

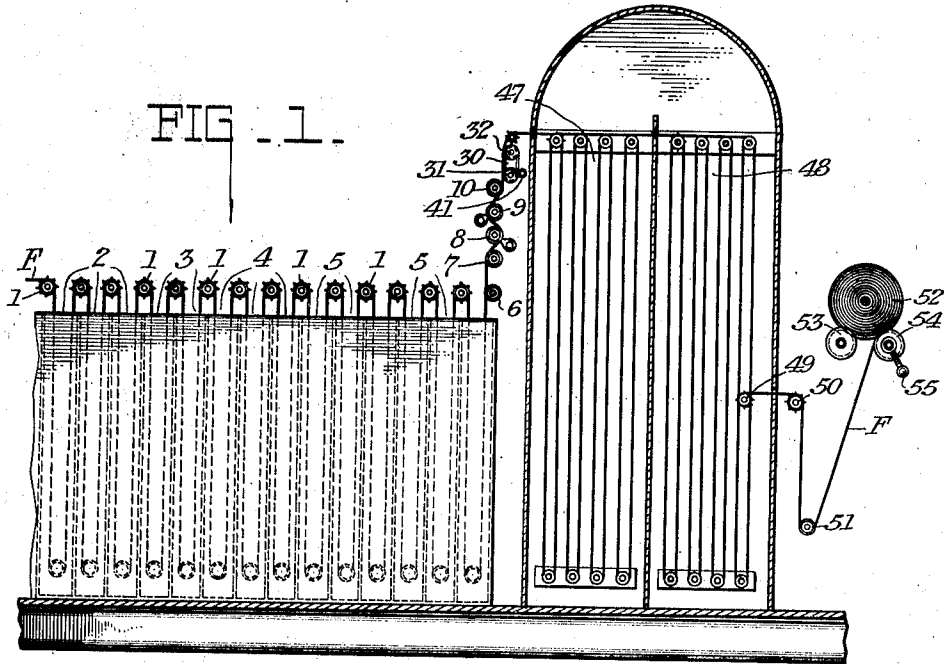
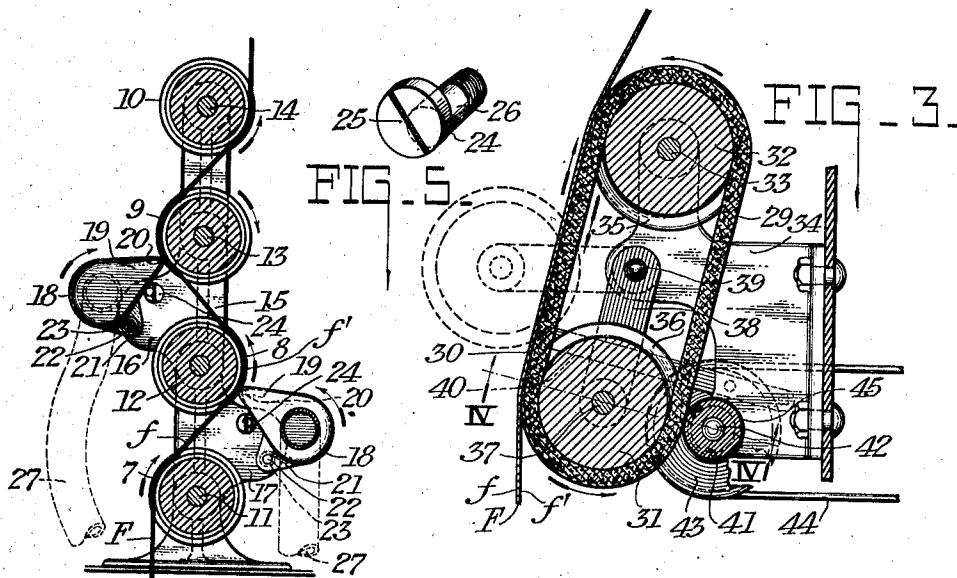
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PROCESS AND APPARATUS FOR TREATING FILM

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PROCESS AND APPARATUS FOR TREATING FILM.

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This invention relates to photography and has particular reference to machines in which long film bands are treated in various fluid baths, polished and dried. One object of my invention is to provide a process by which the film band may be completed and conditioned for use in a single machine; another object is to provide a machine in which the film may be dried and polished before finally being wound into the completed roll; another object is to provide a means for drying and polishing one side of the film before it enters the drying chamber; another object is to provide a suitable polishing belt and mount from which the belt may be easily removed for cleaning; and other objects will appear from the following specification, the novel features being pointed out in the claims at the end thereof.

It is common practice to develop, wash, fix, wash, tint or tone, wash and finally dry long lengths of film band in commercial plants. This series of treatments does not, however, prepare the film for its ultimate use, that is, either as a negative film from which the positives used for projection are made, or as a positive itself. There are, after the treatments above described, imperfections on the film band, such as the moisture lines and irregularities left on the back of the film or there may be markings from the toning bath, and a certain amount of dirt or dust in the form of very minute particles which collect on the film in spite of such precautions as the use of air conditioners, etc. The film is, therefore, after drying, usually passed through a bath of suitable character such as alcohol, to soften the dry imperfections and the back is then burnished to as high a gloss as possible after the undesirable markings and dust particles have been as nearly removed as possible. After having dried the film there are liable to be tiny bits which the particles have caused in the base, and these are frequently turned into scratches when the film is retreated unless great care is taken. Moreover it is difficult to get the high gloss which is desirable on the film base where the fluid markings have dried on the film.

With my invention I first remove all surface moisture and dry the film back, after which I polish the back before drying the entire film band, thus not only producing a clean film back before the final winding

into a reel, but also obviating all the difficulties due to drying the imperfections on the film, and in addition making unnecessary the usual extra operation of retreating and buffing the film, producing a better and a cheaper film. Moreover, it is obvious that particles on the back may be (and frequently are) transferred to the emulsion side of the film when wound together. This is serious because the front or emulsion side of the film cannot be buffed and treated as the back, so that my process also eliminates this difficulty. As it is also obvious that dirt or foreign particles will not stick to a dry highly polished film base, the total amount of such particles will be greatly reduced by drying and polishing the film base immediately upon being drawn out of the fluid treatment baths, where, of course, the film is clean.

Coming now to the drawing in which like reference characters denote like parts throughout:

Fig. 1 illustrates diagrammatically the essential parts of a machine upon which my process may be carried out;

Fig. 2 is a detail of a portion of the machine constructed in accordance with and illustrating one form of my invention;

Fig. 3 is a detail of another portion of the machine constructed in accordance with my invention;

Fig. 4 is a section on line IV—IV of Fig. 3; and

Fig. 5 is an enlarged detail of a screw.

The film band F is moved by sprockets through a series of liquid treatment baths, here indicated as developing in tanks 2, washing in 3, fixing in 4, and washing in water in 5. I also contemplate using more tanks than illustrated for tinting and toning and for additional washing as may be required.

After passing through these fluid treatment tanks the film is drawn up over rollers 6, 7, 8, 9 and 10, the latter four being shown in detail in Fig. 2. These rollers are supported by shafts 11, 12, 13 and 14 carried by the bracket 15 from which there extends two lugs 16 and 17. Each lug supports a suction nozzle 18 consisting of a tapered portion 19 having a narrow suction slit 20. Lugs 21 of nozzle 18 embrace a shaft 22 about which a spring 23 is coiled thrusting the nozzle in the direction of the arrow. A screw 24 limits this movement by

contacting with the tapered end 19. This screw, is best shown in Fig. 5, wherein the screw 24 is shown as having its head 25 eccentric with the shank 26. The head, when
 5 turned, causes the nozzle 19 to approach or recede from the film F. This adjustment is usually made when the machine is set up after which it need not be altered. Tubes
 27 lead from the suction nozzles 18 to a suitable air-exhauster, not shown.

These nozzles not only remove the superfluous water from the emulsion side *f* of the film, but completely dry the back of the film *f'* or that side opposite the emulsion
 15 side. By completely dry I mean that no appreciable amount of moisture can be felt by the hand on the back surface of the film after passing the nozzle, and that a pad of polishing felt 29 will not become damp after
 20 running in contact with such film for hours.

After passing from the last roller 10 the film F passes over a buffer 30, here shown as consisting of a felt belt 29 mounted upon rollers 31 and 32. It should be noted (Fig.
 25 3) that the film is drawn to and from the buffer at such an angle that good contact is always obtained. Roller 32 is carried by a shaft 33 affixed to bracket 34, and is preferably equipped with flanges 35 to confine
 30 the belt 29 to a definite path. Roller 31, similarly flanged at 36 is carried by shaft 37 mounted on a link 38 hinged at 39 to bracket 34. A spring latch 40 normally holds the parts in the position shown, but
 35 permits link 38 and roller 31 to be swung to the broken line position when latch 40 is sprung from its connection with link 38, thus permitting a clean belt to be placed on the rollers. In practice a series of belts
 40 are used so that they can be frequently changed, being thoroughly cleaned before being used on the machine.

The belt 29 is driven against the direction of the film movement—see arrows Fig.
 45 3—to exert a cleaning and buffing action on the film, being moved by a roller 41, mounted on shaft 42 and driven through pulley 43 and belt 44. Small points or serrations 45 grip the belt and the roller may be cut
 50 away between the gripping portions as indicated at 46.

From the cleaning and polishing station just described the film passes into a drying chamber 47 and 48 through which air is
 55 blown by a suitable mechanism, not shown. Passing out over spockets 49, 50 and roller 51 the film is wound into a roll at 52 completely ready for its final use. The wind-up mechanism consists of rollers 53 and 54, the
 60 former being preferably power driven, while the later is equipped with a handle 55 for manual operation.

It is to be understood, of course, that, while the drawing illustrates a preferred embodiment of my invention, I do not wish to

be limited to the exact details of such a machine but contemplate as within the scope of my invention all such machines and processes as shall come within the scope of the
 70 appended claims.

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

1. The process of treating motion picture film which consists in the following steps: 75
 first, passing the film band through aqueous baths; second, removing the surface moisture from the film and drying one side thereof; third, polishing the dry side of the film, and fourth, passing the film band
 80 through a drying chamber.

2. The process of treating motion picture film having a support with a photographically sensitive coated side and an uncoated side which consists in passing the film
 85 through aqueous baths, removing the surface moisture from the photographically sensitive coated side, drying the uncoated side, polishing the uncoated side, and finally drying the complete film band.

3. The process of treating motion picture film having a support with a photographically sensitive coated side and an uncoated side which consists in passing the film
 95 through aqueous baths, removing the surface moisture from the photographically sensitive coated side, drying the uncoated side immediately after the removal of the film from the fluid bath, polishing the dry side to a high gloss thus reducing the film area
 100 upon which dust may collect to a minimum, and finally drying the complete film band.

4. An apparatus for treating motion picture film bands, including a series of aqueous treating tanks through which the film is
 105 passed, a suction nozzle mounted above an aqueous treating tank, a movable mount for the suction nozzle, means for guiding the film band past the suction nozzle, and means including an eccentric adapted to contact with and move the suction nozzle for adjusting the suction nozzle to or from the film.

5. An apparatus for treating motion picture film bands comprising a series of liquid treating tanks, and a suction nozzle mounted
 115 above a liquid treating tank, means for guiding the film band past the suction nozzle, and an eccentric screw having a head eccentric with its shank, a portion of the head contacting with the suction nozzle, whereby the nozzle is moved to or from the film by turning the screw head on its shank.

6. An apparatus for treating motion picture film bands comprising a series of liquid treatment tanks, a suction nozzle mounted
 125 over a treatment tank, rollers mounted above the tank adapted to guide the film band past the suction nozzle, a support, the suction nozzle being hinged mounted upon
 130

the support, a spring for pressing the nozzle in one direction and an adjustable stop limiting the movement of the nozzle under the impulse of the spring, the position of the nozzle with reference to the film being controlled by the adjustable stop.

7. An apparatus for treating motion picture film bands comprising a series of treatment tanks, a series of guide rollers mounted over a tank, means for removing moisture from the film near the guide rollers, a film buffing device located on one side of the film path, comprising a buffing belt mounted upon rollers, means for swinging one roller relative to the other to permit changing the buffing belt.

8. An apparatus for buffing film strips comprising a pair of rollers, a belt passing over the rollers, a support, one roller being carried upon a shaft affixed to the support, a link adapted to swing into two positions, the other roller being carried by the swinging link, a power driven roller carried by the support, said roller driving the belt when the swinging link is in one position.

9. An apparatus for buffing film strips comprising a pair of rollers, a belt passing over the rollers, a support, one roller being carried upon a shaft affixed to the support, a link adapted to swing into two positions, the other roller being carried by the swinging link, and means for retaining the link in position to hold the belt in contact with the driving roller.

10. An apparatus for buffing film strips comprising a pair of rollers, a belt passing over the roller, a support, one roller being carried upon a shaft affixed to the support, a link adapted to swing into two positions, the other roller being carried by the swinging link, a latch for holding the link in one position in which the belt is under tension and positioned for use, the link when released from said latch being adapted to swing into the other position in which the tension on the belt is released so that the belt can be removed.

Signed at Fort Lee, New Jersey, this 27th day of February 1923.

CHARLES DE MOOS.