

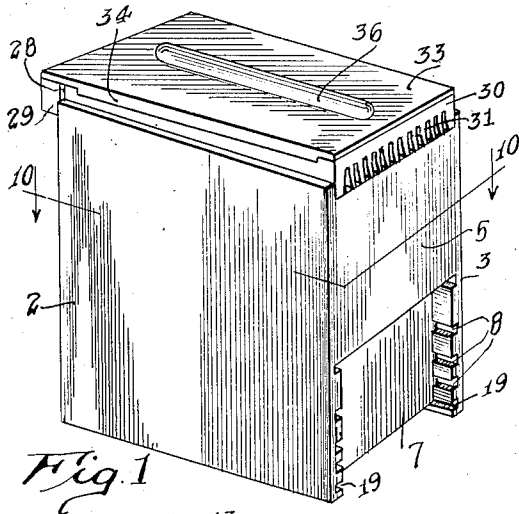
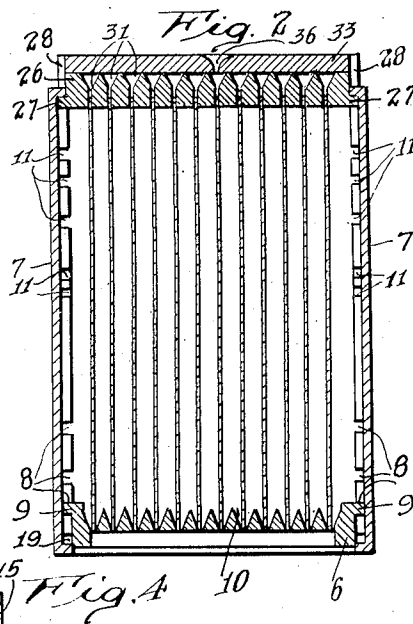
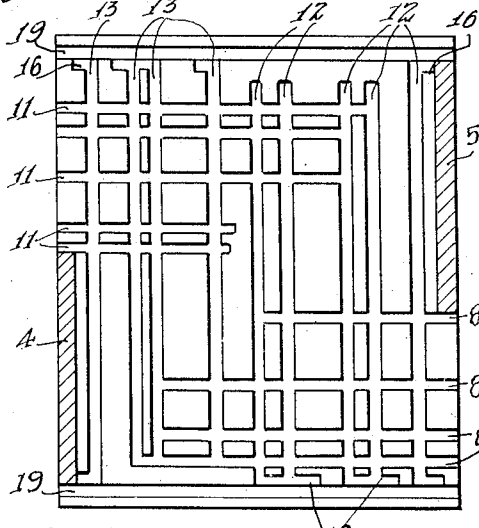
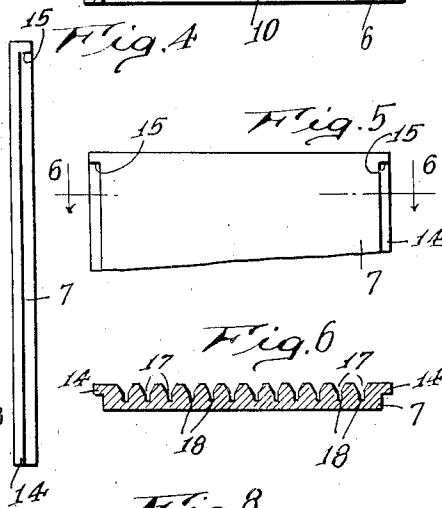
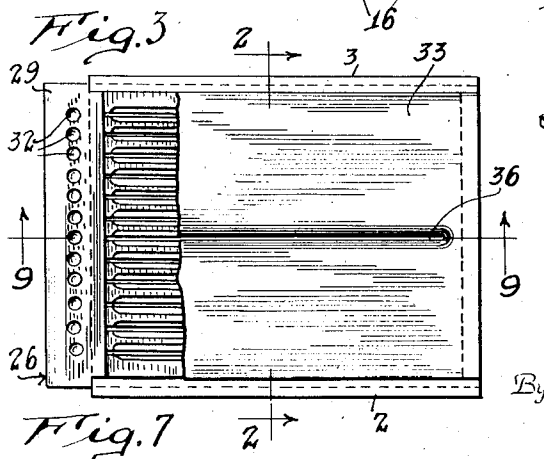
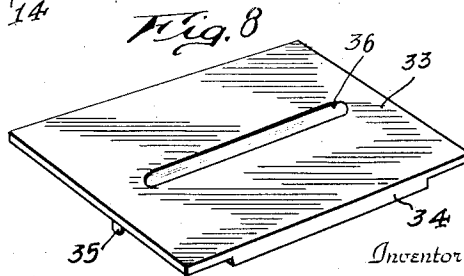
March 21, 1944.

E. P. McMURTRY  
FILM DEVELOPING CAGE

2,344,710

Filed June 9, 1941

2 Sheets-Sheet 1



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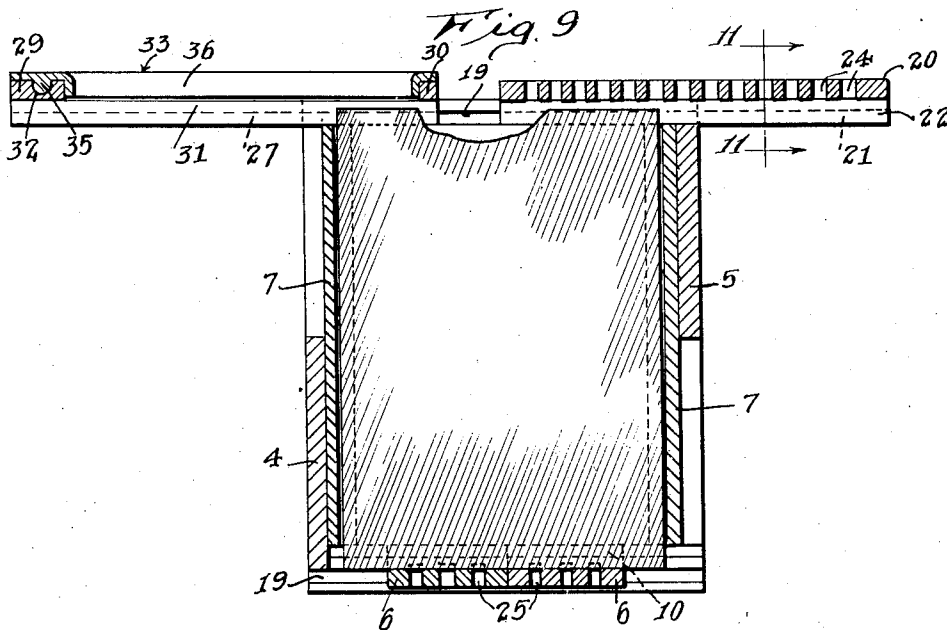
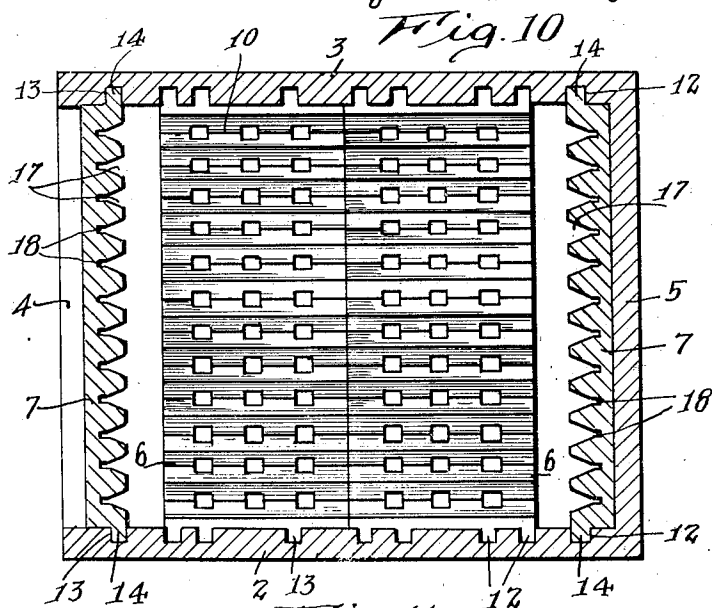
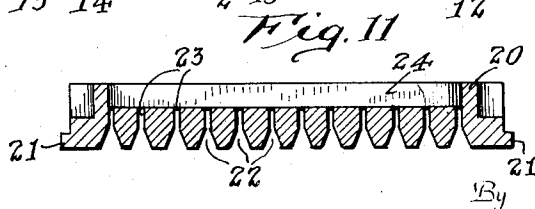
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## UNITED STATES PATENT OFFICE

2,344,710

## FILM DEVELOPING CAGE

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Application June 9, 1941, Serial No. 397,156

8 Claims. (Cl. 95—90)

This invention relates to a film developing cage used for holding a plurality of films in position while the films are exposed to a developing solution.

One of the objects of the present invention is to provide an improved means for holding a film by its four edges during developing operations. By means of the present invention, the film to be developed may be adequately supported without contact between the supporting means and the exposed portion of the film. The supporting means further provides for holding the film against buckling during developing operations and permits the expansion of the film.

Another object of the present invention is to provide a film developing cage which may be readily loaded in darkness.

The film developing cage of the present invention includes means provided with a plurality of notches or slots for holding film to be developed by the four edges thereof and combines therewith a special loading means by which the film may be successively guided into the respective holding positions without danger of harming the film in operation.

A further object of the present invention is to provide a film developing cage constructed and arranged to be readily adjusted in order to accommodate any of the common film sizes, and including means by which adjustments may be made not only to accommodate all of the common size flat type of film but also all of the common size film pack type of film.

It is a further object of the present invention to provide a film developing cage with proper shaped notches and slots for holding the film from the edge, which notches or slots are specially designed to be effective for holding either the common flat film or the film pack type of film.

The film developing cage of the present invention, together with various additional objects and advantages thereof, will be more completely understood from a description of a preferred form or example of a developing cage embodying the invention. For this purpose, I have hereinafter described a preferred form or example of a film developing cage embodying the invention, the description being given in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of the cage showing the loading means in position.

Figure 2 is a vertical section on the line 2—2 of Figure 7.

Figure 3 is a vertical section of the cage per se, showing the adjusting groove arrangement.

Figure 4 is an elevation of one of the false side members.

Figure 5 is a fragmentary rear view of the false side member.

Figure 6 is a section on the line 6—6 of Figure 5.

Figure 7 is a plan view of the cage with the upper member of the loading means broken away.

Figure 8 is a perspective view of the upper member of the loading means.

Figure 9 is a section on the line 9—9 of Figure 7 with the loading means partially removed and the supplementary top partially in position.

Figure 10 is a section on the line 10—10 of Figure 1.

Figure 11 is a section on line 11—11 of Figure 9.

Referring to the drawings, the cage comprises a rectangular frame, consisting of two complementary side members 2 and 3 and two partial end members 4 and 5. As viewed in Figures 1 and 3, for example, the end member 4 extends from near the bottom of the side member 2 upwardly somewhat over half the height of the cage, while the end member 5 extends from near the upper end of the cage downwardly somewhat over half the height of the cage.

In order to fit the size of the cage to the different film to be developed, the film supporting means of the cage are provided by false bottom members 6 and false side members 7. The side members 2 and 3 of the cage are provided with a novel form of supporting means for such false bottom members 6 and false side members 7. Each of the side members 2 and 3 is provided below the bottom of the end member 5 with a plurality of horizontal grooves 8, which are spaced apart at irregular intervals, the spacings of such grooves from the top of the cage being made to accommodate, for example, the four different heights of the film pack type of film. The bottom members 6 (of which there are two) are provided at their ends with tongues 9 adapted to interfit with the grooves 8, so that such bottom members may be slidably supported by any one of the grooves 8 and thereby be positioned at different desired adjusted heights within the cage. Two bottom members 6 are provided since the width of the cage as well as the height are altered in operation. Thus, for example, when the larger sizes of film are being developed, such as necessitate the insertion of the bottom members

6 in the lower three grooves, as shown in Figure 1, both bottom members are employed, but in the use of the apparatus for developing the smaller type of film only one of the bottom members is inserted in the upper of the grooves 8, which is of relatively short length. Each of the bottom members provides a plurality of V-shaped notches 10 for holding the lower edge of the film to be developed.

In order to provide for adjusting the position 10 of the bottoms of the cage properly for developing also the various different lengths of the flat type film, a further series of horizontal grooves 11 is provided in the side members 2 and 3 of the frame of the cage, such horizontal grooves being disposed above the member 4, as viewed in Figure 3. Because of the many different variations in the size of film on the market, adjustments in the height of the bottom required to accommodate the flat type of film would interfere with the adjustments desired for accommodating a device to the different sizes of the film pack type of film, as such adjustments are all made from one end of the cage. In order to overcome this difficulty, I make the frame of the cage reversible; that is to say, the frame as viewed in Figures 1 and 3 is turned upside down when it is desired to accommodate the different flat types of film. Thereupon, the members 6 are inserted in the series of horizontal grooves 11 at a correct spacing for the height of the film to be developed. It is to be noted that the spacings between the grooves 11 are not regular but should be made to conform with the different standard heights of the flat type film to be developed.

The side members 2 and 3 of the frame are further indicated as provided with two series of vertical grooves 12 and 13 for receiving in adjusted position the false side members 7 of the cage; one of such series of vertical grooves 13 being for the adjustment of the position of one of the side members 7 when the cage is in the position indicated in Figures 1 and 3, and the other series of vertical grooves 12 being for adjusting the position of one of the side members when the cage is in the reversed position. The side members 7 are provided with tongues 14, which tongues are adapted to slidably fit within the grooves 12 or 13, and at the end of the tongues there are provided stop shoulders 15. The vertical grooves 12 and 13 are enlarged as indicated at 16 at the ends of the side members in order that the side members 7 may be lowered into the grooves 12 or 13 until the upper edges of said side members 7 are flush with the upper edges of the side members 2 and 3, in which case the stop shoulders 15 of the side members 7 fit within the enlargement 16.

In the use of the cage, when the cage is in the position shown in Figures 1 and 3, one of the false side members 7 is inserted in the right hand groove 12 with its grooves 17 facing inwardly. The other side member 7 is inserted in the correct vertical groove 13 to accommodate the width of the film to be handled. When the cage is turned upside down to accommodate the flat type of film, one of the side members is inserted in the groove 13 most nearly adjacent the side 4, and the other false side member 7 is inserted in the correct groove 12 to accommodate the proper width of the flat film to be developed.

By the means thus described, I have provided for an accurate adjustment of the height and width of the film which will be received in the cage, and by the expedient of making the cage re-

versible have provided for two series of adjustments of both height and width, without such adjustments interfering one with the other.

The false bottom members 6 and side members 7, when considered in connection with the particular form of notches provided thereby and the special means for accurately adjusting the width and height of the cage, provide a means by which the film to be developed may be properly held in the cage without danger of the film or any portion thereof being marred and without binding the film. There are at present two different types of film on the market, and the cage of the present invention is designed to properly hold both types of film in developing operations. The so-called film pack type of film has a comparatively wide margin of unexposed film, so that there is little danger of marring the exposed portion of the film from handling the film by its edges. Such film has, however, a relatively thin back and a relatively large tendency to sag or buckle when set by a developing solution. The flat type film has a very narrow margin and it is thus readily possible to mar the exposed portion of the film in handling the film by its edges, although the film has a stiffer base and less tendency to sag or buckle when in use. In order to so construct and arrange the cage as to properly accommodate both types of film, I provide the bottom members 6 of the cage with V-type notches 10, which will substantially prevent any contact between the sides of the film and the sides of the notches. The notches of the side members 7 are preferably in the form of a Y—that is to say, the notches consist of a V-shaped segment 17 followed by a straight-walled section 18. In determining the separation of the two side members from each other, where the cage is adapted to handle the flat type of film, I fix the spacings between the side members 7, so that the sides of the film do not extend into the straight notches 18 but will only extend into the V-shaped sections 17 of the notches, so that no contact will take place between the supporting means and the exposed portion of the flat type film. Such flat type film has sufficient resistance to buckling to be satisfactorily held in this manner.

When developing the film pack type of film, which has a greater tendency to buckle, I design spacings between the side members 7 so that the edges of the film pack type of film will extend into the straight portions 18 of the notches 17 to thereby be better supported against buckling. In fact, it is preferable to extend the film pack type of film as far as possible into the notches, leaving only sufficient space for the expansion of the film upon contact with the developing solution.

The side members 2 and 3 are provided adjacent the top and bottom with grooves 19 for supporting the top of the cage, one of the grooves 19 being used in each of the reverse positions of the cage. The top 20 employed during developing operations, as indicated in Figures 9 and 11, is provided with tongues 21 for slidably fitting within the grooves 19 of the side members. The top 20 is further provided with Y-shaped notches 22 for receiving the top edges of the film to be developed. When the cage is to be used to develop the flat type of film, the spacings of the bottom members 6 should be such as to bring the top edges of the flat type film only in the V portion of the notches 22, whereas when using the cage to develop the film pack type of film the spacings of the bottom should be such as to cause the top edges of the film to extend into the flat por-

tion 23 of the notches in the top 20. Preferably, the top 20 is provided with a plurality of slots 24 cut from its upper face through to meet the Y-shaped notches 22 in order to provide the top with a plurality of openings for circulation of air and gas through the cage. The bottoms 6 also may be provided with such slots 25 in order to permit circulation of developing solution through the bottom of the cage.

In order to facilitate loading of the cage in the dark and also in order to serve the further purpose of permitting loading through a means which is carefully kept separate from any contact with the developing solution, I provide a special loading top, as indicated in Figures 1, 2, 3, 8 and 9. Said loading top consists of a lower member 26 having tongues 27, by means of which the same may slidably engage the grooves 19 of the cage in substitution for the top 20, shoulders 28 being provided for stopping the movement of the member 26. The member 26 consists of two rails 29 and 30, between which extends a plurality of bars 31, which between them form loading slots for the insertion of the film into the cage. The rail 29 is provided with a plurality of recesses 32 corresponding in number to the number of film-receiving notches of the cage. The loading means at the top also includes an upper member 33, which has an enlarged portion 34 to fit between the rails 29 and 30 of the lower member 26 of the loading means, and is provided with a pin 35 to selectively engage the different recesses 32 of the lower member 26. The upper member 33 is provided with a loading slot 36, by means of which a film may be inserted through the upper member and in turn through one of the slots in the lower member 26 of the loading means, and thereby be guided properly into position to engage the notches of the bottom members 6 and side members 7 of the cage. It will be readily understood that by selectively moving the upper member 33 of the loading means to cause selective engagement of its pin 35 with each of the recesses 32, the loading top may be readily manipulated in the dark for permitting ready loading of the different notches of the cage with film.

When the film is loaded into the cage by the loading top the upper edges of the film will be partially retained in the lower member of the loading means in the manner indicated in Figure 2, and thereby the film will be held from buckling until the loading means can be removed and the regular top employed in the developing operations substituted therefor. Figure 9 of the drawings indicates the manner in which the loading means is slid off the cage while the regular top 20 is simultaneously slid into position on the cage; the loading means retaining the film in position until the same can be properly engaged with the notches 22 of the top 20.

While the particular form of developing cage herein described is well adapted to carry out the objects of the present invention, it is to be understood that various modifications may be made and the present invention includes all such modifications and changes as come within the scope of the following claims.

I claim:

1. A film developing cage, including a box-like member for holding a plurality of films spaced apart and including notches engageable with the side and bottom edges of the film, and a detachable loading top including a lower member provided with a plurality of slots through which the film may be passed in loading operations and

a top member having a loading slot, a selective locking means between said upper and lower member for selectively locking the upper and lower members in position for registering the slot of the upper member with the slots of the lower member in film-loading operations, there being a sliding fit between the box-like member and lower member of the top.

2. A film-holding cage, comprising a box-like member having permanent side members and end members, the side members being provided with a set of horizontal and a set of vertical grooves, one end member terminating above the horizontal grooves of the side members, a false bottom member selectively engageable with said horizontal grooves for varying the depth of the film-receiving space of said cage, and a false side member selectively engageable with said vertical grooves for varying the width of the film-receiving base of said box member, said false members having cooperating film-receiving notches.

3. A film developing cage, comprising a frame including side members having one set of horizontal grooves extending from one edge inwardly and another set of horizontal grooves extending from the opposite edge inwardly and spaced from the first-mentioned set of horizontal grooves, said side members also having one set of vertical grooves extending from the top edge downwardly and another set of vertical grooves extending from the bottom edge upwardly, said sets being spaced from each other, a member selectively engageable with said horizontal grooves for determining the height of the film receiving space of said frame and a member selectively engageable with said vertical grooves for determining the width of the film-receiving space of said frame, said members having notches for holding the film from the edges thereof.

4. A film developing cage, comprising a frame including side members having one set of horizontal grooves extending from one edge inwardly and another set of horizontal grooves extending from the opposite edge inwardly and spaced from the first-mentioned set of horizontal grooves, said side members also having one set of vertical grooves extending from the top edge downwardly and another set of vertical grooves extending from the bottom edge upwardly, said sets being spaced from each other, a member selectively engageable with said horizontal grooves for determining the height of the film-receiving space of said frame and a member selectively engageable with said vertical grooves for determining the width of the film-receiving space of said frame, said members having notches for holding the film from the edges thereof, and a top member slidably engageable with said frame and provided with slots through which the film may be inserted and by which the film may be guided into proper engagement with the notches of said members.

5. A film developing cage, comprising a frame including side members having two sets of horizontal grooves and two sets of vertical grooves for operation in reverse positions, a member selectively engageable with said horizontal grooves for determining the height of the film-receiving space of said frame and a member selectively engageable with said vertical grooves for determining the width of the film-receiving space of said frame, said members having notches for holding the film from the edges thereof, a top member slidably engageable with said frame and

provided with slots through which the film may be inserted and by which the film may be guided into proper engagement with the notches of said members, and a supplemental top member having a loading slot and being selectively movable into engagement with said first-mentioned top member for registration of its loading slot successively with the slots of said first-mentioned top member.

6. A film developing cage, including a frame, side and bottom members having cooperating film engaging notches and means for moving said members to vary the size of film to be received in said cage, loading means for said cage including a detachable loading top having slots corresponding to the notches of said members and having a relatively movable member having a loading slot, and means for causing said loading slot to be selectively registered with said first-mentioned slots.

7. A film developing cage, including a frame, side and bottom members having cooperating film engaging notches and means for moving said members to vary the size of film to be received

in said cage, loading means for said cage including a detachable loading top having slots corresponding to the notches of said members and having a relatively movable member having a loading slot, and means for causing said loading slot to be selectively registered with said first-mentioned slots, said loading top being removable in film developing operations.

8. A film developing cage, comprising a film housing including notches engageable with the side and bottom edges of a film, a detachable top member slidably engageable with said housing member and provided with bars forming slots aligning in the operating position with the notches of said housing member so that film may be inserted through said slots and guided into proper engagement with the notches of said housing, and a supplemental top member having a loading slot and being selectively movable relative to said first-mentioned top member for registration of its loading slot successively with the slots between the bars of said first-mentioned top member.

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