

Oct. 30, 1934.

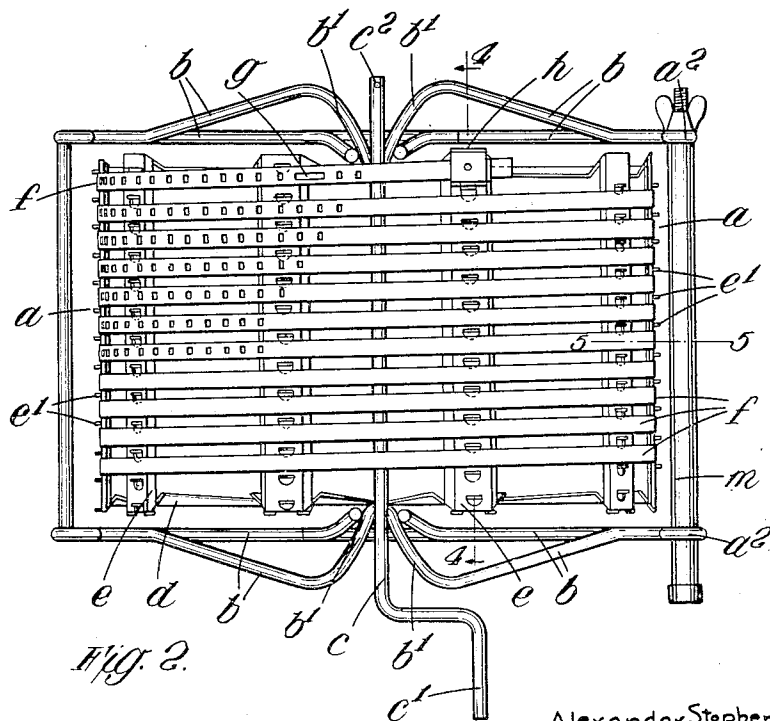
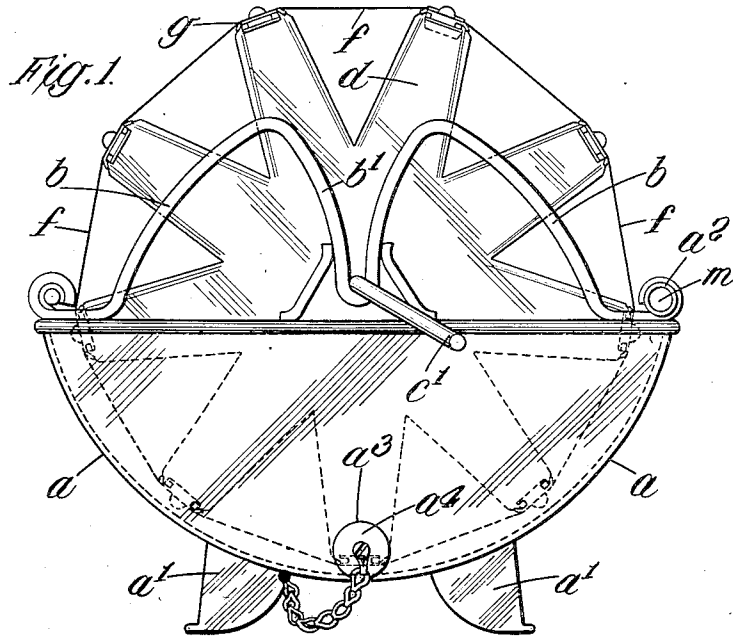
A. S. HENDERSON

1,979,106

APPARATUS FOR TREATING CINEMATOGRAPH FILMS

Filed May 23, 1933

2 Sheets-Sheet 1



Alexander Stephen Henderson
INVENTOR

Otto Lynck
his Attorney

Oct. 30, 1934.

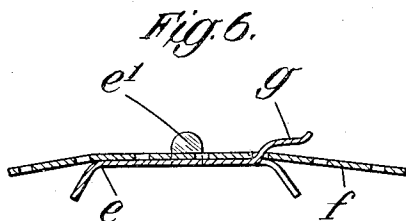
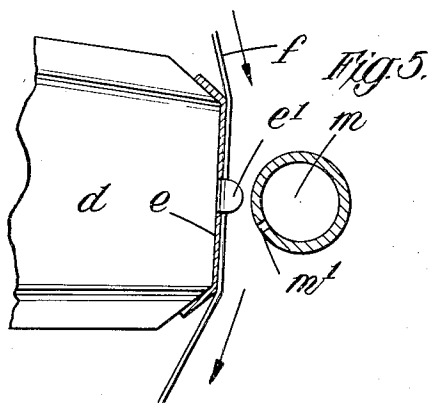
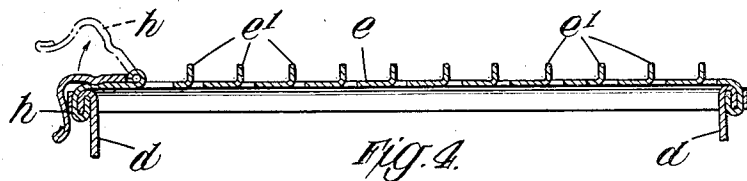
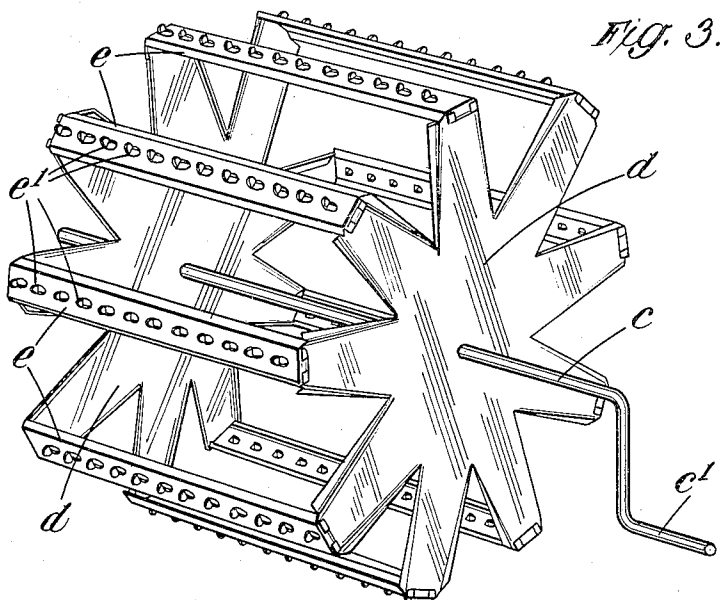
A. S. HENDERSON

1,979,106

APPARATUS FOR TREATING CINEMATOGRAPH FILMS

Filed May 23, 1933

2 Sheets-Sheet 2



Alexander Stephen Henderson
INVENTOR;

Attorney

UNITED STATES PATENT OFFICE

1,979,106

APPARATUS FOR TREATING
CINEMATOGRAPH FILMSAlexander Stephen Henderson, Aberdeen,
ScotlandApplication May 23, 1933, Serial No. 672,407
In Great Britain May 25, 1932

17 Claims. (Cl. 95—93)

This invention relates to apparatus for treating cinematograph films, and has for its chief object to provide a simple, cheap and efficient device for processing, washing and drying standard cinematograph films, such as are used, for example, by amateurs. One of the chief advantages of the apparatus according to the present invention is that the film may be processed, washed and dried without the operator having to handle the wet film.

According to the present invention, the apparatus for treating cinematograph films comprises a tank and a drum rotatably mounted therein to receive the film which is wound around the outer periphery of the drum, the tank also being provided with a spraying device for washing the film on the drum after it has been processed.

In the preferred form of this invention, the spraying device is so disposed with respect to the drum that the water issuing therefrom impinges on the drum in such a manner as to rotate the same so that the device will not require any attention whilst the film is being washed.

The drum, which may be of skeleton form, as hereinafter explained, is conveniently provided around its periphery with helically arranged projections to separate the turns of the film wound thereon.

Certain other novel and advantageous features are provided by the present invention, and these will be fully described hereinafter.

In order that this invention may be the more clearly understood and readily carried into effect, I will proceed to describe the same with reference to the accompanying drawings, which illustrate by way of example and not of limitation one convenient embodiment of this invention, and in which

Figure 1 is a side elevation of the complete apparatus, and

Figure 2 is a plan view of the same.

Figure 3 is a perspective view of the drum removed from the tank.

Figure 4 is a section on line 4—4 of Figure 2, showing a clip device for holding the end of the film.

Figure 5 is a section on line 5—5 of Figure 2.

Figure 6 is a view showing a detail of construction for use with the clip device shown in Figure 4, and

Figure 7 is a view showing the method of holding the end of the film so as to allow for expansion and contraction during the complete treatment of the film.

Referring now to the drawings, the device shown therein comprises a substantially semi-cylindrical tank *a*, supported on feet *a*¹. The two sides of this tank *a* are provided with wire or other suitable frames *b*, slotted or shaped to provide sloping sides, as at *b*¹, to allow the free insertion and removal of the spindle *c* on which the drum is mounted. The wires form guides to prevent the film on the drum coming in contact with the tank. Thus, after the drum has been removed from the tank for any purpose, say to pour in a solution, it cannot be reinserted into the tank unless the spindle of the drum strikes one of the sloping sides, or is positioned between them. All chance of the film being damaged is thereby avoided, this arrangement being of especial advantage when the device is being used in a dark room.

The drum comprises a pair of spider shape side cheeks *d*, the outer ends of the arms of these side cheeks being united by cross pieces *e* which are connected to the arms of the side cheeks *d* in any suitable manner. Punched up from the cross pieces *e* are small lugs *e*¹, the spacing between each of the lugs on each cross piece being fully the width of the film with which the device is to be used, for example, 9 mm. or 16 mm., and the positioning of the lugs being such that they form a helical line around the outer periphery of the drum.

The bottom of the slots *b*¹ in the frames *b* form bearings for the spindle *c* of the drum and, on one side, this spindle is cranked, as at *c*¹, to form a handle by means of which the drum may be rotated in the tank. The curvature of the tank approximates closely to the outer periphery of the drum so that the outer periphery of the drum at the lower part thereof lies in close proximity to the tank whilst at the same time allowing the drum to rotate freely in the tank.

The film *f* is wound on the outer periphery of the drum between the lugs *e*¹ and, due to the helical arrangement of these lugs, the film may be wound evenly and easily around the drum without any sharp bends. The film is attached to one of the cross pieces at one end, and the drum is then rotated by means of the handle *c*¹ whilst feeding the film from the spool on to the drum, the lugs *e*¹ guiding the film easily and smoothly into position. The preferred means of holding the beginning of the film, according to the present invention, comprise a tongue *g* punched up from one of the cross pieces *e* and adapted to take into one of the holes in the film *f*. The adjacent cross piece *e* is provided at its end with a hinged right-

angled clip *h* which is adapted to be snapped over the end of the cross piece and so hold the end of the film tightly against the cross piece. For this purpose, it may be provided with a small depression on its upper surface which, forming a small projection on the underside, grips the film. In use, the film at a suitable distance from its end is threaded over the tongue *g*, leaving sufficient of the film to be gripped by the clip *h*. These devices form the anchoring for the end of the film which, once anchored, is wound on in the manner described above. The tongue *g*, of course, forms a definite connection of the film to the drum and by means of releasing the clip *h* that part of the film which lies between the tongue *g* and the clip *h* may at any time during the treatment of the film be raised off the drum and examined front and back without affecting the remainder of the film. This is, of course, a very advantageous feature as it enables the operator to ascertain easily and quickly whether processing is complete or not.

Also the spaces between the cross piece *e* enable the main portion of the film to be inspected from one side, if desired.

Now it is well known that during the processing the film expands and during the drying operation the film contracts. Hence, since the film is intended to be processed, washed and dried without being removed from the drum, it is desirable to provide means to compensate for this expansion or contraction. Such means, according to the present invention, comprise a hook or tongue *j* which is adapted to take into an appropriate hole in the end of the film remote from that which is held by the tongue *g*, this hook being connected by means of a length of elastic *k* (or a spring) to a further hook *l* which is hooked over an appropriate cross piece *e*, the elastic being under tension. The whole film is, therefore, under tension during processing, washing and drying, and any expansion or contraction of the film will be effectively compensated, so that the film will lie snugly around the drum at all times.

The edges of the arms of the side cheeks are turned in slightly for strengthening purposes, and the edges of the cross pieces are turned down for a like purpose and also to prevent the possibility of any sharp edges coming into contact with the film.

For processing, the required amount of solution is put into the tank *a* and the drum is rotated by means of the handle *c*¹ to run all parts of the film through the solution. The construction of device shown in the drawings has the very great advantage that only a small quantity of solution is required to process the film as, due to the small spacing between the film and the bottom of the tank, quite a small quantity of solution will adequately flood the film on the lower part of the drum, and rotation of the drum will cause the whole of the film to be effectively subjected to the action of the solution. The stage of development reached can easily be ascertained by turning back the end of the film, as above explained.

At various stages during the processing of the film, for example, after developing and before reversing, the film has to be washed, this washing step being, according to the present invention, carried out in the same apparatus without removing the film from the drum. The washing is, according to the present invention, carried out by means of a spraying device comprising a tube *m* mounted along one end of the tank *a* in any suitable manner, say, by means of eyelets *a*², this

tube *m* being connected, when in use, with a tap and being provided on that side facing the drum with a row of holes (one of which can be seen at *m*¹, Figure 5) through which the water is sprayed on to the film *f* on the drum. Now the washing operation is a comparatively long operation and, in order to avoid the necessity of the continuous presence of the operator to turn the drum during the washing operation, the spraying device is, according to the present invention, so arranged that the force of the water issuing from the spraying device in impinging on the drum and film causes the drum to rotate and thus bring all the parts of the film under the spray. This is, of course, a very advantageous feature, as it enables the apparatus to be left alone during the washing operation. The tank *a* is provided at its bottom with a large diameter draining aperture *a*³ which, during the processing operation, is closed by a plug *a*⁴ but which is opened during the washing operation to allow the water to drain away. The diameter of the draining aperture *a*³ may be so proportioned with respect to the spray that a certain amount of water is always maintained in the bottom of the tank or not, as is thought desirable. The spray is, of course, directed on to the drum so as to produce the desired turning movement, and the drum is preferably balanced so as to run smoothly.

The washing arrangement, according to the present invention, will also enable the necessary exposure of the film to light after bleaching to be carried out simultaneously with the washing, the film receiving the light evenly all over as the drum is rotating during the automatic washing process.

After washing, the film is dried, still on the drum, and a small hole *c*² may be drilled in the end of the spindle *c* to receive a length of cord by means of which the drum may be kept spinning during the drying operation.

It will thus be seen that the device, according to the present invention, whilst simple to operate, will nevertheless enable sub-standard cinematograph film to be processed, washed and dried without the operator having to handle the wet film. Two of the great advantages secured by the use of the apparatus according to the present invention, are, firstly, the small quantity of processing solution required and, secondly, the fact that the apparatus may be left without attention during the washing operation with every confidence.

The whole apparatus is preferably made of stainless steel although any other suitable material may be employed for the manufacture of the device.

By the expression "processing the film" is meant any treatment to which the film is subjected after exposure. The apparatus, according to the present invention, is equally applicable to the ordinary development of the film to produce a negative or to the reversal process of development which produces a positive film.

Many modifications may be made in the form of this invention described in detail above, for example, the helically arranged lugs may be formed in any other manner about the periphery of the drum; the drum may be made in any other suitable form; any other form of water spray may be used; means may be provided for coupling the drum spindle to a small motor to rotate the same, and a cover may be provided over the top of the drum. All these and various other modifications which will be apparent to those skilled in the art may be made without departing from the

scope of this invention as defined by the appended claims.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein and a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum.

2. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, helically arranged projections around the periphery of the drum to separate the turns of the film and a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum.

3. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle and a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum.

4. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks, punched up lugs on said cross-pieces to separate the turns of the film, and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle and a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum.

5. Apparatus for treating cinematograph films comprising a tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device so disposed on the tank that the water issuing therefrom washes the film and also causes the drum to be revolved, a tongue on one cross-piece to take into a perforation in the film to hold the same, and a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same.

6. Apparatus for treating cinematograph films comprising a tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks, punched up lugs on said cross-pieces to separate the turns of the film and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device so disposed on the tank that the water issuing therefrom washes the film and also causes the drum to be revolved, a tongue on one cross-piece to take into a perforation in the film to hold the same, and a clip on an adjacent cross-piece to hold the

end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same.

7. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum, a tongue on one cross-piece to take into a perforation in the film to hold the same and a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same.

8. Apparatus for treating cinematograph films comprising a tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device so disposed on the tank that the water issuing therefrom washes the film and also causes the drum to be revolved, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

9. Apparatus for treating cinematograph films comprising a tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks, punched up lugs on said cross-pieces to separate the turns of the film and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device so disposed on the tank that the water issuing therefrom washes the film and also causes the drum to be revolved, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

10. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

11. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining

the end of the arms of the end cheeks, punched up lugs on said cross-pieces to separate the turns of the film and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

12. Apparatus for treating cinematograph films comprising a tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device so disposed on the tank that the water issuing therefrom washes the film and also causes the drum to be revolved, a tongue on one cross-piece to take into a perforation in the film to hold the same, a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

13. Apparatus for treating cinematograph films comprising a substantially semi-cylindrical tank, a drum rotatably mounted therein to receive the film, said drum comprising a pair of spider-shaped end cheeks, cross-pieces joining the end of the arms of the end cheeks and a spindle on which said end cheeks are mounted, bearings on said tank for said spindle, a spraying device comprising a perforated tube disposed at one end of the tank so that the water issuing therefrom washes the film and also rotates the drum, a tongue on one cross-piece to take into a perforation in the film to hold the same, a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

14. Apparatus for treating cinematograph films comprising a semi-cylindrical tank having near its bottom an orifice for the discharge of the contents thereof, a bung to close said orifice, feet to said tank, wire brackets attached to the sides of said tank, said wire brackets extending upwardly from the ends of the tank and then downwardly, converging towards one another towards the middle of the sides of the tank to form bearings, a spindle removably mounted in said bearings, a crank end to said spindle to form a handle by means of which it may be rotated, a pair of spider-form end cheeks secured in spaced relation on said spindle and adapted when the spindle is in position to lie within the tank at their lower parts, cross-pieces joining the ends of the arms of the end cheeks to receive the film which is wound about the skeleton drum so formed, punched up lugs on said cross-pieces

to separate the turns of the film, and a spraying device comprising a perforated tube mounted along one end of the tank to wash the film after it has been processed and also to cause the drum to be rotated.

15. Apparatus for treating cinematograph films comprising a semi-cylindrical tank having near its bottom an orifice for the discharge of the contents thereof, a bung to close said orifice, feet to said tank, wire brackets attached to the sides of said tank, said wire brackets extending upwardly from the ends of the tank and then downwardly, converging towards one another towards the middle of the sides of the tank to form bearings, a spindle removably mounted in said bearings, a cranked end to said spindle to form a handle by means of which it may be rotated, a pair of spider-form end cheeks secured in spaced relation on said spindle and adapted when the spindle is in position to lie within the tank at their lower parts, cross-pieces joining the end of the arms of the end cheeks to receive the film which is wound about the skeleton drum so formed, punched up lugs on said cross-pieces to separate the turns of the film, a spraying device comprising a perforated tube mounted along one end of the tank to wash the film after it has been processed and also to cause the drum to be rotated, a tongue on one cross-piece to take into a perforation in the film to hold the same and a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same.

16. Apparatus for treating cinematograph films comprising a semi-cylindrical tank having near its bottom an orifice for the discharge of the contents thereof, a bung to close said orifice, feet to said tank, wire brackets attached to the sides of said tank, said wire brackets extending upwardly from the ends of the tank and then downwardly, converging towards one another towards the middle of the sides of the tank to form bearings, a spindle removably mounted in said bearings, a cranked end to said spindle to form a handle by means of which it may be rotated, a pair of spider-form end cheeks secured in spaced relation on said spindle and adapted when the spindle is in position to lie within the tank at their lower parts, cross-pieces joining the ends of the arm of the end cheeks to receive the film which is wound about the skeleton drum so formed, punched up lugs on said cross-pieces to separate the turns of the film, a spraying device comprising a perforated tube mounted along one end of the tank to wash the film after it has been processed and also to cause the drum to be rotated, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

17. Apparatus for treating cinematograph films comprising a semi-cylindrical tank having near its bottom an orifice for the discharge of the contents thereof, a bung to close said orifice, feet to said tank, wire brackets attached to the sides of said tank, said wire brackets extending upwardly from the ends of the tank and then downwardly, converging towards one another towards the middle of the sides of the tank to form bearings, a spindle removably mounted in said bearings, a cranked end to said spindle to form a handle by means of which it may be rotated,

a pair of spider-form end cheeks secured in spaced relation on said spindle and adapted when the spindle is in position to lie within the tank at their lower parts, cross-pieces joining the end of the arms of the end cheeks to receive the film which is wound about the skeleton drum so formed, punched up lugs on said cross-pieces to separate the turns of the film, a spraying device comprising a perforated tube mounted along one end of the tank to wash the film after it has been processed and also to cause the drum to be rotated, a tongue on one cross-piece to take into a perforation in the film to hold the same, a clip on an adjacent cross-piece to hold the end of the film, whereby the end of the film may be lifted and inspected without affecting the main part of the same, a detachable clip adapted to take about a suitable part of the drum, a hook member adapted to take into a perforation in the film and elastic means connecting said detachable clip with said hook member, whereby the film is maintained under tension despite elongation.

ALEXANDER STEPHEN HENDERSON.

15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150