G. H. BENNETT.

FILM CLEANING DEVICE.

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1,390,076. Patented Sept. 6, 1921.

Fig. 1.

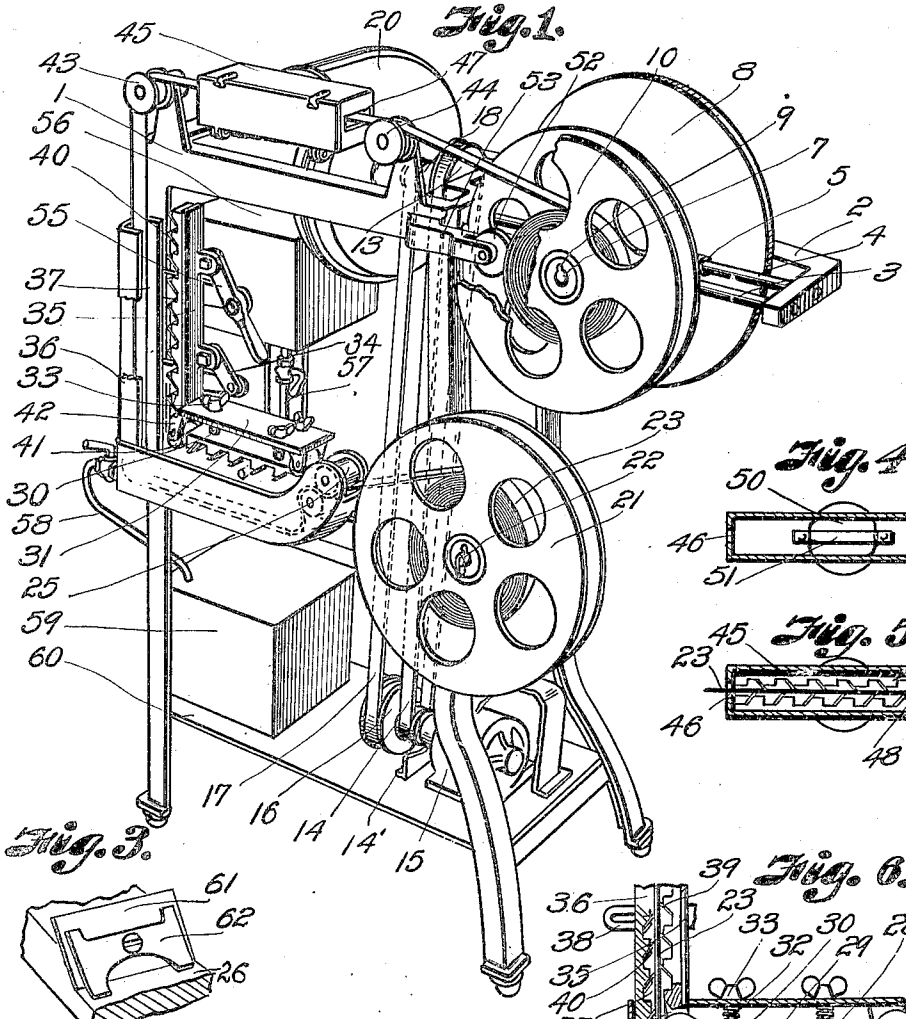


Fig. 4.

Fig. 5.

Fig. 3.

Fig. 6.

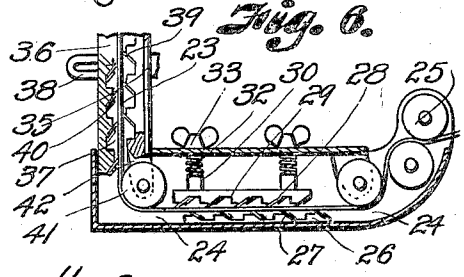
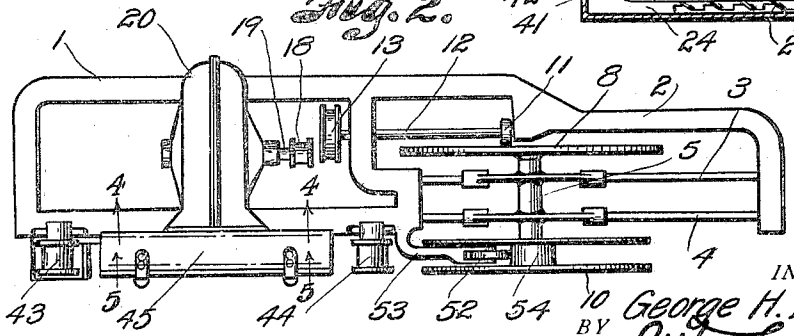


Fig. 2.



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FILM-CLEANING DEVICE.

1,390,076. Specification of Letters Patent. Patented Sept. 6, 1921.

Application filed March 5, 1921. Serial No. 449,670.

To all whom it may concern:

Be it known that I, GEORGE H. BENNETT, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Film-Cleaning Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to a film cleaning device and particularly to a machine for removing dust, dirt, grease and other extraneous matter from the film surface without damaging the film.

After a film has been used in a projectoscope for a considerable time, it accumulates foreign matter, such as dust, dirt and grease, the result being that the film is rendered more opaque and in order to project the objective upon the screen with the desired degree of brilliancy, it is necessary to increase the illuminosity of the light source unless the film be restored to its original condition.

The invention also contemplates means for passing the film through a bath and through drying conduits at a uniform rate of speed so that there will be a uniform treatment throughout the entire strip of film, an advantage which will be clearly apparent when it is considered that in order to obtain the best screen effects, the film should have a uniform density or transparency throughout.

The novel features of my invention will be clearly apparent by reference to the following description in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a machine constructed in accordance with my invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is a detail perspective view of a clamp for securing one of the wipers to a bar.

Fig. 4 is a sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view on the line 5—5 of Fig. 2, and

Fig. 6 is a sectional view through the bath liquid containing reservoir.

In carrying out my invention I prefer to provide a substantially rectangular frame 1 having an extended portion 2. Supported by the extended portion of the frame 1 and the frame 1 are guide rods 3 and 4 on which is slidably secured a carriage 5 and in which is rotatably mounted a shaft 7 having on one end a friction disk 8 and at the other end a keyed portion 9 to receive a reel spool 10. The disk 8 is adapted to be driven by a pinion disk 11 on a shaft 12, mounted in the extension 2 and in the frame 1, as shown in Fig. 2. On the end of the shaft 12 distant from the disk 11 is a pulley 13, receiving motion from a belt 14 driven from the pulley 14′ on the drive shaft of the motor 15.

The shaft of the motor 15 also carries a pulley 16, which drives a belt 17 passing around the pulley 18 on the impeller shaft 19 of a fan blower 20.

The reel 10 is the accumulating reel adapted to wind film from a delivery reel 21, mounted on a shaft 22 carried by the frame 1. The film 23 on the reel 21 passes through a bath contained in the reservoir 24. The entrance end of the reservoir is preferably provided with guide rollers 25, there being three shown, although the number is optional.

The film 23 may pass in a tortuous path through the rollers so that it will be guided over rolling surfaces instead of abrupt angles as it moves through the bath liquid contained in the reservoir 24.

On the floor of the reservoir 24 is shown a rack 26, having flexible wipers 27 bearing against the under side of the film, there being complementary wipers 28 carried by a rack 29 to contact with the upper face of the film. The rack 29 is vertically movable in the casing 21 and carries upstanding posts 30, between the ends of which and the cover plate 31 are springs 32, the ends of the posts also carrying threaded extensions to receive the wing nuts 33 so that the proper tension may be provided for the rack 29. The cover plate is shown as fixed to the half 35 of a vertical conduit 36, the conduit consisting, in addition to the half 35, of another complementary half 37 which is provided with laterally slidable projections 38, adjustably secured to the frame 1 to effect lateral adjustment for the film.

The members 35 and 37 are also formed with recessed portions in the form of racks and carry flexible wipers 39 and 40 respectively to exert slight tension against the film as it passes between them so as to remove moisture adhering to the film after it has passed through its bath.

In order to prevent sharp angles, the film is adapted to pass around an idler 41, carried by the bracket 42 on the end of the vertical conduit member 25, the edges of which slightly overlap the member 36.

After the film has passed through the vertical conduit, it may pass over an idler 43 at the top of the frame 1, as shown in Fig. 1. The idler 43 is in alinement with a corresponding idler 44 adjacent to the receiving reel 10 so that the portion of the film to be dried will move in a substantially horizontal plane through a conduit 45, having an inlet at 46 and an outlet at 47. The conduit 45 carries rack-shaped bars 48 and 49 in the recesses of which are mounted polishing wipers corresponding to those shown in the casing 21 and conduit 36 to polish the film as it is being dried.

In order to insure the dissipation of any moisture adhering to the film before it passes onto the receiving reel, I have provided means for directing a blast of air from the fan casing 20, which communicates directly with the conduit 45 through an opening 50. Across the opening 50 is a dividing strip 51, which directs the blast of air from the fan casing 20 in divided stream lines over the top and bottom surfaces of the film but not against the edge, the edge being protected by the strip 51.

After the film has moved through the conduit 45 and over the idler 44, it will be wound upon the receiving reel 10 in a dry state, having been sufficiently polished by the polishing wipers in conduit 45. In order to obtain the best results, it is desirable that the film pass through the bath in the reservoir 21 at a uniform rate of speed, to be uniformly acted upon by the cleansing fluid within the reservoir 21, it being understood that any suitable cleansing fluid may be employed which will not soften the film.

In order to maintain a constant, uniform travel of the film through the bath removing and drying conduit I have provided means whereby the speed of the receiving reel will be such as to wind the film upon itself at a uniform rate of speed irrespective of the change in diameter or perimeter of the film roll as it accumulates upon the receiving reel. In order to provide for this I have mounted a roller 52 in the bracket arm 53, carried by the frame 1, the roller 52 being in line with the hub 54 of the receiving reel 10.

When the film begins to wind upon the receiving roll 10, the hub will be in contact with the roller or wheel 52 and at that time the friction pinion disk 11 will be near the center of the friction disk 8. As the film roll increases in diameter on the hub 54, the roller or wheel 52 will press against it to move the carriage 5 outwardly on the guide rods 3 and 4, causing the center of the friction disk 8 to move away from the pinion 11, increasing the circumference of the path traversed by the pinion 11 so that there will be a greater number of turns of the pinion 11 for a complete revolution of the disk 8 as the pinion disk 11 moves toward the perimeter of the disk 8, consequently the disk 8 will move at a slower rate of speed but at such rate that it will wind the film upon it at a uniform rate of speed. Correspondingly, there will be a uniform travel of the film through the machine at all times, consequently, a uniform treatment will be applied and the finished product will be greatly enhanced over one in which an intermittent or irregular feed is provided.

When the film has been completely cleaned or completely wound upon the reel 10, the reel 21 may be substituted for 10 and a new reel to be cleaned may be applied to the shaft 18 and the operation may then be repeated.

By reference to Fig. 1 it will be observed that the member 35 can be moved into and out of operative position by means of a hand lever 55, pivoted at a convenient point on the machine and constituting a link connection between the pivot and the member 35, the link 34 coöperating therewith to insure proper positioning of the member 35 when it is to coöperate with the member 37.

The machine may be provided with a liquid supply tank 56, delivering liquid through the valved pipe 57 into the reservoir 21, which may be drained through the valved pipe 58 into a refuse receptacle 59, conveniently supported upon the base plate 60.

The rack-shaped members in all of the conduits are substantially of like construction, consisting of recessed bars having inclined faces against which flexible elements 61 may be secured by clamping devices 62, as shown in Fig. 3. The bar in Fig. 3 is designated 26 but the same construction applies to all of the bars, the essential problem being to provide means for effecting a wiping contact to remove dust, dirt, etc., in reservoir 21, moisture in conduit 37, and to polish the film in conduit 45. The wiping contacts are more efficient than polishing rolls or brushes which tend to scape the film which is not true of the flexible wipers.

From the foregoing it will be seen that a device constructed in accordance with my invention will adequately remove extraneous accumulations of foreign matter from

the film so as to restore it to practically its original condition in an inexpensive manner.

What I claim and desire to secure by Letters-Patent is:

1. In a film cleaning machine, film delivery and receiving members, a conduit between said members, paired racks in said conduit, between which a film may pass and each comprising separate wiping members inclined in the direction of travel of the film and terminating in flexible contact lips adapted for engaging a film, and an individual clamp for securing each wiping member to its rack.

2. In a film cleaning machine, film delivery and receiving members, bath and drying conduits through which the film may pass, having connected housing members, removable to expose the interiors of the conduits, a single lever mechanism for simultaneously shifting the connected housing members, wipers fixed in the conduits, and wipers on the connected housing member coöperative with the fixed wipers to mop and dry both sides of a film while the film travels through the conduits.

3. In a film cleaning machine, film delivery and receiving members, a plurality of conduits through which a film may pass, each having wipers for engaging both sides of the film, one of the conduits having a slot in its side wall, means for delivering air through said slot to the interior of the conduit, and a baffle extending across the slot in line with the edge of the film, for the purpose set forth.

In testimony whereof I affix my signature.

GEORGE H. BENNETT.