June 20, 1933. A. I. MACKLER 1,914,890

FILM RENOVATING MACHINE

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Fig. 1.

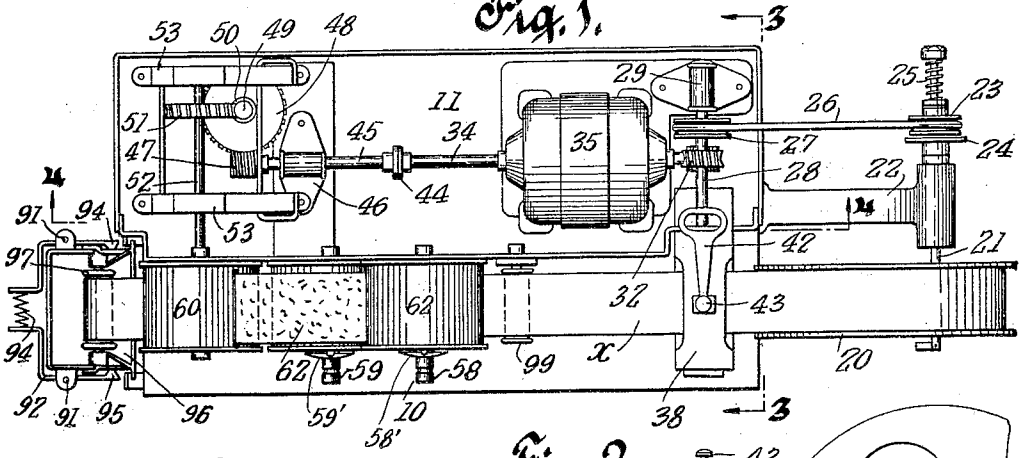



Fig. 2.

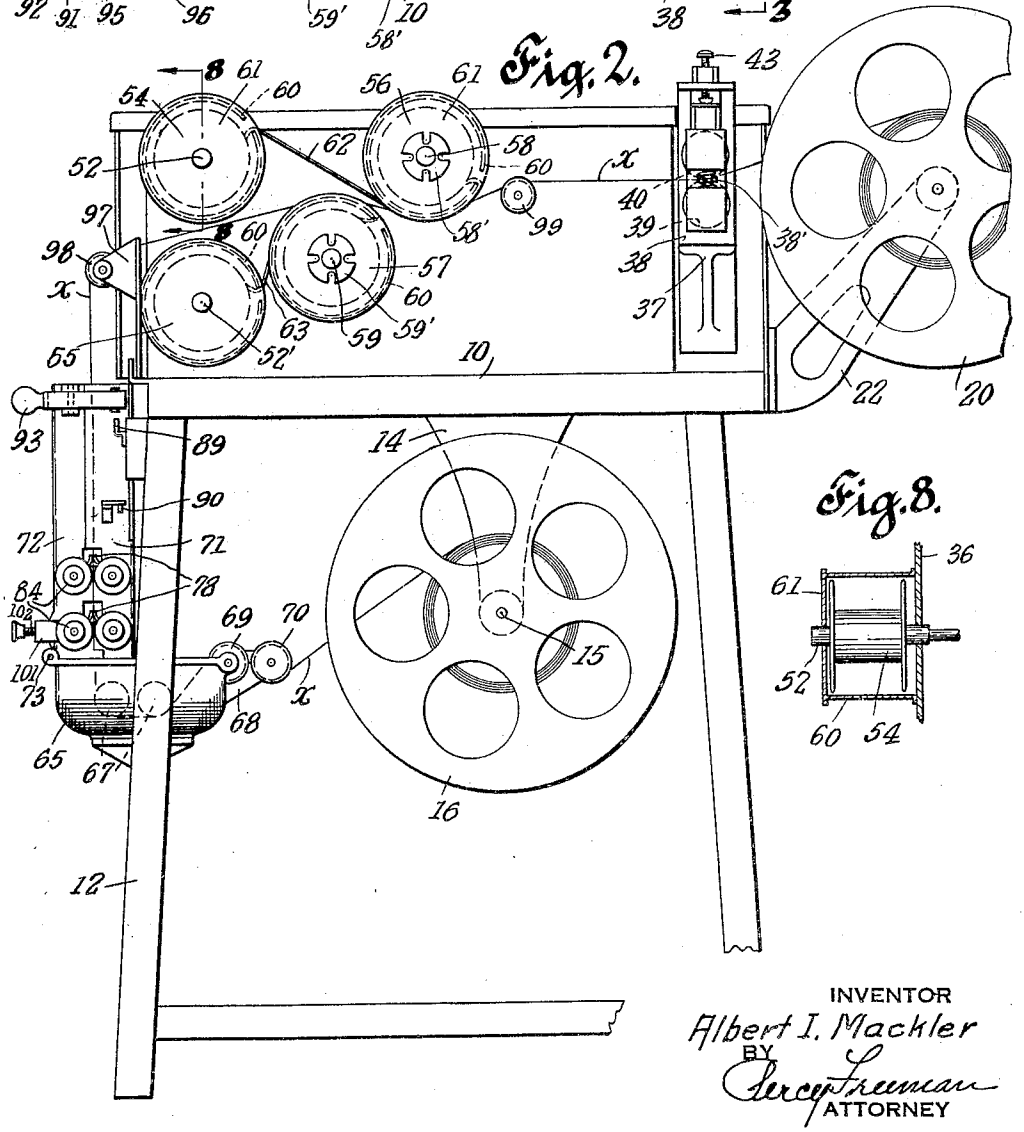



Fig. 3.




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Fig. 3.

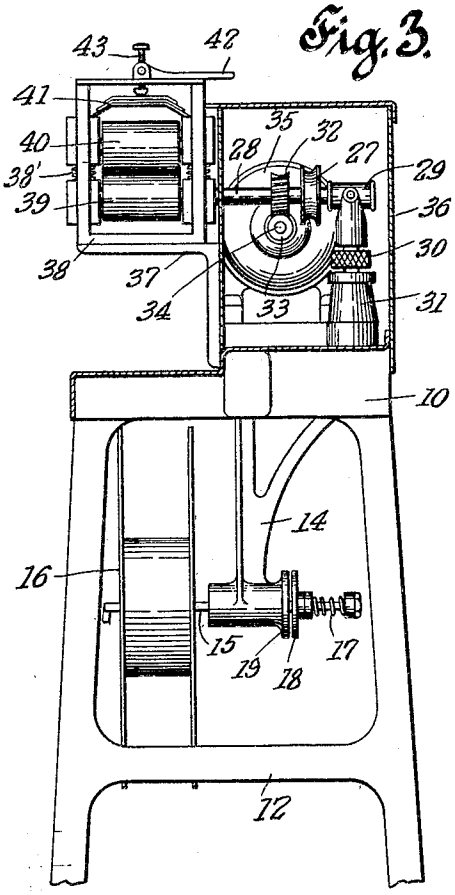
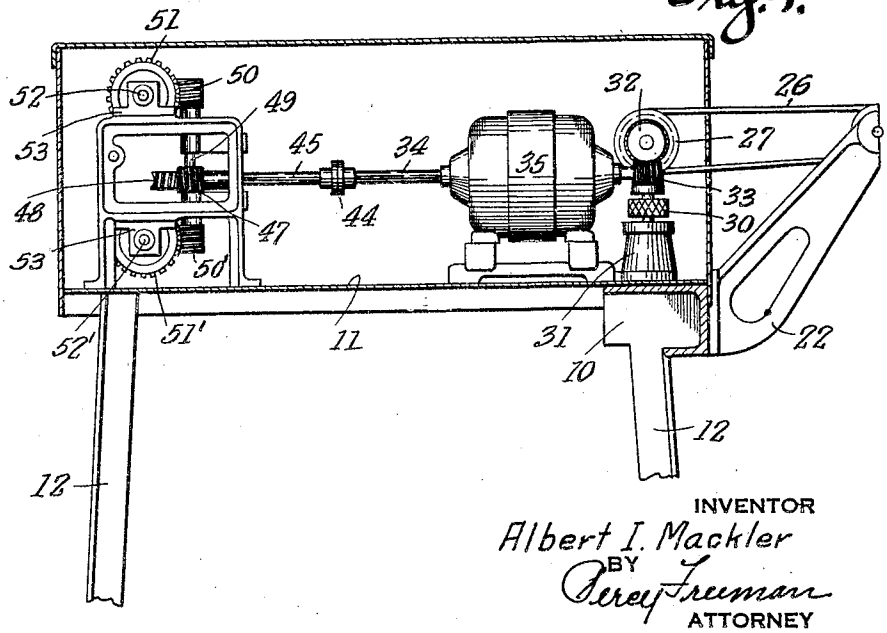



Fig. 4.




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Fig.5.

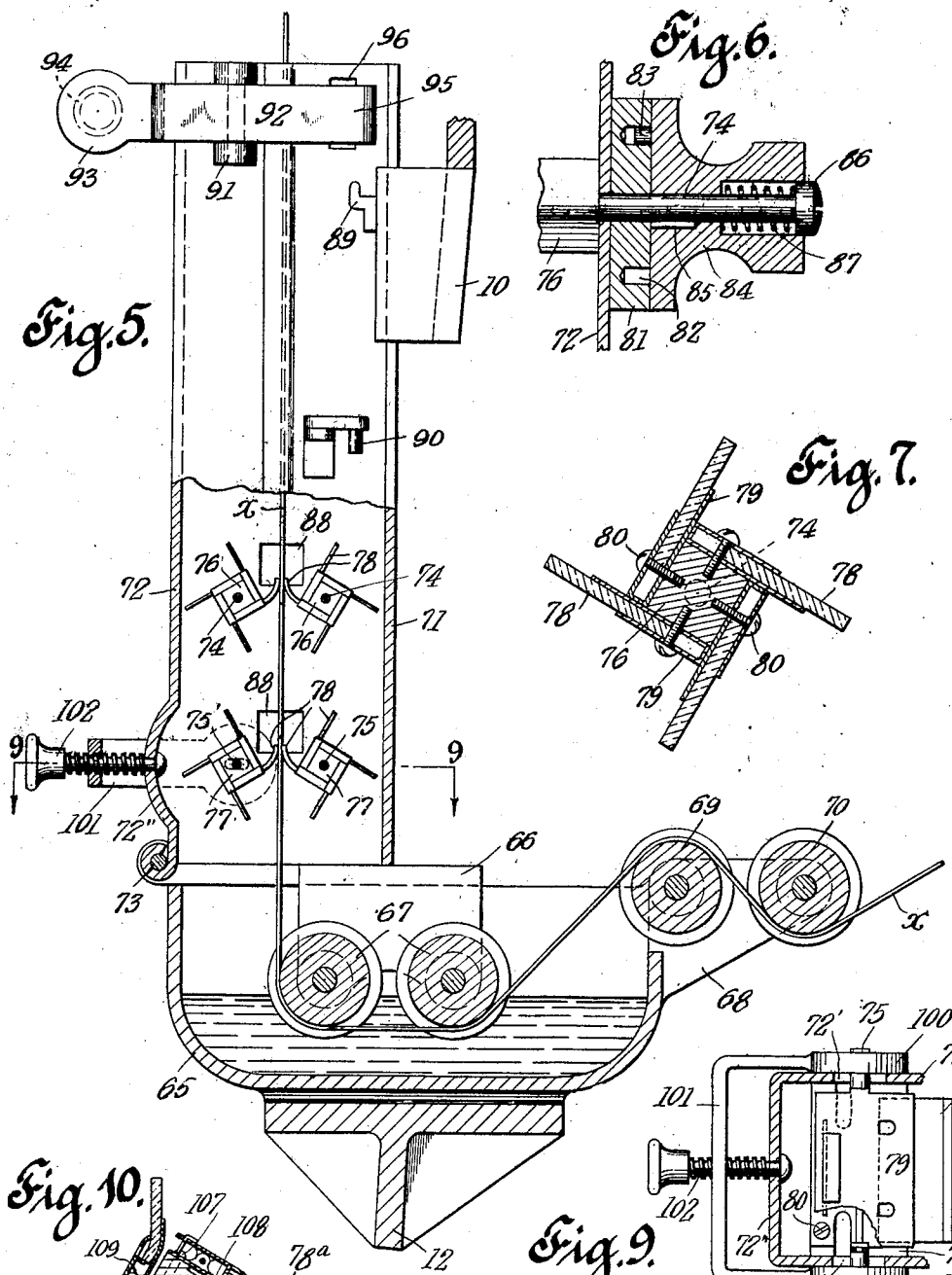



Fig.6.




Fig.7.




Fig.10.

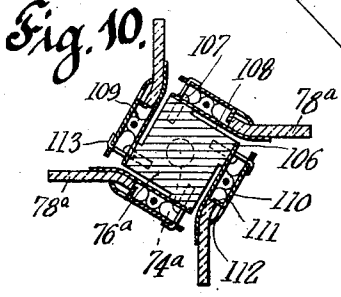



Fig.9.




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Patented June 20, 1933 1,914,890

# UNITED STATES PATENT OFFICE

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## FILM RENOVATING MACHINE

Application filed January 19, 1931. Serial No. 509,616.

This invention relates to machines for cleaning accumulations of dust and other opaque matter from the surfaces of moving picture films whereby their exposures are rendered clear, sharp and distinct, in contradistinction to the dim, cloudy effects produced by dirty films.

It is an object of this invention to provide a power driven apparatus receptive of a pair of film reels, respectively to wind and deliver the film, the film being caused to pass through a bath of cleansing solution, thereafter doubly wiped on both sides to remove moisture and adherent matter, and further subjected to a continuous drying operation, all of the operative parts, including the motor being encased in a fire proof and fool proof housing.

A further feature is in the provision of means to raise and lower the submerging rolls relative to the bath at will, and to cause the film to be drawn at a uniform speed, quite irrespective of the constantly changing diameter of coils on the reels.

Another purpose is to produce means whereby the several wipers, with their accumulations, may be substituted by fresh, clean wipers, by manual means, without retarding or stopping the action of the machine.

These and other important aims and objects are accomplished by the novel and practical construction, combination and arrangement of parts hereinafter described and illustrated in the accompanying drawings, forming a material part of this disclosure, and in which:

Fig. 1 is a top plan view of an embodiment of the invention, indicating its application, the cover being removed.

Fig. 2 is a side elevational view of the same.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a longitudinal sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a partial side elevational, partial sectional view of the film bath and wiping device, drawn to an enlarged scale.

Fig. 6 is a further enlarged sectional view of one of the film wiper changing and securing means.

Fig. 7 is a similarly enlarged transverse sectional view of one of the plural wiping means.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 2.

Fig. 9 is a partial transverse sectional view taken on line 9—9 of Fig. 5.

Fig. 10 is a sectional view of a wiping device similar to Fig. 7, but modified in construction.

The machine consists of a platform 10 over which is disposed a metal table 11 supported by a plurality of legs 12.

Referring more particularly to Fig. 2, a bracket 14 will be seen depending from the platform and carried in a bearing at the bottom of the bracket is a spindle 15 on which is mounted a reel 16, for the film X, the spindle being rotatable under the adjustable tension of a spring 17, (see Fig. 3) coiled about its oppositely extending portion, this spring forcing into frictional engagement a sliding clutch member 18 of the bracket.

A similar reel 20 is mounted on a spindle 21 carried in a bracket 22 extending outwardly from the end of the table (see Fig. 1), the spindle having fastened upon it a grooved driving pulley 23, which is pressed against an annular flange 24 fixed on the spindle, the pulley being wedged thereagainst by a spring 25 encircling the opposite, outer end of the spindle and constituting a friction drive.

Trained over the pulley 23 is a belt 26 driven by a pulley 27 fixed on a transverse spindle 28 rotatable in a bearing 29 which is adjustable for height by a knurled screw 30, the lower end of the screw engaging in a rigid bracket 31 mounted on the platform 10.

The spindle 28 also has fixed upon it a worm wheel 32, driven by a worm 33 fixed on the extending end of the shaft 34, of an electric motor 35 secured on the platform 10.

A casing 36 preferably encloses the motor and driven elements, and attached to one side of the casing is an angular bracket 37 carrying a housing 38 in which are mounted a pair of drive rolls 39 and 40, the upper roll 40 of which is pressed downwardly by a series of

cambered flat springs 41 at the top of housing, the tension of which is controlled by a lever 42, operatively engaging a screw 43 impinging on the outermost spring at its rounded bottom.

The bearings in which the roll spindles are rotatably mounted are normally pressed apart by inserting therebetween, compression springs 38′, as seen in Figs. 2 and 3.

The lowermost roll 39 is directly driven by the spindle 28 so as to cause the rolls to operate, and it will be understood that these rolls actuate the film X disposed therebetween.

The take-up reel 20 is driven at a speed in excess of the delivery of the film, which is controlled by the rolls 30 and 40, due to the friction drive of the pulley 23 to spindle flange 24, which allows slippage of the film to occur in a manner which will be well understood.

The opposite end of the motor shaft 34 is connected by a flexible coupling 44 with a shaft 45 housed in a bearing 46 and secured on the end of the shaft 45 is a worm 47 engaging a worm wheel 48 fixed on a vertical shaft 49 having at its ends worms 50—50′ meshed with worm wheels 51—51′ fixed on spaced transverse spindles 52—52′ respectively upper and lower, mounted in bearings 53—53′.

These spindles 52—52′ extend through the front of the machine, and secured thereon are magazine drums or spools 54 and 55 respectively upper and lower; similar spools 56 and 57 are mounted on spindles 58 and 59 set in the front side frame of the machine.

All these several spools are enclosed in casings 60 having end plates 61 for the purpose of keeping the rolls and material on them in a cleanly condition and are driven at substantially one revolution per minute.

Fixed on the outer ends of the fixed spindles 58′ and 59′ acting as friction brakes in retarding the action of the spools 56—57 from which the material is fed to the driven rolls 54—55, means for adusting the tension of the washers being provided.

The spools 54 and 56 carry a strip of felt 62, while the lower pair of spools 55 and 57 carry a similar felt strip 63, the purpose of which will later become apparent.

Secured on one of the support legs 12, below the surface of the table 11, is a rigid tank 65, and extending into the tank at its sides are brackets 66, having journalled at their lower ends a pair of rollers 67 arranged in the same horizontal plane.

Extending outwardly from the tank is a bracket 68, carrying spindles on which are loosely mounted another similar pair of rolls 69 and 70 in a horizontal plane and above the axes of the rolls 67.

Above the tank 65 is an upright sectional casing 71 having a cover portion 72 connected by a hinge 73, the casing 71 extending level with the table top; mounted transversely in the casing are two opposed pairs of spindles 74—74′ and 75—75′ respectively upper and lower, these spindles having between the sides of the casing rectangular blocks 76—76′ and 77—77′ on the four equal sides of which are secured wiping elements 78 of a semi-elastic nature, such as firmly condensed felt, the inner ends of the wiping elements being carried in metallic sockets 79, which are held to the sides of the square blocks 76—76′ and 77—77′ by screws 80, and it is to be noted that the wipers 78 extend outwardly at uniform distances and are alike in all respects.

Preferably the spindle 75′, in place of being journalled directly in the side walls of the cover element 72, pass through slots 72′ formed transversely therein and are rotatable in a pair of opposed hubs 100 connected by a yoke 101 in which is an adjusting screw 102 having an extending knob on its outer end, while its inner end is rotatably received in a curved projection 72″ on the outer wall of the cover, the arrangement being such that the block 77′ may be moved towards and from the mating block 77, thus increasing or decreasing the tensional effect of the wipers 78.

The spindles 74—75 extend through the side of the casing 74—75 and also annular plates 81 which are secured to the casing side and provided with four equally spaced openings 82 adapted to receive a pin 83 set in the inner side of the flange portion of a knob 84 keyed as at 85 to the spindle but slidable thereon, these spindles terminating the heads 86 which compress springs 87 set in recesses in the outer ends of the knobs and normally urge the flanges of the knobs into contact with the plates 81.

However, upon withdrawing the knobs and giving them a partial rotation it will be apparent that the wipers 78 may be changed in their relative position so as to present a fresh wiper into operative position relative to a film X passed therebetween.

This construction is clearly apparent in Fig. 5, where the wipers may be seen in operation through openings 88 provided in the casing so that their condition can be visually ascertained.

In the modified form of wiping head, shown in Fig. 10, the blocks 76*a* are secured on spindles 74*a*, these blocks having raised longitudinal ridges 106 at their rear edges and held by screws 107 to these ridges are forwardly extending spring plates 108, outturned at their outer free edge portions to act as seats for the wipers 78*a*.

Pivoted to lugs 109 carried by the plates 108 are clamp plates 110 sheared to present stops 111 for the rear edges of the wipers, which are forced against their seats by the

forward sharp edges 112 of the clamp plates, these plates being guided by the inbent studs 113 set in the blocks.

An inreaching hook 89 is provided on the end of the platform 10, the same being engageable with a pin 90 hingedly carried by the casing 71 and as the brackets 66 are attached to the lower end of the casing it will be seen that the rolls 67 may be raised and held out of the tank 65 when desired.

At the upper end of the casing 71—72 mounted upon a lateral extending bracket 91 are opposed lever members 92, their outer, inset ends, 93 acting as handles being pressed apart by a compression spring 94 disposed therebetween, the inner ends 95 of the levers acting as latches to engage in openings 96 in the casing element 71, thereby holding the hinged element 72 thereagainst.

A bracket 97 is raised at a suitable height from the end of the casings surrounding the mechanism, and mounted therein is a roll 98, a similar roll 99 is rotatable on a plug set in the front of the casing.

In operation, a filled reel of the film X is disposed on the bracket carried spindle 15, the film being trained under the roll 70, over the roll 69, and under the submerging rolls 67 at that time raised above the surface of the bath which may be of any suitable cleansing solution.

The rolls 67, upon being released by disconnecting the pin 90 from the hook 89, cause submersion of the film within the bath, from which the film passes upwardly, substantially central of the casing 71—72, between the lower wiper carrying blocks so that the wipers 78 are resiliently pressed thereagainst from opposite sides, removing much of the moisture and accumulations, the lower pair of wipers being manually adjustable.

The film, continuing to travel, passes between the second pair of blocks on which the upper wipers are carried and operated in a similar manner, thence over the carrier roll 98, between the drums 54 and 55 over the felt strip 63, and thence under the corresponding felt strip 62, continuing over the idle roll 99, between the feed rolls 39—40, operating under tension and finally delivered to the take-up or winding roll 20, which, as has been noted, is driven at a rate of speed in advance of the roll but capable of slipping to avoid damage of the film, the film moving at approximately 1000 feet in three and a half minutes, while the wiper strips 62—63 travel about one foot in the same time.

All of the several reels 54, 55, 56 and 57 are mounted within casings 60—61 to prevent soiling of the wiping elements 62 and 63 which are fed from the rolls 56—57 to the rolls 54 and 55, these rolls being caused to travel at a relatively slow rate of speed so that a fresh surface of the wiping elements 62 and 63 is constantly presented to the passing film.

In order to present a fresh resilient wiper 78 to the film, the knob 84 may be retracted so as to clear the pin 83 from its corresponding opening and re-insert it in the next adjacent opening, thereby causing the wipers 78 to operate progressively.

As changes of construction could be made within the scope of the invention, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. In a film cleaner, a bath, means for submerging a moving film in said bath, a series of opposed blocks between which the film is drawn after passing from the bath, a plurality of resilient wipers in contact with and extending from the faces of each of said blocks to impinge on the film, and means for manually turning said blocks whereby one wiper is removed from and another substituted in operative position.

2. In a film cleaner, a casing through which the film is drawn, a bath at the bottom of said casing, means to pass the film through said bath, a pair of spindles journalled in the casing walls in spaced relation, and in the same horizontal plane rectangular blocks fixed on said spindles, metallic sockets fixed on the sides of the blocks, and felt wipers set in said sockets to extend uniformly outward in different radial directions in such manner that when a wiper on one block is positioned to oppose a wiper on the other block the opposed wipers will impinge upon opposite sides of a film passing from said bath.

3. In a film cleaner, a casing through which the film is drawn, a bath at the bottom of said casing, means to pass the film through said bath, a pair of spindles journalled in the casing walls in spaced relation, rectangular blocks fixed on said spindles, metallic sockets fixed on the sides of the blocks, and felt wipers set in said sockets to radially extend uniformly outward to impinge when in operative position upon opposite sides of a film passing from said bath, and means for manually rotating said spindles to bring selected wipers into operative position.

4. In a film cleaner, a casing through which the film is drawn, a bath at the bottom of said casing, means to pass the film through said bath, a pair of spindles journalled in the casing walls in parallel relation, and in the same horizontal plane rectangular blocks fixed on said spindles, metallic sockets fixed on the sides of the blocks, and felt wipers set in said sockets to extend uniformly outward in different radial directions to impinge when in oper-

ative position upon opposite sides of a film passing from said bath, plates on said casing through which said spindles extend, said plates having openings in their faces corresponding to said wipers, a knob longitudinally slidably engaged on but fixed for rotation with each spindle, and a detent carried by said knob to be engaged in the plate openings selectively.

Signed, in the city, county and State of New York, June, 1930.

ALBERT I. MACKLER.