March 21, 1933. W. L. HELMS 1,902,281

FEEDING MECHANISM FOR PHOTOGRAPHIC STRIPS

Filed July 25, 1932

Fig. 3.

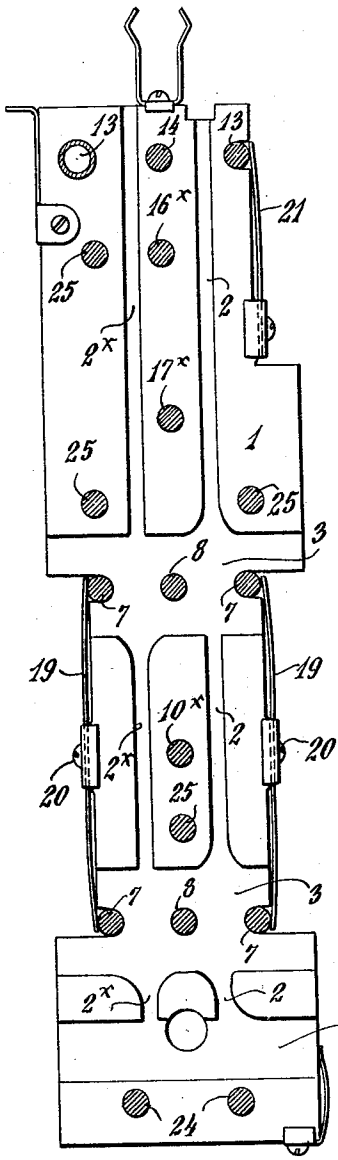


Fig. 1.

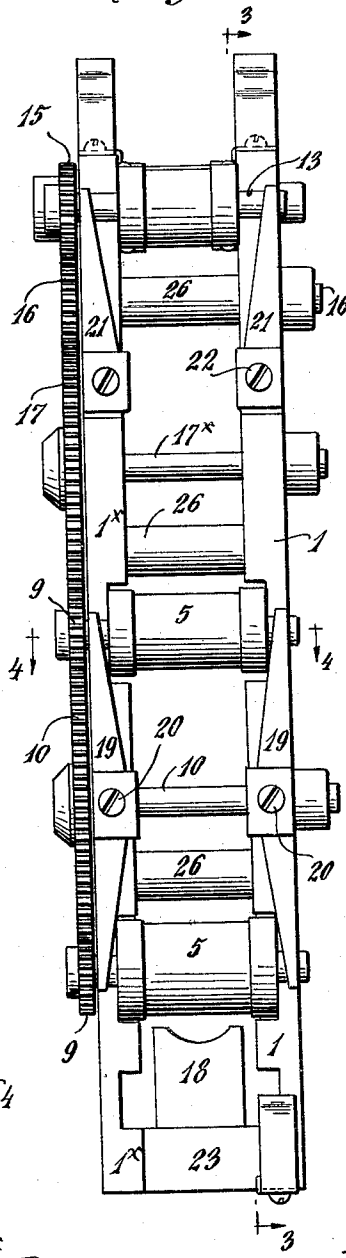


Fig. 2.

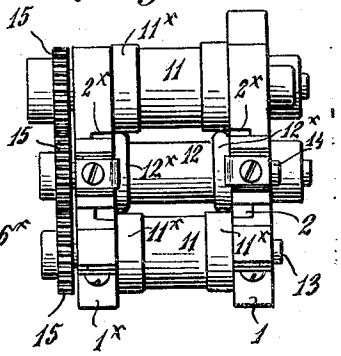
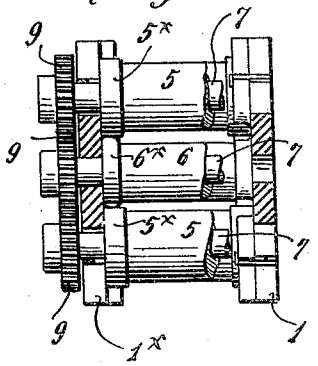


Fig. 4.



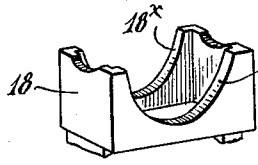


Fig. 5.

INVENTOR

Patented Mar. 21, 1933

1,902,281

UNITED STATES PATENT OFFICE

WATERS LEE HELMS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE NEW PHOTOMATON, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

FEEDING MECHANISM FOR PHOTOGRAPHIC STRIPS

Application filed July 25, 1932. Serial No. 624,638.

This invention relates to improvements in devices for feeding strips of emulsified paper and the like through developing or other tanks containing liquids, in such manner that the margins of the strips are engaged by feed rollers, and the object of the invention is to provide a device of this character which shall be positive in its action, the strip being fed without binding thereof, particular attention being paid to the relation between the devices which directly engage and propel the strip and the guide elements.

The invention will be described with reference to the accompanying drawing in which

Fig. 1 is a front elevation of an embodiment of the invention.

Fig. 2 is a plan view of the said embodiment.

Fig. 3 is a vertical section on the line 3—3, Fig. 1.

Fig. 4 is a horizontal section on the line 4—4, Fig. 1.

Fig. 5 is a detailed perspective view of the reversing block.

Referring to the drawing, it will be seen that the invention comprises a device adapted to be inserted within a liquid holding tank and which will receive a strip of photographic paper, or the like, at the top thereof, which will feed it downwardly and thence upwardly either to a place of ejection or to suitable means for guiding the strip into another tank via a second feed device.

The device comprises opposed plates which are normally disposed in vertical position within a tank, these plates being shown at 1 and 1x in the drawing.

By reference to Fig. 3, it will be seen that each plate is formed with parallel guide channels 2, 2x, which are broken by horizontal sections 3 at which the material of the plate is cut away at 3 and 4 to the depth of the channels 2 and 2x.

Intermediate the two plates and seated within the cut away sections 3 are, in the present embodiment, two sets of three feed rolls, each set comprising the outer rolls 5 and the inner roll 6, the outer rolls preferably being formed at their ends with the peripheral wheel-like enlargements 5x and the inner roll preferably having the soft rubber ring 6x at each end thereof (Fig. 4).

The outer rolls of each set are carried by shafts 7 and the inner roll by shaft 8, a train of three gears 9 exterior of plate 1x being in mesh to drive the rolls in unison.

Intermediate the two trains of gears, one for each set of feed rolls 5, 6, is a large driving gear 10 on a shaft 10x.

At the top of the device are three feed rolls comprising the outer rolls 11 and the inner roll 12, the outer rolls having, at their ends, the annular wheel-like projections 11x and the inner roll having at its end soft rubber rings 12x. The outer rolls are carried by shafts 13 and the inner roll by shaft 14, these shafts carrying a train of gears indicated at 15 in mesh with a pinion 16 on a shaft 16x, the pinion being driven by a large gear 17 on a shaft 17x in mesh with one of the train of gears 9.

Opposite cut away area 4 intermediate two blocks and spaced therefrom, is a reversing block 18 constructed as a hollow member having opposed spaced and connected walls, the top surface of each of the opposed walls being curved at 18x, Fig. 5, to afford a guiding and reversing surface for the strip. In other words, assuming the strip to be moved downwardly along channel 2 by means of the feed roll, the lower end of the strip will finally meet curved surfaces 18x of the guiding block, which surfaces will guide the strip in a curvilinear path until its direction is reversed and it enters between a pair of the rolls 5 and 6 and is moved thereby upwardly into channel 2x.

In the reversing movement of the strip, the margins thereof are free, the block being, as shown in Fig. 1, spaced from the inner walls of the assembled plates 1, 1x. I have discovered that by such arrangement, there is less binding and likelihood of jamming of the strip than in the case of reversing grooves cut U-shaped in the wall of the plate. It is also to be noted that at 2 and 2x, relatively wide channels are formed, as contrasted with grooves slightly wider than the thickness of the paper to be guided, by providing wide

channels, the paper is free for substantial lateral deflection in its movement downwardly and upwardly with relation to the side plates. Thus, while the paper may be guided with the accuracy required, there is such freedom of movement that jamming is avoided.

To further add to the flexibility of the device, I have so mounted certain of the feed rolls that they themselves may have bodily movement. To this end, the shafts 7 are held in channels formed in the side plates, as shown in Fig. 3, being maintained in position by springs 19 held by screws 20. Likewise, one of the shafts 13 is held in position by springs 21 held by screws 22.

Reversing block 18 is mounted upon a supporting base 23 and studs may pass through the plates and through base 23 to aid in holding the assembly together, the studs being indicated in Fig. 3, at 24. Similar holding studs 25 carrying spacer sleeves 26 may be employed for holding together the assembly at various points.

In the operation of the device, it will be assumed that it lies vertical within a tank and that means are provided for delivering the photographic strip to the grooves 2 or the grooves $2x$ depending upon the direction of rotation of the feed rolls. Assuming the strip to be fed into groove 2, the rolls will carry it downwardly until the strip meets the reversing block 18, whereupon the end of the strip will be moved upwardly and pass between the lowermost roll 6 and its adjacent roll 5 and the action of the device will be reversed until the end of the strip is carried above the feed device out of channels $2x$ and means will be provided at that point for receiving strip and guiding it to another tank or to an ejection point.

Having described my invention, what I claim and desire to secure by Letters Patent, is as follows:—

1. In feeding mechanism for photographic strips, means for conveying a strip in reverse directions within a tank, comprising opposed plates, a plurality of sets of feed rollers supported intermediate said plates, driving means for the rollers, parallel channels in each plate for guiding a margin of the strip, and a reversing block intermediate the plates and having a curved guiding face for receiving the strip fed to the base of one channel and for conveying it to the base of the second channel, said block contacting with the strip intermediate its marginal edges.

2. In feeding mechanism for photographic strips, means for conveying a strip in reverse directions within a tank, comprising opposed plates, a plurality of sets of feed rollers supported intermediate said plates, driving means for the rollers, parallel channels in each plate for guiding a margin of the strip, cut away sections formed in the plate intermediate channel sections to receive the ends of the feed rollers so that acting faces of the feed rollers extend within the plates to approximately the depth of the channels, and a reversing block intermediate the plates and having a curved guiding face for receiving the strip fed to the base of one channel and conveying it to the base of the second channel, said block contacting with the strip intermediate its marginal edges.

3. In feeding mechanism for photographic strips, means for conveying a strip in reverse directions within a tank, comprising opposed plates, a plurality of sets of feed rollers supported intermediate said plates, driving means for the rollers, parallel channels in each plate for guiding a margin of the strip, the channels being broken by cut away sections of the plates substantially to the depth of the channels, a set of feed rollers being disposed within said cut away sections contiguous to the channels, and a reversing block intermediate the plates and having spaced curved guiding sections for receiving the strip fed to the base of one channel and conveying it to the base of the second channel, said block being of less width than the strip and contacting therewith in such manner as to leave margins thereof free.

In testimony whereof, I have signed my name to this specification:—

WATERS LEE HELMS.