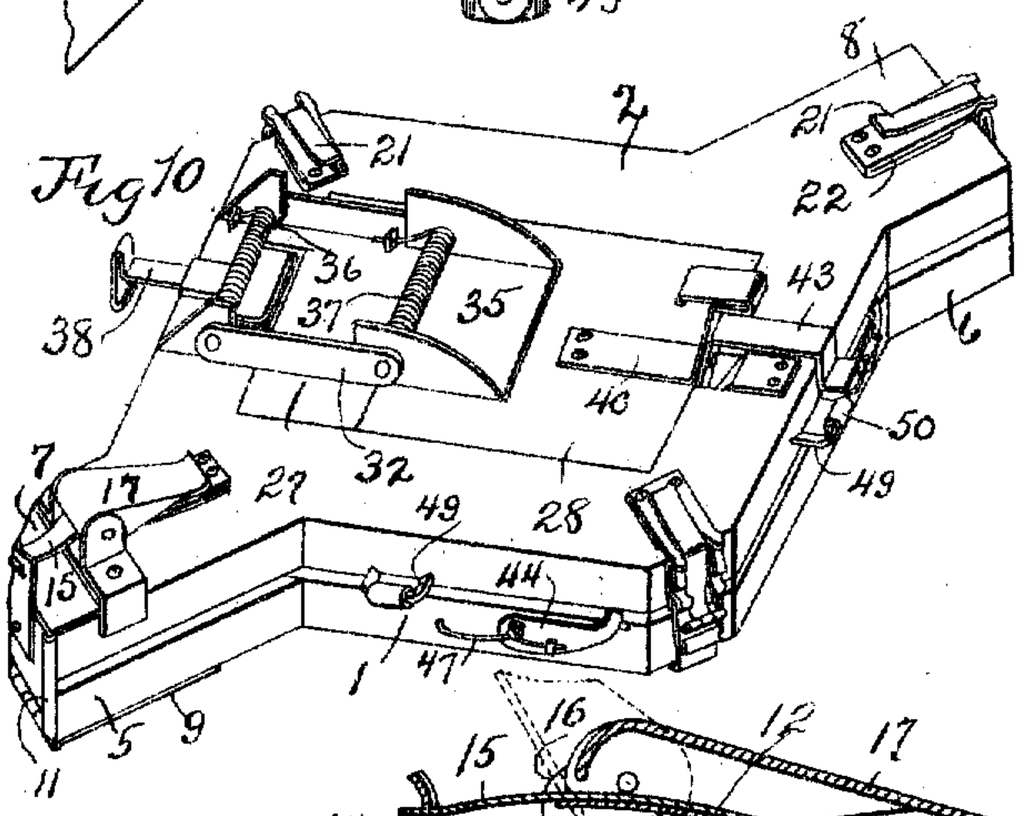

Fig 10

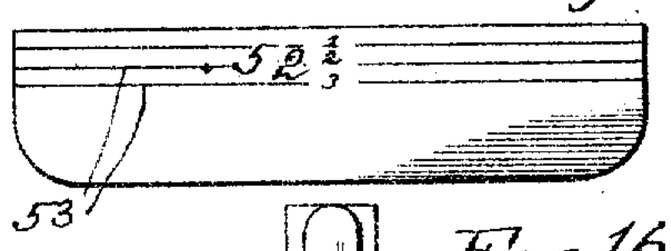

Fig 15

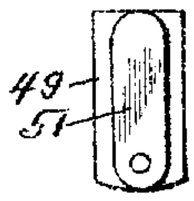

Fig 16

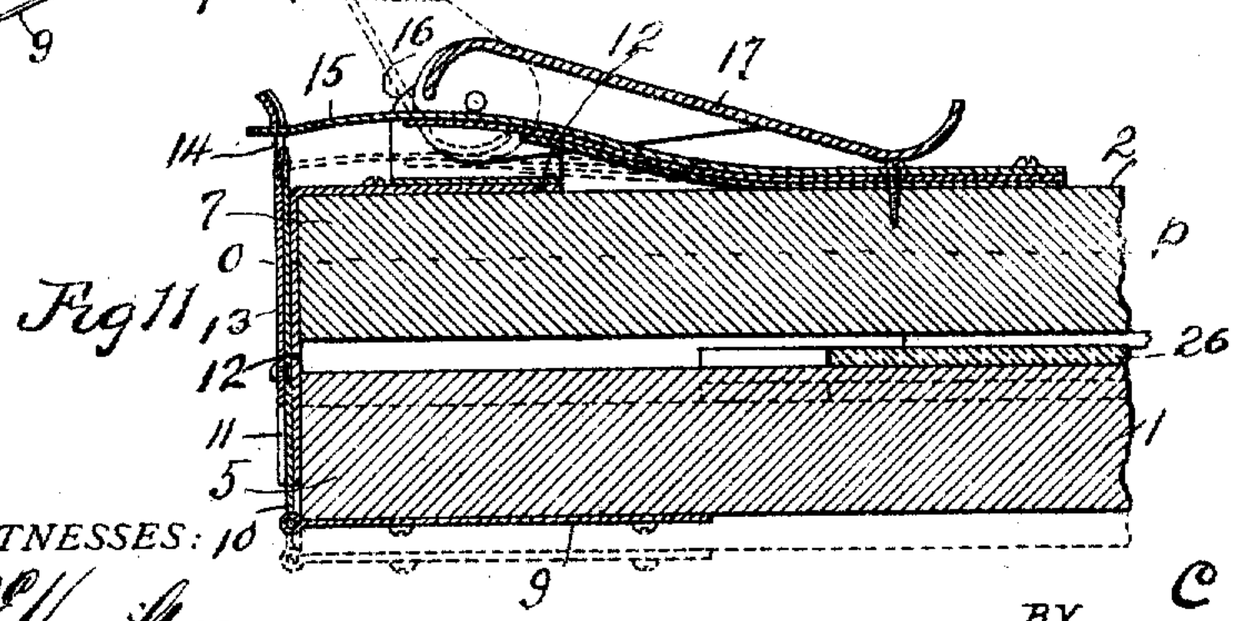

Fig 11

WITNESSES:

R. C. Hamilton.

E. B. House

INVENTOR.

C. E. Weltmer

BY Warren D. House.

His ATTORNEY.

C. E. WELTMER.

PRINTING FRAME.

APPLICATION FILED APR. 25, 1908.

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6 SHEETS—SHEET 4.

Fig 17

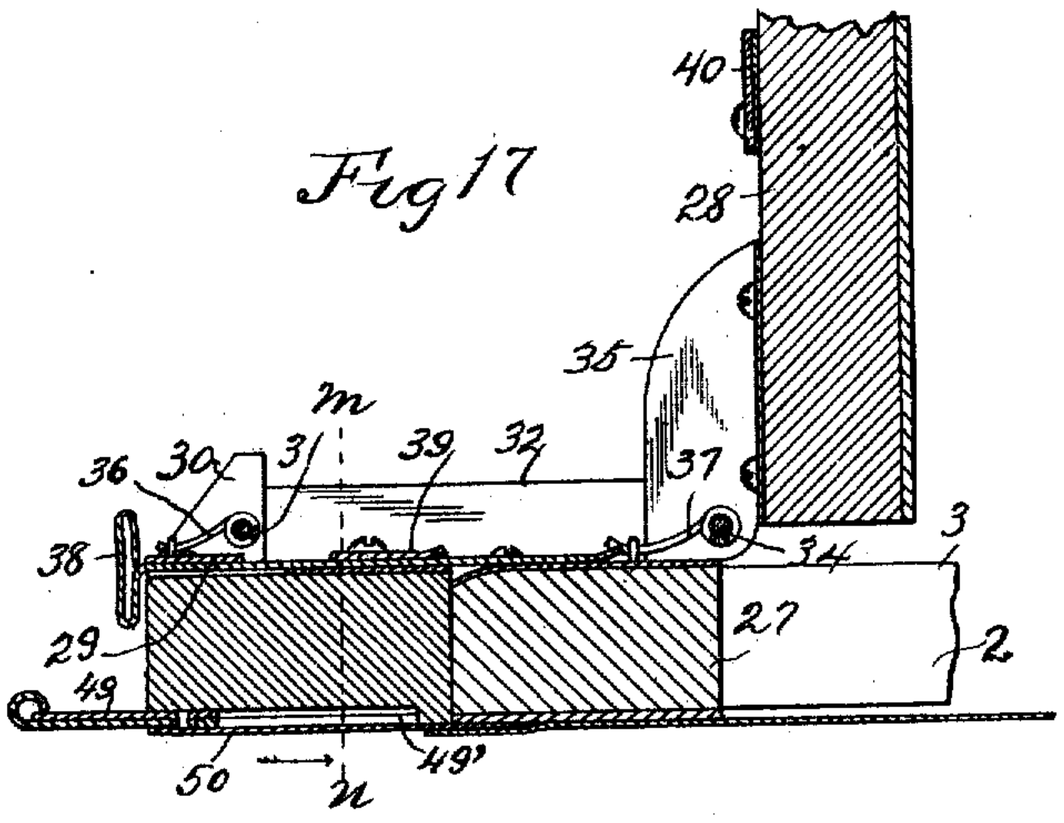


Fig 19

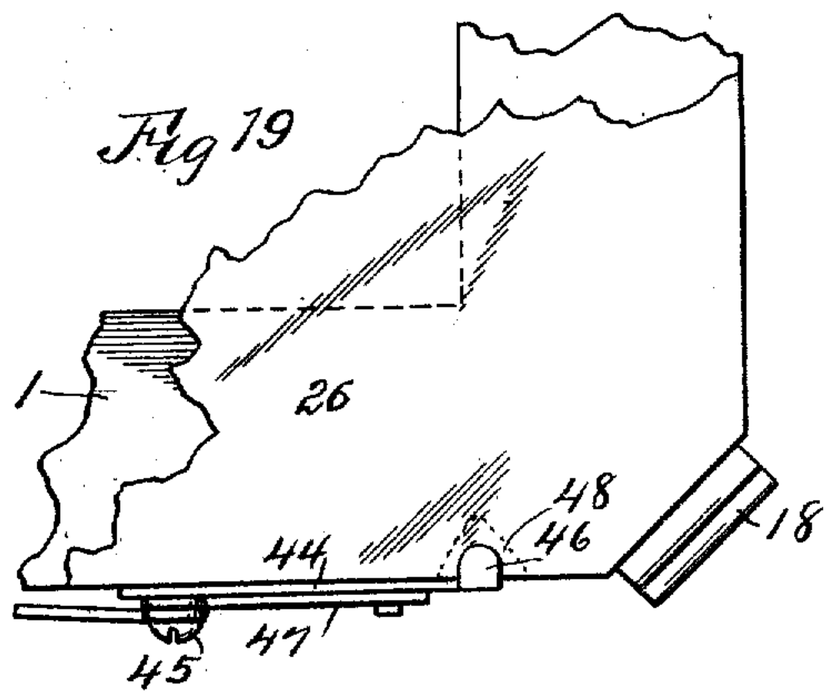


Fig 18

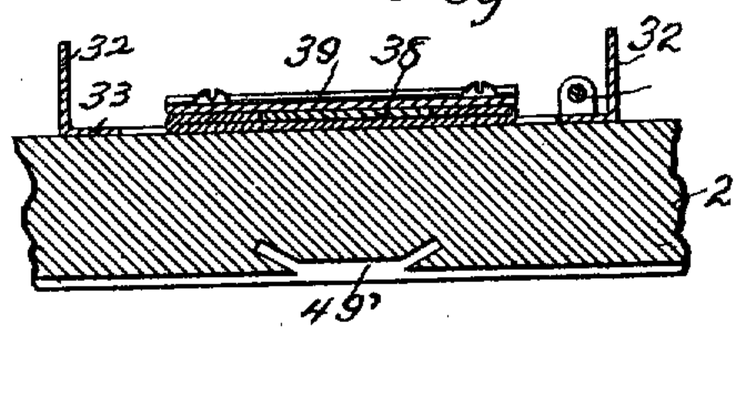


Fig 20

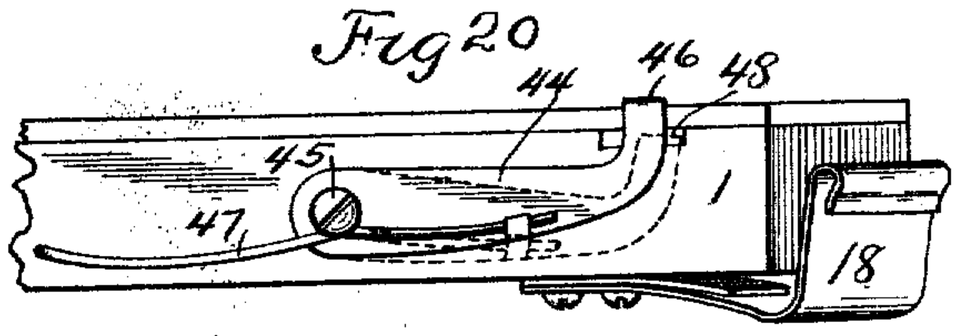


Fig 22

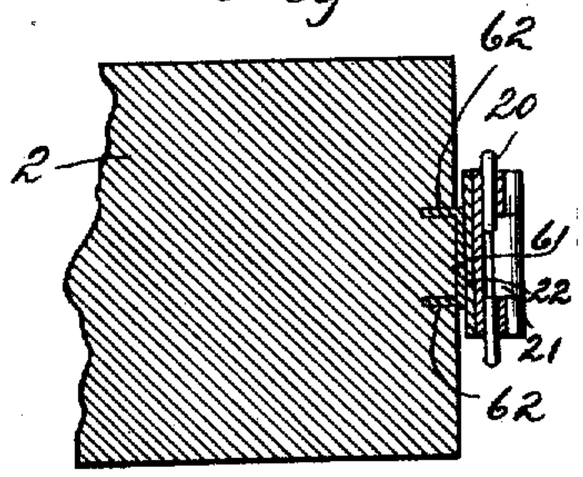


Fig 21

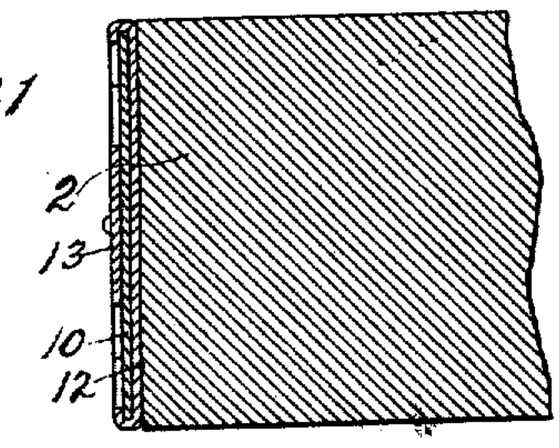
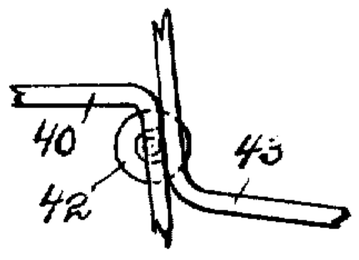


Fig 23



WITNESSES:

R. C. Hamilton.

E. B. House

INVENTOR.

C. E. Weltmer

BY

Warren D. House

His ATTORNEY.

C. E. WELTMER.

PRINTING FRAME.

APPLICATION FILED APR. 25, 1908.

917,696.

Patented Apr. 6, 1909.

5 SHEETS—SHEET 5.

Fig 24

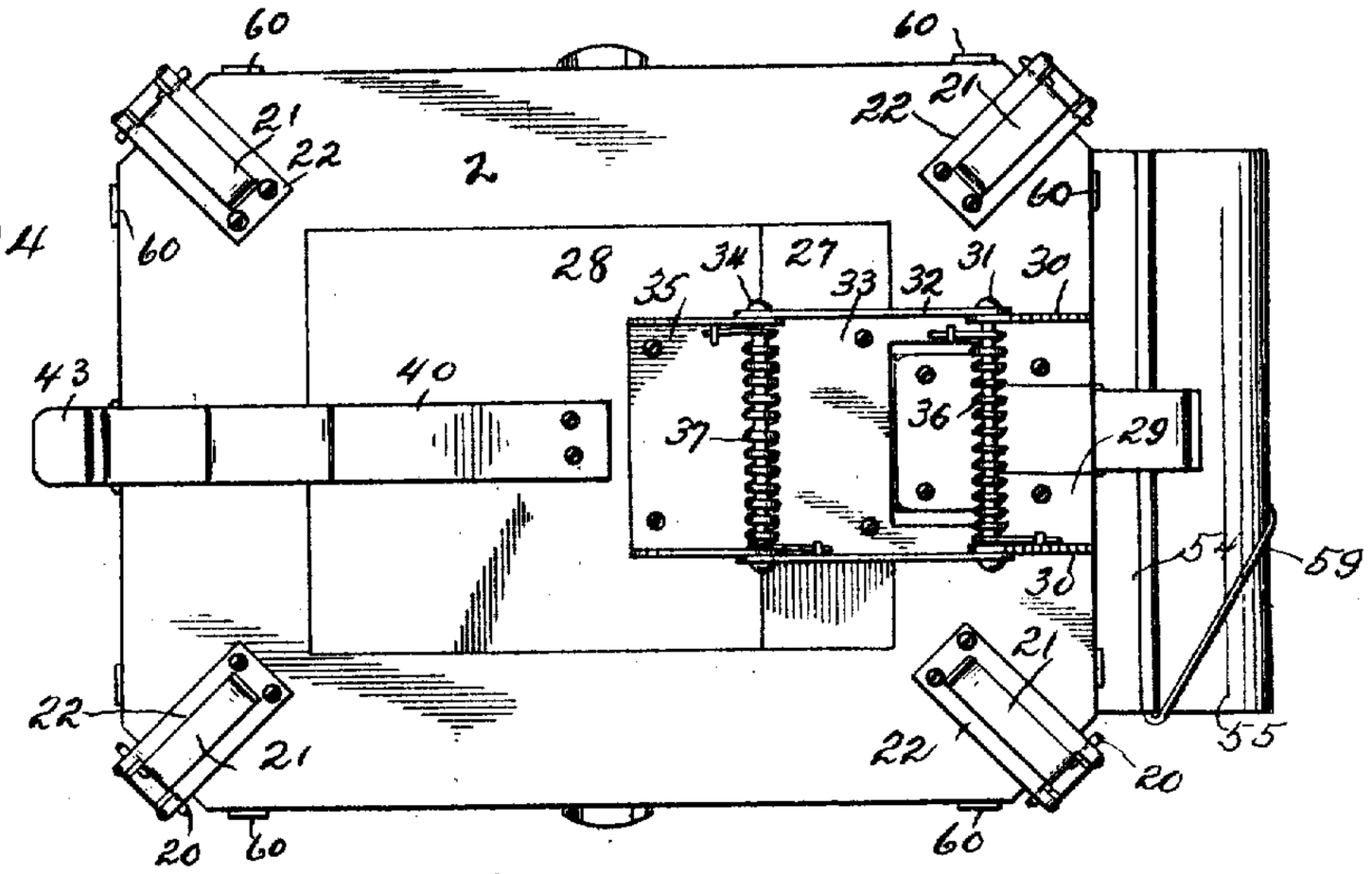


Fig 26

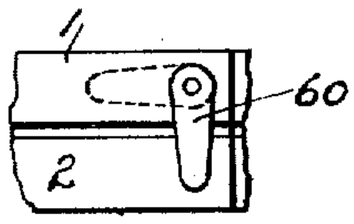


Fig 27

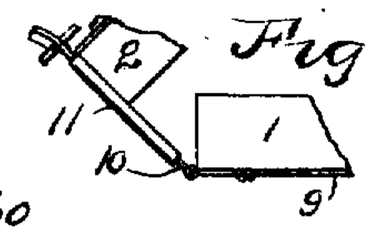
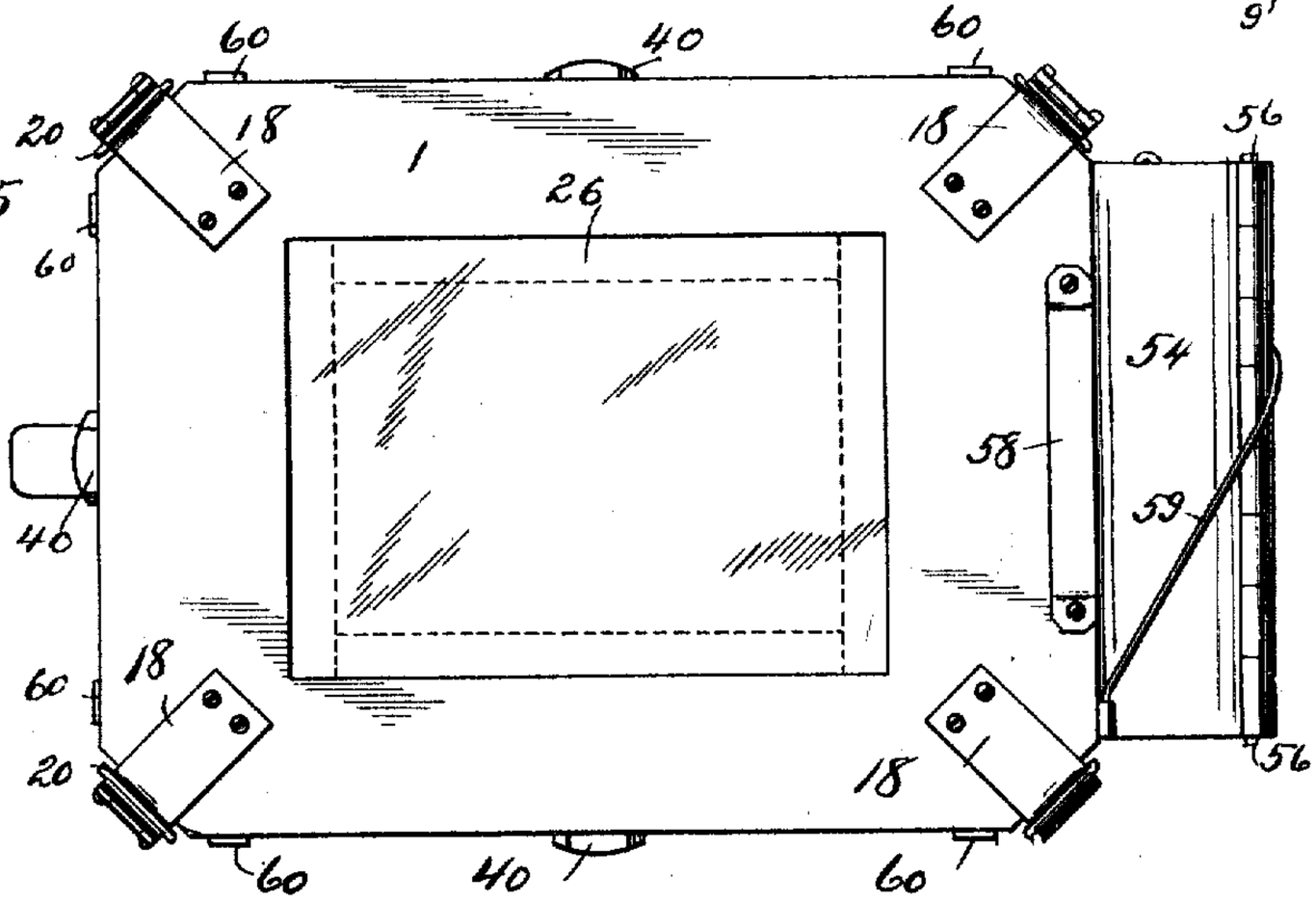


Fig 25



WITNESSES:

R. H. Hamilton.

E. B. Hause

INVENTOR.

C. E. Weltmer

BY

Warren D. House

His ATTORNEY.

UNITED STATES PATENT OFFICE.

CYRUS E. WELTMER, OF NEVADA, MISSOURI.

PRINTING-FRAME.

No. 917,696. Specification of Letters Patent. Patented April 6, 1909.

Application filed April 25, 1908. Serial No. 429,197.

To all whom it may concern:

Be it known that I, CYRUS E. WELTMER, a citizen of the United States, residing at Nevada, in the county of Vernon and State of Missouri, have invented certain new and useful Improvements in Printing-Frames, of which the following is a specification.

My invention relates to improvements in printing frames.

The object of my invention is to provide a construction of printing frame which will provide a wide range of adjustment in the frame of the plates or films containing the negatives of which prints are to be made.

My invention provides further, a frame comprising front and back members adapted to receive between them the negative plate or film, said members being releasably connected with each other by clamping means which permit the members to be moved apart without detachment from each other so that the adjustment of the negative may readily be obtained, said clamping means providing further, yielding means by which the two frame members may be forced toward each other so as to tightly clamp the negative.

My invention provides further, a frame comprising two members substantially rectangular in form, provided with clamping means located adjacent to the corners of the frame, whereby uncut films may have a wide range of adjustability in the frame, such as cannot be obtained by two-part frames which are otherwise connected with each other.

Another object of my invention is to provide a construction having one or more masks adjustable transversely across the printing opening in the frame and capable of pivotal movement relative to the frame whereby the mask can be adjusted to correspond with the position of the picture on the film or plate.

My invention provides further, a shutter comprising two members which are hinged to each other, one member being hinged to the frame, means being provided by which both members are normally and independently swung to the open position when the shutter is released from the locking device provided for holding it in the closed position. By means of this construction great rapidity is afforded in the making of duplicate prints.

My invention provides still further, novel means for locking the shutter in the closed position and by which the shutter is held tightly clamped against the print when in the closed position.

My invention provides further, a shutter hinged to the frame combined with means by which, when the shutter is released from the locking device, it will automatically swing from the closed to the open position and in the latter position fully clear the opening in the frame so that the sensitive sheets may be rapidly inserted and withdrawn from said opening.

Novel means are employed for clamping in the frame the transparent glass plate which is employed when printing from film negatives.

Other novel features of my invention are hereinafter more particularly described and claimed.

In the accompanying drawings illustrative of my invention, for the purpose of convenience the printing frame will be described as being disposed in a horizontal position.

Figure 1 is a plan view looking at the upper side of the front frame member. Fig. 2 is a vertical section taken on the dotted line *a*—*b* of Fig. 7 and showing one of the corner clamping devices represented in solid lines in the locked position and in dotted lines in the unlocked but not detached position. Fig. 3 is a vertical sectional view taken on the dotted line *c*—*d* of Fig. 7. Fig. 4 is a view similar to Fig. 2, the clamping device being shown in the disconnected position. Fig. 5 is an elevation of the clamping device shown in Fig. 2. Fig. 6 is an elevation of the hinge clamping mechanism shown in vertical section in Fig. 11 and by which the front and back frame members are slidably and pivotally connected with each other. Fig. 7 is a bottom view of the printing frame. Fig. 8 is a central, longitudinal vertical sectional view of the printing frame having mounted thereon a tubular film holder. In this view the shutter is shown in solid lines in the closed position and in dotted lines in the open position. Fig. 9 is a top view of the back frame member, portions of which are broken away, showing mounted thereon a plurality of masks and mask supports. Fig. 10 is a perspective view of my improved printing frame, with the back member shown disposed above the front member. Fig. 11 is a vertical sectional view, taken on the dotted line *e*—*f* of Fig. 7. Fig. 12 is a vertical sectional view taken on the dotted line *g*—*h* of

Fig. 9 and showing one of the masks pivoted to its support. Fig. 13 is a bottom view of one of the pivoted masks and its support. Fig. 14 is a vertical sectional view taken on the dotted line *i*—*j* of Fig. 9. Fig. 15 is a plan view of one of the masks which is detachable from its support. Fig. 16 is a plan view of one of the supports on which the detachable masks are mounted. Fig. 17 is a vertical section of a portion of the back frame and of the shutter, taken on a plane corresponding to the dotted line *k*—*l* of Fig. 7. In this view the shutter member which is hinged to the back frame, is shown locked in the closed position, the other shutter member being shown in the open position. Fig. 18 is a vertical section taken on the dotted line *m*—*n* of Fig. 17. Fig. 19 is a plan view of the underside of a portion of the top or front frame member having a transparent plate, a portion of which is shown, clamped thereto. Fig. 20 is an elevation of what is shown in Fig. 19. Fig. 21 is a horizontal section taken on the dotted line *o*—*p* of Fig. 11. Fig. 22 is a horizontal section taken on the dotted line *q*—*r* of Fig. 3. Fig. 23 is an enlarged detail view of a portion of one of the shutter locking devices. Fig. 24 is a bottom view of a modification of my invention in which the four clamping devices at the corners of the frame all correspond in construction to the clamping device shown in Figs. 2 and 4. Fig. 25 is a top view of the modified construction which is shown in Fig. 24. Fig. 26 is an elevation of the guide employed in the form shown in Figs. 24 and 25. Fig. 27 is a detail elevation of a portion of the frame shown swung to the open position.

Similar characters of reference denote similar parts.

1 and 2 denote the front and back members of the printing frame. These members are preferably of substantially rectangular shape, and are provided each with a rectangular opening 3 across which is adapted to extend a negative plate or film 4, as shown in Figs. 7 and 8.

The frame members 1 and 2 are detachably connected with each other, preferably at the four corners of the frame, by releasable clamping devices, by which the frame members 1 and 2 may be forced apart, as shown in dotted lines in Fig. 2, to permit the adjustment of the film or negative plate to its proper position between the frame members. The clamping devices each further provide means by which the two frame members 1 and 2 may, after the negative is properly adjusted, be forced toward each other and thereby clamp between them with a yielding pressure, the film or negative plate.

The frame clamping devices at the corners of the frame may all be alike in construction, as shown in the modification in Figs. 24 and 25, or these devices may be of different construction, as shown in other figures of the drawing.

In the preferred form of my invention, such as is illustrated in Figs. 1 and 7, the front member 1 is provided at diagonally opposite corners with diagonal projections 5 and 6. The back member at corresponding corners is provided with similarly disposed projections 7 and 8. The corner projection 5 of the front member 1 is hinged to the projection 7, and a releasable locking and clamping device connects the projections 6 and 8.

Referring particularly to Figs. 6, 7 and 11, 9, denotes the leaf of a hinge secured to the upper side of the front member 1. The other leaf 10 of the hinge is slidably mounted in vertical guides 11 provided at opposite edges of a right angled plate 12, the horizontal portion of which is secured to the under side of the projection 7 of the member 2. Secured to the outer side of the leaf 10 is a vertical resilient plate 13, the upper end of which may be swung toward and from the member 2 and is provided adjacent its upper end with a hole 14 in which normally rests the outer end of a flat spring plate 15, the inner end of which is secured to the under side of the back member 2, when said member is disposed in its operative position below the member 1, as shown in Fig. 8. The tension of the spring 15 is such that normally its outer end bears upwardly against the spring plate 13, thereby exerting a pressure tending to force the members 1 and 2 toward each other, or to the position shown in solid lines in Fig. 11. The horizontal portion of the plate 12 is provided with two vertical ears 16 between which is pivoted a horizontal lever 17 adapted to be swung to a position, as shown in dotted lines in Fig. 11, in which it will force the spring 15 against the opposite side of the recess or hole 14, thereby forcing the plate 13 and leaf of the hinge 10 in a direction such that the members 1 and 2 will be forced apart, as shown in dotted lines in Fig. 11. When the lever 17 is swung to the position shown in solid lines in Figs. 7 and 11 it will not bear on the spring 15 and said spring will therefore exert a pressure tending to force the members 1 and 2 toward each other as already described.

I will now describe the clamping device, such as is disposed at each of the other three corners of the printing frame, and such as is provided at all four corners of the modified form of my invention, shown in Figs. 24 and 25.

To the outer or top side of the member 1 is secured one end of a substantially right angled spring plate 18 provided at its free end with an outwardly turned hook 19 adapted to receive therein a link, of rectangular form, denoted by 20 and best shown in Figs. 2, 4 and 5. The link 20 is pivoted to a rec-

tangular lever 21, said lever being pivoted to the free end of a substantially right angled plate 22 of resilient material and which at its other end is secured to the outer or under side of the back member 2. The spring plates 18 and 22 are adapted to be drawn toward each other by the link 20 and lever 21 to the position shown in solid lines in Figs. 2 and 3, when the link 20 is engaged in the hook 19 of the plate 18 and the lever 21 is swung to the closed position shown in solid lines in said figures. In this position the lever 21 bears against the outer side of the horizontal portion of the spring plate 22 and the link 20 is swung to a position at the inner side of the pintle 23 which connects the lever 21 with the plate 22. In this position the tension of the spring plates 18 and 22 will cause the link 20 to retain the lever in the locked position.

In order to more securely hold the lever 21 in the closed position shown in Figs. 2 and 3, the plate 22 at its angle is provided with two outwardly extending projections 24 having concave inner sides adapted to receive and hold respectively two lateral shoulders 25 provided at opposite edges of the lever 21 when said lever is swung to the closed position, shown in Fig. 5.

The hook 19 of the plate 18 is of a width such that the link 20 must be forced into it with considerable force when the link is made to engage said hook. This construction is provided so that when the lever 21 is swung to the open position, shown in dotted lines in Fig. 2, the link 20 is still in engagement with the hook 19. When the lever is so swung, the members 1 and 2 will be forced apart to the positions shown in dotted lines in Fig. 2, thereby permitting the adjustment between them of the negative plate or film. Thus by swinging the lever 21 to the closed and open positions the members 1 and 2 may be forced toward and from each other. The plates 18 and 22 being resilient will, when the lever is swung to the closed position, exert a yielding pressure by which the members 1 and 2 are clamped to the negative plate when used, and to the glass plate 26 and film 4 when a film is employed.

When for any purpose it is desired to detach the members 1 and 2 from each other, this may be done by swinging each lever 21 to the position shown in dotted lines in Fig. 2 and then forcing the link 20 out of the adjacent hook 19. The parts will then be in the position shown in Fig. 4. In this position, it will be noted, the parts of the clamping device are positioned so as not to interfere with the free insertion of a plate or film between the members 1 and 2. To completely detach the members 1 and 2 from each other, the spring plate 13 is swung outwardly so that the spring 15 is cleared from engagement with said plate, thus permitting the leaf 10 of the hinge to be slid out of engagement with the guides 11 of the plate 12.

The following is a description of the shutter mechanism employed to secure the prints or sensitized paper in position in the opening 3 of the frame member 2.

The shutter comprises two members 27 and 28 hinged to each other, the member 27 being hinged to the member 2 at one side of the opening 3 therein. Means are provided for normally forcing the shutter members both to the open position, shown in dotted lines in Fig. 8, suitable locking means hereinafter described being provided for independently locking each shutter member in the closed position shown in solid lines in Fig. 8.

Secured to the outer or under side of the member 2 is a U shaped plate 29 to the vertical arms 30 of which are pivoted by a rod 31, horizontally disposed, the two vertical arms or flanges 32 respectively of a U shaped plate 33 the horizontal portion of which is secured to the outer side of the shutter member 27. The flanges 32 are pivoted by a horizontal rod 34 to corresponding flanges provided vertically on a U shaped plate 35 the horizontal portion of which is secured to the outer side of the shutter member 28. A coiled spring 36 encircles the rod 31 and has one end secured to the plate 29, the other end being secured to the plate 33. The tension of the spring 36 is such as will cause it to exert a pressure tending to swing the shutter member 27 to the open position.

A coiled spring 37 encircles the rod 34 and has one end secured to the plate 33, the other end being secured to the plate 35. The tension of the spring 37 is such that it will exert a pressure tending to force the shutter member 28 to the open position. The spring 36 is weaker than the spring 37, so that when the shutter is moved to the closed position, the member 27 will always be swung first to the closed position so as to clamp the sensitive sheet for making the print in its position.

To independently lock the member 27 in the closed position irrespective of the position of the member 28 an inwardly and outwardly slidable spring plate 38 is mounted upon the outer side of the member 2 at the inner side of the plate 29 and at the inner side of a horizontal plate 39 secured to the outer side of the member 2. The spring plate 38 is slidable to and from the position shown in Fig. 17, in which position it is disposed at the outer side of and securely holds the shutter member 27 in the closed position. By withdrawing the spring plate 38 to the position shown in Fig. 8, the shutter member may be swung automatically to the open position shown in dotted lines in Fig. 8.

For locking the shutter member 28 in the closed position, the following described mechanism is preferably employed.

Referring to Figs. 7, 8 and 23, 40 denotes

a flat spring secured at one end to the under or outer side of the shutter member 28. The spring 40 has a vertical portion provided with a hole or recess 41 adapted, when the shutter is swung to the closed position to receive and lockingly engage a roller 42 rotatively mounted on the inner side of the vertical portion of a spring 43 which is secured to the member 2. The tension of the springs 40 and 43 is such that the roller 42 will automatically enter the hole or recess 41 when the shutter is moved to the closed position.

By moving the spring 43 to the position shown in dotted lines in Fig. 8, the roller 42 will be released from the spring 40 after which the springs 36 and 37 will cause the shutter members 27 and 28 to swing to the open position shown in dotted lines in Fig. 8. A roller 42 is preferably employed for the reason that it will readily engage and disengage with the spring 40.

For securing the transparent glass plate 26 in position on the inner side of the frame member 1, four vertical plates 44 are pivoted respectively on four horizontal screws 45 secured respectively in the four vertical outer edges of the member 1.

Each plate 44 is provided with an inwardly horizontally turned lip 46 adapted to rest upon the top of the glass plate 26 to secure the same in position. The plates 44 are respectively forced to the position shown in Fig. 20 by four springs 47 each mounted on a screw 45 and having one end secured to the member 1 and the other end secured to the adjacent plate 44. The tension of the springs 47 is such that the plates 44 will be swung to the position shown in dotted lines in Fig. 20, when the plate 26 is absent, the lips 46 entering recesses 48 provided therefor in the upper side of the member 1, as shown in Figs. 19 and 20.

Two styles of masks are provided for covering such portions of the negative as it is desired not to print.

Four horizontal plates 49 are slidable toward and from the opening 3 of the member 2 in four grooves 49′ provided respectively in the four vertical outer edges of the member 2 adjacent the upper side of said member. To some of the plates 49 are pivoted horizontal flat masks 50 which may be swung in a horizontal plane to suitable positions relative to the picture on the negative. Other of the plates 49 have each secured to it a flat spring plate 51 adapted to clamp to the plate a detachable mask 52, shown in Figs. 9, 14 and 15.

The sides of the masks 50 and 52 next the shutter members 27 and 28 are preferably provided with longitudinal parallel lines 53 adapted to register with the adjacent side of the opening 3 of the member 2. Adjacent to these lines are indicating characters, preferably numerals for guiding the operator in adjusting the masks inwardly and outwardly.

In Figs. 8, 24 and 25 is shown an improved form of roll film holder comprising two arcuate members 54 and 55 which are hinged by a longitudinal pintle 56 to each other, the member 54 having at one edge a laterally turned longitudinal lip 57 adapted to snugly fit in a recess provided between the member 1 and a plate 58 secured thereto. A spring 59 has one end secured to the outer side of one member and the other end secured to the other member. The tension of said spring is such that the member 55 will normally be swung to the closed position shown in Fig. 8. In this position a longitudinal space will be provided between the two members through which the film 4 may pass. When it is desired to place an uncut film or roll in the roll holder, the plate or member 55 is swung to the position shown in dotted lines in Fig. 8, the film placed therein, after which the spring 59 will force the member 55 to the closed position in which it will lie in the same circle as the member 54.

In operating my invention the levers 21 and the lever 15 are swung to positions in which the frame members 1 and 2 will be forced apart. The film or negative plate is then inserted between the members and adjusted laterally and endwise to the position desired. The shutter members 27 and 28 are moved to the open position so that the operator may look through the negative so as to obtain the adjustment with exactness. When the film or plate is properly positioned, the levers 21 and 15 are swung so as to move the members toward each other so as to tightly clamp the negative in position.

The negative is positioned with regard to the fact that the prints should always be placed in the frame with one end and one side edge always against one end and side of the opening 3 in the member 2.

The negative having been positioned and clamped, the sensitive sheets from which the duplicates are made are successively inserted in the opening 3 of the member, 2, the shutter closed and locked and the print then made in the usual manner.

When it is desired to inspect the print without removal from the frame, the plate 38 is moved to the position shown in Fig. 17, thus holding the member 27 in the closed position. The shutter member 28 is then swung to the open position, which permits the print to be inspected.

By providing the members 1 and 2 with the diagonally opposite projections 5 and 6 and 7 and 8 and mounting the clamping devices thereon, a wide range of adjustment laterally is provided for uncut films, which may be disposed at an angle to the printing frame as shown in Fig. 7. By disposing the

clamping devices which connect the members 1 and 2 adjacent to the corners, much wider range of adjustment may be given the film than is possible with the clamping devices otherwise disposed.

In the modified form shown in Figs. 24 and 25 the projections at diagonally opposite corners of the members 1 and 2 are omitted, and all of the clamping devices for holding together the members 1 and 2 are alike. Otherwise the modified form corresponds in construction with the other form of my invention, excepting that in the modified form different means are employed to keep the members 1 and 2 in register at the openings 3. In the modified form shown in Figs. 24 and 25, vertical guides comprising plates 60 are pivoted to the four outer edges of the member 1. These plates are adapted to engage the adjacent edges of the member 1 when the members are attached to each other. The plates 60 may be swung to horizontal positions, shown in dotted lines in Fig. 26 to permit the insertion of a plate or film.

In the other form of my invention a vertical U shaped plate 61 is secured at its lower end to the projection 6 of member 1 and is adapted to enter grooves 62 provided in the projection 8 of the member 1. The plate 61 serves to keep the openings 3 of members 1 and 2 in alinement.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a printing frame, the combination with front and back frame members, of releasable securing means for detachably connecting said frame members, said securing means having means by which said members may be forced toward or from each other.

2. In a printing frame, the combination with front and back frame members, of releasable means for detachably connecting said frame members with each other, said securing means having means by which the frame members may be forced toward each other with a yielding pressure or forced apart from each other without disconnection.

3. In a printing frame, the combination with front and back frame members, of means for detachably securing said members together, said securing means having means for forcing said members either toward or from each other, and guiding means by which said members are retained in proper register with each other.

4. In a printing frame, the combination with front and back frame members, of pivotal means for hinging said members together, and locking means for forcing said members either toward or from each other, said pivotal means also having means by which the members may be forced toward and from each other.

5. In a printing frame, the combination with front and back frame members, of yielding pivotal means for hinging said members together, said pivotal means having means for forcing said members toward each other with a yielding pressure and having means for forcing said members apart from each other, and locking means having yielding means for forcing said members toward each other and provided with means for forcing said members apart.

6. In a printing frame, the combination with front and back frame members movable toward and from each other, of pivotal means for detachably hinging said members together, said pivotal means having means for normally forcing said members toward each other with a yielding pressure, and provided also with means for forcing said members apart without disconnecting them.

7. In a printing frame, the combination with front and back frame members, of pivotal means for detachably hinging said members together, said pivotal means having means for normally forcing said members toward each other with a yielding pressure, and provided with means for forcing said members apart, and locking means for detachably connecting said members and having means for normally forcing said members toward each other with a yielding pressure and provided also with means for forcing said members apart.

8. In a printing frame, the combination with front and back frame members, of a hinge one leaf of which is secured to one member, a member slidable on the other leaf toward and from the pintle of the hinge, a spring mounted upon the other frame member for reciprocating said slidable member on the hinge leaf upon which it is mounted, the tension of the spring normally forc' it in one direction, and means for forcing said spring in the opposite direction.

9. In a printing frame, the combination with front and back frame members, of a hinge having a leaf secured to one frame member, a member slidable on the other leaf toward and from the pintle of the hinge, a spring upon the other frame member for reciprocating said slidable member, the tension of the spring normally forcing said slidable member in one direction, and a lever for moving said spring in opposition to its tension to force said slidable member in the opposite direction.

10. In a printing frame, the combination with front and back frame members, of two clamping members, one of which is resilient, secured respectively to said members, a lever hinged to one of said clamping members, and a link mounted on said lever for engaging the

other clamping member and by which, when the lever is swung in one direction, the front and back members are forced with a yielding pressure toward each other, and when the lever is swung in the opposite direction the front and back members are forced apart.

11. In a printing frame, the combination with front and back frame members, of two clamping members, one of which is resilient, secured respectively to said members, a lever hinged to one of said clamping members, and a link carried by said lever and releasably engaging the other clamping member by which, when the lever is swung in one direction, the front and back members will be forced in one direction and when the lever is swung in the other direction the front and back members will be forced apart.

12. In a printing frame, the combination with front and back frame members, of two clamping members secured respectively thereto, a lever pivoted to one of said clamping members, said clamping member having means for releasably holding said lever in the locked position, and a link carried by said lever and engaging the other clamping member and by which, when the lever is swung to the locked position, the front and back members will be forced toward each other, and when the lever is swung in the opposite direction or to the unlocked position, the front and back members will be forced apart.

13. In a printing frame, the combination with front and back frame members, of two clamping members, one of which is resilient, secured respectively thereto, a lever pivoted to one of said clamping members, and a link carried by said lever and engaging the other clamping member by which, when the lever is swung to and from the locked position, the frame members will be forced toward and from each other, the position of said link when the lever is in the locked position being disposed in a position in which the tension of the resilient member will tend to retain said lever in the locked position.

14. In a printing frame, the combination with front and back frame members, of two clamping members, one of which is resilient, secured respectively thereto, a lever pivoted to one of said clamping members and having means for being releasably retained thereby in the locked position, and a link carried by said lever and normally releasably engaging the other clamping member, by which, when the lever is swung to and from the locked position, the frame members are respectively moved toward and from each other, said link, when the lever is in the locked position, being disposed in a position such that the resilient clamping member will exert a pressure tending to retain said lever in the locked position.

15. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape, of a plurality of clamping means connected respectively to one of said members adjacent to diagonally opposite corners and connected respectively to corresponding corners of the other frame member.

16. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape and provided each with an opening therethrough across which a negative is adapted to extend, of guiding means connecting said frame members by which said openings are retained in register with each other, and a plurality of clamping means secured respectively to one frame member adjacent to diagonally opposite corners thereof and connected respectively with the opposite frame member adjacent to corresponding corners.

17. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape and provided each with an opening therethrough across which a negative is adapted to extend, of guiding means connecting said frame members by which said openings are retained in register with each other, and a plurality of clamping means secured respectively to one frame member adjacent to diagonally opposite corners thereof and connected respectively with the other frame member adjacent to corresponding corners, each of said clamping means having means by which said frame members can be forced toward and from each other.

18. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape, of a plurality of clamping means connected respectively to one of said members adjacent to diagonally opposite corners and connected respectively to the other frame member at corresponding corners, each clamping means having means by which said frame members can be forced thereby toward and from each other.

19. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape, of a plurality of clamping means connected respectively to one frame member adjacent to diagonally opposite corners and connected respectively to the other frame member adjacent to corresponding corners, each clamping means having means by which said frame members can be forced toward each other with a yielding pressure and provided also with means by which said members can be forced by said clamping members apart from each other.

20. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape, of pivotal means for hinging together said two members, said hinging means being located adja-

cent to corresponding corners of opposite members, and releasable means for locking said members together, said locking means being disposed adjacent to corners diagonally opposite to the corners adjacent to which said hinging means is secured.

21. In a printing frame, the combination with front and back frame members, each substantially rectangular in shape and provided each at diagonally opposite corners with diagonally extending projections, and two sets of clamping means respectively connecting corresponding projections of opposite members.

22. In a printing frame, the combination with front and back frame members each substantially rectangular in shape, and provided at diagonally opposite corners with diagonally extending projections, of hinging means pivotally connecting corresponding projections of opposite members, and locking means for connecting the other two projections.

23. In a printing frame, the combination with front and back frame members each substantially rectangular in shape and provided each at diagonally opposite corners with diagonally extending projections, of hinging means pivotally connecting corresponding projections of opposite members, said hinging means having means by which said members are moved toward and from each other, and locking means connecting the other two projections and having means by which the frame members can be moved thereby toward and from each other.

24. In a printing frame, the combination with a frame, of a shutter comprising two members, said members being hinged to each other and one member hinged to the frame, and two springs for independently forcing said members respectively to swing to the open position, the spring which actuates the member which is hinged to the frame being the weaker of the two springs.

25. In a printing frame, the combination with a frame, of a shutter comprising two members hinged to each other, one member being hinged to the frame, means for normally forcing the member which is hinged to the frame to the open position, and releasable means independent of the other member for locking in the closed position the member which is hinged to the frame.

26. In a printing frame, the combination with a frame, of a shutter comprising two members hinged to each other, one member being hinged to the frame, means for normally forcing to the open position the member hinged to the frame, and separate means operative independently of each other for respectively locking both members in the closed position.

27. In a printing frame, the combination with a frame, of a shutter comprising two members hinged to each other, one member being hinged to the frame, two springs for independently forcing said members respectively to swing to the open position, the spring actuating the member which is hinged to the frame being the weaker of the two springs, releasable means for locking in the closed position the member hinged to the frame independently of the position of the other member, and releasable means for locking said other member in the closed position.

28. In a printing frame, the combination with a frame having an opening therethrough, of a shutter for closing said opening and comprising two members hinged to each other, one member being hinged to the frame, releasable means for locking said members in the closed position, and means by which, when said members are released from said locking means, they will both be swung through an arc of at least ninety degrees.

29. In a printing frame, the combination with a frame, of a shutter hinged thereto, two springs mounted respectively on said shutter and frame, one spring having a recess, and a roller mounted on the other spring and adapted to enter said recess for locking said members together, one spring exerting a pressure on the shutter, when in the locked position, for retaining the shutter in the closed position, the tension of the other spring normally forcing it into a position in which the roller will enter said recess when the shutter is swung to the closed position.

30. In a printing frame, the combination with a frame having an opening therethrough adapted to receive sensitized printing paper, of a mask for closing more or less of said opening, and a support slidable on the frame and upon which said mask is pivoted so as to swing laterally.

31. In a printing frame, the combination with a frame having an opening for receiving paper to be printed, of a mask pivotally and slidably movable to different positions transversely across said opening and having a plurality of indicating devices for registering with one side of said opening.

32. In a printing frame, the combination with a frame having an opening therethrough adapted to receive the paper to be printed, of a mask pivotally and slidably movable transversely to different positions across said opening and provided on one side with a plurality of parallel lines adapted each to register with one side of said opening for indicating the different positions to which the mask may be adjusted.

33. In a printing frame, the combination with a frame having an opening therethrough, of a mask pivotally and slidably movable to different positions transversely across said opening and provided on one side with a

plurality of parallel lines adapted each to register with one side of said opening and having distinguishing characters disposed adjacent to said lines respectively for indicating the same.

34. In a printing frame, the combination with a frame having an opening therethrough, of a mask support slidable on said frame and provided with means for detachably holding a mask, and a mask pivoted so as to swing laterally on said support.

35. In a printing frame, a plate clamping member pivoted to one edge of the frame and provided with an inwardly turned lip for engaging the top of a plate placed on the frame, and a spring for normally forcing said lip in position to clamp the plate.

36. In a printing frame, the combination with a frame adapted to support a plate and provided with a recess in the side which supports the plate, of a clamping member pivoted to one edge of said frame and provided with an inwardly turned lip which, when the plate is mounted on the frame, rests upon said plate, and when the plate is absent rests in said recess with its upper side below the surface of the side of the frame which supports the plate, and a spring for forcing said member to a position in which the lip will engage the plate or enter the recess when the plate is absent.

37. In a printing frame, the combination with a frame, of a film holder comprising two arcuate members hinged to each other for receiving a film roll, means for securing one of said members to the frame, and a spring for forcing the other member to a position in which both members will coöperate in forming a cylindrical tube having a longitudinal slot for receiving the film.

38. In a printing frame, the combination with a frame, provided with a recess, of a cylindrical tubular film holder comprising two arcuate members hinged together for receiving a film roll, one member having a lip for being detachably secured in the said recess, the pintle connecting said members being disposed longitudinally of the holder, and a spring for normally retaining said members in cylindrical form, that is, the closed position, a longitudinal opening being provided between said members when they are in the closed position for receiving the film.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

CYRUS E. WELTMER.

Witnesses:
E. B. HOUSE,
WARREN D. HOUSE.