E. W. SWEIGARD.

PRINTING FRAME.

APPLICATION FILED AUG. 24, 1914. RENEWED DEC. 18, 1916.

1,234,416. Patented July 24, 1917.

Fig. 1.

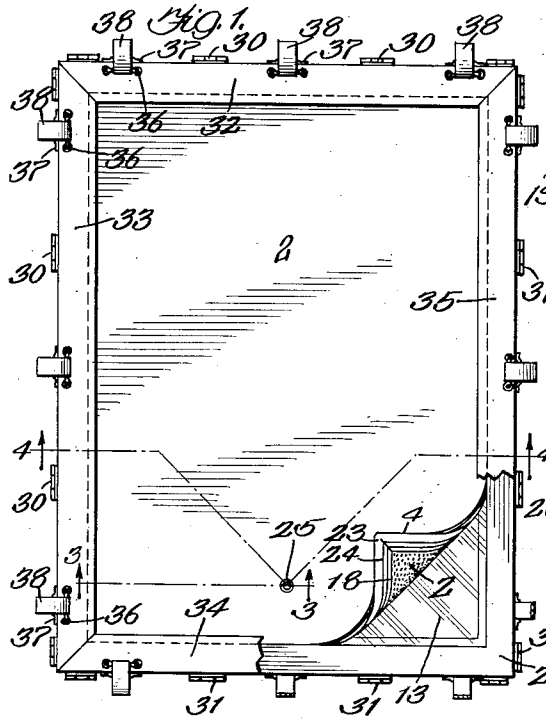


Fig. 2.

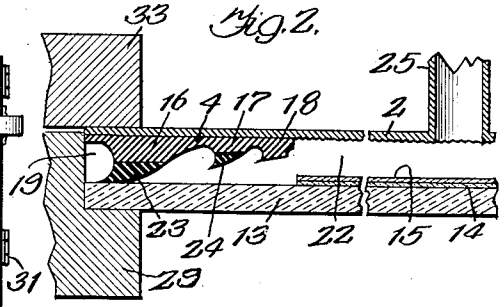


Fig. 3.

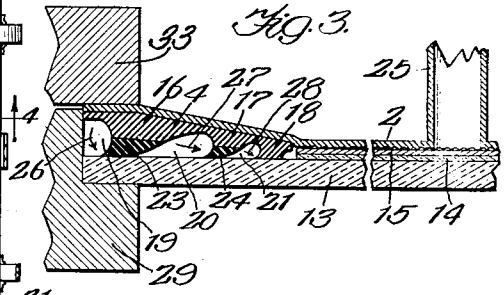


Fig. 4.

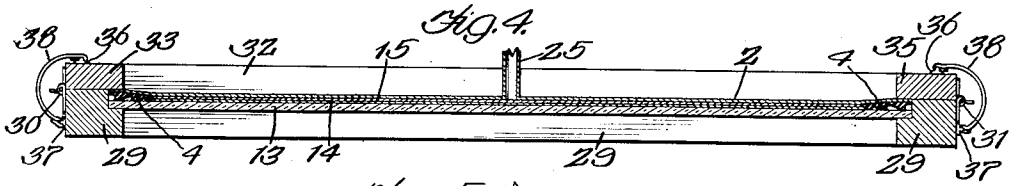


Fig. 5.

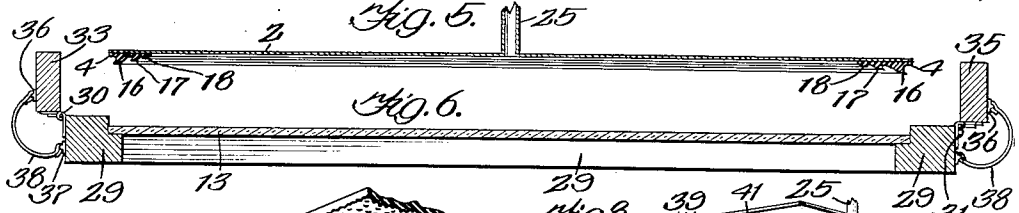


Fig. 6.

Fig. 7.

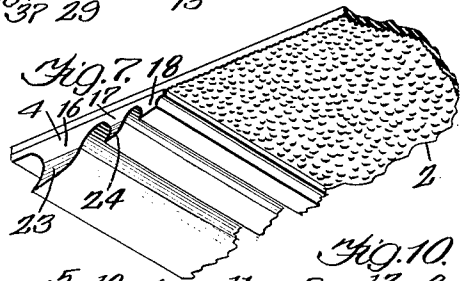


Fig. 8.

Fig. 9.

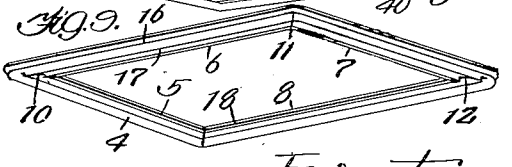
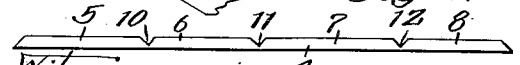


Fig. 10.



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PRINTING-FRAME.

1,234,416. Specification of Letters Patent. Patented July 24, 1917.

Application filed August 24, 1914, Serial No. 858,175. Renewed December 18, 1916. Serial No. 137,695.

To all whom it may concern:

Be it known that I, EMANUEL W. SWEIGARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Frames, of which the following is a specification.

My invention relates to printing frames for holding negatives and sensitized paper or metal in printing chemically, such as blue-prints, half-tones and the like, and has particular reference to the construction of the larger types of frames which, for the sake of convenience in handling, require flexible backs and more elaborate means for applying the pressure than that required for the simple small frames.

The object of the present invention is to provide improvements in the flexible back, mat or blanket between which and the front or glass of the frame are held the negative and sensitized sheet, and to provide an improved air-sealing edge for said back, mat or blanket.

With this object in view the invention consists in the novel construction of back and seal therefor hereinafter described in detail, illustrated in the accompanying drawing and incorporated in the appended claim.

In the drawing—

Figure 1 is a plan view of a frame, partly broken away, to which my invention has been applied.

Fig. 2 is an enlarged section taken substantially on line 3—3 of Fig. 1.

Fig. 3 is similar to Fig. 2 with the back and seal pressed against the glass front.

Fig. 4 is an enlarged section taken substantially on line 4—4 of Fig. 1.

Fig. 5 shows the flexible back removed from Fig. 4.

Fig. 6 is similar to Fig. 4, but with the clamping rails in released or open position, and back removed.

Fig. 7 is a perspective view of a broken away portion of the back.

Fig. 8 is a reduced diagrammatic view of a modified form of back in which its inner surface is corrugated.

Fig. 9 is a similar view of the rubber edge or seal for the back.

Fig. 10 is a plan view on a reduced scale of the blank from which the seal in Fig. 9 is formed.

Referring in detail to the several views, the seal portion of the back, shown in perspective in Fig. 9, forms a quandrangular frame. This frame is cemented to the back 2, or its modified form 3 in Fig. 8, and forms an air-seal 4 which in Fig. 10 appears in four sections 5, 6, 7, and 8 produced by notches 10, 11 and 12 which permit bending the blank to form the frame or seal. This seal and the back 2 or 3 are made of a cheap quality of rubber. On the side of the seal 4 which faces the front of the frame, indicated as the usual glass plate 13 through which the printing light is admitted to the negative and sensitized sheet, (indicated, respectively, in Figs. 2 and 3 as 14 and 15) said seal is provided with beads, ridges or raised portions 16, 17 and 18, which, together with parts of the printing frame, form air-spaces 19, 20 and 21 that are closed to the usual air-space 22 between back 2 and front 13 of the printing frame when the seal is in operative position, as in Fig. 3.

The raised portions 16 and 17 are crowned with or terminate in sections 23 and 24 made of pure rubber vulcanized to the bodies 16 and 17, this to insure the necessary pliability or elasticity in the surfaces of the beads, ridges or raised portions 16 and 17 which contact with the front or glass 13. An air tube 25 is connected with the back and communicates with the air space 22. This tube is connected with a suction pump (not shown) or any suitable means for exhausting air from the space 22 with the result that the atmospheric pressure on the outsides of the front and back causes compression of the back against the negative, sensitized sheet and front as in Fig. 3. This atmospheric pressure also acting on the seal 4 causes its parts 23, 24 and 18 to be compressed against the front or glass and the tendency of the air to enter around the edges of the seal in the direction indicated by arrows 26, 27 and 28 in Fig. 3 causes lateral pressures on the ridges, which, owing to their outwardly inclined positions presses them still closer to the glass and effectively seals up any initial leakages of air.

Owing to the utilization of air pressures from the edges parallel to the planes of the back and front as an aid to automatically tighten the seal I am able to dispense with the comparatively powerful mechanical clamping means that would otherwise be required at the edges of the flexible back 2 or 3, or for its sealing edge. The front of the

printing frame consists of the usual glass-holding frame 29. To this frame I have hinged as at 30 and 31 a printing back series of clamping rails 32, 33, 34 and 35 which are independent of each other but together form a frame as shown in the plan view of Fig. 1. To each of these clamping rails 32 to 35 and to the frame 29 are pivoted, respectively, as at 36 and 37 the ends of a curved spring 38. Two or more of these springs may be advantageously employed for each rail as shown in Fig. 1. When the clamping rails are in their clamping or operative position in the manner shown, for instance, in Fig. 4 each spring 38 acts to compress the clamping rail against the seal or edges of the back, the pivotal connections 36 and 37 being on a line forward of the hinge 30. When the rail is released or swung back on its hinge, as for instance the rail 33 in Fig. 6, the tension of the spring exerts a pull on a line in the rear of the hinge 30 and tends to hold the rail open or raised, from which position it is snapped shut or against the back by merely pressing the rail inwardly by hand. This construction, arrangement and operation of the clamping rails for the back's seal facilitates rapid and convenient manipulation of the frame and obviates the trouble and expenditure of time required for securely clamping down the edge of a back not provided with a self sealing seal sealed by leakage pressures of air.

In order to permit the air to exhaust through the tube 25 from the entire inner surface of the flexible back, or glass front, or from the space 22, the inner surface of the back or mat 2 is roughened by small surface projections as in Fig. 7 or by corrugations or channels 39 running parallel and connected with each other and with the air-outlet 25 by diagonal or transverse channels 40 and 41, as in Fig. 8.

In Fig. 1 a corner of the flexible back, blanket or mat is shown turned back exposing the glass 13 of the front below. In operation the rails 32 to 35 are simply turned back as in Fig. 6, the back lifted to permit insertion of negative and sensitized sheets, then restored and finally the back-frame rails snapped into place to hold the ribs 16 against the glass. Suction is then applied through the tube 25 causing the atmospheric pressure, as explained, to press the seal 4 air-tight against the glass and relieve the clamping rails of the function of producing an air-tight periphery for the back. My improved printing frame is mounted in any usual or convenient way for loading, exposure, etc., such details forming no part of the present invention and are therefore not shown.

By roughening or corrugating the side of the blanket or back which faces the glass or front the need of an auxiliary blanket of felt or the like is obviated. The body of the seal, or the plurality of seals represented by the ribs, is made of stock having sufficient rigidity to withstand collapse under atmospheric pressure while the points or crowns of the seals or ribs are made of a specially prepared material, such as nearly pure, or pure, rubber which has a tendency to cling to any smooth surface such as polished glass used in these frames. The ribs or seals are made endless, or without open joints at the corners and their clinging contact surfaces prolong the life of a vacuum so that repumping will not be necessary during exposure. The amount of air between the back and the front is quite small, hence a small leakage of the check valve or stop cock of an air-pumping mechanism will result in an imperfect vacuum and insufficient pressure, hence the importance of a plurality of sealing ribs and the backing of the latter.

I claim as my invention—

The combination with the back of a printing frame, of a sealing strip having ribs thereon, which provide a plurality of separated air spaces, said ribs crowned with a more resilient material than that of which the bodies of said strips are made.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EMANUEL W. SWEIGARD.

Witnesses:
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J. W. BECKSTROM.