

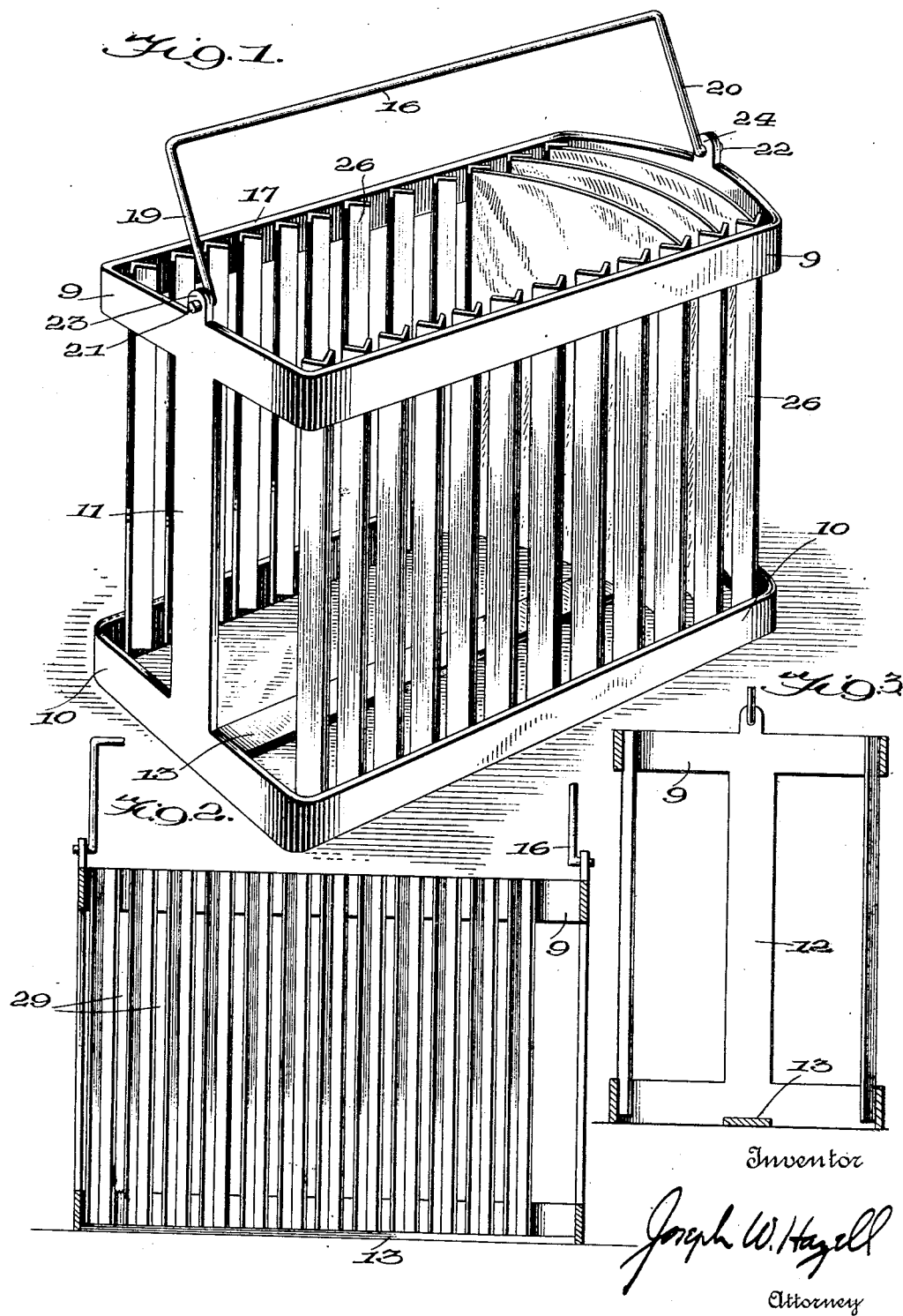
Nov. 18, 1930.

J. W. HAZELL
NEGATIVE HOLDER

1,782,068

Filed Dec. 21, 1926

2 Sheets-Sheet 1



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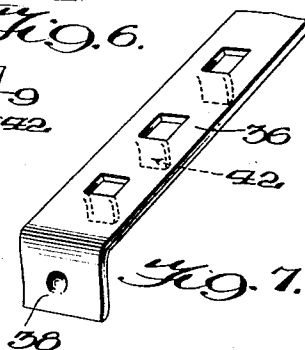
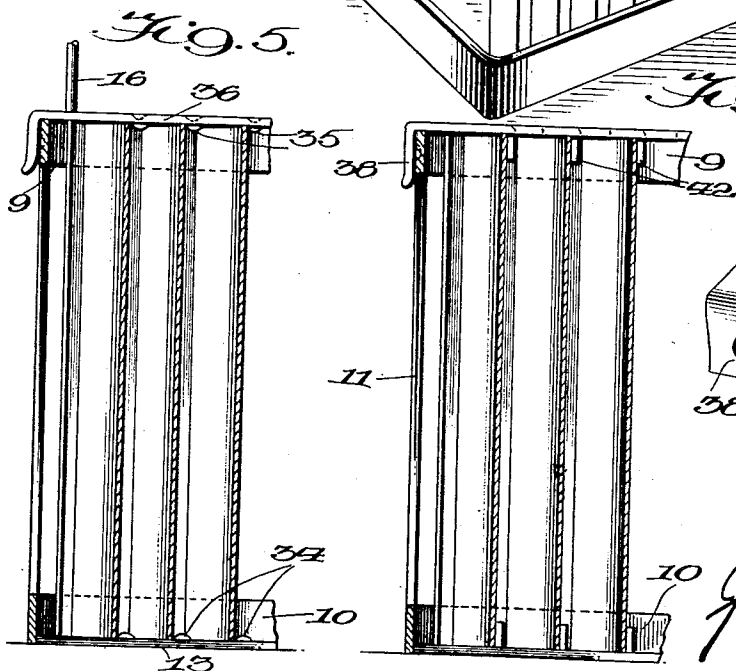
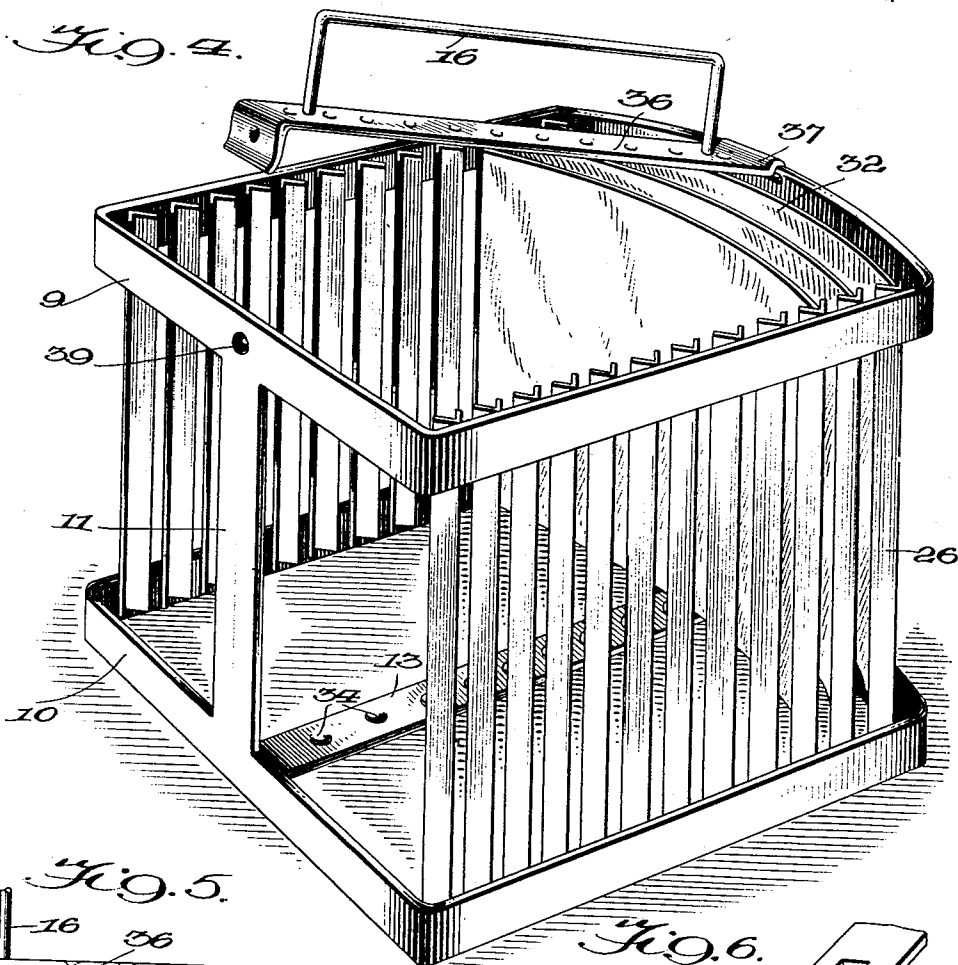
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NEGATIVE HOLDER

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The present invention relates to photographic apparatus, and more particularly to a holder for flexible sensitized photographic material such, for example, as a flexible photographic negative.

The principal object of the invention is to provide a holding device to support one or more flexible photographic negatives, such, for example, as cut film, during the process of development, and to support said negative or negatives with sufficient rigidity to maintain them in relatively fixed position throughout the process of development, but without the use of any clamps or fastening devices secured to the negative.

Another object of the invention is to provide such a device which will support the negative at its edges only, so that there is nothing in contact with either flat face of the negative which might mar it or cause spotting.

A further object is to provide a device which will support a plurality of such negatives during the process of development by holding them under resilient pressure or tension exerted by the negative itself, so that the tendency of the negative to curve slightly is utilized to hold the negative more firmly in position, and, in addition, to provide a device which so supports the negative during development that the tendency of the negative to curve slightly after development is to a certain extent counteracted or overcome.

A still further object of the invention is to provide such a device in which a relatively large number of negatives may be supported in relatively fixed position during development in such a manner that the entire number may be shifted with respect to the developing solution by a single movement of the holder, the holder being so constructed that it insures a fixed and adequate spacing of the negatives from each other during development.

Further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, which illustrate, by way of example, preferred embodiments of

the invention, but which are not to be taken as a definition of the limits thereof, reference being had to the appended claims for that purpose.

In the drawings:

Fig. 1 is a perspective view of one embodiment of the invention;

Fig. 2 is a longitudinal vertical section therethrough;

Fig. 3 is a vertical sectional elevation taken laterally therethrough;

Fig. 4 is a perspective view of a slightly modified form adapted particularly to hold the larger sizes of negatives;

Fig. 5 is a fragmentary longitudinal sectional elevation through Fig. 1, but showing the top brace closed;

Fig. 6 is a similar view showing a different form of top brace;

Fig. 7 is a fragmentary perspective view showing more in detail the top brace of Fig. 6.

Referring in detail to the drawings, and particularly to Figs. 1 to 3 inclusive, the invention as here illustrated is shown as being adapted to hold a plurality of cut films and for this purpose is shown as having the form of an open frame provided with supporting means, in the present instance for twelve of such films, though it will be understood that the frame may be any desired size and may be made to hold one film or more than a dozen without departing from the invention. As shown in the embodiment of the invention herein illustrated by way of example, the holder consists of spaced top and bottom horizontal frame members 9 and 10, which may be connected at their ends by upright members 11 and 12. A horizontal stop member 13 is shown as extending from one end to the other of the lower frame member 10, and upon this stop or stretcher member 13 the lower edges of the negatives are adapted to abut and rest.

The holder of the present invention is preferably provided with some convenient handle means to permit it to be lifted out of a solution or tank, said handle means being constructed and designed so that it will not interfere with the insertion or removal of the negatives. For this purpose there is shown,

by way of example Figs. 1 and 3, a bail 16 having a horizontal carrying portion adapted in lowered position to lie along the outside of the upper edge 17 of the top frame member 9. The upright portions 19 and 20, whose ends 21 and 22 are inserted in openings in the lugs 23 and 24, are adapted to lie along the upper edges of the ends of the top frame member 9.

The film supporting means in the present embodiment of the invention are shown as consisting of opposed, grooved, parallel members 26 secured at their tops and bottoms to the top and bottom frame members 9 and 10 respectively. Adjacent supporting members 26 are preferably spaced from each other so as to provide openings 29 between supporting members for the purpose of permitting free access of the developing solution between adjacent films.

The distance between adjacent supporting members 26 may be varied within wide limits; it is sufficient to space them far enough apart to prevent any possibility of contact between adjacent films. The distance between adjacent supporting members 26 may be computed for the maximum spacing of the films in a given quantity of developing solution, as will be obvious.

Referring now to what is perhaps the most important feature of the invention, the opposed supporting members 26 on one side of the frame are spaced from the similar series on the opposite side of the frame a certain distance apart which is determined by the distance between the side edges of the film to be supported in the holder. In order to insure the greatest effectiveness of the holder and rigidity of the film, even when it becomes softened by immersion in solutions, it is necessary that the two opposed series of supporting members 26 be spaced apart a distance which is less than the distance between the side edges of the film to be supported.

There is generally at least a slight tendency of the film negative to curve so that one of its faces is slightly concave and the other face slightly convex. In the use of the present invention, the negative is curved in the opposite direction by forcing it manually to assume a position in which its normally convex surface becomes concave, and while the negative is in this position it is slid vertically down between two opposite trough members or grooved supports 26, and owing to the fact that their distance apart is less than the straight line distance between the side edges of the negative when it is flat, the negative cannot spring back into its normally curved condition, and the tendency of the negative to do this merely forces it into tighter contact with the bottoms of the grooves of the supports 26.

It has been found that the pressure thus

exerted is sufficient of itself to hold the smaller negatives, up to size 5 x 7, with great firmness during the entire process of development so that the holder as a unit may be lifted out of one solution and placed in the next and may be agitated freely by vertical movement of the holder in the solution without any danger of the negatives becoming displaced. It may be added that there is a slight tendency of such flexible negatives to swell when placed in solutions. This tendency slightly increases their curvature when in the holder and makes up for the loss of some spring pressure effect of the negative, which is greater when the negative is dry than when it is wet.

Referring now to Figs. 4 to 7 inclusive, a construction is shown which is particularly adapted to hold in position negatives larger than 5 x 7. The top and bottom frame members 9 and 10 are constructed as before and are spaced by vertical spacing members 11. The trough-like supporting members 26 are also constructed as before and are similarly spaced. Where a large film 32 is to be used in the holder, the lower stretcher member 13 may be provided with upset portions 34, herein shown as being in the form of small domes upset in the stretcher member 13. A top bracing stretcher 36 is hinged at 37 to the upper frame 9 and is provided with a spring catch 38 at its forward end to cooperate with a coacting locking portion 39 provided on the frame member 9. The top portion of the upper stretcher or holding member 36 may be provided with a handle 16. The under side of the member 36 is preferably provided with projections 35 similar to the projections 34.

In constructing the device, the two series of parallel grooved supporting members 26 are spaced apart less than the width of the film to be held, and the upper and lower bracing projections are so placed that when the film is dry its enforced curvature in the holder will bring the central part of its upper and lower edges into close proximity but not quite in contact with the upper and lower bracing projections 34 and 35, so that when the negative expands slightly after immersion in a solution, its top and bottom edges will be forced into contact with said projections. In cooperation with the grooved supports 26, which maintain the negative in its enforced curved condition, the top and bottom bracing projections 34 and 35 maintain the negative in sufficiently rigid condition to insure that it will not slip out of the grooved members 26.

In Figs. 6 and 7 another form of projection is shown in which the projections 42 are punched out of the upper and lower stretcher members.

The advantages of the present invention are derived by reason of the fact that instead

of the opposed grooved supports 26 being spaced from each other a distance slightly greater than the width of the negative, usually glass, to be supported (a construction which is quite useless for flexible negatives), the supports 26, according to the present invention, are spaced apart a distance less than the width of the flexible film. This construction permits the film to be supported with sufficient rigidity to insure that it will not become displaced during development even though the frame be moved about in the solution. The frame supports the flexible negative so that nothing can touch or deface either of its surfaces; a plurality of such negatives may be placed dry in the holder and the whole number, including the holder as a unit, may be removed bodily from one solution to the next. If desired, the negatives may even be dried in the holding frame. The entire frame may be placed in a tank which may be closed and inverted from time to time. Any number of frames may be placed in an open tank and may be removed successively after the proper time of immersion, which varies depending upon the kind of film used. The entire number of films may be agitated at once by moving the frame without any danger of scratching or marring any part of any film surface. The vertical position of the films and the adaptability to vertical movement of the frame prevents any foreign matter from settling on the film surface, and insures that the films can be subjected to the action of the top portion as well as the bottom portion of the solution. This, together with the fact that the solution between any two films is intermixed with the adjacent portions of the solution, either when the holder is raised and lowered or by reason of the spacing between adjacent grooved portions, insures even development.

Various changes and modifications may be made without departing from the invention as defined by the appended claims.

What is claimed is:

1. A holder for flexible negatives including a pair of parallel side members provided with opposed negative supporting portions, each portion being grooved, the sides of each groove diverging from each other at an angle of substantially ninety degrees, said opposed negative supporting portions being spaced apart a distance less than the corresponding dimension of the negative to be supported thereby, and means for preventing relative movement of one of said side members with respect to the other.

2. A holder for flexible negatives including a pair of parallel side members provided with opposed negative supporting portions, each portion being grooved, the sides of each groove diverging from each other at an angle of substantially ninety degrees, said opposed negative supporting portions being spaced

apart a distance less than the corresponding dimension of the negative to be supported thereby, means for preventing relative movement of one of said side members with respect to the other, fixed means for bracing a negative in each pair of grooves along its bottom, and a hinged strip member carrying bracing means for the tops of the negatives in said grooves.

In testimony whereof I affix my signature.

JOSEPH W. HAZELL.