

May 30, 1950

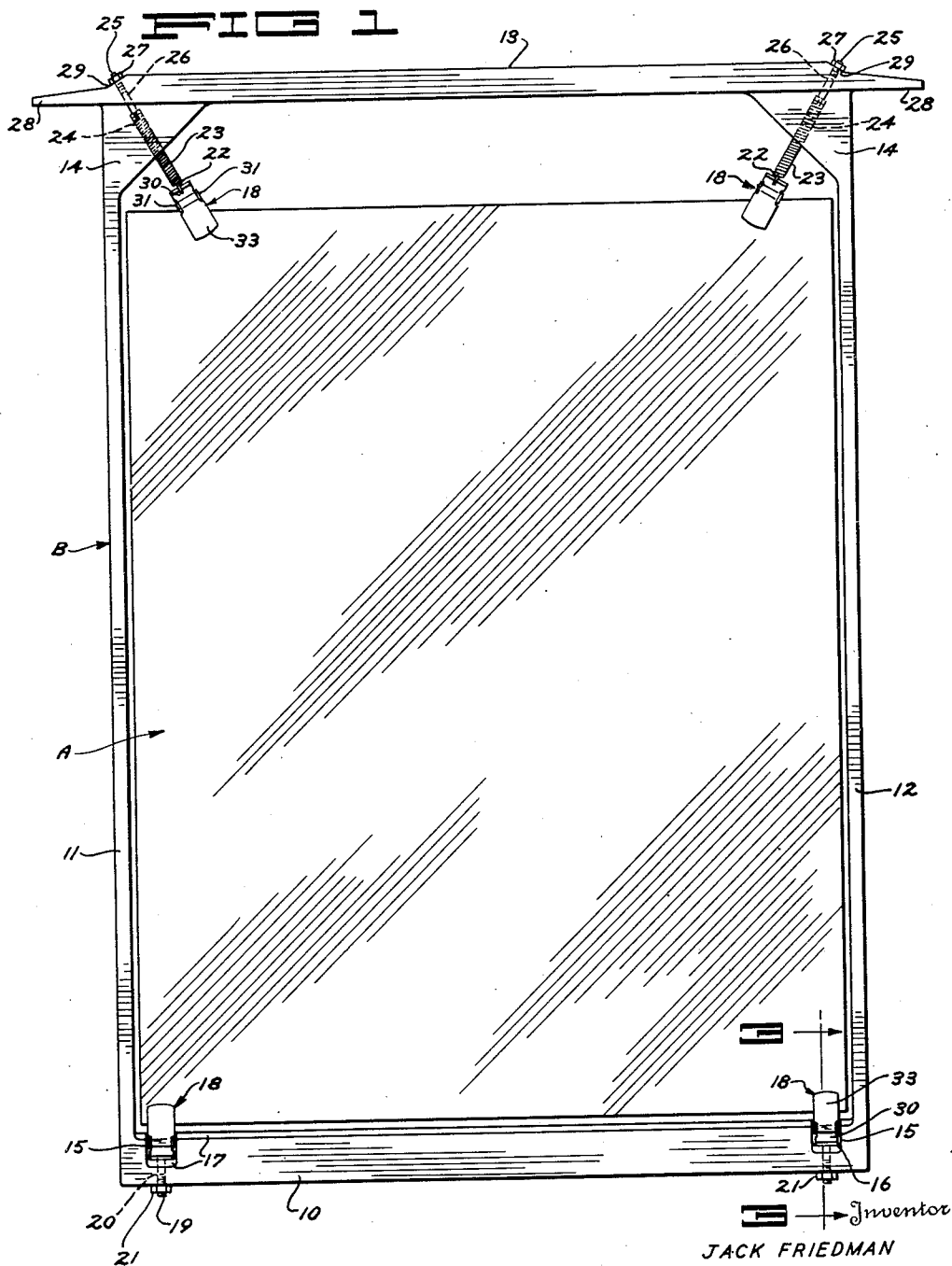
J. FRIEDMAN

2,509,293

FILM HANGER WITH TAPERING SIDES

Filed May 31, 1947

2 Sheets-Sheet 1



By *Carlson & Hazle*
Attorney

May 30, 1950

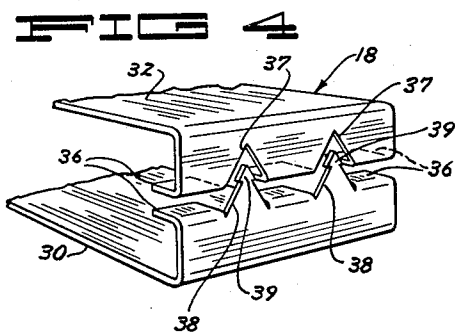
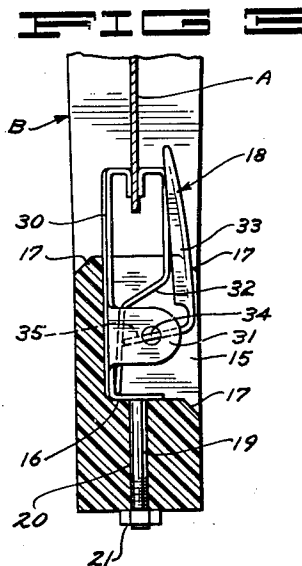
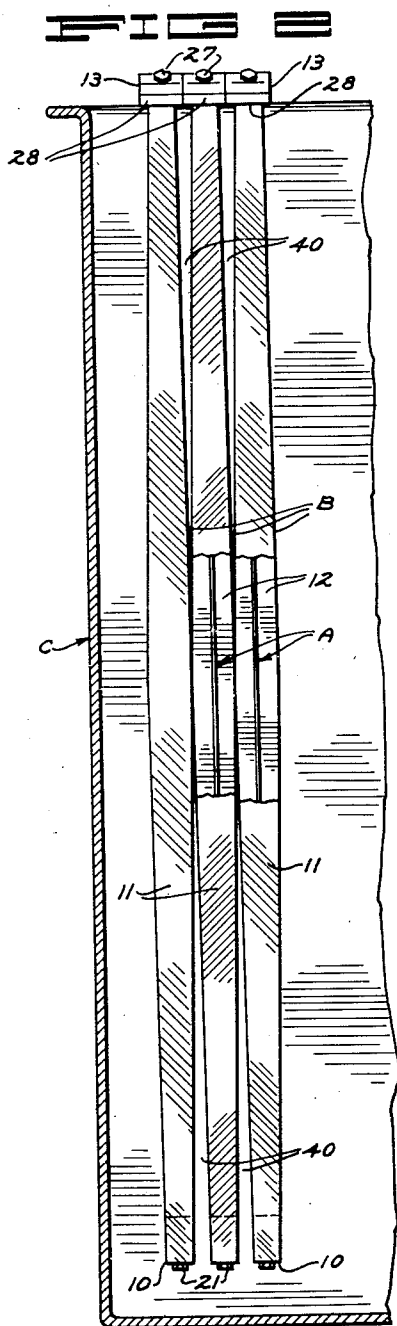
J. FRIEDMAN

2,509,293

FILM HANGER WITH TAPERING SIDES

Filed May 31, 1947

2 Sheets-Sheet 2



Inventor

JACK FRIEDMAN

334 *Carlson + Hagle*
Attorneys

UNITED STATES PATENT OFFICE

2,509,293

FILM HANGER WITH TAPERING SIDES

Jack Friedman, St. Paul, Minn., assignor of one-half to Dorothy L. Friedman, St. Paul, Minn.

Application May 31, 1947, Serial No. 751,540

3 Claims. (Cl. 95—100)

1

This invention relates to improvements in film hangers and the primary object is to provide a frame in which X-ray films may be conveniently fastened and manipulated through the usual developing, fixing, washing and drying operations, all with the maximum of convenience and without damage to, or wrinkling of, the film.

The present day hangers for this purpose, to my knowledge, are awkward to use in all respects, are difficult to manipulate in inserting the films and frequently allow the films to touch each other in the developing tanks, or to become scratched or otherwise injured in handling. It is accordingly an object of my invention to provide improvements which will overcome all of these disadvantages, which will firmly hold and stretch the film and will protect it completely and such improvements will be discussed in detail hereinafter.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

Fig. 1 is an elevation of my improved film hanger with a film in place therein.

Fig. 2 is an edge view of several film hangers supported in a developing or fixing tank, partially shown in cross section.

Fig. 3 is an enlarged sectional view along the line 3—3 in Fig. 1.

Fig. 4 is an enlarged, fragmentary perspective view of the jaw end of one of the clips or fasteners for the film.

Referring now more particularly and by reference characters to the drawing, A designates the usual rectilinear X-ray film and B a hanger therefor, constructed in accordance with my invention. There are several standard sizes of films and it will be understood that my hanger will be made in appropriate sizes to fit.

The hanger B comprises a rectangular frame preferably fabricated from a suitable plastic having a lower end 10, sides 11 and 12 and an upper end or support bar 13. The inside dimensions of the frame are such as to loosely accommodate the film A, the frame being considerably longer vertically to provide clearance at the top for integral gussets 14 which join the sides 11 and 12 and the upper end 13, and for the fasteners for the upper end of the frame, as clearly shown. The sides 11 and 12 are quite thin while the bottom 10 is wide (vertically) and heavy enough so that the frame is weighted at this lower end and may be readily lowered straight into the

2

developing or other liquid without any tendency to float off to either side.

Adjacent its junction with the sides 11 and 12 the lower frame end 10 has notches or recesses 15 which open upwardly and to one side, forming rests or supports 16 at each side. It will be noted that the horizontal surfaces of the end 10, and these rests 16, are all beveled off at their edges 17 so that fluid will run off readily when the hanger is removed from the liquid. Positioned in each of the notches 15 is a clip, designated generally at 18, and the construction of which will presently be described. At this point it is sufficient to state that the clips include threaded studs or pins 19 which extend down through openings 20 in the lower frame end 10 and are provided with retaining nuts 21 so that the clips may be removed and replaced when necessary.

Similar clips 18 are provided for engaging the upper corners of the film A and these clips are attached at 22 to the lower ends of retractile coil springs 23 which angle upwardly and outwardly up into openings or guideways 24 formed in the corner gussets 14. These openings 24 house a part of the springs 23 preventing them from dangling about and thus facilitating the attachment of the upper clips to the film as will be understood. The springs 23 are attached at upper ends to threaded studs or pins 25 which extend upwardly through smaller extensions 26 of the openings 24, and these studs are provided at upper ends with nuts 27 to anchor the springs but to permit convenient removal and replacement when necessary.

The upper end 13 of the frame projects at each extremity beyond the frame sides 10 and 11 in the form of suitably tapered fingers 28 and it will be noted that where the nuts 27 are placed, angular surfaces 29 are formed at right angles to the axes of the openings 24 to properly seat the nuts.

Attention is called to the shape of the frame as viewed from the side or edgewise, and as seen in Fig. 2, wherein it will be noted that the sides 11 and 12 taper upwardly and downwardly from their centers at which they are substantially wider, and that the upper end 13 of the frame is the same width as the wide centers of the frame sides. The importance of this conformation will be presently set out.

The clips 18 are somewhat similar to the conventional clamp or cam type clips used on suspenders and the like, each having a fixed jaw 30 having apertured ears 31 turned from its edges

3

and between which is positioned a movable jaw 32 and a cam member 33 which is pivoted at 34 between the ears 31 and has an end 35 to engage and cam the jaw 32 to a closed position as seen in Fig. 3. When the cam member 33 is swung away from the jaws its end 35 clears the jaw 32 to allow the ends of the jaws to spread apart in a well known manner. The studs 19 are fixed to the ends of the fixed jaws 30 in the case of the lower clips, while the springs 23 are hooked to these jaws in the upper clips. The clips are preferably made of stainless steel.

For my purpose the working ends of the jaws 30 and 32 (Fig. 4) have edges 36 turned back and adapted to clamp and grip the film A when the clips are engaged therewith, while one jaw has triangular notches 37 to receive complementarily shaped teeth 38 on the other so that the clips will perforate the film also and thus obtain a secure grip thereon. The ends of the teeth 38 are preferably also barbed as indicated at 38 to further assist in securing a firm hold on the film.

In use, the film A is placed in the hanger frame and is first fastened at its lower end by the lower clips 18. For loading the hanger it may be conveniently placed in an easel-like support (not here shown) and it will be found easy to properly center and straighten the film with respect to the frame bottom 10. The springs 23 are then pulled down and the upper clips 18 engaged with the film and since the springs then exert both upward and outward forces on the film it will be held taut and flat as will be understood. The dual perforations made by the teeth 38 on each clip overcome any tendency of the film to twist about on the lower clips and get out of line as the upper clips are engaged and it is found that the hanger is very easy to load even in the dark-room where this work is done.

When so mounted in the hanger the film may be handled with ease and may be suspended in the developing or fixing fluids which are provided in tanks, such as indicated at C in Fig. 2. The hangers will engage at their fingers 28 on the sides of the tank to suspend the films in the fluid and it is at this point, where a member of the hangers are positioned side by side as shown in the drawing that the double-tapered shape of the frame sides 11 and 12 becomes of importance. Thus the films A are spaced apart a distance equal to the maximum width of the frame so that there is no possibility of the films touching and causing so-called "kiss marks," while the tapered sides provide spaces, indicated at 40, through which the fluid may freely circulate around all of the films. The wide upper ends 13 of the hangers maintain this spacing and prevent the hangers from "fanning" apart at lower ends when a group of hangers are grasped or moved lengthwise of the tank.

It will be noted that the clips 18 are all so located in the frame that the film A is exactly centered, as viewed from the edge, to obtain the maximum spacing between films in adjacent hangers, and further that the lower clips particularly have no projections which might catch on and pull up an adjacent hanger when one is being lifted from the tank, as frequently happens with present day hangers.

For the accommodation of smaller films the frame sides 11 and 12 and lower end 10 may be reduced in length but the upper end 13 will preferably remain the same length so as to properly and supportably engage the tank sides, as will be readily understood.

4

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. A film hanger for hanging an X-ray film in a developing or fixing tank, comprising a rectangular frame having upper and lower ends and connecting sides adapted to enclose the film, said upper end of the frame having end projections to hang on the sides of the tank, means for fastening the film in the frame, the sides of the frame being widest at their centers as viewed from the edges of the frame to space films in adjacent hangers apart, and the said frame sides tapering from substantially their centers toward upper and lower ends thereby forming spaces between adjacent hangers through which the developing and fixing fluids may freely circulate about the opposite sides of the films, the said upper ends of the hanger frames being substantially the same width as the wide centers of the frame sides.

2. A film hanger for hanging an X-ray film in a developing or fixing tank, comprising a rectangular frame having upper and lower ends and connecting sides adapted to enclose the film, said upper end of the frame having end projections to hang on the sides of the tank, means for fastening the film in the frame, the sides of the frame being widest at their centers as viewed from the edges of the frame to space films in adjacent hangers apart, and the said frame sides tapering from substantially their centers toward upper and lower ends thereby forming spaces between adjacent hangers through which the developing and fixing fluids may freely circulate about the opposite sides of the films, and the upper ends of the frames being as wide as the centers of the frame sides to thereby prevent the hangers from fanning apart at lower ends when a group of hangers are pushed along the tank or lifted therefrom.

3. In a film hanger wherein is embodied a frame having upper and lower ends and spaced sides defining an opening to accommodate a film and having means for holding a film in said opening, the improvement which consists in tapering the opposite edges of the frame sides upwardly and downwardly from a common point the thickness of which at least equals the thickness of the upper end of the frame.

JACK FRIEDMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
617,335	Hall	Jan. 10, 1899
1,141,314	Caldwell	June 1, 1915
1,237,562	Schoenberg	Aug. 21, 1917
1,955,575	Buck	Apr. 17, 1934
2,299,779	Wolfe	Oct. 27, 1942
2,352,601	Burke	July 4, 1944
2,370,434	Wolfe	Feb. 27, 1945
2,436,882	Edelhart	Mar. 2, 1948
2,445,496	Sardeson et al.	July 30, 1948

FOREIGN PATENTS

Number	Country	Date
24,451	Sweden	Apr. 4, 1908