

Nov. 17, 1925.

1,561,699

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METHOD AND APPARATUS FOR DEVELOPING FILMS

Filed Sept. 21, 1923

2 Sheets-Sheet 1

Fig. 1.

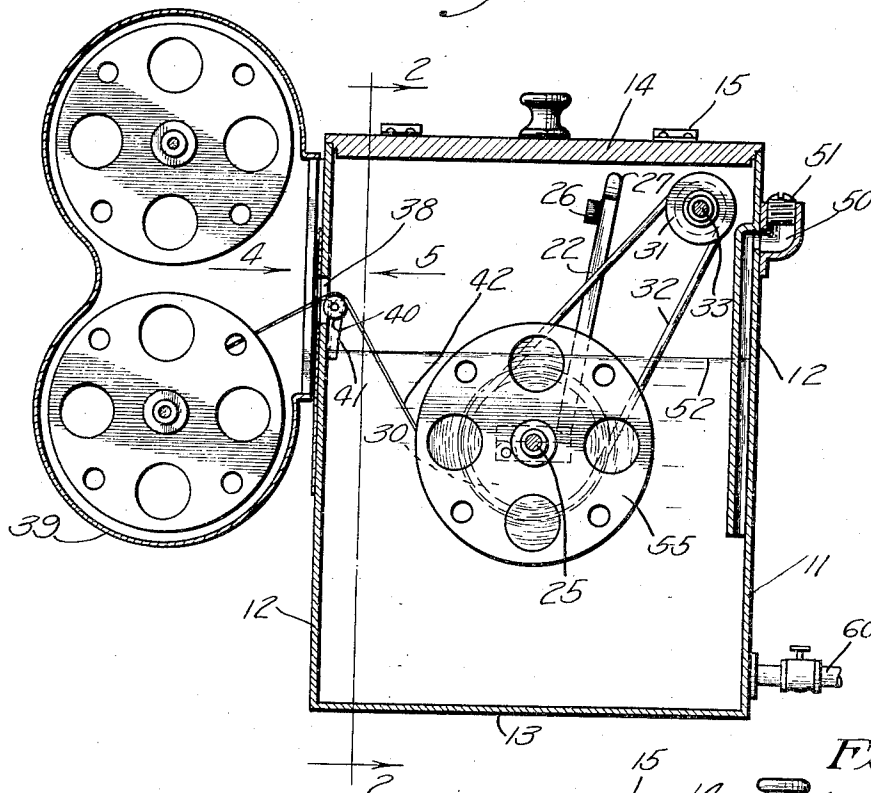


Fig. 6.

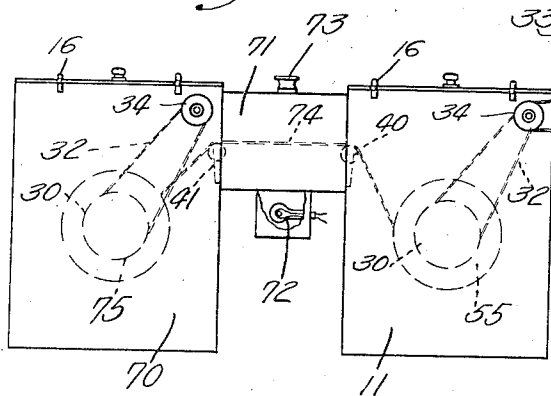
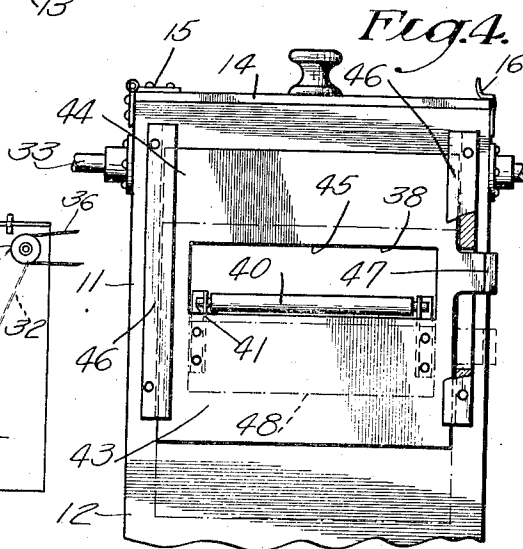


Fig. 4.



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METHOD AND APPARATUS FOR DEVELOPING FILMS.

Application filed September 21, 1923. Serial No. 664,020.

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 Method and Apparatus for Developing Films, of which the following is a specification.

This invention relates to the development of photographic film and relates particularly to the development of strips of film such as are used in the motion picture industry.

In the filming of a large production, it is often necessary to go on location remote from the established film laboratories. The film handling and development devices now employed in the laboratories are not suitable for transportation to various points and it has previously been customary to ship the exposed film into the laboratory from the location where the films are developed and inspected. The development of the film often does not occur until after the company has left a certain location and when it is found that certain of the scenes are not satisfactory, this means that the company must return to the location for retaking of the unsuitable portions.

It is an object of my invention to provide a simple and efficient method of apparatus whereby films may be developed on location, thus enabling their inspection in order to find any portions which are unsuitable for ultimate use. These parts may then again be taken before the company has left location. The great saving in time and transportation expenses attained by being able to inspect the films at the location makes the invention of considerable value to the film producing industry.

The especial advantages of the invention and further objects thereof will be made evident hereinafter.

Referring to the drawings which are for illustrative purposes only.

Fig. 1 is a vertical section through a film developing tank employed in the practice of the film developing method.

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

Fig. 3 is a fragmentary view taken as indicated by the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary view taken as indicated by the arrow 4 of Fig. 1, showing

the film opening of the film developing tank and the door thereof.

Fig. 5 is a fragmentary view taken as indicated by the arrow 5 in Fig. 1 and showing the manner of mounting the film roller across the lower edge of the film opening.

Fig. 6 is a diagrammatic view showing the manner in which two of these film developing tanks may be employed in the development of a film.

Fig. 7 is also a diagrammatic view showing a pair of these tanks in use, but showing in addition therewith means for winding a strip of absorbent material between the separate turns of the film, for drying purposes.

The principal feature of my invention is the employment of a spool immersed in a developing solution and the winding of the film through the solution and onto the spool, where it is allowed to remain until the desired developing action has taken place. It has been heretofore considered impractical to develop a film while wound upon a spool or reel, but contrary to previous ideas and practice I have found that this may be accomplished by using a very slow developing solution, or in other words a developing solution which will take from two to four hours to accomplish the development of the exposed emulsion coating of a film. The results of this developing process are further assisted by passing the film through the solution before it reaches the spool, thus causing the film to become wet directly therewith before winding upon the spool, with the result that a thin film of liquid is formed between each turn of the film upon the spool.

In the drawings 11 indicates a container or developing tank which is comprised of side walls 12, a bottom wall 13, and a cover 14 secured by hinges 15 and held in place by a spring clip 16 as shown in Figs. 2 and 4. Upon the opposing side walls 12, stationary blocks 18 are mounted, these blocks having semi-circular grooves 19 therein as shown in Fig. 3. Hinged at 20 to each block 19 is a cap block 21 provided with an upwardly extending lever 22 and having formed in the under side thereof a semi-circular channel 23 which co-operates with the channel 19 of the block 18 in enclosing the ends 24 of a shaft 25. Engagement projections 26 as shown in Figs. 2 and 3 are mounted upon the walls 12 and are adapted to engage the

levers 22 when the levers are in raised position, thus holding the cap blocks firmly down upon the stationary blocks 18. When it is desired to remove the shaft 25, the upper ends 27 of the levers 22 are forced inwardly so that they will pass over the engagement members 26, whereupon the levers and the blocks associated therewith may be swung upon the hinges 20 into the position indicated by the dotted lines 29 of Fig. 3.

A sheave 30 is rigidly secured upon the shaft 25 near one end thereof and is driven from a sheave 31 by a belt 32. The sheave 31 is mounted upon a shaft 33, mounted in the upper rearward corner of the container 12, this shaft 33 having a sheave 34 upon the external end 35 thereof which may be driven by a belt 36 from some suitable motive source.

In the side wall 12 of the container constituting the front thereof, a rectangular opening 38 is formed through which a film may be carried from a film magazine 39 or from another similar container. As shown in Figs. 1 and 5, a roller 40 is mounted by brackets 41 along the lower edge of the opening 38 so that a length of film 42 may pass thereover and thus be relieved of scraping action due to contact with stationary edges of the opening 38. A closure member 43 is provided for closing the opening 38, this closure member consisting preferably of a plate 44 having a rectangular opening 45 therein and being slidably guided by cleats 46, so that it may be moved vertically to bring the opening 45 thereof into a position coinciding with the opening 38 or into a position as indicated by the dotted lines 48 in which the opening 45 is offset from the opening 38. A laterally projecting handle 47 may be provided upon the plate 44 by which it may be manipulated.

In the use of a developing tank or container 11, as shown in Fig. 1, a body of developing solution may be placed therein by pouring the solution into a filling port 50 having a plug 51 normally placed therein, this solution being allowed to rise substantially to the level indicated at 52. The film 42 is then wound from the magazine 39 situated before the film opening 38 and is carried through the solution in the container 11 before being wound upon the film spool 55 which is secured upon the shaft 25. In this manner, the film is wet by the solution before being wound upon the spool 55 and a thin film of the solution is spread between the separate turns of the film. The film is then left in the solution for a period of from two or four hours so that the developing action of the slow working solution may take place. After this development has taken place, the solution may be drained off through an outlet 60 and replaced by a mixture which is introduced into the tank

through the filling port 50. In placing the film 42 upon the spool it may be wound into distilled water instead of into a developing solution and the solution afterward being substituted for the water which has directly wet the film, the chemicals contained in the developing solution thereafter penetrating the spaces between the film and producing its desired action.

A very simple manner of using the film developing equipment is as follows:

The film is first wound into a container 11 and immersed into a developing solution, whereupon it is allowed to fully develop. As shown in Fig. 6, a second container 70, identical in construction with the container 11, is placed adjacent to the container 11 and an intercommunicating member 71 connected therebetween, this intercommunicating member providing a passage between the containers 11 and 70 and having a ruby globe 72 and sight glass 73 so that the film in passing from one container to the other, as indicated by the dotted lines 74, may be viewed. The container 70 is filled with a fixing solution and the film from the spool 55 of the container 11 is wound onto the spool 75 of the container 70, whereupon the fixing of the film takes place. After the fixing of the film, which requires but very short time, the container 11 is filled with water and the fixed film is thereupon wound back upon the spool 55 so that it is passed through the water in the container 11 and wound therein, thus accomplishing a washing action of the film.

With reference to Fig. 7, the containers 11 and 70 having been drained the intercommunicating member 71 is then replaced by an intercommunicating member 80 having a roll of absorbent material 81 such as a specially prepared blotting paper supported therein. The film 42 is then wound into the container 70 together with a strip 82 of the absorbent material between each turn of the film 42 upon the reel 75. The moisture contained on the film 42 is absorbed by the absorbent strip 82 and finally evaporates, the absorbent strip serving to prevent contact of the inner and outer faces of the separate turns of film during the drying thereof. A film may then be kept wound upon the spool with the absorbent strip until it is sent into the laboratory where the absorbent strip is removed and the film polished in the customary manner.

I claim as my invention:

1. In a method of treating motion picture films in the development thereof, the step which consists of winding the film into roll formation in a bath of liquid, the convolutions of the roll being separated only by such of said liquid as is not forced from between said convolutions during the winding of the film.

2. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a solution and allowing the roll of film thus formed to remain in said solution until the required chemical action is produced.

3. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a slow acting solution and allowing the roll of film thus formed to remain in said solution until the required chemical action is produced.

4. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a solution without the use of spacing means and allowing the roll of film thus formed to remain in said solution until the required chemical action is produced.

5. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a slow acting solution without the use of spacing means and allowing the roll of film thus formed to remain in said solution until the required chemical action is produced.

6. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a slow acting solution, the length of film being wet by the solution before being wound in a roll upon said member, changing the solution in which said member is submerged; and winding said film from said member, the length of film passing through said changed solution as it is unwound from said member.

7. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a slow acting solution, the length of film being wet by the solution before being wound in a roll upon said member, changing the solution in which said member is submerged; and winding said film from said member onto a second member submerged in another solution, the length of film passing through said changed solution as it is unwound from said first member and through said another solution as it is wound upon said second member.

8. The method of treating motion picture film in the development thereof, which consists of winding the film on a member submerged in a slow acting developing solu-

tion, the length of film being wet by the solution before being wound in a roll upon said member, changing the solution in which said member is submerged to a fixing solution; and winding said film from said member, the length of film passing through said fixing solution as it is unwound from said member.

9. In a method of treating motion picture films in the development thereof, the steps which consist of winding the film into roll formation in a bath of developing solution, the convolutions of the roll being separated only by such of said solution as is not forced from between said convolutions during the winding of the film, then rewinding the film in like manner in a bath of fixing solution, and subsequently unwinding and drying the film.

10. In apparatus for developing motion picture film, the combination of: walls forming a substantially rectangular box; means for filling said box with a solution; a spool within said box upon which a film may be wound; and means for rotating said spool in a manner to cause the winding of the film thereupon.

11. In apparatus for developing film, the combination of: walls forming a container in which a body of solution may be placed; a spool member in said container on which a film may be wound and submerged in said solution; and means for rotating said spool member.

12. In apparatus for developing film, the combination of: walls forming a container in which a body of solution may be placed, one of said walls having an opening therein above the level of said solution through which a film may pass; a closure member for said opening; a spool member in said container on which a film may be wound and submerged in said solution; and means for rotating said spool member.

13. In apparatus for developing motion picture film, the combination of: a pair of box members comprised of walls forming chambers in which solutions may be placed; spool members in said chambers on which a film may be wound; means for rotating said spools; and an intercommunicating member providing a passage through which a film may be passed from one chamber to the other.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 14th day of September, 1923.

VINCENT C. DE YBARRONDO.