Feb. 12, 1929. 1,702,232

A. T. KOPPE

VACUUM PRESSURE PRINTING FRAME

Filed May 17, 1923 2 Sheets-Sheet 1

Fig. 1.

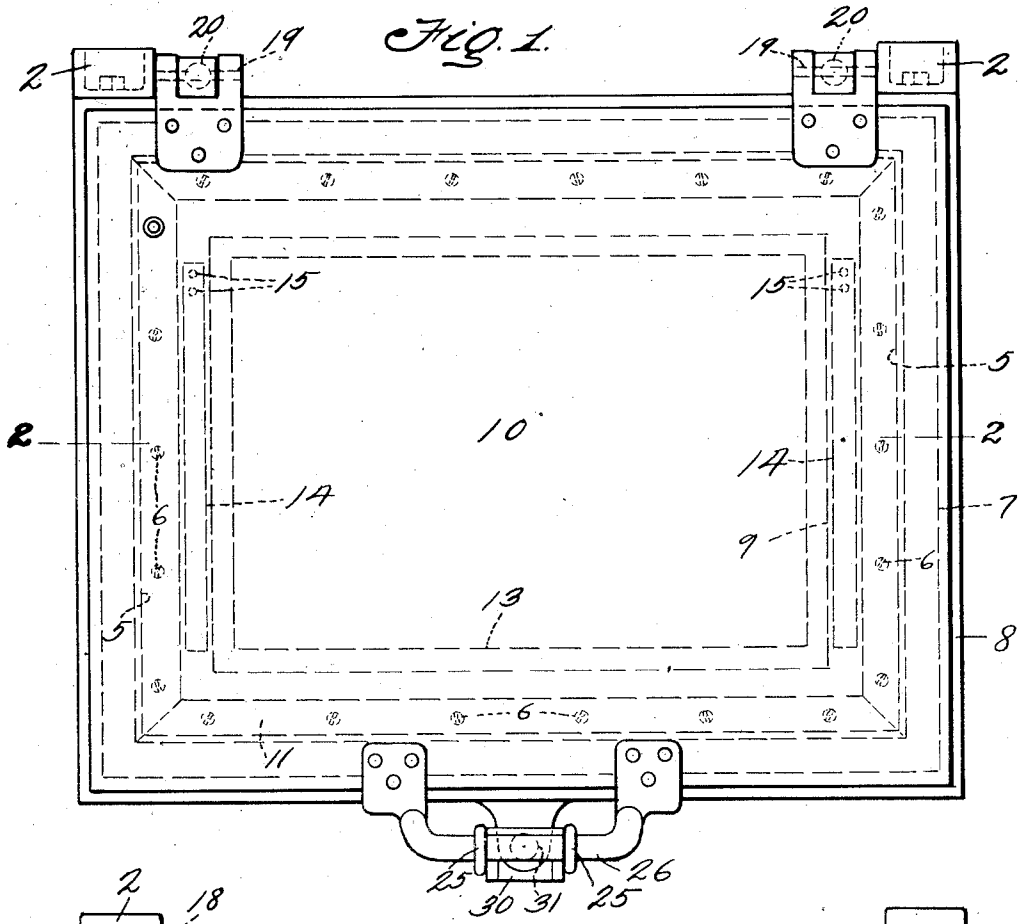


Fig. 2.

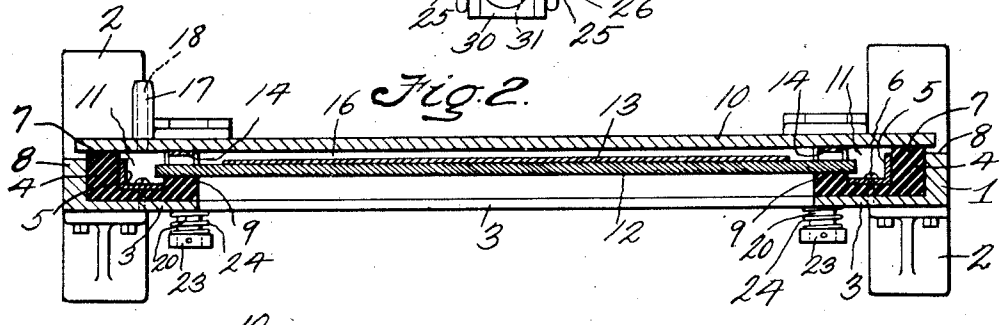
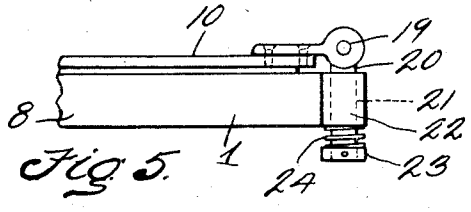


Fig. 5.



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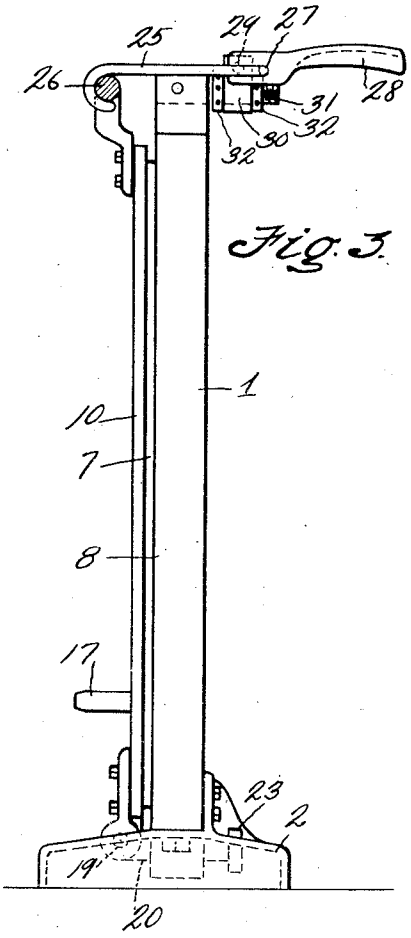
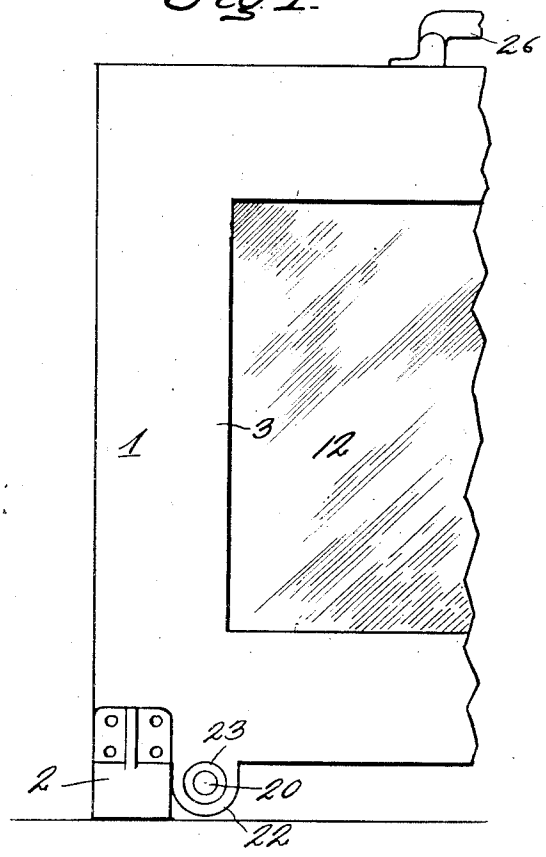


Fig. 3.

Fig. 4.



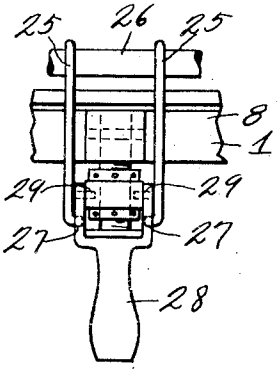
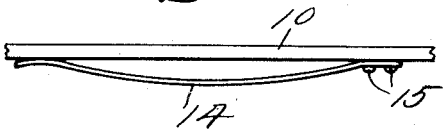


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

ALEXANDER T. KOPPE, OF CHICAGO, ILLINOIS, ASSIGNOR TO DIRECTOPLATE CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

VACUUM-PRESSURE PRINTING FRAME.

Application filed May 17, 1923. Serial No. 639,669.

The invention relates to vacuum pressure frames, and has for its object to provide a device of this character wherein a negative is received and held on a sealing strip by springs carried by a cover plate, and the cover plate cooperating with a flange of the sealing strip for forming an airtight chamber around the negative, from which chamber and the chamber formed by the negative and the plate, air may be sucked for creating a vacuum between the negative and the cover plate, thereby insuring a close engagement of the press plate with the negative. The air is sucked from between the negative and the press plate during the vacuum forming operation, thereby causing the negative and press plate to be forced together by atmospheric pressure and insuring the holding of the press plate in adjusted position on the negative during the photographic reproduction of the image from the negative on the press plate.

A further object is to provide a vacuum pressure frame wherein a negative is held yieldably in engagement with a sealing strip, while a press plate is disposed on the negative within a chamber, in which chamber a vacuum is created and the air withdrawn from between the press plate and the negative and from the chamber, thereby causing the press plate and negative to be pressed into close contact and to be held securely in the exact positions they have been placed in, in relation to each other.

A further object is to form the cover plate springs sufficiently strong whereby they will not be flexed when the vacuum is formed within the chamber of the frame, and consequently will maintain the negative in close airtight engagement with the sealing strip.

A further object is to provide a yieldable hinged connection between the hinged end of the cover plate and the base plate, thereby allowing the cover plate to be adjusted or assume a position relative to the plane of the glass negative, or incident to the variation and thickness of the glass. Also to provide an adjustable clamping and holding means carried by the base and cooperating with the free end of the cover plate for holding and clamping the cover plate in closed position.

A further object is to provide the cover plate with a nipple having a passage in communication with the chamber extending around the sides of the negative, to which nipple a hose may be attached leading to a pump for forming a vacuum within the frame.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawings, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:—

Figure 1 is a top plan view of the frame.

Figure 2 is a transverse sectional view through the frame taken on line 2—2 of Figure 1.

Figure 3 is a side elevation of the frame.

Figure 4 is a bottom plan view of one side of the frame.

Figure 5 is a side elevation of the hinged end of the frame.

Figure 6 is a detail view showing the cover plate holding member.

Figure 7 is a detail view showing a side elevation of one of the negative engaging springs.

Referring to the drawing, the numeral 1 designates the base plate of the frame, which base plate is preferably rectangular shaped as shown, and is supported by brackets 2, which may be secured to a vertical or horizontal support, for supporting the vacuum frame, either in a horizontal or vertical position. The rectangular shaped frame 1 is provided with an inwardly extending relatively wide flange 3, to which flange is secured a sealing strip 4, by means of angle bars 5, through which screws 6 extend into the flange 3. The sealing strip 4 is provided with a flange 7, which extends beyond the outer edge 8 of the frame 1, and with a flange 9 at its inner edge, which is not as high as the flange 7. However the flanges 7 and 9 are spaced from each other, thereby forming, when the cover plate 10 is closed, a rectangular shaped chamber 11 extending entirely around the frame. When it is desired to make a press plate impression, the negative 12 is placed in the frame with its sides resting on the inner flanges 9 of the sealing strip, which strip is preferably formed from rubber. After the negative 12 has been placed in position, the press plate 13 is

properly positioned on the negative, and then the cover plate 10 is closed. When the cover plate 10 is closed the outer sides thereof engage the sealing strip flanges 7, and the oppositely disposed bowed leaf springs 14, which are secured at 15 at one of their ends to the inner side of the cover, (see Figure 7) engage the opposite sides of the negative 12 in registration with the flange 9 of the sealing strip 4 and form an air-tight binding connection between the negative and sealing strip. Springs 14 are sufficiently strong to prevent leakage between the negative and flange 9 when air is sucked from the rectangular shaped chamber 11 and from the chamber 16 formed by the negative 12 and the cover 10, the purpose of which will presently appear. Cover plate 10 is provided with a nipple 17, to which may be attached a hose leading to a pump, and through which nipple the passage 18 of which is in registration with the chamber 11, air may be sucked for creating a vacuum within the chambers 11 and 16. When a vacuum is created in said chambers the air is withdrawn from the region between the negative 12 and the press plate 13 and from the region between the press plate 13 and the cover plate 10 so that the flanges 7 and 9 are compressed by the outside atmospheric pressure, thus causing the cover plate to move inwardly and press the press plate 13 against the negative 12 to produce a close contact of the negative and press plate and to hold the press plate securely in position on the negative. By providing vacuum means, the necessity of using or providing mechanical means for holding the press plate and negative in contact is obviated, and consequently the breaking of the negative incident to undue pressure is also eliminated.

One end of the cover plate 10 is hingedly connected at 19 to shafts 20, which shafts are slidably mounted in bearings 21 of bosses 22 carried by the adjacent end of the base 1, and consequently allows a movement of the cover plate 10 in relation to the base 1 when the cover plate is closed. Secured to the ends of the slidable shafts 20 are collars 23, and interposed between said collars and the bosses 22 are coiled springs 24, which coiled springs exert an inward pull on the hinged end of the cover plate 10, thereby insuring a close and binding engagement of the cover plate with the flange 7 of the sealing strip, consequently insuring an airtight engagement between the cover plate and the flange 7 when the cover plate is closed. The yieldable supporting of the shafts 20 also allow the cover plate to conform to any irregularities which may exist in the flanges 7 of the sealing strip or in the inner surface of the cover plate. After the press plate is properly positioned, the cover plate 10 is closed, and the hooks 25 are hooked over the U-shaped member 26 carried by the free end of the cover plate. Hooks 25 are pivotally connected at 27 to a handle member 28, which handle member has its end pivoted at 29 to a block 30, adjustably mounted on a bolt 31 carried by the base 1. The pivotal point 29 is intermediate the pivotal points 27, and the base plate 1, and consequently it will be seen that when the handle member is moved to the position shown in Figure 3, the free end of the cover plate 10 will be forced into close and binding engagement with the flanges of the sealing strip 4. By adjusting the nuts 32 on the bolt 31, it will be seen that the clamping action may be varied for insuring an airtight joint between the cover plate and the sealing strip, or to adjust the device according to the thickness of the negative 12. Springs 24 automatically allow the hinged end of the cover plate to adjust itself to the thickness of the negative 12, or to irregularities in the sealing strip or cover plate.

After the press plate has been positioned and a vacuum created for expelling air from the chambers of the frame and from between the press plate and negative, the image on the negative may be reproduced photographically in the usual manner by a light disposed to the negative side of the frame.

From the above it will be seen that a vacuum pressure frame is provided, wherein the negative is resiliently held in an airtight condition without use of mechanical means for holding the same, as is now the practice, and one wherein the press plate is held on the negative without use of mechanical means by expelling air from between the press plate and the negative for securely holding the press plate in the exact position on the negative.

The invention having been set forth what is claimed as new and useful is:—

1. A vacuum pressure frame comprising a base plate, spaced yieldable sealing flanges carried by said base plate, a cover plate hingedly connected to the base plate, the outer sealing flanges engaging the cover plate, the inner sealing flanges being adapted to engage one side of a negative, yieldable members carried by the cover plate and adapted to engage the other side of the negative and hold the same in engagement with the inner sealing flanges, said cover and negative forming a press plate receiving chamber, said spaced sealing flanges forming a chamber around the sides of the negative in combination with the cover plate, and means for exhausting air from said chambers.

2. The combination with a vacuum pressure frame, said frame comprising cooperating base and cover plates, spaced sealing flanges disposed between the base and cover plates, yieldable members carried by the cover and cooperating with one of said sealing flanges for holding the negative yieldably in air tight engagement with the sealing flange,

means for exhausting air from between said plates, said yieldable members being sufficiently strong to prevent unseating of the negatives during the air exhausting operation.

3. A vacuum pressure frame comprising a base plate, a cover plate hingedly and yieldably connected to the base plate, clamping means for clamping the free end of the cover plate to the base plate, a channeled sealing member extending around the base plate thereby forming spaced flanges, said cover plate having a binding engagement with the outer sealing flange, spring means carried by the cover plate and registering with the inner flange of the channel and forming means for holding a negative in close airtight engagement with the inner flange of the sealing channel and means whereby air may be exhausted from between the negative and cover plate and from the chamber formed by the channeled member.

4. A vacuum pressure frame comprising cooperating base and cover plates, spaced yieldable sealing flanges carried by one of said plates, one of said yieldable sealing flanges being adapted to support a negative, and yieldable members carried by one of said plates and cooperating with one of the yieldable sealing flanges for holding the negative.

5. A vacuum pressure frame comprising cooperating base and cover plates, spaced resilient sealing flanges carried by the base plate, thereby forming a chamber around the the base plate when the cover plate is closed, spring means carried by the cover plate and registering with one of the spaced resilient sealing flanges and forming means for holding a negative in engagement with said sealing flange and means whereby air may be exhausted from the chamber formed by the spaced flanges and from a chamber formed between the negative and cover plate.

6. A vacuum pressure frame comprising cooperating plates, sealing means between said plates adjacent their sides, and means for entirely yieldably holding a negative between the sealing means and one of the plates.

7. A vacuum pressure frame comprising cooperating plates, a channeled sealing member extending around one of said plates and with which sealing member the other plate cooperates, and yieldable means carried by one of said plates and cooperating with the sealing means for holding a negative in airtight engagement with the sealing means, means for exhausting air from between the negative and plate, said yieldable means being sufficiently strong to prevent unseating of the negative when air is exhausted from the frame.

8. A vacuum pressure frame comprising a base plate, a yieldably hinged cover carried by said base plate, sealing means interposed between the base plate and cover and with which the cover cooperates for holding a negative in spaced relation to the cover, yieldable means carried by the cover for engaging the negative and means whereby air may be exhausted from between the negative and the cover.

9. In combination, a rectangular frame having an opening to permit light to pass therethrough, a negative mounted over said opening, a resilient sealing member fixed on said frame and engaging one side of said negative around said opening, a sensitized plate adapted to contact with the other side of said negative, a plate adapted to engage the side of said sensitized plate opposite said negative, means for forming an air seal around the edges of said negative and beyond said edges, and means to permit the air to be exhausted from the region between said negative and said press plate.

10. In combination, a rectangular frame having an opening to permit light to pass therethrough, a negative mounted over said opening, a sealing member carried by said frame and engaging one side of said negative around said opening, a sensitized plate adapted to contact with the other side of said negative, a plate adapted to engage the side of said sensitized plate opposite said negative, a second sealing member attached to said frame and engaging said plate around said negative outwardly of the edges of said negative, and means to permit the air to be exhausted from the region between said negative and said sensitized plate.

11. In combination, a rectangular frame having an opening to permit light to pass therethrough, a negative mounted over said opening, a sealing member carried by said frame and engaging one side of said negative around said opening a sensitized plate adapted to contact with the other side of said negative, a plate adapted to engage the side of said sensitized plate opposite said negative, a second sealing member attached to said frame and engaging said plate around said negative outwardly of the edges of said negative, means to permit the air to be exhausted from the region between said negative and said sensitized plate, and means for resiliently connecting said frame and said plate.

In testimony whereof I affix my signature.

ALEXANDER T. KOPPE.