Sept. 4, 1923. 1,467,106

C. DE MOOS

PHOTOGRAPHIC FILM TREATING APPARATUS

Filed June 9, 1922

FIG. 1.

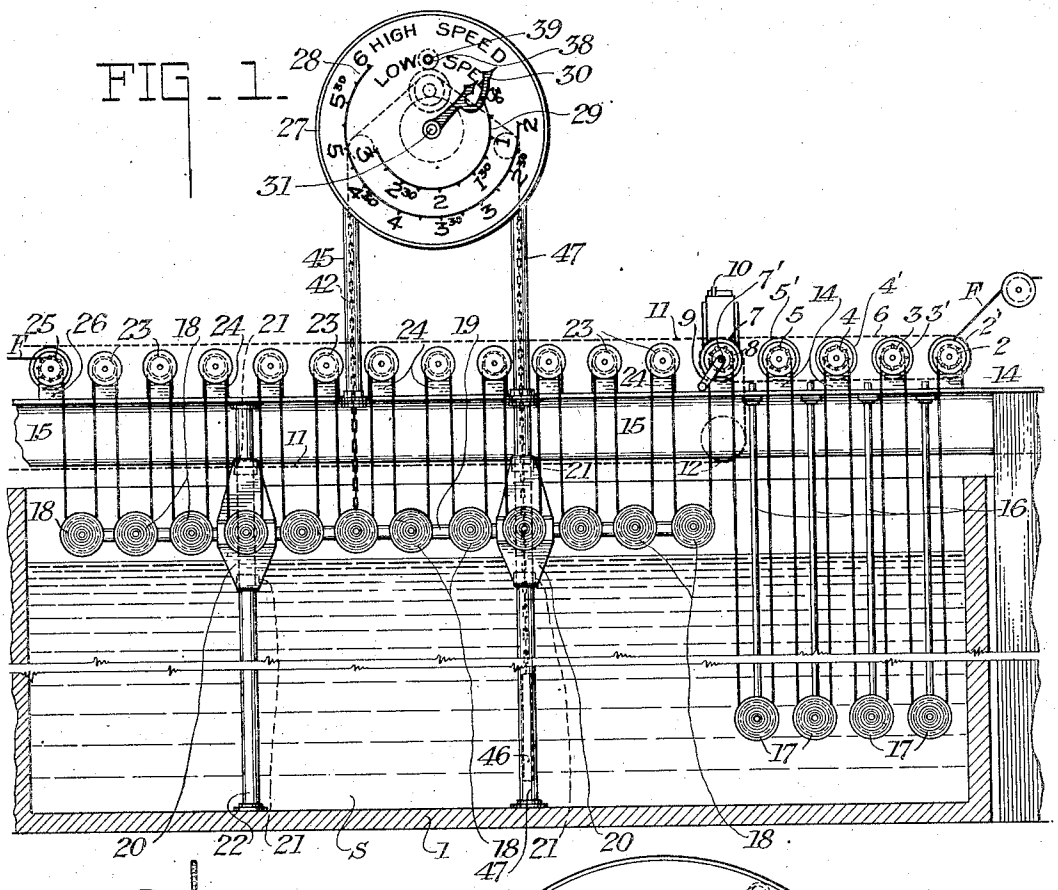


FIG. 2.

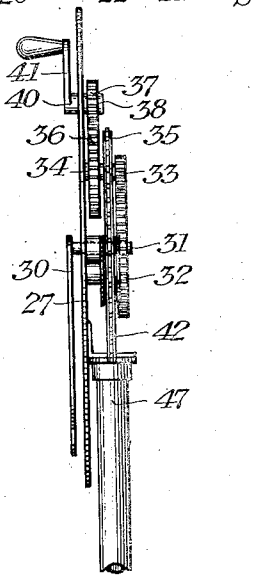
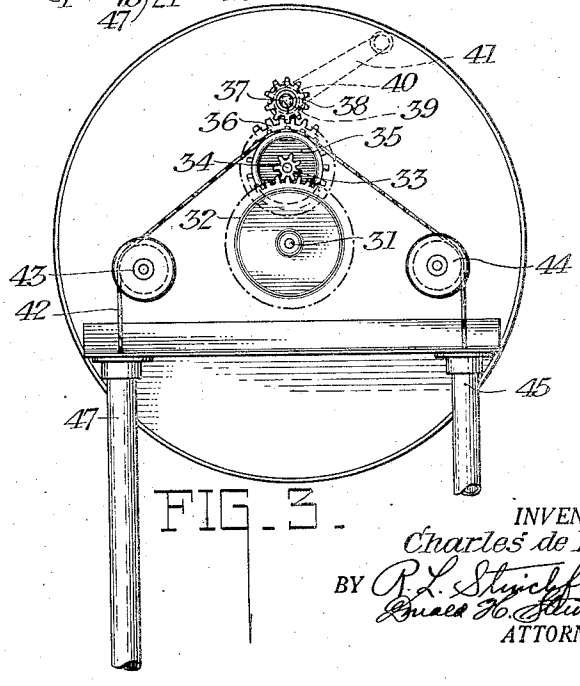


FIG. 3.



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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC-FILM-TREATING APPARATUS.

Application filed June 9, 1922. Serial No. 567,147.

To all whom it may concern:

Be it known that I, CHARLES DE MOOS, a citizen of the United States of America, residing at Fort Lee, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Photographic-Film-Treating Apparatus, of which the following is a full, clear, and exact specification.

This invention relates to photography, and more particularly to machines for treating film. One object of my invention is to provide an indicating device which will register at all times the setting of the machine, so that the time of treatment in a bath may be read from a scale. Another object is to provide a simple and compact indicating device which can be located above the treatment tanks and which will take but little room. Another object is to provide an indicator support which will also serve as a guide for a counterbalancing weight. Another object is to provide a compact support for the dial in which a portion of the dial-operating mechanism is contained. Other objects will appear hereinafter.

In the drawing, in which like reference characters denote like parts throughout,—

Fig. 1 is a section through a treatment tank above which an indicator constructed in accordance with and embodying one form of my invention is shown;

Fig. 2 is a side elevation of the indicator, together with its operating mechanism, and

Fig. 3 is a rear elevation of the parts shown in Fig. 2.

I have shown the registering dial and associated mechanism, by way of illustration, as mounted above a developing tank through which a film F is continuously moved for treatment. It is obvious that my device is equally well suited for use in timing the treatment of film in other baths, such as tinting, toning, or the like. In this specification the term "film' is used to designate broadly a photographically light sensitive emulsion on any of the well known types of support.

A tank 1 is filled with the treatment solution S through which the film band F is continuously moved for treatment. It is drawn from a source of supply (not shown) over an idler roller by means of a film-driving sprocket 2. This sprocket is mounted upon a bracket 14 which is carried by the beam 15, as are also a series of other similar driving sprockets 3, 4, 5 and 8. A chain sprocket 7 is connected through a chain 6 to chain sprockets 2′, 3′, 4′ and 5′ so that the above described sprockets are driven all at one time as a unit. Pulley 7 may derive its power through chain 11 passing over a sprocket affixed to shaft 7′ and over idler 12 and driven from a source of power not shown, or it may be driven by the handle 9, in which case the lever 10 is used to disconnect shaft 7′ from the power drive, a suitable clutch being provided for this purpose.

A series of rods 16 extend down from beam 15 terminating in film guides 17, which in this instance are made in the form of idler rollers. The film is looped over film-driving roller 2, the idler film-guide roller 17 and so on until it passes over the film-driving roller 8.

Beam 15 carries a series of idler rollers 23 mounted on brackets 24, and upon bracket 26 a film-driving sprocket 25, which is operated by power through chain 11. Beneath the idler rollers 23 are a series of film guides 18 mounted upon a rack 19 which is mounted with bearings 21 of castings 20 embracing pipes 47 and 22, so that the rack 19 is slidable vertically upon these rods.

After passing over the driving sprocket 8 the film band is looped over the idler rollers 23 and film guides 18 finally passing out of the tank 1 by being driven through the film sprocket 25. It is obvious that the depth of the rack depends upon the quantity of film between sprockets 8 and 25. As long as this quantity remains constant the rack will stay in one position, and a greater or less quantity will cause the rack to lower or raise upon its slideway 22—47.

In order to at all times indicate the setting of the rack 19, and to indicate the duration of development of the film band at the setting, I provide a dial 27 having scales 28 and 29 over which a pointer 30 is automatically moved, as will be hereinafter described. The dial is supported by pipes 45 and 47, the former extending upwardly from beam 15 and the latter extending to the bottom of the tank 1. A portion 46, of pipe 47 forms one of the guideways for rack 19. A chain 42 is attached at one end

to the rack 19, and is equipped with a counterbalance weight 46 at the other end. The weight is guided by pipe 47 and is protected from the solution S by this pipe. In addition the chain is guided and protected by pipes 45 and 47.

Chain 42 extends upwardly through pipe 45 over a guide roller 44, over a sprocket 35, a second guide roller 43, down through pipe 47 to the weight 46. Pointer 30, carried by shaft 31 is moved by the chain through gears 32 and 33, the latter being affixed to a shaft 34 which carried sprocket 35 and gear 36. A pinion 37 meshes with gear 36, and is carried by a shaft 38 which terminates in a deformed end 39 upon which a deformed socket in base 40 of an operating handle 41 can be placed to move rack 19 by hand through chain 42 when the film breaks or at any other desirable time. This handle is not normally in operative position.

Two scales 28 and 29 are provided on dial 27 because in this machine the chain 11 can be driven at two speeds through its source of power. It is obvious that, if desired, the number of scales and the number of speeds of the drive can be varied as may be necessary. I have here shown my scales graduated into units of time as I prefer this type of graduation because with a given strength of development bath, the rack can be set at the time indication which will be necessary to completely develop the film.

The operation of my machine is as follows: A film band F is drawn over the film sprockets, guides and idler rollers by means of a dummey film known as a leader strip. If the exposure of the film is not known, an operator may watch the degree of development of the film as it passes over sprocket 8 after having passed over the fixed portion of the machine—that represented by the travel of the film from sprocket 2 to sprocket 9. The degree of development can be used as an index to determine the setting of rack 19 and consequently to control the total time of development. Throwing out the clutch with handle 10 the handle 9 can be used to adjust the rack by increasing or decreasing the film loop between sprockets 8 and 25, until the pointer 30 indicates the proper time of development on dial 27. The film treatment will then proceed without further attention. Should the film break between film sprockets 8 and 25, handle 41 can be placed on shaft 37 and the rack 19 raised for rethreading or repairing the film.

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

1. In an indicating device for film-treatment machines including a tank and a movable film guide therein, the combination with an indicator, of operative connections between the indicator and the movable film guide whereby the position of the guide relative to the tank will be automatically registered on the indicator.

2. In an indicating device for film treatment machines including a tank for holding a body of solution and a movable film guide therein, the combination with an indicator comprising a scale and a pointer movable over the scale, of a connection between the indicator and the movable film guide, whereby the indicator is controlled by the movements of the guide.

3. In an indicating device for a film-treatment machine having a treatment tank and a movable film guide therein, the combination with a dial, of a pointer to cooperate therewith, to form an indicator, connections between the indicator and the movable film guide for automatically indicating on the former the position of the film guide.

4. In an indicating device for a film-treatment machine including a tank for holding a treatment bath, and a movable film roller therein, the combination with a dial, of a hand cooperating therewith to form an indicator, and connections between the movable film roller and the indicator whereby the extent of treatment of the film in the bath will be automatically registered on the dial.

5. In an indicating device for film-treating machines having a fluid tank with a movable film roller therein, the combination with a support, of a dial carried by the support, and a shaft, a pointer movable over the dial and mounted upon the shaft, and connections between the shaft and the movable film roller for indicating on the dial the position of the roller relative to the tank.

6. In an indicating device for film treating machines including a tank and a movable film guide therein, the combination with an indicator, of operative connections between the indicator and the film guide and means for positioning the movable film guide through the operative connections between the indicator and the film guide.

7. In an indicating device for film treating machines including a tank, the combination with means for looping a film for treatment in the tank including a series of fixed film rollers and a series of film guides movably mounted in the tank, means including a hand wheel for raising and lowering the movable guides, a support, a scale associated therewith, a pointer movable over the scale, and connections between the pointer and the movable film guides whereby the movement of the film guides will be automatically registered on the scale as the hand wheel is moved.

8. In an indicating device for film-treating machines, including a tank and a movable film guide therein, the combination with an indicator comprising a scale, a

pointer movable thereover, a shaft for carrying the pointer, a wheel attached to said shaft, a flexible member attached to the movable film guide and operatively connected to the wheel, whereby the latter will move the pointer as the film guide moves.

9. In an indicating device for film-treating machines, including a tank and a movable film guide therein, the combination with an indicator comprising a scale, a pointer movable thereover, a shaft for carrying the pointer, a wheel, a weight for counterbalancing the film guide, a scale, a flexible connection between the weight and the film guide, said flexible member passing over the wheel, and means connecting the wheel to the shaft whereby the pointer carried by the shaft will indicate on the scale the time of development at the setting of the film-treating machine.

10. In an indicating device for film-treating machines, including a tank and a movable film guide therein, the combination with a support including a tubular member, of a plate attached to the support, a scale on the plate, a pointer movable over the scale, and connections between the pointer and the movable film guide including a movable member passing through the tubular member.

11. In an indicating device for film-treating machines, including a tank and a movable film guide therein, the combination with a support comprising tubular members, of a plate attached to the support, and a wheel mounted thereon, a movable film guide in the tank, a balanceweight therefor, and a flexible connection between the movable guide and the weight passing over the wheel, and means for guiding the weight including one of the tubular members forming the support.

12. In an indicating device for film-treating machines, including a tank and a movable film guide therein, the combination with a support comprising tubular members, of a plate attached to the support, and a wheel mounted thereon, a movable film guide in the tank, a balance weight therefor, and a flexible connection between the movable guide and the weight passing over the wheel, one of the tubular members which form the support also serving as a slideway for the movable film guide.

13. In a device for film-treating machines, including a tank, the combination with a movable film guide, of posts for the film guide to slide upon, a counterbalance weight for the film guide, and means including one of the film guide posts for guiding the balanceweight.

14. In a device for film-treating machines, including a tank, the combination with a movable film guide, of posts for the film guide to slide upon, at least one of the posts being of tubular construction, a counterbalance weight for the film guide, the film guide sliding upon the outside of the tubular post as a slideway, and the weight sliding inside of the post.

15. In a device for film-treating machines, including a tank adapted to hold a treatment bath, the combination with a film guide adapted to move in the tank, of a wheel above the tank, a balance-weight for the film guide suspended in the tank, a flexible member connecting the film guide and the weight and passing over the wheel, and means for protecting the weight from bath contained in the tank.

Signed at Fort Lee, New Jersey, this 24th day of May, 1922.

CHARLES DE MOOS.