A. G. OGDEN.

PRINTING MACHINE.

APPLICATION FILED MAR. 1, 1917.

1,388,968.

Patented Aug. 30, 1921.

9 SHEETS—SHEET 1.

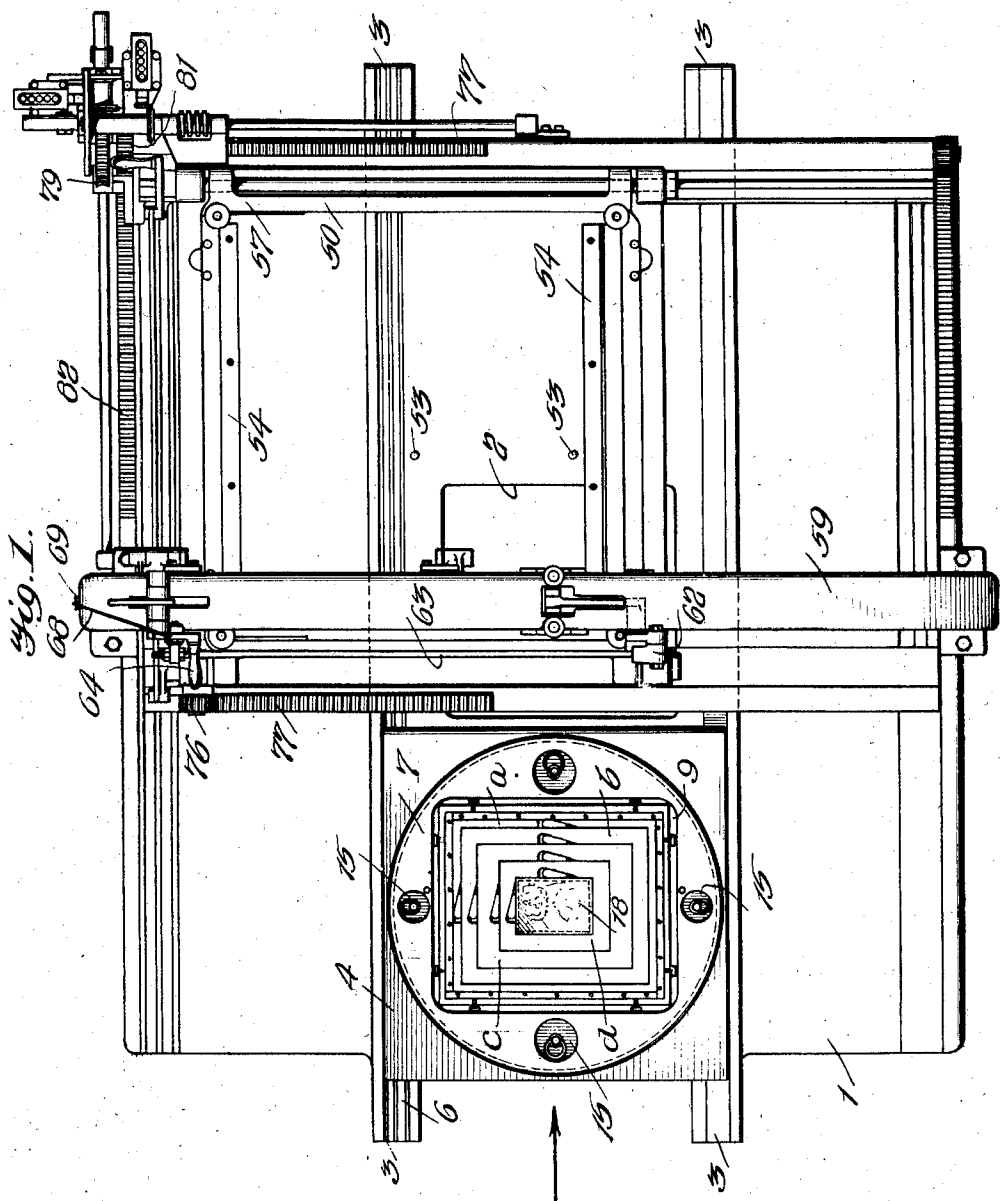


Fig. 1.

WITNESSES

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9 SHEETS—SHEET 2.

Fig. 2.

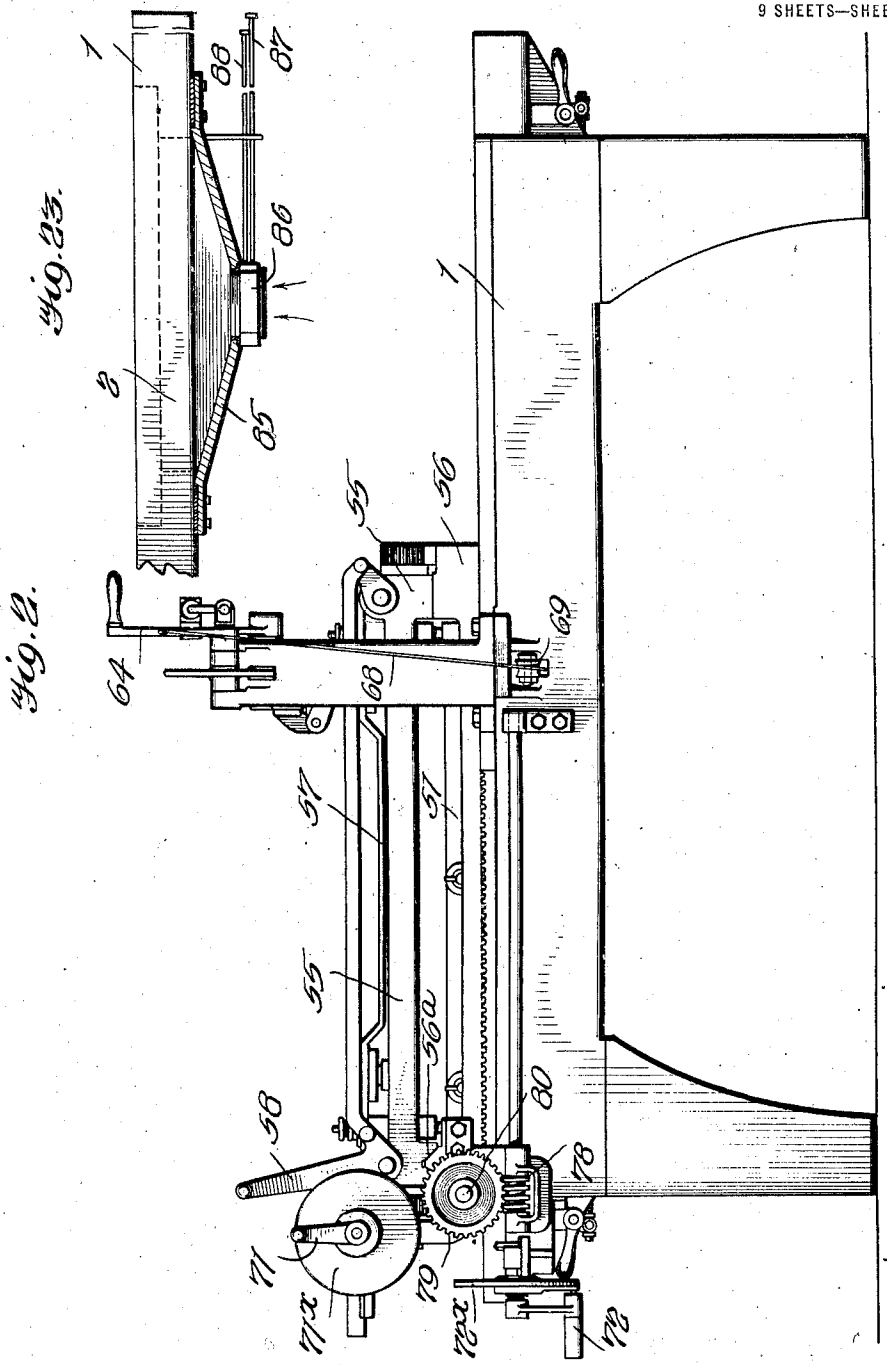


Fig. 3.

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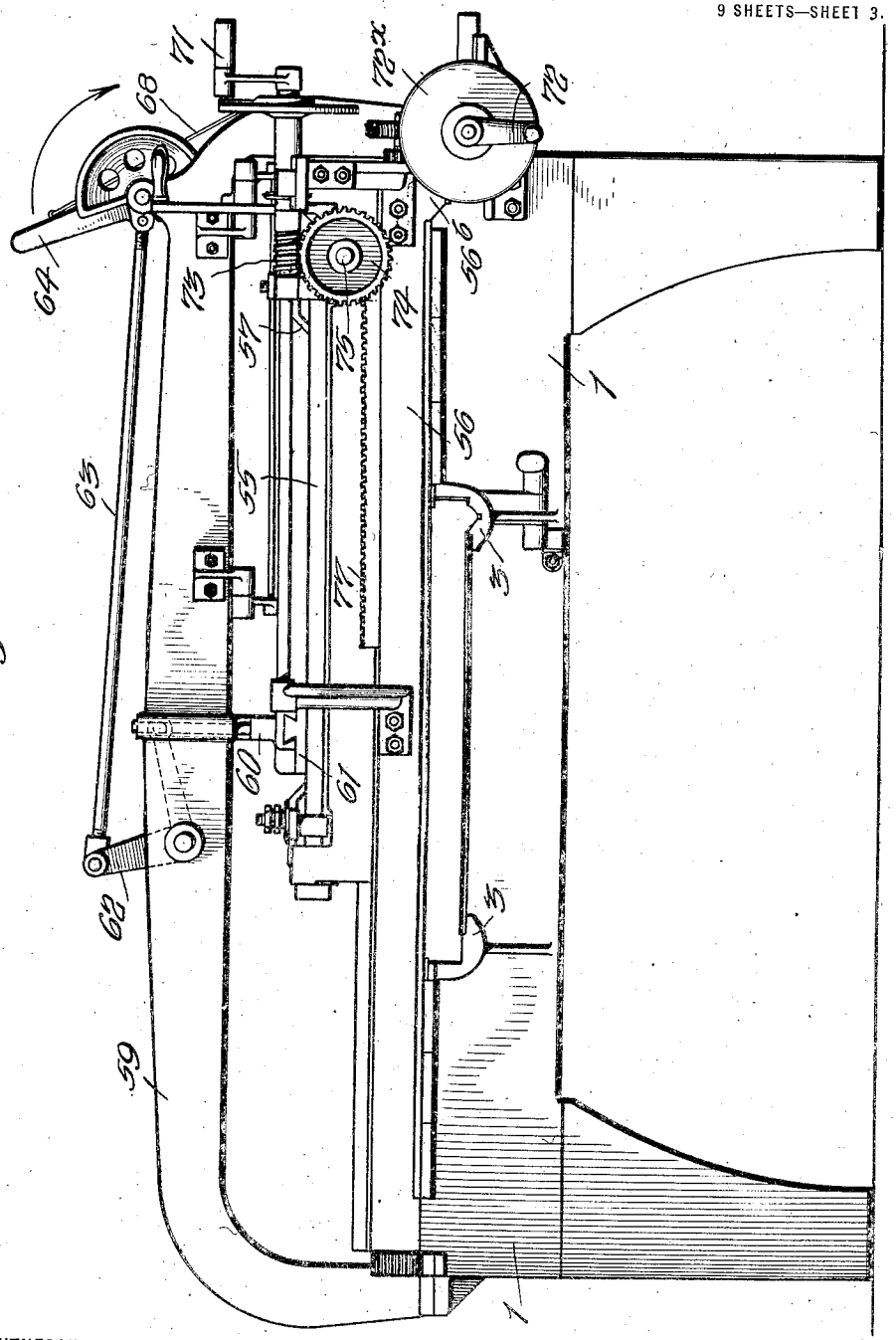


Fig. 3.

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9 SHEETS—SHEET 4.

Fig. 4.

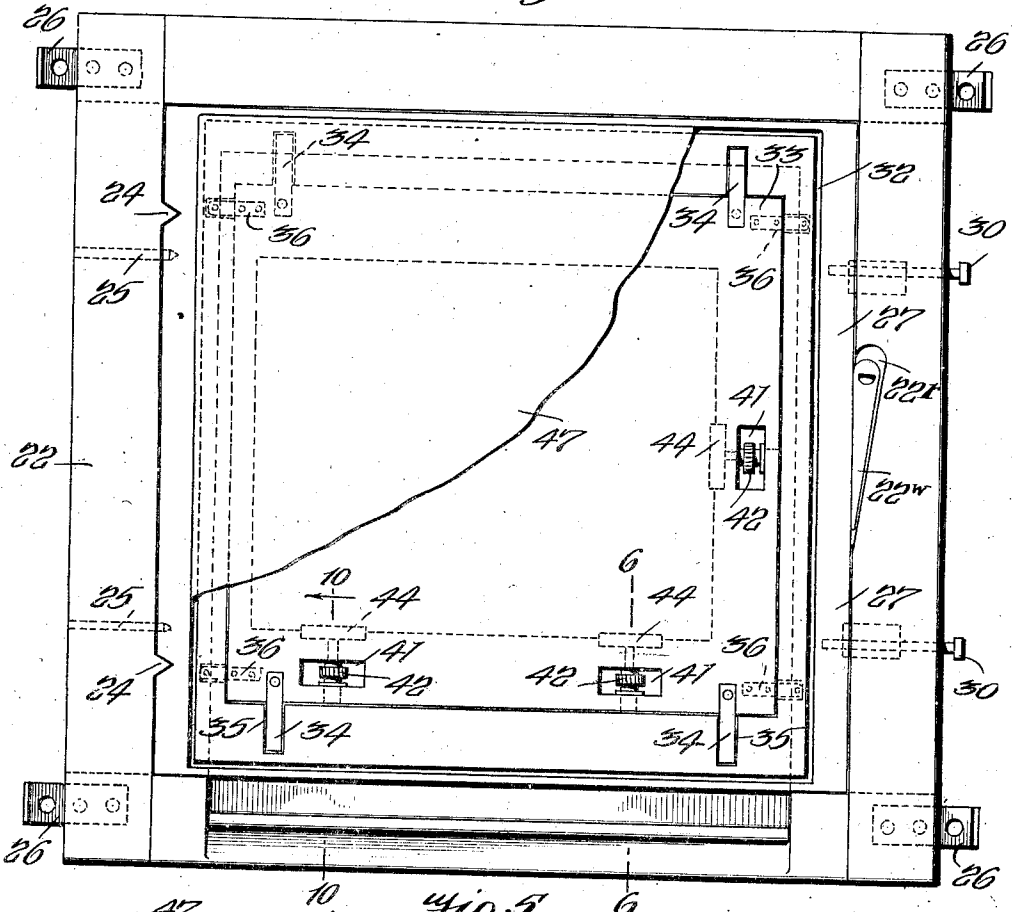


Fig. 5.

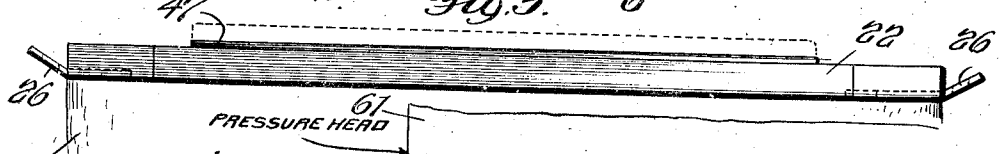
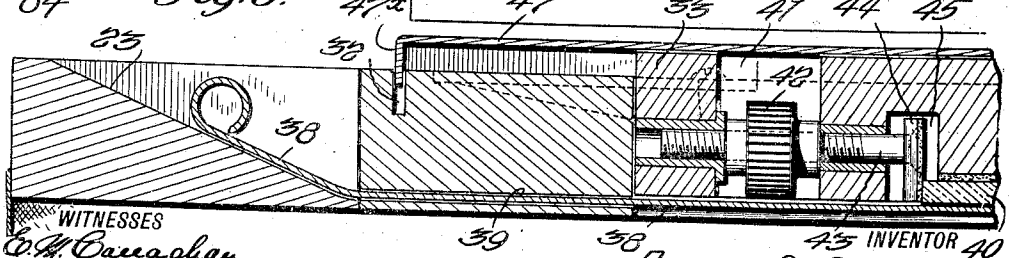


Fig. 6.



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9 SHEETS—SHEET 5.

Fig. 7.

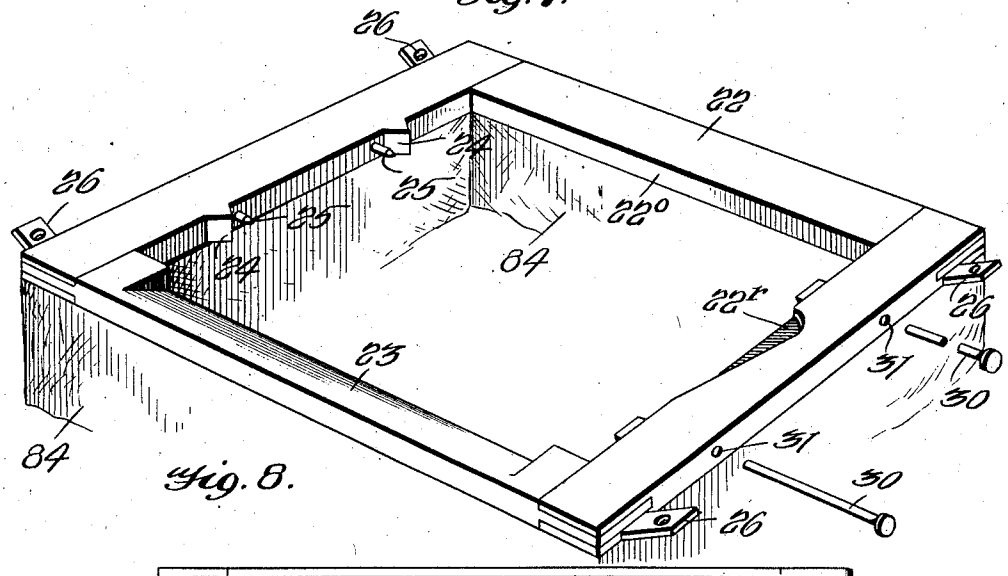


Fig. 8.

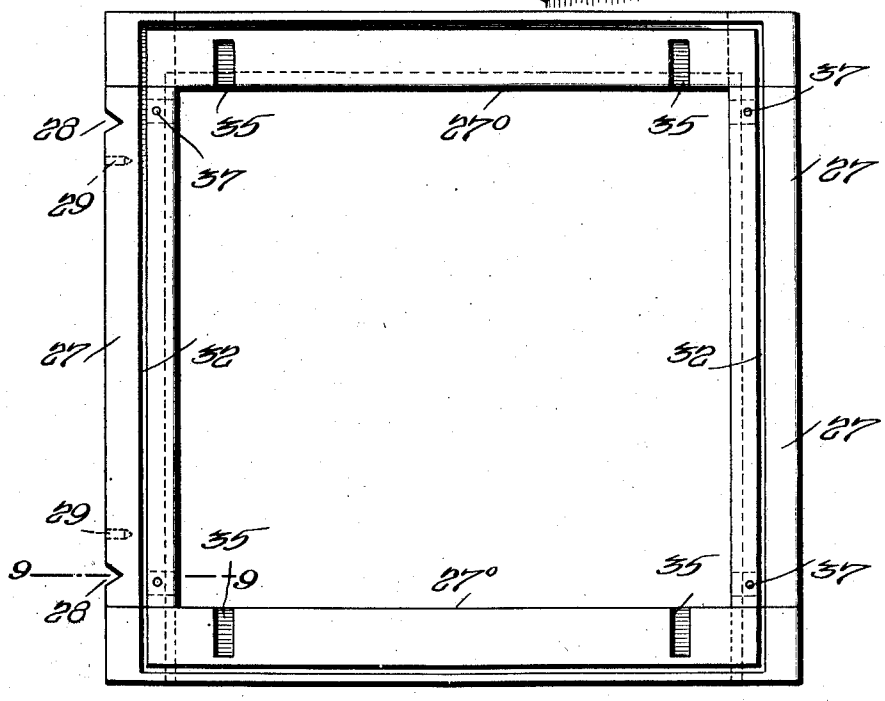
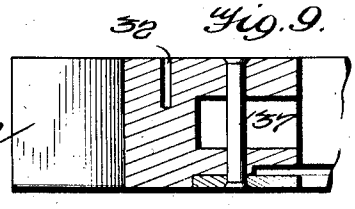


Fig. 9.



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9 SHEETS—SHEET 6.

Fig. 10.

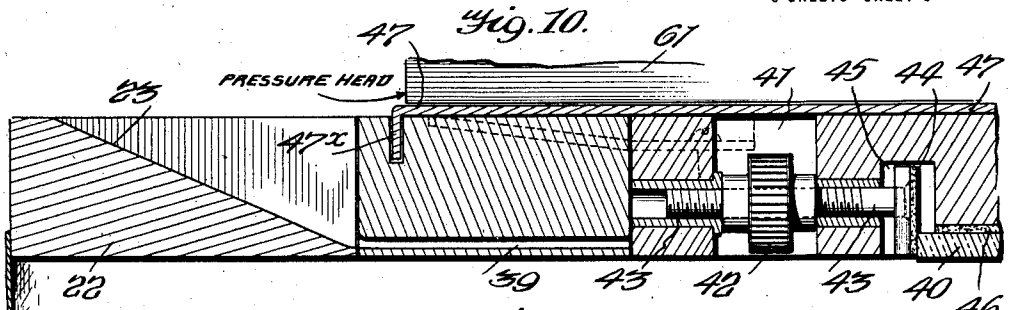


Fig. 11.

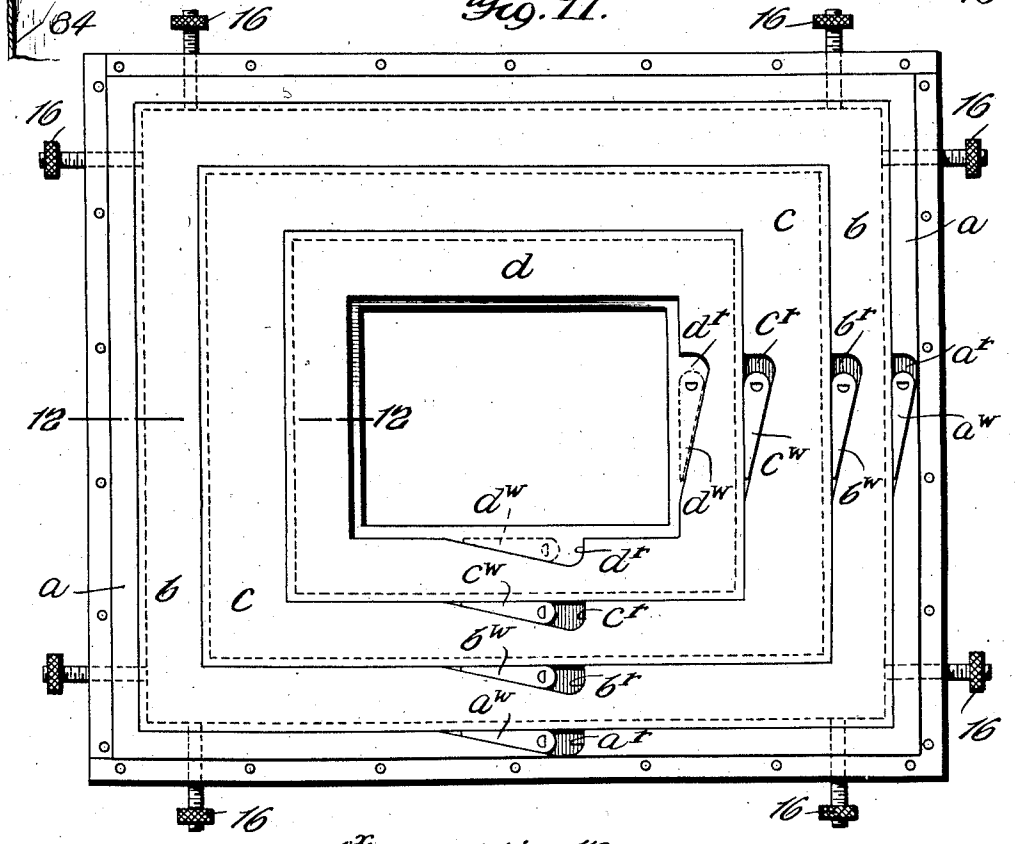


Fig. 12.

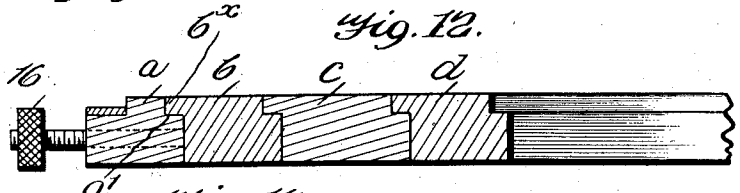
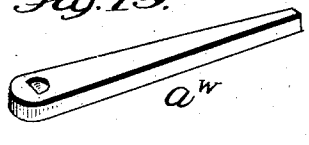


Fig. 13.



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9 SHEETS—SHEET 7.

Fig. 14.

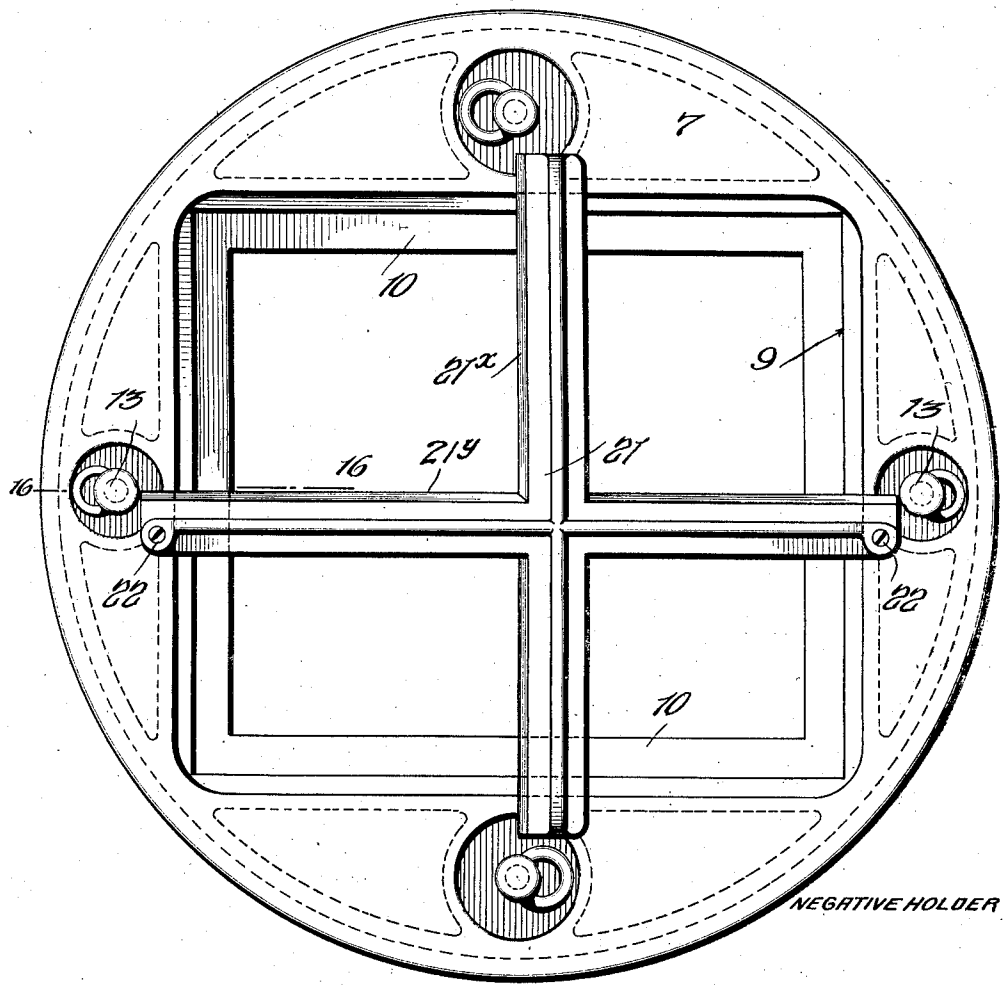


Fig. 15.

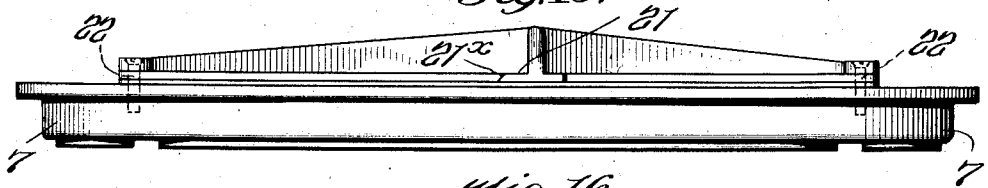
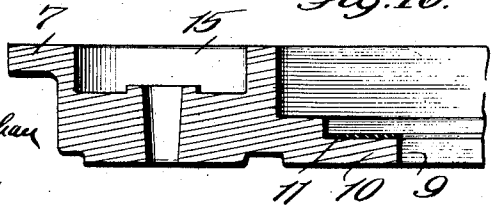


Fig. 16.



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9 SHEETS—SHEET 8.

Fig. 17.

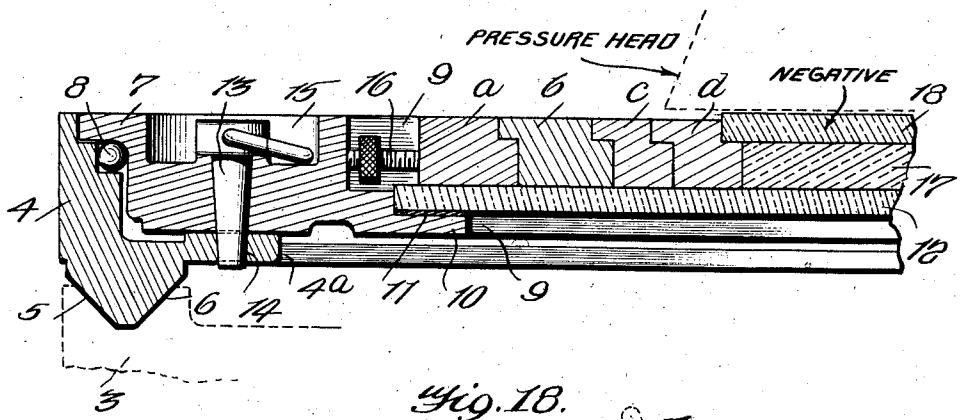


Fig. 18.

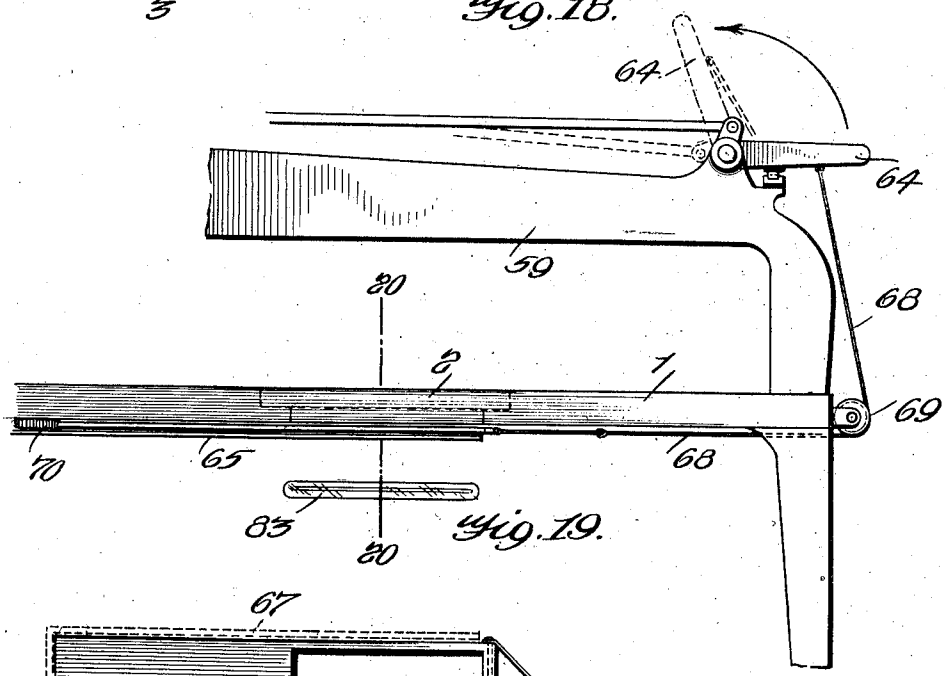


Fig. 19.

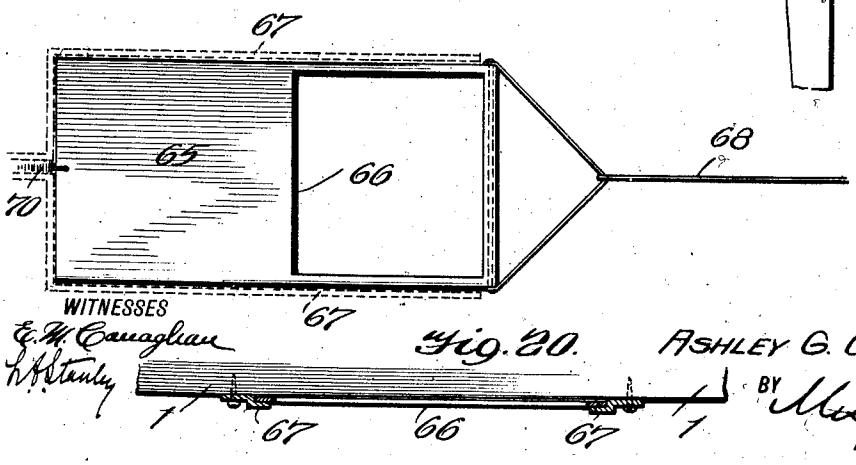


Fig. 20.

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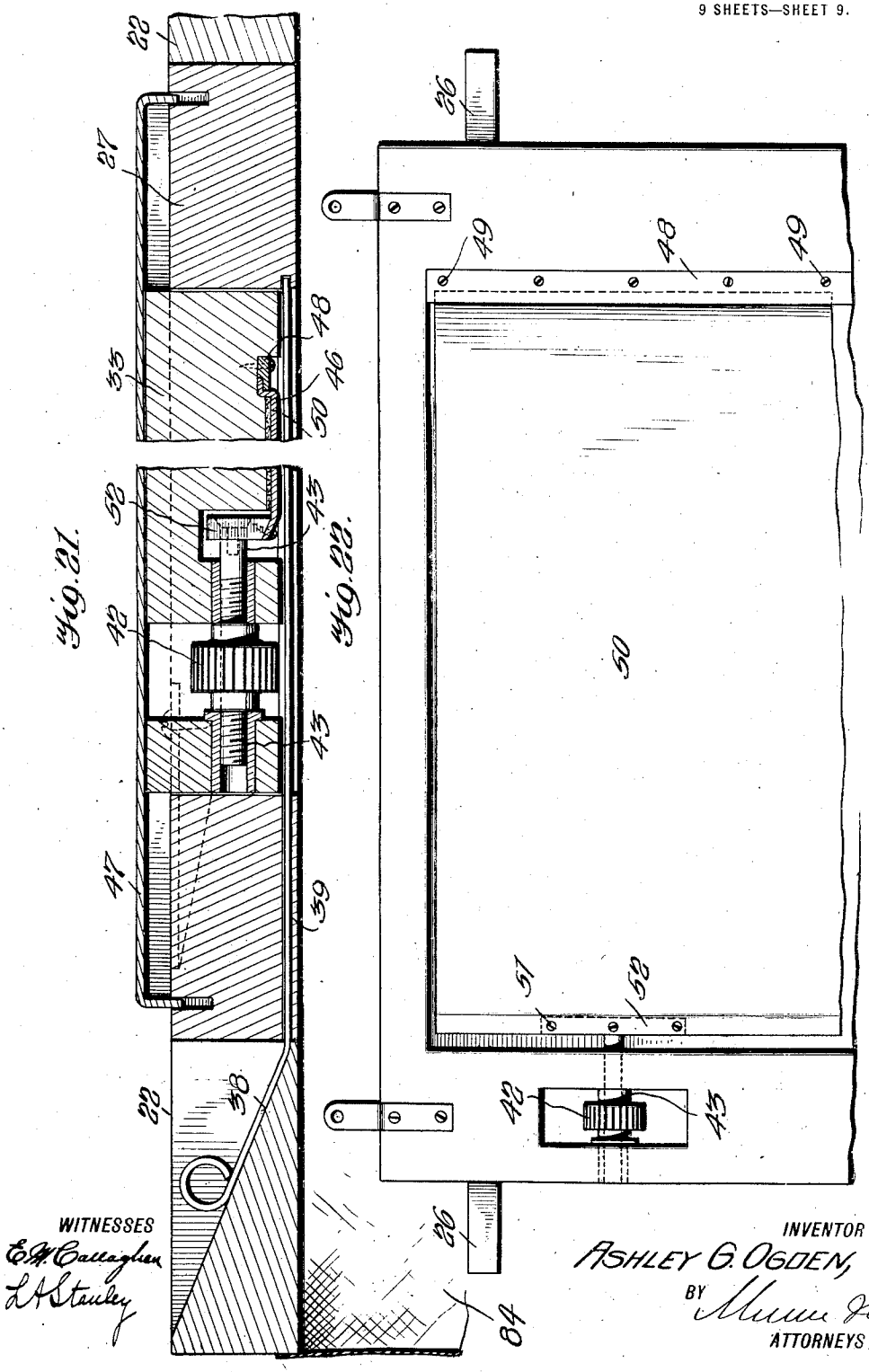


Fig. 21.

Fig. 22.

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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

1,388,968. Specification of Letters Patent. Patented Aug. 30, 1921.

Application filed March 1, 1917. Serial No. 151,748.

To all whom it may concern:

Be it known that I, ASHLEY G. OGDEN, a citizen of the United States, and a resident of the city of Baltimore, in the State of Maryland, have made certain new and useful Improvements in Printing-Machines, of which the following is a specification.

An object of my invention is to provide a photographic printing machine by means of which a plurality of prints may be made on a single sensitized plate, without the necessity of resorting to a dark room, or to an inclosed light chamber.

A further object of my invention is to provide a device of the class described in which the printing operation may be carried on in rooms which are light, due to the fact that a shutter is provided which only opens when the print is to be made and which closes when the apparatus is shifted from one printing position to another.

An object of my invention is to provide a printing machine for printing on sensitized surfaces by means of which prints of varying sizes may be made.

A further object of my invention is to provide a device of the class described in which the sensitized plate is held in a plate holder in such a manner that it is protected from light until after it is in printing position, and in which means is provided for permitting the movement of the sensitized plate so that it may be forced into printing contact with the negative.

A further object of my invention is to provide a printing device of the class described having a negative holder of novel construction.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

In the drawings—

Figure 1 is a plan view of the device.

Fig. 2 is a side elevation of the device.

Fig. 3 is a side elevation at right angles to Fig. 2.

Fig. 4 is a plan view showing the parts of the sensitized plate holder assembled.

Fig. 5 is an end view of the device shown in Fig. 4.

Fig. 6 is an enlarged section along the line 6—6 of Fig. 4.

Fig. 7 is a perspective view of the outer frame of the sensitized plate holder.

Fig. 8 is a plan view of the plate holder proper.

Fig. 9 is an enlarged section along the line 9—9 of Fig. 8.

Fig. 10 is an enlarged section along the line 10—10 of Fig. 4.

Fig. 11 is a plan view showing the nested frames of the negative holder.

Fig. 12 is an enlarged section along the line 12—12 of Fig. 11.

Fig. 13 is a perspective view of a wedging pin.

Fig. 14 is a plan view of the circular negative holder.

Fig. 15 is an edge view of the parts shown in Fig. 14.

Fig. 16 is an enlarged section along the line 16—16 of Fig. 14.

Fig. 17 is an enlarged section through a portion of the negative holder and slidable frame which supports it.

Fig. 18 is a side view showing a shutter operating mechanism, and

Fig. 19 is a plan view of the shutter shown in Fig. 18.

Fig. 20 is an enlarged section along the line 20—20 of Fig. 18.

Fig. 21 is a section through a modified form of the holder for the sensitized plate.

Fig. 22 is a plan view of a portion of the holder shown in Fig. 21.

Fig. 23 is a sectional view of a modified form of shutter.

The present invention contains improvements over that disclosed in my prior but co-pending application Serial Number 114,601 filed August 12th, 1916, upon which was issued my Patent No. 1,244,362 of October 23, 1917.

In carrying out my invention I provide a table 1. This table is provided with a central rectangular opening 2, see Fig. 1. As will be seen from the drawings the table has tracks or runways 3, which extend beyond the edges of the table. These tracks are arranged to support slidable negative holders like that set forth more particularly in Figs. 14 to 17 inclusive. Each negative holder comprises a plate 4, which is preferably of square contour and which has V-shaped runners 5 arranged to engage V-

shaped slots or grooves 6 in the tracks 3, so as to guide the plate 4 in its movement.

The plate 4 is provided with a rectangular opening 4^a in its bottom and is recessed to permit the entrance of a circular negative carrier plate 7. The latter rests on ball bearings 8 so as to permit the plate 7 to be rotated with respect to the plate 4. The circular plate 7 is itself provided with a rectangular opening 9 which is bordered by a flange 10 bearing a cushion 11 of rubber, felt, or other resilient material upon which is mounted a piece of plain glass 12. At opposite sides of the circular plate 7 are disposed locking pins 13, which are arranged to enter openings 14 in the plate 4 so as to lock the negative carrier 7 in position. The plate 7 is recessed as shown at 15 and the locking pin 13 is provided with a ring which normally lies in its recess and by means of which the pin may be removed when desired.

Carried by the glass plate 12 is the series of nested frames of different sizes, these frames being for the purpose of holding negatives of sizes corresponding to the sizes of the frames. In Figs. 11 and 17 it will be seen that the outer frame *a* is provided with a series of adjusting screws 16 by means of which the frame may be centered within the carrier frame 7. The frame *a* has a shoulder *a'* which supports a flange b^x of the next smaller frame *b*, which in turn supports frame *c*, which supports an inner frame *d*. It is obvious that as many of these nested frames as desired may be used. The innermost frame which in Fig. 17 is the frame *d*, has a sheet of thick plain glass 17 disposed in an opening at the bottom, this plate being securely held in position and being flush with the bottom of the frame *d*. The negative 18 is placed in the inner frame and rests on the glass plate 17, the top of the negative projecting very slightly above the top of the frame *d*.

This arrangement of nested frames provides means for the holding and approximate centering of negatives of any standard size. It will be understood that there are two sets of the frames, one set similar to the frames *b* and *c* in that the bottoms of these frames are open ready to receive the frame of the next smaller size. The frame *b*, however, has a corresponding frame of the same size which instead of being open at the bottom is provided with a glass plate similar to the plate 17, see Fig. 17, of the frame *d*.

As will be seen from Fig. 11, each of the frames *a*, *b*, *c*, *d*, is provided with a recess *ar*, *br*, *cr*, and *dr* respectively, having wedges *aw*, *bw*, *cw* and *dw* respectively, by means of which the nested inner frames may be secured in position, the inner frame *d* holding the negative 18.

In order to center the negative I provide the centering means shown in Figs. 14 and 15. This consists of a light metal frame 21 preferably made of aluminum, but which may be made of any suitable material. The frame as it will be observed from Fig. 14 is in the shape of a cross. The edges 21^x, 21^y are at right angles to each other. The frame 21 is provided at its ends with pins 22 which are arranged to enter openings in the negative carrier 7 so as to center the frame 21.

Before the negative is placed in the carrier it is marked with four guide marks on the edges of the negatives, certain of these guide marks being at right angles to the others. When the negative is placed in the negative holder and the frame 21 is put in position, the negative is shifted by manipulating the adjusting screws 16 until the guide marks on the negative registers with the edges 21^x and 21^y, respectively of the frame 21 when the negative will be exactly centered. After the negative is centered the frame 21 is removed.

The present invention is primarily designed to enable one to make photographic prints without the necessity of resorting to a dark room, in other words to make the prints in a light room. To this end I use a plate holder for the sensitized plate, such as that shown in Figs. 4 to 10 inclusive.

Referring particularly to Fig. 7, it will be seen that the outer portion of this plate holder comprises a frame 22 made of wood or other suitable material which has a side beveled as shown at 23. The frame 22 has V-shaped guide lugs 24 and guide pins 25 on the inner edge of one side. The opposite edge of the frame 22 is provided with a recess 22^r for a wedge 22^w. Secured to the opposite ends of the frame 22 are strips 26 by means of which the frame 22 may be held in position in the manner hereinafter explained. Arranged to enter the rectangular opening 22^o in the frame 22 is a rectangular frame portion 27 which is provided with recesses 28 arranged to receive the lugs 24 and with bores 29 arranged to receive the pins 25. The opposite edge of the frame portion 27 is adapted to be held to the frame 22 by means of pins 30 which pass through openings 31 in the frame 22 and which extends into the frame portion 27 so as to hold the latter firmly in position. The frame portion 27 has a groove 32 extending inwardly from one face of the frame 27 as shown in Figs. 4, 8 and 9.

Disposed within the opening 27^o of the frame 27 is the plate holder 33 proper. It is supported in a normally retracted position by leaf springs 34 which are disposed in recesses 35 in the inner edges of the frame portion 27. Guide arms 36 are carried by the holder 33 being guided on pins 37 like that shown in Fig. 9.

The holder 33 is arranged to move bodily

in the opening 27° of the frame 27 but it is normally held by means of the springs 34 in the position shown in Fig. 6. In this position a flexible slide 38 of hard rubber or other suitable material may be placed into position in grooves 39 so as to cover the sensitized plate 40.

As will be seen from Figs. 4, 6 and 10 the movable holder 33 is provided with recesses such as that shown at 41, arranged to receive an adjusting nut 42 which works on a threaded spindle 43 at the end of which is a pressure shoe 44 which engages the sensitized plate 40. The pressure shoe is in a recess 45 as clearly shown in Figs. 6 and 10. Between the plate holder proper 33, and the sensitized plate 40 is disposed a cushion 46 of felt or similar resilient material. A cover plate 47 is provided whose edges are turned downwardly as shown at 47^x and enter the groove 32 in the frame portion 27.

When it is desired to print a sensitized plate the latter is placed in the holder 33, and the shoes 44 are adjusted by means of adjusting nuts 42 so as to hold the sensitized plate in position, and the slide 38 is placed in position as shown in Fig. 6. This is done in the dark room and the frame member 27 to which the holder 33 proper is secured, is now taken from the dark room and placed in the frame 22 by withdrawing the locking pins 30, slipping the frame 27 in position and locking the frame in position by again inserting the locking pins 30. The holder containing the sensitized plate is now ready for placing in position in the printing machine.

In Figs. 21 and 22 I have shown a modified form of the holder for a sensitized plate. This plate may be any kind of a sensitized sheet such as a sheet of paper, a sheet of metal, or other similar material. In such instance instead of having pressure shoes for exerting pressure on the edges of a rigid plate, as shown in Figs. 4 and 6, I may provide gripping devices for exerting tension on opposite sides of the plate so as to stretch the latter in the holder, thus preventing the plate from buckling. To this end the holder 33 is provided with a clamping strip 48 which has screws 49 that may be loosened to permit the strip to be lifted so as to admit the edge of a sensitized plate such as that shown at 50, which may be clamped in position against the resilient backing 46. The opposite end of the plate 50 is secured as by means of the screws 51 to the head 52 carried by the threaded screw 43. It is obvious that if the thumb wheel 42 be turned the sensitized plate 50 may be stretched. The remaining features of this plate holder for the sensitized sheet are the same as those already described in connection with the rigid sensitized plate.

One of the main purposes of this invention, as stated heretofore, is to provide a printing device which may be operated in a room in ordinary light, as distinguished from those machines which can only be operated in a dark room. The specific means by which the sensitized plate is moved with respect to the stationary negative forms no part of the present invention except in so far as it coöperates with the novel features which will be more particularly pointed out in the claims. The mechanism for moving the sensitized plate has been set forth in detail in the prior application above-mentioned so I will only describe sufficient parts of the machine to enable a thorough understanding of the novel features.

It will be seen in Fig. 1 that I have provided stop pins 53 which limit the movement of the frame 4 so as to center the negative in printing position. The fact that the tracks 3 extend on opposite sides of the machine permits the insertion of a frame 4 at either or both ends, so that while one is being printed the other may be withdrawn for placing another negative in position, and thereby permitting the prints to be varied during the printing process.

The holding strips 26 are secured in clamping devices 54 carried by an upper slidable frame 55. In my prior patent, mentioned above, the clamping devices 54 were for the purpose of holding a single sensitized metal plate. The plate holders containing the sensitized plates 40 or 50 will be substituted for the single sensitized metal plate held in position by the same clamping devices 54 in the present application.

The frame 55, see Fig. 2, is slidable on a lower frame 56. One side of the frame 55 is provided with a V-shaped groove arranged to receive a V-shaped track 56^a carried by the frame 56 so as to guide the frame 55 in its movement. The frame 56 is in turn movable in a direction at right angles to the frame 55 on the table 1. One side of this frame is provided with a V-shaped runner 56^b which guides the frame in its movement. The upper frame 55 bears a short frame 57 which is pivotally mounted in such a manner that when the handle 58 is moved the frame is raised or lowered slightly. It is this frame 57 which bears the clamping members 54 to which the holder for the sensitized plate may be secured.

A bar 59 spans the device and is provided with a plunger 60 bearing a pressure head 61. The plunger is operated by means of a bell crank lever 62 connected by a link 63 with an operating handle 64.

On the under side of the table 1 is a shutter 65 which is provided with an opening 66. This shutter is suspended in runners 67 and to one end is secured a cable 68 which passes over a pulley 69 on the table and which is

fastened to the arm 64, see Figs. 18 to 20. A spring 70 is secured to the opposite end of the shutter.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. Normally the pressure head 61 is raised, and when in such position the arm 64 is up as shown in Fig. 3, in full lines, and in Fig. 18 in dotted lines. The shutter 65 is drawn forwardly by means of the flexible connection 68 so that it covers the opening 2 in the table. Now when the negative is placed in position in the manner already described and the holder for the sensitized sheet has been inserted in the printing machine the shutter 38 may be withdrawn so as to permit the sensitized surface of the plate 40 or the plate 50, as the case may be, to come into contact with the negative.

The upper and lower frames are moved by means of the crank handles 71 and 72, respectively, the former driving a worm 73 which operates a worm wheel 74 on a shaft 75 bearing a pinion 76 carried by the upper frame 55 and arranged to engage a rack 77 carried by the lower frame 56. The handle 72 drives a worm 78 meshing with a worm gear 79 on a shaft 80, see Fig. 2, which bears a pinion 81 arranged to engage a rack 82 carried by the table. By manipulating these devices the upper and lower frames may be moved.

When a printing position has been selected which may be indicated by the dials 71^x and 72^x then the handle 64 is moved in a direction shown by the curved arrow in Fig. 3. This brings the pressure head 61 downwardly. It engages the cover 47, see Fig. 6, and forces it downwardly in the slot 32, pressing the frame 33 downwardly, from the position shown in Fig. 6 into that shown in Fig. 10. In this position the plate 40 is in contact with the negative.

The movement of the arm 64 will cause the retraction of the shutter 65 so as to uncover the opening 2. Light from the lamp 83, disposed underneath the opening 2, may now enter through the negative upon the sensitized plate. When a print has been made the pressure head is raised from the plate holder by raising the arm 64 in the direction shown by the curved arrow in Fig. 18. This shuts off the light between the lamp 83 and the sensitized plate and permits the latter to be retracted into the position shown in Fig. 6.

When the printing operation is finished the slide 38 is placed in position and the printed plate may be taken in the plate holder to a dark room for development or for further treatment.

In order to permit the movement of the frame 22 while preventing the light from entering to fog the sensitized plate, I may arrange a flexible curtain 84 around the edge of the frame so as to shut out side lights and obviate all danger of such a contingency.

From the foregoing description it will be seen that I may make contact prints upon sensitized surfaces regardless of whether the sensitized surfaces are quick acting or slow acting, in daylight, without any danger of spoiling the sensitized plates by light. One valuable feature about this device is that there is no necessity of doing the printing in a dark room and there is no necessity of inclosing the lower part of the machine since the shutter 65 automatically cut off the light from the lower part of the machine until such time as the pressure head is actually brought into operative relation with the sensitized plate, or the holder containing the same just prior to the turning on of the light.

In Fig. 23 I have shown a modified form of shutter mechanism in which a casing 85 is secured to the bottom of the table 1, underneath the opening 2. At the center of this casing is a shutter mechanism 86. This shutter mechanism may be of any suitable type. It is such a mechanism as is used on cameras, and the illustration is purely diagrammatic.

Means is provided for operating the shutter manually, these means consisting of a rod 87, which extends outwardly into convenient position beside the machine. The rod 88 is for time exposures. The shutter mechanism is of course provided with the usual speed regulating means, not shown.

In this form of the device, the sensitized plate is brought into position, and the light is admitted to the plate only when the shutter is operated. With this arrangement, rapid plates may be used.

I claim:

1. In a device for printing on sensitized surfaces, the combination with a negative holder, of a sensitized surface holder, a support for the surface holder, a device for shielding the sensitized surface from light coming through the negative, means for relatively moving the holders to printing position, connections for making the shielding device ineffective by actuation of the moving means to bring the holders to printing position, and a device connected to the support and made effective by the relative approach of the holders to exclude side light from between the holders.

2. In a device for printing on sensitized surfaces, the combination with a negative holder, of a sensitized surface holder, a support for the surface holder, a device for shielding the sensitized surface from light coming through the negative, means for relatively moving the holders to and from printing position, connections whereby said relative moving of the holders makes the shield-

ing device ineffective and effective respectively, and a device connected to the support and made effective by the relative approach of the holders to exclude side light from between the holders.

3. In a device for printing on sensitized surfaces, the combination with a negative holder, of a sensitized surface holder, a removable slide connected to the sensitized surface holder adapted to shield the surface from light coming through the negative, means for movably supporting the surface in the holder so that it normally lies behind the slide, means for supporting the sensitized surface holder adjacent the negative holder, and means adapted to be operated when the slide is removed for moving the surface in its holder against the negative.

4. In a device for printing on sensitized surfaces, the combination with a negative holder, of a sensitized surface holder, a source of light, a removable slide connected to the sensitized surface holder adapted to shield the surface from the light, a spring support for the surface in the holder so that the surface normally lies behind the slide, and means adapted to be operated when the slide is removed to bear upon the spring support to carry the surface against the negative.

5. In a device for printing on sensitized surfaces, the combination with a negative holder, of a sensitized surface holder, a source of light, a removable slide connected to the sensitized surface holder adapted to shield the surface from the light, a spring support for the surface in the holder so that the surface normally lies behind the slide, means adapted to be operated when the slide is removed to bear upon the spring support to carry the surface against the negative, and a light-excluding device adapted to prevent the admission of side light between the sensitized surface holder and the negative holder in their relative movement.

6. In a device for printing on sensitized surfaces, the combination with a negative frame, of a sensitized surface holder, means normally holding the sensitized surface retracted in the holder, means for moving the frame from the negative to enable shifting of the frame, a device for shielding the sensitized surface from light coming through the negative, means for carrying the sensitized surface to the negative in the frame, and connections whereby such carrying of the sensitized surface to the negative makes the shielding means ineffective.

7. In a device for printing on sensitized surfaces, the combination with a negative frame, of a sensitized surface holder, means normally holding the sensitized surface retracted in the frame, means for moving the frame from the negative to enable shifting, a device for shielding the sensitized surface from light coming through the negative, a handle for moving the sensitized surface to the negative in the frame, and a flexible connection extending from the handle to the shielding means adapted to move the shielding means to ineffective position at the moving of the sensitized surface to the negative.

8. In a device for printing on sensitized plates, a negative holder comprising a plurality of nested frames, the innermost frame carrying the negative, a rotatable plate carrying said nested frames, and means for accurately centering the negative on the rotatable plate.

9. In a device for printing on sensitized plates, a negative holder comprising a plurality of nested frames, the innermost frame carrying the negative, a rotatable plate having openings therein for carrying said nested frames, and means for accurately centering the negative on the rotatable plate, said means comprising a T square having pins arranged to removably engage the openings in the rotatable plate.

10. A plate holder for sensitized plates comprising an exterior frame, an interior frame provided with a groove movable with respect to said exterior frame, a cover disposed over said interior frame and having sides arranged to enter the groove in the exterior frame, means carried by said interior frame for gripping a sensitized plate, and a removable shutter for normally shutting off access of light to the sensitized plate.

11. A plate holder for sensitized plates, comprising an exterior frame, an interior frame provided with a groove movable with respect to said exterior frame, a cover disposed over said interior frame and having sides arranged to enter the groove in the exterior frame, means carried by said interior frame for gripping a sensitized plate, a movable shutter for normally shutting off access of light to the sensitized plate, and springs secured to said exterior frame for normally holding said interior frame away from said shutter.

12. In a photographic printing apparatus, a negative carrier adapted to be moved upon a printing table, said negative carrier comprising a carriage having a central opening, a circular frame rotatable on said carriage about its central axis, a transparent plate carried by said circular frame, and a series of nested frames carried by said circular frame, the innermost of said nested frames having a transparent bottom for supporting the negative.

13. In a printing device, a negative carrier adapted to be moved upon a printing table, said negative carrier comprising a carriage having a central opening, a circular frame rotatable on said carriage about its central axis, a transparent plate carried by said circular frame, and a series of nested frames

carried by said circular frame, the innermost of said nested frames having a transparent bottom for supporting the negative, said rotating frame being shiftable to different positions with respect to the carrier, and means for locking the rotatable frame in its shifted positions.

14. In a printing device, a negative carrier comprising a carriage adapted to be moved upon a printing table, said carriage having a central opening, and a circular frame rotatable thereon, said circular frame carrying a series of nested frames, said rotatable frame being shiftable to various positions with respect to the carrier, and locking means on said rotatable frame engaging openings in said carriers.

15. In a photographic printing apparatus, the combination with a horizontal negative shield, of a removable sensitized surface support adapted to hold a sensitized surface while in contact with the negative, means normally holding the surface clear of the negative, means for shifting the surface across the shield to enable a plurality of prints to be made on the surface from the negative, means connected to the support for excluding side light from the surface while the surface and negative are separated, a slide for the support for excluding light from the surface when the support is removed from the shield, a shutter for the negative adapted to admit light to the sensitized surface through the negative when the slide is withdrawn, and means for bringing the surface and negative into contact to make a pri...

16. In a photographic printing apparatus, a sensitized surface holder, a negative support, means normally holding said surface and negative separated to enable their relative transverse shifting, a light-excluding slide for the sensitized surface in its holder, means for bringing said surface and negative together when said slide is removed, a shutter normally adapted to prevent light from passing the negative, and means for automatically making said shutter ineffective at the bringing together of said surface and negative.

17. In a photographic printing apparatus, a light interrupting shield having an aperture, means for supporting a negative in the path of light through said aperture, means for supporting a sensitized surface facing said negative and normally holding it clear of the negative, means for transversely shifting the relative position of said surface and negative, means for bringing said surface and negative together to effect printing, and a shutter normally screening the negative and automatically made ineffective at the bringing together of said surface and negative.

18. In a photographic printing apparatus, a light interrupting shield having an aperture, means for supporting a negative in the path of light through said aperture, a removable sensitized surface holding device adapted to hold said surface facing said negative and normally clear of it, means for transversely shifting the relative position of said surface and negative, means for bringing said surface and negative together to effect printing, and a shutter normally screening the negative and automatically made ineffective at the bringing together of said surface and negative.

19. In a photographic printing apparatus, a light interrupting shield having an aperture, means for supporting a negative in the path of light through said aperture, a removable sensitized surface holding device adapted to hold said surface facing said negative and normally clear of it, a removable slide in the holding device adapted to keep the sensitized surface dark when the device is removed from the apparatus, means for transversely shifting the relative position of said surface and negative, means for bringing said surface and negative together after the removal of the slide to effect printing, and a shutter normally screening the negative and automatically made ineffective at the bringing together of said surface and negative.

20. A device for printing on sensitized plates comprising a support for a negative, a negative thereon, a source of light on one side of the negative, a removable spring-supported plate-holder adapted to hold the sensitized plate on the other side of the negative, and means for holding the sensitized plate in contact with the negative during the printing operation.

21. In a photographic printing apparatus, rails, a negative holder slidable upon the rails, nesting frames adapted to be wedged into each other, any frame adapted to support a negative, an outer frame, in which the nesting frames are adapted to be firmly held, and fine adjusting devices for positioning the nested frames in the outer frame to enable the negative to be accurately adjusted.

22. In a photographic printing apparatus, the combination with a horizontal negative shield, of a removable sensitized surface support adapted to hold a sensitized surface while in contact with the negative, means normally holding the surface clear of the negative, means for shifting the surface across the shield to enable a plurality of prints to be made on the surface from the negative, means connected to the support for excluding side light from the surface while the surface and negative are separated, a slide for the support for excluding light from the surface when the support is removed from the shield, a shutter for the

negative adapted to admit light to the sensitized surface through the negative when the slide is withdrawn, means for bringing the surface and negative into contact to make a print, and connections whereby the shutter is automatically opened by the bringing of the negative and surface into contact.

23. In a photographic printing apparatus, a sensitized surface holder comprising holding means and a main frame, an inner frame slidable in the main frame and carrying the holding means, a lightproof cover for the inner frame having a lightproof joint with the main frame to permit it to slide upon the inner frame, a negative support having a shutter, and adapted to receive the holder to enable a print to be made upon said surface from the negative, and means for pressing upon the inner frame to slide said surface against the negative to make the print.

24. In a photographic printing apparatus, a slide carrying holder, an inner frame slidable on the holder to and from retracted position, and carrying a sensitized surface, a negative support having a shutter and adapted to receive the holder with the inner frame in retracted position, and means for pressing the inner frame from its retracted position when the slide is withdrawn to carry said surface against the negative to enable a print to be made thereon from the negative at the opening of the shutter.

25. In a photographic printing apparatus, a slide carrying holder, an inner frame slidable on the holder to and from retracted position, and carrying a sensitized surface, a negative support having a shutter and adapted to receive the holder with the inner frame in retracted position, means for pressing the inner frame from its retracted position when the slide is withdrawn to carry said surface against the negative to enable a print to be made thereon from the negative at the opening of the shutter, and light-excluding means around the holder adapted to permit the withdrawal of the slide above the light-excluding means.

26. In a photographic printing apparatus, a holder having a main frame, a negative support, light-excluding means on said main frame made effective as the frame approaches the support, an inner frame slidable on the main frame and carrying a sensitized surface, a light-excluding slide for said surface withdrawable through the main frame above the light-excluding means, a device for pressing the inner frame to carry said surface against the negative when the shield is withdrawn, and a shutter for the negative adapted to admit light to print upon the surface.

27. In a photographic printing apparatus, the combination with a negative shield, of a removable sensitized surface support, means for shifting the support across the shield to enable a plurality of prints to be made on the surface from the negative, means for separating the support and shield to enable said shifting, a device for excluding side light from entering between the shield and support while they are separated, a slide in the support for excluding light from the surface when the support is removed from the shield, and a shutter for the negative, adapted to admit light at will to the sensitized surface through the negative when the slide is withdrawn.

28. In a photographic printing apparatus, the combination with a negative shield, of a removable sensitized surface support, means normally holding the surface clear of the negative, means for shifting the surface across the shield to enable a plurality of prints to be made on the surface from the negative, means for excluding side light from the surface while the surface and negative are separated, a slide for the support for excluding light from the surface when the support is removed from the shield, and a shutter for the negative adapted to admit light at will to the sensitized surface through the negative when the slide is withdrawn.

29. In a photographic printing apparatus, a plate holder comprising outer and inner frames, the inner frame adapted to carry a sensitized surface and to be slid on the outer frame to bring the sensitized surface at least to the level of the outer frame, means for finely adjusting said surface across the outer frame, a slide slidable across said surface in the retracted position of the inner frame, a negative support having a normally closed shutter and against which the holder is adapted to be brought, and means coöperating with said support to form light-excluding means covering said adjusting means.

30. In a printing device the combination with a negative shield, of a sensitized surface holding device, springs bearing on the shield and normally holding the device clear of the negative to permit transverse sliding of the surface on the negative, and means for pressing the device against the spring tension to bring the surface close to the negative to enable printing to be effected.

31. In a printing device the combination with a negative support comprising a shield, of a sensitized surface holding device, springs on said device adapted to seat themselves on the support and normally holding the device clear of the negative, and means adapted to bear on the device to carry the surface toward the negative against the tension of the springs.

32. In a printing device the combination with a negative supporting table having an

opening through which the negative may print, of a sensitized surface holding device, resilient means normally holding the device to keep the surface away from the negative, rails upon which the device may run to shift it across the negative when the surface is away from the negative and pressure mechanism adapted to be operated to move the device against the spring tension to carry the surface close to the negative to enable printing to be effected.

33. In a printing device the combination with a negative supporting table having an opening through which the negative may print, of a sensitized surface holding device, resilient springs on the device adapted to normally hold the surface away from the negative, rails upon which the device may run to shift it across the negative when the surface is away from the negative, and pressure mechanism adapted to be operated to move the device against the tension of the springs to carry the surface close to the negative to enable printing to be effected.

34. In a printing device the combination with a negative shield, of a sensitized surface holding device, leaf springs extending from the device and adapted to bear upon the shield to normally hold the device away from the negative to permit transverse sliding of the surface on the negative, guide pins for guiding the device as it moves to and from the shield, and pressure mechanism adapted to be operated to move the device against the spring tension to carry the surface close to the negative to enable printing to be effected.

ASHLEY GUY OGDEN.