April 7, 1936. M. TANATAR 2,036,442

METHOD AND APPARATUS FOR DEVELOPING SOUND RECORD MOTION PICTURE FILM

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Fig. 1

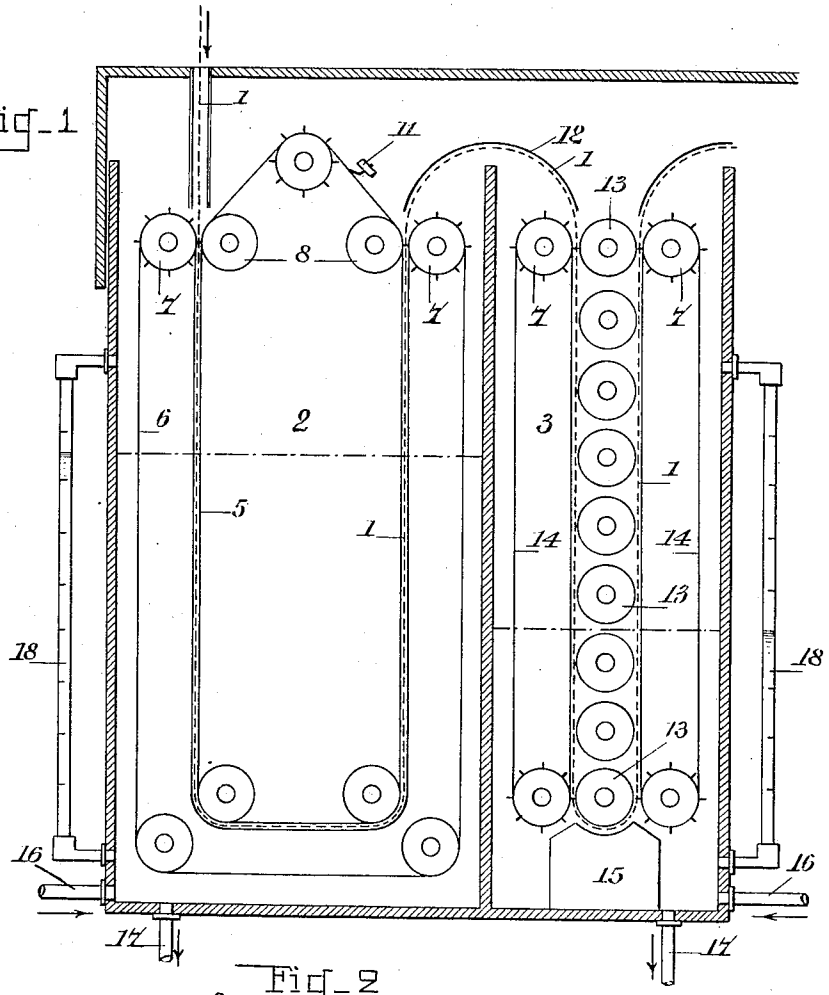


Fig. 2

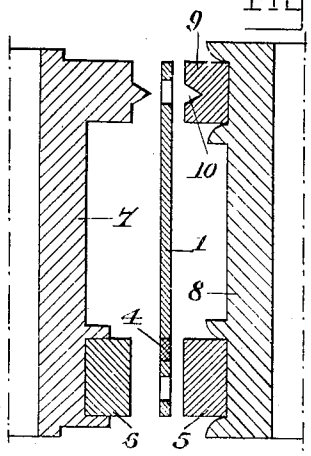
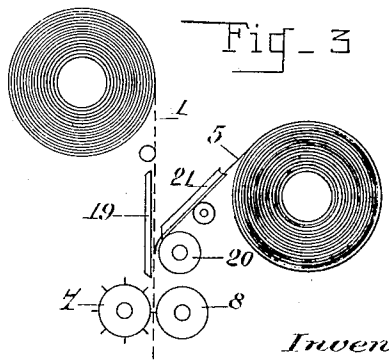


Fig. 3



Inventor:
Marc Tanatar,
by C. F. Wenderoth
Atty.

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METHOD AND APPARATUS FOR DEVELOPING SOUND RECORD MOTION PICTURE FILM

Marc Tanatar, Paris, France

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19 Claims. (Cl. 95—94)

(Granted under the provisions of sec. 14, act of March 2, 1927; 357 O. G. 5)

The known motion picture films containing sound records usually consist of two bands of film which must be separately developed by reason of the difference in the time required to develop the image record and the sound record, these two bands being then cemented together. The cementing operation is both expensive and complicated, and may lead to a displacement of the image record with reference to the sound record.

The present invention has for its object, the development of a motion picture film of any kind which carries a sound record and is made in a single piece, that is, a film in which the image record and the sound record are both carried by a single band which is not separated in the lengthwise direction.

In conformity to the invention, and to provide for the developing of the image record and the sound record without being obliged to cut the film, the sound record is protected against the action of the developer for at least a portion of the time required to develop the image record.

This protection can be variously obtained, and chiefly by pressing an impermeable substance such as a rubber band against the emulsion side of the film corresponding to the sound record, or by applying upon the film a suitable substance such as paint, varnish, a gummed band or the like, upon the emulsion side of the film corresponding to the sound record.

Obviously, the protecting substance will not damage the emulsion side of the film; it must be impermeable and must not be acted upon by the developer, or at least not to an excessive degree.

The accompanying drawing shows by way of example two embodiments of the invention.

Figure 1 is a sectional view of the vessels for developing a film in which the sound record part is protected against the action of the developer in the first vessel by the use of rubber bands.

Figure 2 is a detail view.

Figure 3 shows a device by which a gummed band is caused to adhere to the film before the latter is brought into the developing vessels.

In the apparatus shown in Figure 1, the film 1 proceeds successively in a first developing vessel 2 in which the portion 4 of the film carrying the sound record is protected against the action of the developer, and in a second vessel 3 in which the image record and the sound record are developed at the same time.

In the vessel 2, the film 1 moves between two endless bands 5 and 6 which aid in drawing it forward. One of these bands 5 is situated on the emulsion side of the film, and as shown in Figure 2 it covers the portion 4 of the film corresponding to the sound record and protects it against the action of the developer. The other band 6 presses the film 1 against the band 5. In order to prevent the film from slipping upon the bands 5 and 6, by which it may be damaged, the film with the said bands move upon toothed bobbins 7, or upon bobbins without teeth 8 (Figure 2) of which both sets serve to move the film forward, said bobbins having the same speed in all cases. The bobbins 8 without teeth carry an endless band 9 which is parallel with the aforesaid endless band and has a recess 10 into which can be inserted the ends of the teeth of the bobbins 7. In such conditions, only the part of the film corresponding to the image record will be developed, and the part 4 of the film corresponding to the sound record, which is out of contact with the developer, will not be developed. After it has been immersed in the developing bath, the band 5 travels in contact with a wiping device 11 by which it will be wiped off before again making contact with the film.

When the film proceeds into the vessel 3, directed by a guide 12, it travels between a set of directing reels 13 and endless bands 14. On the bottom of the vessel is mounted a member 15 corresponding to the form of the lower directing bobbin. The directing bobbins 13, the endless bands 14 and the said member 15 serve to giude the film 1 and to aid in drawing it forward, while providing for the developing of the two records at the same time, the emulsion side being adjacent the directing reels 13.

The film then leaves the vessel 3 in the completely developed state, and may proceed into different vessels for the washing, fixing and the like.

Each of the vessels 2—3 is provided with a filling pipe 16, an emptying pipe 17 and a level gauge 18.

The said apparatus can be utilized as follows. The time for the developing of the image portion and the sound portion of the film by means of a given developer being determined for instance at four minutes for the image record and at one minute for the sound record, the film will be developed for three minues in the vessel 2 and for one minute in the vessel 3. For this purpose, the operator will regulate, according to the rate of travel of the film, the level of the developing bath in each vessel by observing the level

gauge 18, in such manner that the time of immersion of the film in the developer in the vessel 2 will be three minutes and in the vessel 3 only one minute. When this has been arranged, he sets the bobbins 7 in motion and places the film between the bobbins 7 and 8 of the left-hand set in the vessel 2; since the film is drawn forward by the bands 5—6, the end of the film will reappear between the right-hand set of bobbins 7—8 and the film which travels in the guide 12 will be taken up between the bobbins 7 and 13 of the vessel 3, and as it is drawn forward by the bands 14 it will reappear between the roller 13 and the bobbin 7 on the right hand, then proceeding in the other vessels, not shown. The film being thus engaged in the vessels 2—3, it will be developed in the proper conditions.

Figure 3 shows a simple means by which a gummed band 5 may be fixed upon the emulsion part of the film corresponding to the sound record. For this purpose, the film 1 travels in front of a supporting plate 19 in contact with the back of the film; a drum 20 carrying the band 5 which is gummed on the side next the film and is guided by a member 21, presses the gummed band against the film as it proceeds, and causes the band to adhere to the film. The said film, thus partially protected, is immersed in the developing bath and is developed in the usual manner. The paper band is then removed by any suitable means, and the part of the film which was protected can now be developed.

Obviously, the present invention is not limited to the forms of construction herein disclosed, and it is susceptible of numerous modifications. It is evident that if the image record is more rapidly developed than the sound record, the arrangement of the two parts of the film must be reversed, and in this case it is the image record that will be protected against the action of the developer.

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

1. A process of developing films having sound and image recordings thereon comprising passing the film between a support and a screen into a development bath, said screen covering only the sound recordings and urging the film against the support and then uncovering the sound recordings upon said film and passing the same into a second developing bath.

2. A process according to claim 1 in which the screen and the film are moved at the same speed through said firstmentioned developing bath.

3. A process according to claim 1 in which the support and the film are moved at the same speed through the first mentioned developing bath.

4. A process according to claim 1 in which the screen, the support and the film are moved at the same speed through the first mentioned developing bath.

5. A process according to claim 1 in which the length of time of immersion of the film in the developing baths is controlled by varying the height of the bath levels.

6. A process of developing films having recordings thereon requiring different times of development comprising first developing said film while the recordings thereon requiring less time for development are protected by a covering agent from the action of the developer and then exposing all the recordings on said film to the action of the developer.

7. A process for developing films having recordings thereon requiring different times of development comprising subjecting the film to a portion of a development process with a portion of the width of the film covered by an agent protecting such portion of the film from the development process and then subjecting the entire film to the remainder of the development process.

8. In the process of developing films having recordings thereon requiring different times of development the step of subjecting the film during a portion of the development process to the developing medium while protecting a portion of the film with a covering agent.

9. A process for developing films having recordings thereon requiring different times of development comprising subjecting the film to a portion of a development process with a portion of the width of the film covered by an agent moving with said film through a developing medium and protecting such portion of the film from the development process, and then subjecting the entire film to the remainder of the development process.

10. A process for developing films having recordings thereon requiring different times of development comprising subjecting the film to a portion of a development process with a portion of the width of the film enclosed between a screen and a support which protects such portion of the film from the development process and then subjecting the entire film to the remainder of the development process.

11. A process as set forth in claim 10 in which the support and the film are moved at the same speed through the developing medium.

12. A process according to claim 10 in which the length of time of immersion of the film in the developing medium is controlled by varying the height of the developing medium.

13. An apparatus for the development of films having a plurality of bands of recordings thereon comprising a container for holding the developing medium, a support in said container, a screen also located in said container so that the film to be developed passes between said support and said screen, said screen being of such size as to cover only a portion of the film so that the recordings upon said film requiring the longer development time are left uncovered and means for completing the developing of said film.

14. An apparatus as set forth in claim 13 in which the support is formed as an endless band.

15. An apparatus as set forth in claim 13 in which the screen is formed as an endless band.

16. An apparatus as set forth in claim 13 in which the support and the screen are formed as endless bands, pulleys having teeth located in said container cooperating with said support, screen and film so as to lead said support, screen and film at the same speed through the developing medium.

17. An apparatus for the development of films having recordings thereon requiring different times of development comprising a plurality of containers, a plurality of pulleys arranged in pairs in one of said containers, two endless bands passed between the pairs of pulleys and located one on each side of the film, one of said endless bands forming a screen and having

a width equal to only a portion of the width of the film, means for leading the film between the two endless bands, means for feeding the film and the two endless bands at the same speed and means for leading the film from one container to the following container.

18. An apparatus as set forth in claim 17 in which guides are provided to receive the film upon leaving the first container and to direct the same into the following container.

19. An apparatus according to claim 17 in which a wiping device is provided located adjacent the screen for removing any developing solution adhering to the screen.

MARC TANATAR.