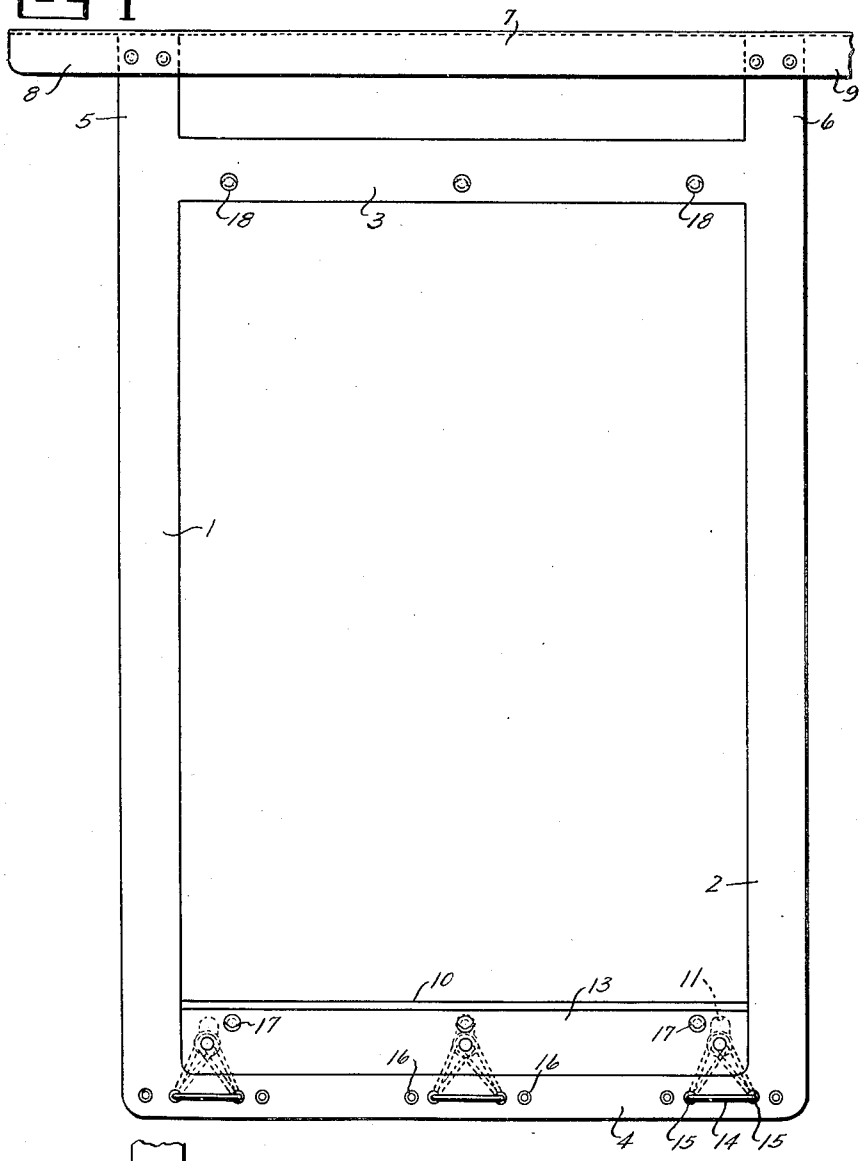
July 20, 1948. W. R. FISCHER ET AL 2,445,320

PHOTOGRAPHIC FILM PROCESSING FRAME

Filed Aug. 29, 1946

Fig 1



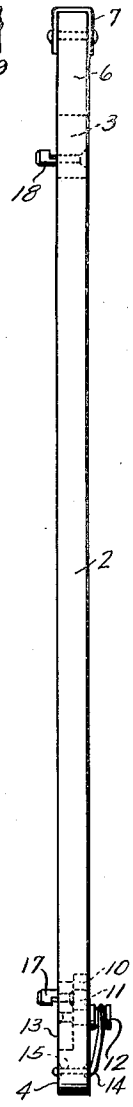


Fig 2

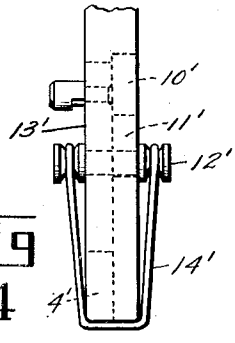


Fig 4

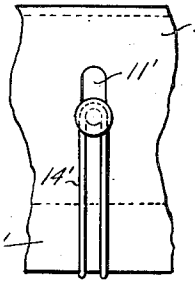


Fig 3

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PHOTOGRAPHIC FILM PROCESSING FRAME

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3 Claims. (Cl. 95—100)

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The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to us of any royalty thereon.

The present invention relates to a photographic film processing frame which includes provision for readily attaching and detaching the sheets of film.

The principal object of this invention is to provide a one piece frame for use in processing photographic film or paper and including means to retain the sheets of material in place under light tension. The retaining means being resiliently mounted it is a related object to use the tensioning force thereof in providing a retaining means which will facilitate attachment and detachment of the sheets undergoing processing.

Another object of the invention is to provide a film processing frame of simplified construction and one that is adapted for use of synthetic plastic construction, so as to provide a frame less subject to attack by photographic chemicals.

A further object of the invention is to provide a sheet processing frame having a sheet tensioning means combined therewith and including tensioning elements which are easily replaced and which are preferably in the form of rubber or other elastic bands.

It is a related and primary object of the invention to generally improve the construction of sheet processing frames.

The above and other objects of invention will become apparent on reading the following detailed description in conjunction with the drawing, in which;

Fig. 1 is a plan view of the sheet processing frame.

Fig. 2 is an edge view of the sheet processing frame.

Fig. 3 is a fragmentary plan view of the sheet processing frame and including a modified sheet tensioning means.

Fig. 4 is a fragmentary edge view of the sheet processing frame and including the same tensioning means as shown in Fig. 3.

For a detailed description of the sheet processing frame reference is made to Fig. 1 wherein the structure includes two vertical members 1 and 2 joined by two horizontal members 3 and 4. The vertical members 1 and 2 are extended upwardly beyond the member 3 to provide extension 5 and 6 to which are fastened a carrier element 7. The carrier 7 may be in the form of a metal channel of stainless steel riveted to the extensions 5 and 6 with the open side of the channel facing downward as shown. The carrier or supporting means 7 provides a convenient attachment to handle the frame without touching the lower parts thereof, and because of the lateral extension 8 and 9 on the carrier the frame may be suspended in a processing tank with these extensions resting on opposite top edges of the tank. The frame members 1 to 4 are preferably of a plastic material which is not attacked by various chemicals used in processing the photographic film or paper carried on the frame. The frame members may be made as separate strips and then joined or cemented together, or the whole frame may be molded or formed in one continuous piece. If the members are to be joined together it is preferred that their end portions be halved-out to provide a neat joint having the thickness of a single member. The cementing techniques for plastic materials are well understood, but as an example the members of the frame might be of nitrocellulose (Celluloid), in which case acetone may be used to soften the materials and thus effect a joint therebetween. As an alternative the members may be of methyl-methacrylate (Lucite), in which case cementing may be effected by the use of Du Pont H–7 cement or any other cement or solvent found to be suitable.

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At the lower part of the frame the horizontal member 4 carries an upwardly extending guide portion 10, which has a thickness about half that of the members 1 to 4 and which is connected at its ends to the frame members 1 and 2. The portion 10 is slotted at 11 in several places to receive studs 12 secured on the slide member 13 and having annular recesses therein for reception of rubber bands 14. The rubber bands have their ends extended through pairs of openings 15 in the frame member 4 and their end loops are snapped over the studs 12 to tension the slide member 13. Additional pairs of openings 16 in the member 4 provide for the use of more than one rubber band at each stud if more tensioning force is desired, or if a single band is used which is longer than those illustrated. The slide member 13 is shaped in plan as shown in Fig. 1, and has a thickness about half that of the frame members 1 to 4. In its lowermost position the slide member abuts along its lower edge with the upper edge of the thicker portion of frame member 4. Upward movement of the slide member is limited by the slots 11 in which are located the studs 12 carried rigidly on the slide member.

The slide member 13 carries several sheet securing elements 17 which correspond in number and relative location with similar elements 18 on

the upper horizontal frame member 3. The securing or retaining elements may be of stainless steel and may be riveted onto the members 3 and 13. Each of the elements 17 and 18 includes a recessed head portion which provides a shoulder to retain the sheet material in position on the frame. Each sheet to be attached to the frame has holes in two opposite edges which are slightly larger in diameter in the elements 17 and 18. The holes in one edge are spaced from the holes in the opposite edge such a distance as to be slightly closer than the elements 17 and 18 when the slide member 13 is in the lowermost or fully retracted position. To install a sheet of film or paper the slide member 13 is pushed toward the frame member 3 to allow the sheet to be pushed over the elements 17 and 18 and past the sheet retaining shoulders thereof. Then the slide member is released or allowed to slide back under the influence of the tensioning bands 14. Thus the sheet is pulled taut ready for processing in a liquid bath or for subsequent drying in the air. To remove the sheet the procedure used in applying the same is merely reversed.

Referring now to Figs. 3 and 4 the lower portion of the sheet processing frame is shown in fragmentary form to illustrate a modified form of sheet tensioning means which also uses rubber bands or their equivalent. In this form of the invention the guide portion 10', forming part of the lower frame member 4', is slotted at 11' to receive the guide studs 12' rigidly connected with the slide member 13'. Each stud carries a recessed head at its opposite ends, providing an annular band receiving recess. Also one head portion of each stud may have a threaded or drive fit thereon to facilitate assembly of the structure. To tension the slide member 13' downwardly a rubber band is looped over the recessed heads with the middle portion of the rubber band 14' extending around the lower edge of the frame member 4'. If more tensioning force is required, as in instances where the sheet material to be processed is relatively heavy, additional rubber bands may be snapped in place.

In Figs. 3 and 4 the lower horizontal frame member 4' including the guide portion 10' is illustrated as made up of two superimposed strips of material, the one at the left in Fig. 4 being relatively narrow while the one at the right is relatively wide and extends above the narrow strip. These two strips may be cemented together along their abutting faces and are also adapted to be cemented or otherwise joined to the frame members 1 and 2. While the use of plastic frame members is not required, it does provide a frame which is easily cleaned, readily fabricated, and which does not contaminate the film treating reagents or affect the film being treated. In the same way the use of rubber bands as a sheet tensioning means results in a structure having a minimum of metallic parts. The guide studs associated with the slide member and the sheet retaining elements or studs are preferably of stainless steel for strength and durability, but these elements may be made of plastic materials if desired and if so may be cemented in fixed position on the frame members or molded integrally therewith.

The processing frame is shown and described as being of rectangular form, to provide an open frame which can in no way obstruct the free flow of treating liquid to the film under treatment, nor will the frame interfere with air drying of the finished film or print. The rubber band type of sheet tensioning means is easily replaced when the bands wear out or lose their resilience. Also when the sheets are to be mounted on the frame the bands may be removed if desired, so that the slide may be more readily moved into proper position for application of the sheets over the sheet retaining elements.

The embodiments of the invention herein shown and described are to be regarded as illustrative only and it is to be understood that the invention is susceptible to variations, modifications and changes within the scope of the appended claims.

We claim:

1. A rectangular sheet processing frame comprising, two side frame members connected by an upper frame member and a lower frame member, said frame members being of the same uniform thickness, said lower frame member having an upward extension about half the thickness of said frame members and having one face coplanar with respect to one side of said frame, a slide member about the same thickness as said upward extension and being movably mounted thereon in face to face contacting relation therewith, the opposite non-contacting face of said slide member being coplanar with respect to the other side of said frame, means retaining said slide member in movable relation with respect to said upward extension, sheet securing studs on said slide member and on said upper frame member and adapted to be received in openings in opposite edge margins of a rectangular sheet, and sheet tensioning means extending between said slide member and said lower frame member.

2. A rectangular sheet processing frame as recited in claim 1 wherein said sheet tensioning means comprises, projections extending from said slide member, and a plurality of rubber bands each having their end loops extended through spaced openings in said lower frame member and with said end loops being secured over said projections.

3. A rectangular sheet processing frame as recited in claim 1 wherein said sheet tensioning means comprises, projections extending from said slide member at opposite sides of said frame, and a plurality of rubber bands each having their end loops secured over said projections at opposite sides of said frame and having their middle portions extending around the lower edge of said lower frame member.

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