Dec. 25, 1923. 1,478,828

H. C. JONES

VACUUM FRAME FOR PRINTING UPON SENSITIZED SURFACES

Filed March 25, 1922

Fig. 1.

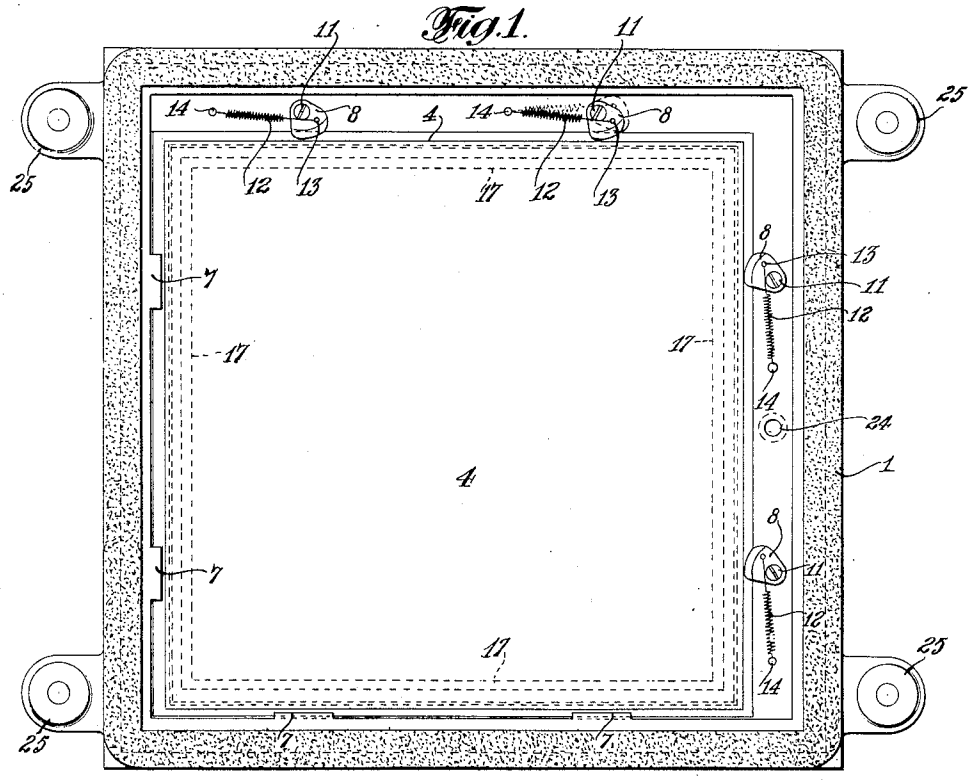


Fig. 2.

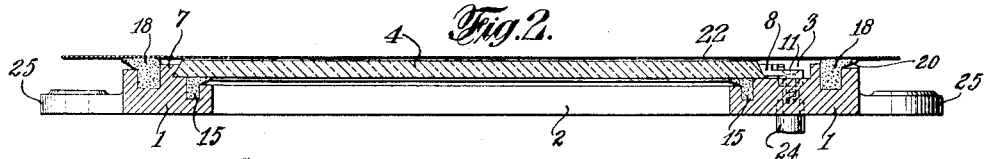


Fig. 4.

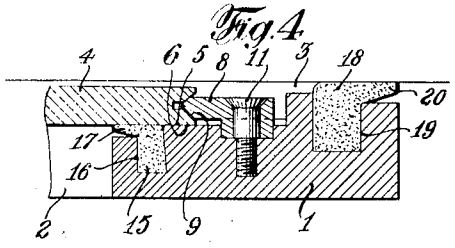


Fig. 3.

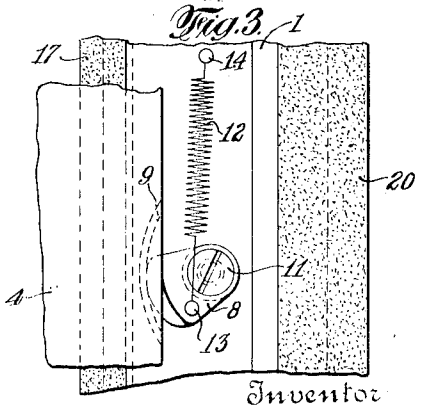
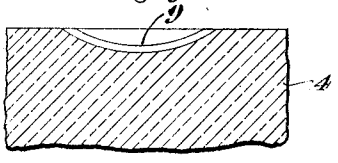


Fig. 5.



Inventor

Harry C Jones

By his Attorneys

Ward Canby & Smith

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UNITED STATES PATENT OFFICE.

HARRY C. JONES, OF LARCHMONT, NEW YORK, ASSIGNOR TO LITHOPRINTEX CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

VACUUM FRAME FOR PRINTING UPON SENSITIZED SURFACES.

Application filed March 25, 1922. Serial No. 546,579.

To all whom it may concern:

Be it known that I, HARRY C. JONES, a citizen of the United States, and resident of Larchmont, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Vacuum Frames for Printing upon Sensitized Surfaces, of which the following is a specification.

My invention relates to vacuum frames for printing upon sensitized surfaces, and the invention is especially useful for contact printing from a negative or other transparency onto a sensitized surface of larger area than said negative, and which for one reason or another is not conveniently placeable, or capable of being placed in a printing frame.

The invention contemplates a frame for receiving and supporting the negative and means for sealing the frame and negative upon a portion only of the sensitized surface, then creating a vacuum in the space between the parts to produce firm contact, and then exposing the negative to a light source.

The principal object of my invention is to provide a vacuum frame especially useful for contact printing between a negative and a portion only of a sensitized surface, and by the use of which when used for printing only on a portion of the sensitized surface the negative may be handled more conveniently and rapidly and the printing accomplished more accurately than has been the case heretofore with contact printing. In carrying out my invention I provide a frame to hold the negative and support it in proper position on the frame from relative lateral—i. e., parallel, movement with respect to the frame, and I provide means by which the negative may be sealed over a portion only of the sensitized surface, with suitable means whereby the air may be exhausted from over the portion of the sensitized surface covered by the negative so as to cause the surface and negative to be forced together to hold the two in firm contact. The invention thus not only enables the elimination of the usual blanket or glass pressure plate covering or enveloping the entire sensitized surface, but it enables a quick and accurate handling of the negative in contact printing, as will hereinafter be explained. According to my invention, I am enabled to seal off any selected part or portion of the whole sensitized surface corresponding to the size of the negative used, and exhaust air from the space between such portion only of the sensitized surface and the negative, so as to produce the desired firm contact, and this can be done while the sensitized surface is held in any position or supported in some special machine. The invention is applicable to printing on any suitable sensitized surface.

The invention consists in the novel features, arrangement, construction and combination of parts hereinafter more fully described in connection with the preferred embodiment thereof.

In the drawings, Fig. 1 is a plan view of the printing frame showing a negative held in place;

Fig. 2 is a sectional view on line A—B of Fig. 1;

Fig. 3 is a plan view of a modified means for holding the negative within the frame;

Fig. 4 is a sectional view on line C—D of Fig. 3; and

Fig. 5 is a sectional view of the negative on line E—F of Fig. 4, showing the milled slot for clamping the negative in the frame.

The printing frame may consist of a rectangular or otherwise formed body member 1 provided with an opening 2, of any convenient form, for the passage of light through the negative. On one side of the frame 1, i. e., the side adapted to lie adjacent the sensitized surface and which I will call the front side, is formed a recess 3 to receive the negative; the outer edges 5, 5 of which may rest on the finished surface 6, 6 of recess 3, while suitable projections or lugs 7, 7 formed on two of the vertical sides of said recess 3 provide means for positioning and with the aid of adjustable clamps 8, 8, for holding the negative rigidly within the recess of the frame.

To hold the negative within the frame and to prevent the holding lugs 7, 7 and clamps 8, 8 from projecting above the contacting surface of the negative, any suitable means may be adopted such as beveling the edge of the negative and the holding lugs or clamps, as is clearly shown in Fig. 2, or by any other means such as illustrated in Figs. 3, 4 and 5, where a beveled slot or recess 9 cut in the edge of the negative, is adapted to be engaged by an adjustable clamp 8. Clamps 8, 8 may be formed with a single or

double bevel, to conform to the character of holding down means provided on the negative, and are eccentrically and pivotally mounted on shouldered screws 11, 11. By means of their beveled edges and eccentricity, the clamps 8, 8 tend to force the negative against the locating lugs 7, 7 for position, and to press it down firmly against the edges 5, 5 of recess 3. Tension springs 12, 12 attached to clamps 8, 8, by pins 13, 13, and to frame 1, by pins 14, 14, tend at all times when on one side of their pivotal center, to draw the clamps more tightly against the negative, and consequently to force the negative against its locating stops and the surface 5, 5 of the frame.

The following means is provided for sealing the edges of the negative so that air can not get around the edges thereof when the vacuum is produced. This consists of member 15 securely held within the groove or channel 16 cut in frame 1. The sealing member 15 may be of leather, rubber, or any suitably yielding or flexible material, and is preferably formed in one continuous piece with an inner projecting flange 17, the upper side or surface of which is in contact with the negative while the under side is free to be acted upon by the pressure of the atmosphere.

Means for sealing the frame with the sensitized surface on which a print is to be made is provided in a similar flexible member 18 rigidly held in the channel or groove 19 of frame member 1. The member 18 projects above the frame member 1 and is provided with a flat surface and a continuous extension flange or lip 20.

When assembled in frame 1, the upper or contacting surface of the negative 4 is but little below the surface of the yielding flange or seal of member 18 so that when said flange is brought in contact with any flat surface 22 a closed chamber is formed between that surface, the frame member and the negative. Preferably the sealing member 18 should be so constructed as not to cause any lateral shifting of the negative and frame with respect to the sensitized surface when the vacuum between the negative and the sensitized surface is produced.

Suitable means are provided for exhausting the air from said space. This may consist of a nipple 24 screwed into a bore in the frame, and provided with a suitable spring-pressed ball check valve, and means for connecting the nipple with an exhaust pump or exhaust receiver.

The operation of the apparatus is as follows: In practice the negative is placed in the frame and positioned or located by the lugs 7, 7 and held in place by clamps 8, 8. The frame is then moved into position opposite the sensitized surface and the sealing member 18 is placed in contact with that portion of the sensitized plate or surface on which a print is to be made, and the air is exhausted from the closed chamber. The pressure of the atmosphere forces the negative and sensitized plate together in intimate contact and holds them in such contact until the vacuum in the closed chamber is broken.

Light to the sensitized surface is admitted through the negative by the opening 2 of frame 1.

Suitable lugs 25, 25 are provided on frame member 1 by which said frame may be supported by bolts or any other means and held in proper position with respect to the sensitized surface during exposure.

It will be understood that the vacuum is not necessarily relied upon to support and position the frame with respect to the sensitized surface, but merely to insure the desired contact. The frame is positioned and supported by other suitable means.

It might be pointed out that the general form of sealing means shown, i. e., the rubber ribs or flanges 15 and 18 with the relatively stout body portion and the relatively thin flexible lips 20, is of special advantage because while the body is firm enough, the lip provides a reliable quick acting seal even on distorted surfaces.

The invention while generally useful, has special application in what are known as "step and repeat" machines. Such machines are well known in the art, and one such machine is described, for example, in United States Letters Patent No. 1,131,631, granted March 9, 1915, for an invention of Herbert M. Pilkington. It is desirable in some cases to use a machine of this character for stepping and repeating designs from a negative directly onto a sensitized metal surface such as a sensitized zinc plate, utilizing in such stepping and repeating the principle of contact printing instead of the principle of projecting by means of lenses. This invention makes it possible in such machines to utilize such contact printing; holding the negative and sensitized surface into contact by pneumatic pressure rather than by having to force the surfaces into close contact by mechanical means which might strain the precision parts of such a machine.

In using the invention in a step and repeat machine which in some forms is known as a photo-composing machine, the negative frame with the negative will be supported securely upon the horizontally and vertically shiftable carriage, and the sensitized zinc plate will be supported upon an adjacent part of the machine and parallel to the shifting carriage and in close proximity thereto. This portion of the machine is capable of being shifted toward and from the carriage to move the zinc plate toward and from the carriage,

While I have described my invention with particularity in connection with the preferred form herein shown and described, it will be understood by those skilled in the art, after understanding the same, that various changes in the form, arrangement and construction of the parts may be made without departing from the spirit or scope of the invention, and I aim in the appended claims to cover all such changes and modifications as are within the scope of the invention. Novel subject matter herein described and not claimed is covered by other pending applications.

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

1. In apparatus of the character described, the combination of a frame for receiving and holding a negative to be printed from onto a sensitized surface, means for positioning and securing the negative in a fixed position upon the frame at the front side thereof from lateral movement relative thereto so that the frame and negative secured thereto may be moved together with respect to the sensitized surface, means operatively related to said sensitized surface frame and negative and serving to seal off from the atmosphere that portion of the sensitized surface covered by the negative, and means of communication for exhausting the air from over said portion of the sensitized surface to cause the negative to be forced into engagement with the same.

2. In apparatus of the character described, the combination of a frame for receiving and holding a negative to be printed from onto a sensitized surface, said frame having means for securing the negative thereto from relative lateral movement so that the frame with the negative secured in predetermined position may be moved together with respect to the sensitized surface, said frame also having means for sealing the negative thereto when the air is exhausted from between the negative and sensitized surface, means for sealing the frame to the sensitized surface, and means of communication for exhausting the air from over the portion of the sensitized surface covered by the negative to cause the negative to be forced into engagement with said surface.

3. In apparatus of the character described, the combination of a frame for a negative, having a yieldable member around the same for engaging and sealing the marginal edges of the negative to the frame, and having another yieldable member around the frame adapted normally to project above the adjacent surface of the negative for engaging and sealing the frame to a co-operating sensitized surface, and means for admitting air to and exhausting it from the space between said negative, surface and frame.

4. In apparatus of the character described, the combination of a frame for a negative, a sealing member around the inner portion of the frame, having a continuous lip adapted to engage one side of the negative when in the frame, said lip having its opposite side exposed to the atmosphere, a second sealing member around the outer portion of the frame and above the first sealing member, and also having a continuous lip adapted to engage a sensitized surface on one side and having its opposite side exposed to the atmosphere, and means of communication for exhausting the air from between the sensitized surface and negative.

5. In apparatus of the character described, the combination of a frame for a negative, means for positioning and holding the negative in a fixed position upon the frame, means around the frame for sealing the marginal portions of the negative with respect to the frame, means around the frame for sealing the frame with respect to a co-operating sensitized surface and means of communication for exhausting the air from said sealed off space between the sensitized surface and negative.

6. In apparatus of the character described, the combination of a frame for receiving and holding a negative to be printed from onto a sensitized surface, said frame supporting the negative and securing it from lateral movement relative thereto so that the frame and negative secured thereto may be moved together with respect to the sensitized surface, said frame having means serving to seal the negative within the frame, said frame also having a yieldable member extending around the same and adapted to engage the sensitized surface to form a sealing joint therewith, and means of communication for exhausting the air from over the portion of the sensitized surface covered by the negative to cause the two to be forced together.

7. In apparatus of the character described, the combination of a frame for a negative, means for positioning and holding the negative in a fixed position upon the frame, means around the frame for sealing it with one side of the negative, means around the frame on the opposite side of the negative for sealing the frame to a co-operating sensitized surface, and means for admitting air to and exhausting it from the space between said negative, surface and frame.

8. In apparatus of the character described, the combination of a frame for a negative, means on two adjacent sides of the frame against which the negative is to abut, means on the other two sides of the frame for holding the negative against said first two sides, means around the inner portion of the frame for sealing it with one side of

the negative, and means around the outer portion of the frame on the opposite side of the negative for sealing the frame to a co-operating sensitized surface.

9. In apparatus of the character described, the combination of a frame for receiving and holding a negative to be printed from onto a sensitized surface, said frame supporting the negative and securing it from lateral movement relative thereto so that the frame and negative secured thereto may be moved together with respect to the sensitized surface, means for sealing the frame and negative over a portion of the sensitized surface, and means of communication for exhausting the air from over the portion of the sensitized surface covered by the negative to cause the two to be forced together.

In testimony whereof I have signed my name to this specification.

HARRY C. JONES.