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2,608,876

SPOOL FOR PHOTOGRAPHIC FILM PROCESSING MACHINES

Filed July 10, 1950

2 SHEETS—SHEET 1

FIG. 1

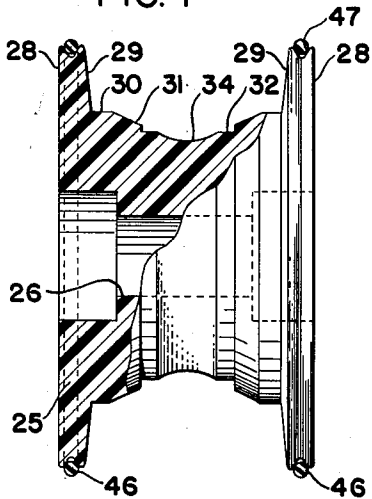


FIG. 2

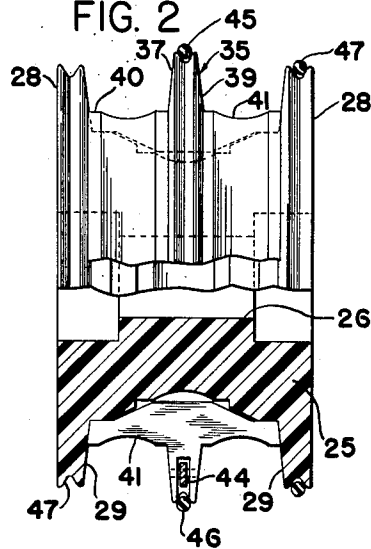


FIG. 3

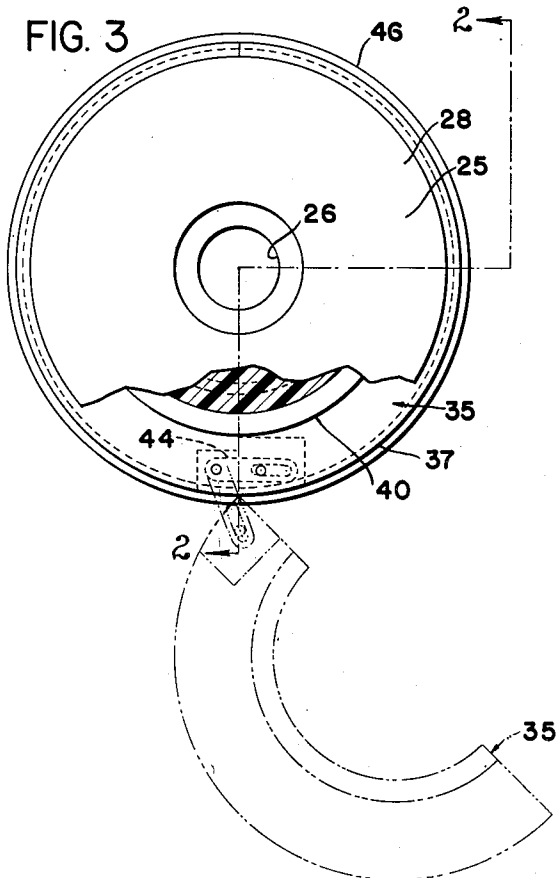
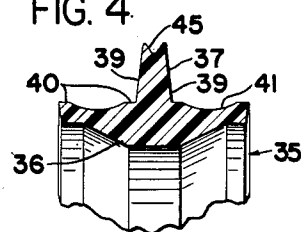


FIG. 4



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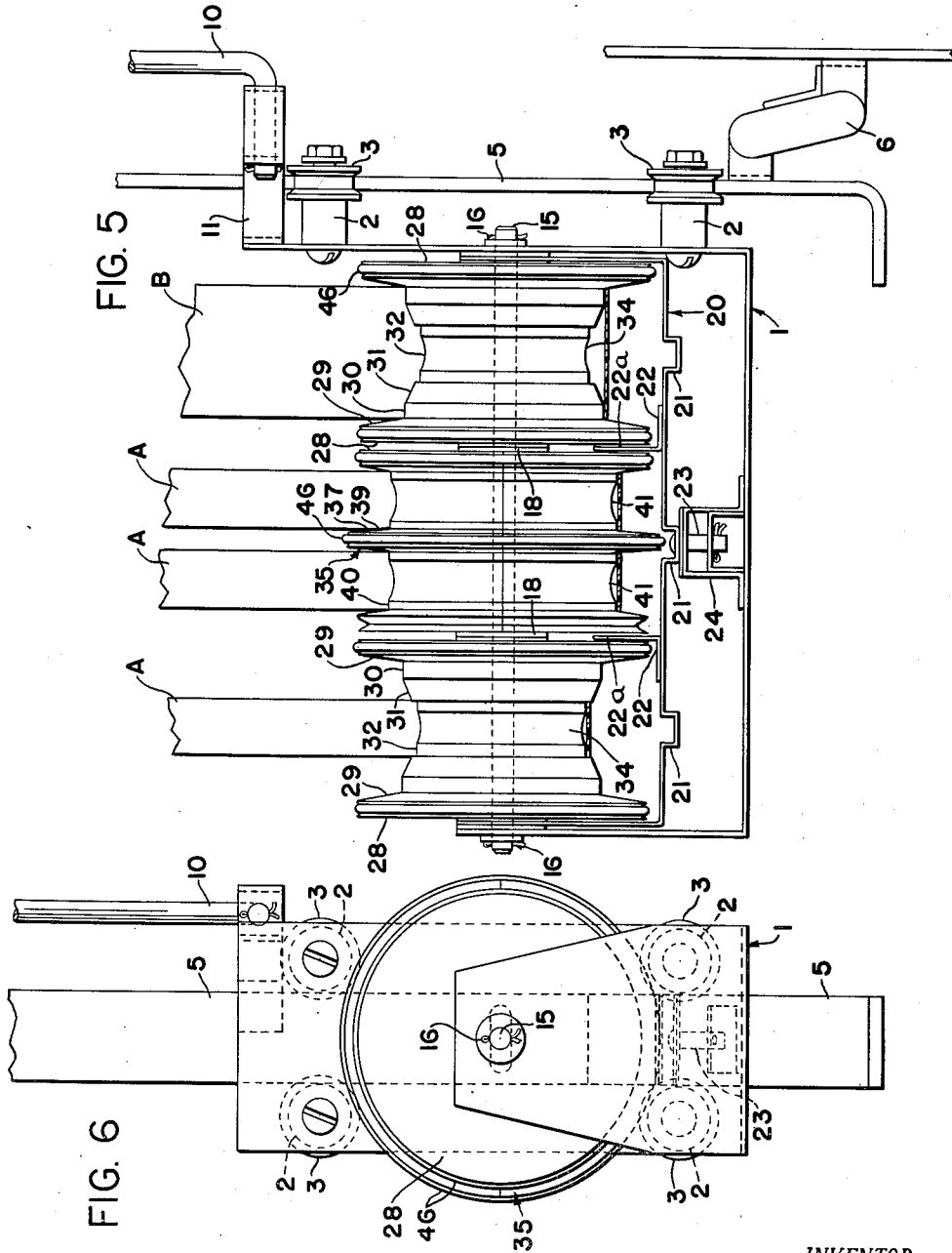
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2 SHEETS—SHEET 2



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SPOOL FOR PHOTOGRAPHIC FILM
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The present invention relates to improvements in machines for the processing of long lengths of photographic films and is particularly intended to meet the demands of the armed forces for a mechanism that will be readily adaptable for handling the two standard widths of films which are employed. The armed forces have standardized upon two film widths, the wider film being 35 mm. and the narrower 16 mm. In the processing of these films, they are treated in machines equipped with numerous guide rollers which conduct the films, in vertical loops, through the various baths. In machines of this type, the rollers or spools over which the films are guided are mounted on vertically movable carriages, which are raised and lowered in accordance with the standard practices.

These processing machines are required to be adaptable for both widths of film and, as the 16 mm. film is more extensively employed, the guiding rollers or spools should be constructed so as to take a maximum of that width. Heretofore, the task of changing the spools to accommodate the demands for differing widths of films has been troublesome and time consuming.

It is the object of the present invention to devise a form of spool which is adapted for quick and easy change-over from one width of film to the other. It is also an object of the invention to provide a film spool that may be readily changed to accommodate either (1) a wide or 35 mm. film; (2) two narrow or 16 mm. films; or (3) one narrow 16 mm. film. By designing a spool in which the several requirements may be met without keeping the processing machines out of production for long periods, the processing of film is speeded up and the production of any machine during a given length of time is greatly increased. It is also an object of the invention to combine with the new form of spool a device on the carriage which will present a film from leaving its groove or seat in a spool and interfering with an adjacent film on the spool.

The invention is shown herein in its environment in such detail as to enable the invention to be practiced. While the perfected and preferred embodiment of the invention is shown in detail, changes and modifications may be made without departing from the essential features of the invention as set forth in the appended claims. While the dimensions stated are those currently in use for narrow or wide film, the dimensions are, of course, changeable to suit changed specifications.

In the drawings, in which the preferred form of the invention is shown:

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Fig. 1 is a side view, partially in section, showing the main body or core of a spool in the condition in which it may take either a wide, or 35 mm., film or a single 16 mm. film.

Fig. 2 is a similar view, partly in section, on the line 2-2 of Fig. 3, showing the spool as it is set up for accommodating two narrow films.

Fig. 3 is a side view of the composite spool, the dotted lines showing the manner in which the central insert is removable from the main body.

Fig. 4 is a section of the insert removed from the main body.

Fig. 5 is an elevation of a typical carriage such as used in the processing machines equipped with the guard which prevents the films from leaving the tracks provided for them.

Fig. 6 is a side view of the carriage.

Referring first to Figs. 5 and 6, a typical carriage comprises a U-shaped frame 1, which is supported upon upper and lower spaced pairs of pins 2, on which are mounted flanged rollers 3 movable over a vertical rail or track 5 located in the side of the processing machine. The track is braced at its lower end by a bracket 6. To the carriage is attached a link 10, the lower end of which is connected to a bracket 11 at the side of the carriage and by which the carriage may be raised or lowered. It will be understood that in a complete processing machine there are a number of tanks or chambers through which the film passes in succession and that there are numerous carriages in each of these chambers and the necessary guiding rolls at the top of each chamber so that the films are guided in numerous vertical loops in each of said chambers, depending upon the procedure adopted and used. It will therefore be seen that the task of converting any machine of this type from one film width to another consumes much valuable time and, by reducing the time for change-over and making the machines more flexible, the invention has proved to be very valuable.

Across the two arms of a carriage is located a horizontal shaft 15 held in position by cotter pins 16 or the like. In Fig. 5 the spacing of the parallel arms of the carriage is such that three spools may be accommodated and, to illustrate the flexibility of the equipment, the middle spool is shown in the condition in which it receives two narrow films A-A; the spool to the right receives one wide film B and the spool to the left receives one narrow film A. The several spools are separated by washers 18 over the shaft. The width of the carriage may be altered to accommodate a greater or lesser number of film spools.

Located within the vertical arms of the car-

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riage is a second U-shaped frame, indicated generally by the numeral 20, the function of which is to prevent the films from leaving their proper channels in the spools. During the processing, the films are apt to have some fullness and it is necessary to provide means to prevent migration of a film out of its path. As will be noted in the full description of the spool, when the spool is set to receive two narrow films, the dividing rib between the two narrow film passages or tracks is of somewhat larger diameter than the outside flanges.

The main portion of the frame 20, which lies under the spools is closely spaced from the outer rims of the spools, but it is provided with three depressions or offsets 21 to clear the raised rim of an insert on a spool in any location on the shaft 15. The frame 20 is anchored to the main carriage by a removable pin 23 which passes through the central depression 21 and into a keeper 24 attached to the horizontal arm of the carriage. Angular plates 22 provided with up-standing flanges 22a are secured to the frame 20 and lie between adjacent spools to prevent the film on one spool from passing over to an adjacent spool.

The spool construction is shown in Figs. 1 to 4. These spools are preferably made of "Bakelite" or any other suitable plastic material for the sake of economy in manufacture and to reduce the weight of the equipment. Each spool comprises a central or body portion 25, which is cored out at 26 to be received over the shaft 15. The contour of this spool center is shown in Fig. 1. The spool has the two marginal flanges 28, the height of which is sufficient to prevent the film from leaving the spool under normal circumstances. The inner opposed surfaces of the flanges are tapered, as at 29, to points where they meet the two cylindrical portions 30. The width between the flanges at their bases is that of the wider film, which, as explained, is currently 35 mm. The surfaces or ledges 30 are of sufficient widths to support the edges of the film.

Inwardly of the ledges 30, the walls of the spool are again tapered, as at 31, and are brought to a second pair of cylindrical surfaces or ledges 32, the distance between the surfaces 31 at their bases being equal to the width of the narrow film, i. e., 16 mm. The width of the ledges 32 is sufficient to support the edges of the narrow film and, between the ledges, the spool body is relieved at 34 to minimize surface contact between the spool and the film.

When the spool is in the condition shown in Fig. 1, it will receive and guide the wide film, as shown at the right of Fig. 5, or a single narrow film, as shown at the left in the same view.

As explained above, the narrow film is used in much greater quantities than the wider film and the spool is designed so that it may be readily converted to take two narrow films. For this purpose, there is provided an insert which is shown in position in Fig. 2 and separated from the main spool body in Fig. 4.

The insert, which is given the general numeral 35, consists of a base portion 36, the inner contour of which fits the surfaces 30, 31, and 32, and part way up the surfaces 29. The center of the insert is formed with a central spacing and dividing rib 37 having walls 39 tapered to correspond to the walls 29, and serving to form two channels for the narrow films. At the base of the surfaces 39, on each side of the mid-rib 37, are the two cylindrical ledges 40 which sup-

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port the edges of the narrow films with the relief areas 41 at the center of each channel.

The insert is removable from the main body of the spool so that the conversion from one type to the other may be easily done. The insert is split diametrically, as shown in Fig. 3, the two sections being united by a hinge member 44 set in the mid-rib, as shown in Fig. 2. To hold the insert in position on the spool body, any type of clamp may be employed, but a simple solution is to provide the edge of the mid-rib 37 with a groove 45 in which is seated an endless rubber ring or grommet 46. For convenience, the edges of the flanges 28 are also grooved, as shown at 47, so that the ring may be held therein when not in use. In general practice, two rings 46 are furnished with each spool, so that the operator will have a spare which may be conveniently held in one of the grooves in the spool body.

It will be seen that in making the change from the spool of the type shown in Fig. 1 to the double channel type shown in Fig. 2, all that is required is to seat the insert in its place on the spool body and snap one of the rubber rings into the groove therein. The change may be accomplished without removing the spool from the carriage.

What is claimed is:

1. A spool for the uses and purposes set forth, comprising a main spool body, flanges on the ends of the spool body defining a main channel adapted for guiding a relatively wide strip passing over the spool, a second narrow channel depressed below the base of the main channel adapted for guiding a relatively narrow strip passing over the spool, a removable insert seated in the main channel and a centrally located rib on said insert which with the flanges form two channels for guiding relatively narrow strips passing over the spool when the insert is located on the spool.

2. A spool for the uses and purposes set forth, comprising a main spool body, flanges on the ends of the spool body defining a main channel adapted for guiding a relatively wide strip passing over the spool, a second narrow channel depressed below the base of the main channel adapted for guiding a relatively narrow strip passing over the spool, a removable insert seated in the main channel and a centrally located rib on said insert which, with the flanges, form two channels for guiding relatively narrow strips passing over the spool when the insert is located on the spool, said insert having outer surfaces to support said narrow strips as they pass over the spool.

3. A spool for the uses and purposes set forth, comprising a spool body, flanges at the ends of the spool body defining a channel adapted to receive and guide a relatively wide strip passing over the spool, and a removable insert positionable in the channel and surrounding the spool, said insert being provided with a rib of greater diameter than the flanges, said rib and said flanges defining two separate channels of narrow width when the insert is located on the spool and a guard overlying the spool to prevent escape of strips from said channels, said guard having a recessed portion to receive the rib.

4. A spool for use with apparatus for treating wide and narrow films selectively, said spool having a main body, flanges on the ends of said body, ledges at the bases of said flanges adapted to support the edges of a relatively wide film passing over the spool, a removable insert located between the flanges, said insert having an out-

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standing rib, which with the flanges defines two separate narrow channels when the insert is located on the spool, and ledges on the insert at either side of the rib to support the edges of relatively narrow films, and means to hold the insert around the main body.

5. A spool for use with apparatus for treating wide and narrow films selectively, said spool having a main body, flanges on the ends of said body, ledges at the bases of said flanges adapted to support the edges of a relatively wide film passing over the spool, a relatively narrow channel between said ledges, said narrow channel having ledges adapted to support the edges of a relatively narrow film, a removable insert located between said flanges, said insert having an outstanding rib which with the flanges defines two separate narrow channels and ledges on the insert at either side of the rib to support the edges of relatively narrow films when the insert is located on the spool, and means to hold the insert around the main body.

6. A spool for the uses and purposes set forth comprising a one-piece spool body, flanges integral with the spool body and located at the ends thereof, and a removable insert positionable between the flanges, said flanges when the insert is removed defining a channel for a relatively wide strip passing over the spool, said insert being divided so that it may be positioned over the

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spool body and provided with a rib which with the flanges defines two separate channels of relatively narrow width when the insert is located on the spool.

7. A spool for the uses and purposes set forth comprising a one-piece spool body, flanges integral with the spool body and located at the ends thereof, and a removable insert positionable between the flanges, said flanges when the insert is removed defining a relatively wide channel to receive and guide a relatively wide strip passing over the spool, said insert fitting between the flanges, said insert being provided with a centrally located projecting rib which when the insert is in position defines with the flanges two separate channels for receiving and guiding two relatively narrow strips, said insert being in sections so that it may be located around the spool, and means to hold the sections of the insert together when in position on the spool.

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