Oct. 6, 1925. 1,555,957

V. C. DE YBARRONDO

DEVICE FOR TREATING MOTION PICTURE FILMS

Filed Jan. 30, 1922

Fig. 1.

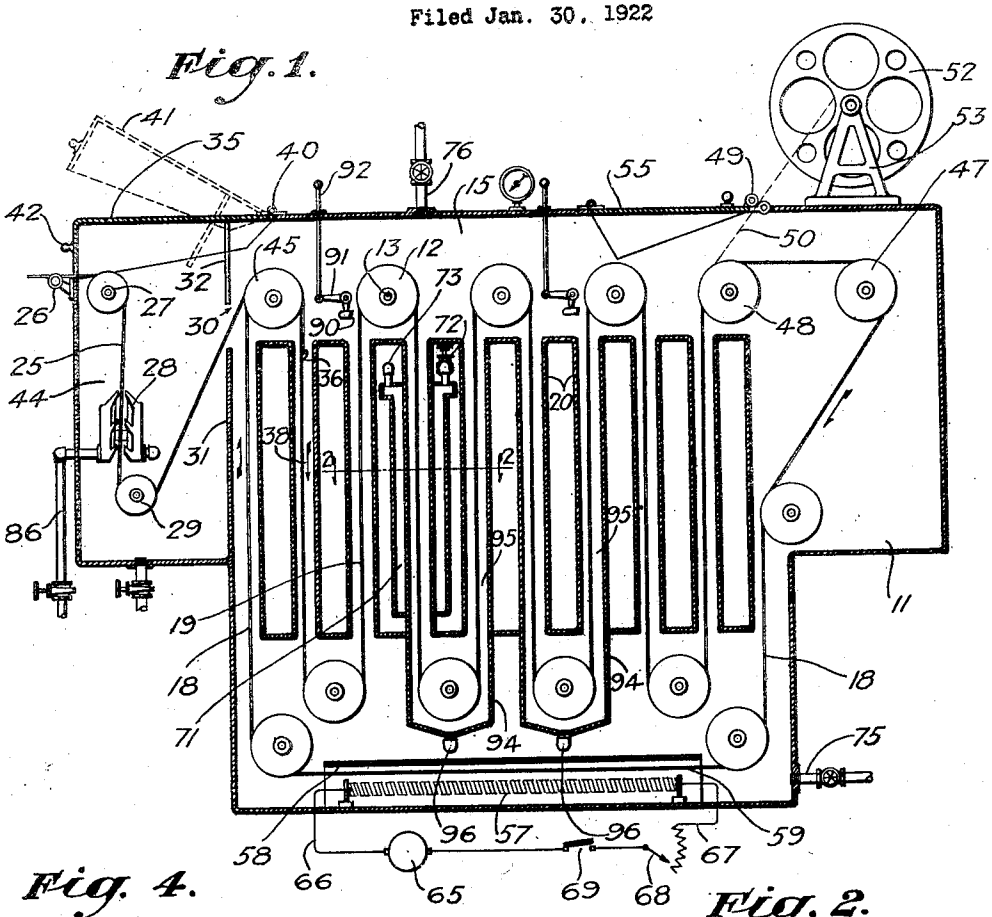


Fig. 4.

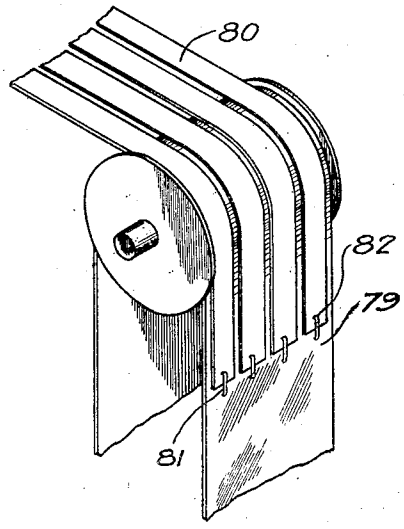


Fig. 3.

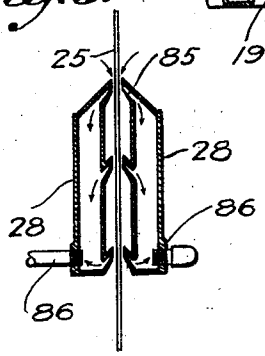
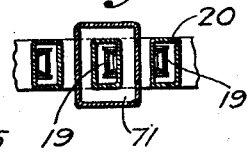


Fig. 2.



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DEVICE FOR TREATING MOTION-PICTURE FILMS.

Application filed January 30, 1922. Serial No. 532,918.

To all whom it may concern:

Be it known that I, VINCENT C. DE YBARRONDO, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Device for Treating Motion-Picture Films, of which the following is a specification.

My invention relates to the production of motion pictures and relates particularly to the treatment of exposed film for the development thereof and the further preparation thereof for its ultimate use.

Both negative and positive films are subjected to a series of consecutive treatments after their exposure, these treatments consisting essentially of the following steps: the development of the image by immersing the film in developing solutions; the fixation of the image by the immersion of the film in fixative solutions; washing of the film to remove all adhering solutions; and finally the drying of the film after which it may be polished to remove the evidences of the extensive treatment through which it has been passed in preparation for commercial uses.

It is the principal object of my invention to provide an apparatus which will expedite the operations which are performed upon motion picture films for the purpose of preparing them for exhibiting use.

It is a further object of my invention to provide a device for treating motion picture film into which a film may be introduced at one side of the device and may be conveyed therethrough without further manual attention and may be taken from the device in a condition suitable for the subsequent operation.

I attain these and other objects, as will be made evident hereinafter; by the provision of a continuous traveling belt to which the film is attached, the film thereafter being carried through certain of the operations hereinbefore mentioned; and by other mechanical means which I have entered into combination with the principle of the traveling belt.

Referring to the drawing which is for illustrative purposes only,

Fig. 1 is a somewhat diagrammatic section through a film treating device embodying my invention.

Fig. 2 is a section taken upon a plane represented by the line 2—2 of Fig. 1.

Fig. 3 is a section through the exhaust nozzle which I use for removing surplus water from wet film before the film is introduced into the drying apparatus.

Fig. 4 is a diagrammatic perspective view showing a multiple arrangement of films attached to a continuous belt suitable for employment in the practice of my invention.

Although the principles of my invention may be applied to the developing, fixing, washing, drying and certain other ordinary operations through which the film must be passed before it is ready for commercial use, I am in this application presenting but one form of my invention; that of a device for drying films after they are taken from the washing operations.

As shown in Fig. 1 of the drawing I employ a substantially tight box-like structure 11 within which spools 12 are mounted upon shafts 13 extending between the side walls 15 of the box 11. A continuous belt 18 is so mounted on the spools 12 that a sinuous course is provided. In assuming this sinuous course, the belt passes through channels formed by extending walls 20 between the side walls 15 of the box 11. A film 25 from the previous operation is carried into the box 11 over a roller 26 upon the exterior of the box 11 and is passed downwardly over a spool 27 between a pair of vacuum nozzles 28 whereupon it is passed around a spool 29 and is carried upwardly through an opening 30 which is formed between a wall 31 within the box 11 and a web 32 extending downwardly from the underside of the door 35. After passing through the opening 30 the film is attached to the belt 18 as indicated at 36 so that it will be carried throughout the different channels 19 as the belt is moved in the direction indicated by the arrow 38.

The door 35 is mounted upon a hinge 40 and may be swung back through the position indicated by the dotted lines 41, by lifting upon the knob 42. It will be perceived that the door 35 is of sufficient size to expose the interior of the water removing chamber 44 and the first of the spools 12 which I have indicated by the number 45. When introducing film into the device, the film 25 is manually placed over the spools 27 and 29 and attached to the belt at the spool 45. The belt 18 is caused to travel by driving one of the spools over which it runs, preferably by driving the end spool as des-

ignated at 47, the driving of which spool may be accomplished by connection with a rotating member, not shown, by means of suitable belting or gearing. The film 25 is then conveyed by the traveling belt 18 through the channels 19 until the spool designated at 48 is reached whereupon the film is detached from the belt and conveyed as indicated by the dotted line 50, to the exterior of the box 11 through rollers 49 and wound upon a suitable spool 52 which is supported between brackets 53. A door 55 is provided to allow access to the spool 48, and it will be perceived that one of the rollers 49 is mounted thereupon.

I prefer to make the belt 18 of a porous substance or fabric having high water absorption qualities and it is one of the principal features of my invention to heat the belt 18 at a point in its course before contact is made with the moist film 25. I accomplish the heating of the belt 18 by the employment of a heating element 57 which is covered by a member 58 under which the belt passes as indicated at 59 in its return from the spool 47 to the spool 45. Electric current for energizing the element 57 is taken from a current source as the generator 65, through a lead conductor 66 and a return conductor 67 in which a rheostat 68 and a service switch 69 are placed. A certain amount of the heat generated in the element 57 passes upwardly through certain of the channels 19 and has further drying action upon the film being carried through these channels. Additional heat for drying the film may be furnished by placing a steam jacket 71 around a desirable number of the channels 19. Steam is introduced into the jacket 71 through a valve 72 and is carried off therefrom through piping 73.

I further assist the drying of the film carried upon the traveling belt by influencing the atmosphere upon the interior of the box 11 in such a manner that the moisture absorbing qualities are considerably increased. By influencing I intend to convey the meaning of creating a particularly desirable state of the atmosphere within the box 11 such as extremely low humidity of the air constituting this internal atmosphere which may be accomplished by introducing dry air through piping 75 into the box and carrying off moist air from the box 11 through piping 76. It may be further desirable to create a partial vacuum upon the interior of the box 11 by exhausting air through either of the pipings 75 or 76 to assist in the vaporization of the moisture carried upon the film 25 or it may be desirable to introduce a refrigerant through piping 75 allowing this refrigerant to expand within the box 11 and to be carried off through the piping 76.

A particular advantage in the use of my invention resides in the fact that after the first length of film is started on its course throughout the box, the apparatus may be operated continuously without the necessity of opening either of the doors 35 or 55 as succeeding lengths of film may be joined by the temporary film splicers which are of common use in the motion picture industry.

In Fig. 4 of the drawing I show a very desirable form of belt for use in the practice of my invention. This belt 79 is of sufficient width to accommodate a plurality of films 80 which are attached thereby by means of small hooks 81 which pass through small holes 82 punched in the end of each of the films 80. In the operation of my device, the film 25 is passed over the roller 27 and downwardly between the vacuum nozzles 28 which are shown in section in Fig. 3. Each of the nozzles 28 is provided with small openings 85 through which air is drawn at a high velocity due to the exertion of a vacuum through the piping 86. As the film 25 passes between the nozzles 28, any water adhering thereto is taken off by the swiftly moving currents of air which are drawn into the nozzles 28 through the openings 85. By this means I am able to accomplish a very complete removal of the free moisture carried upon the film so that when the film comes in contact with the heated belt 18, only the entrained moisture must be cared for. In passing through the channels 19 the moist film is acted upon by the heated atmosphere and the condition of vacuum created therein as hereinbefore mentioned thus accomplishing the entire removal of moisture from the film so that when the film is taken from the box 11, it is in a perfectly dry condition. The length of time to which the film is subjected to the conditions upon the interior of a device embodying my invention may be regulated by varying the speed at which it is carried through upon the belt 18, this regulation being accomplished after a comparatively few trials.

The device shown in the drawing may be employed for the purpose of removing emulsion from film in the following manner. The wet film is passed over the rollers 27 and 29 and attached to the belt 18 as previously described. In this case the vacuum nozzles are allowed to remain inactive so that most of the moisture will remain upon the film. Small pads such as indicated at 90 are mounted upon bell cranks 91 so that they may be drawn into contact with the surface of the film by downwardly actuating the rod 92. The wet emulsion is comparatively easy of removal from the film and comparatively small pressure is required against the film by the pads 90. Walls 94 disposed beneath certain of the channels 19 provide, in combination with certain of channels 19, chambers 95 in which solutions may be placed to

assist in the removal of the emulsion, these solutions being afterwards drained off through drains 96.

I claim as my invention:

1. In apparatus for treating motion picture film, the combination of: a traveling belt; clips functioning independently for attaching film to said traveling belt and holding the film to said belt; and means for treating said film as it is conveyed upon said traveling belt.

2. In apparatus for treating motion picture film, the combination of: a continuous traveling belt; clips for functioning independently for attaching film to said traveling belt and holding the film to said belt; and means for treating said film as it is conveyed upon said traveling belt.

3. In apparatus for treating motion picture film, the combination of: a traveling belt; clips functioning independently for attaching film to said traveling belt; and means for heating said belt.

4. In apparatus for treating motion picture film, the combination of: a continuous traveling belt; clips functioning independently for attaching film to said traveling belt; means for treating said film as it is conveyed upon said traveling belt; and a heat dispersing member for heating said belt.

5. In apparatus for treating motion picture film, the combination of: a continuous traveling belt; clips for attaching film to said traveling belt; means for treating said film as it is conveyed upon said traveling belt; and a heat dispersing member for heating said belt before contact is made between said belt and said film.

6. In apparatus for treating motion picture film, the combination of: a traveling belt; means for attaching film to said traveling belt; exhaust means for removing moisture from said film before said film comes in contact with said belt; and a heat dispersing member for heating said belt before contact is made between said belt and said film.

7. In apparatus for treating motion picture film, the combination of: a traveling belt; means for attaching film to said traveling belt; means for removing moisture from said film before said film comes in contact with said belt; and a heat dispersing member for heating said belt before contact is made between said belt and said film.

8. In apparatus for treating motion picture film, the combination of: a box-like member; a continuous traveling belt within said member; means for attaching film to said belt; an exhaust nozzle for removing water from said film before said film comes in contact with said belt; and a heat dispersing element for heating said belt before said film comes into contact therewith.

9. In apparatus for treating motion picture film, the combination of: a box-like member; a continuous traveling belt within said member; means for attaching film to said belt; an exhaust nozzle for removing water from said film before said film comes in contact with said belt; a heat dispersing element for heating said belt before said film comes into contact therewith; and means for heating the interior of said box-like member to assist in the vaporization from said film of the moisture remaining thereupon after the subjection thereof to the action of said exhaust nozzle.

10. In apparatus for treating motion picture film, the combination of: a box-like member; a continuous traveling belt within said member; means for attaching film to said belt; an exhaust nozzle for removing water from said film before said film comes in contact with said belt; a heat dispersing element for heating said belt before said film comes into contact therewith; means for heating the interior of said box-like member to assist in the vaporization from said film of the moisture remaining thereupon after the subjection thereof to the action of said exhaust nozzle; and piping connecting into the interior of said box-like member through which the interior atmosphere of said member may be influenced to assist in the drying of said film as it is conveyed through said member by said traveling belt.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 23rd day of January, 1922.

VINCENT C. DE YBARRONDO.