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MACHINE FOR THE TREATMENT OF PHOTOGRAPHIC PRINTS

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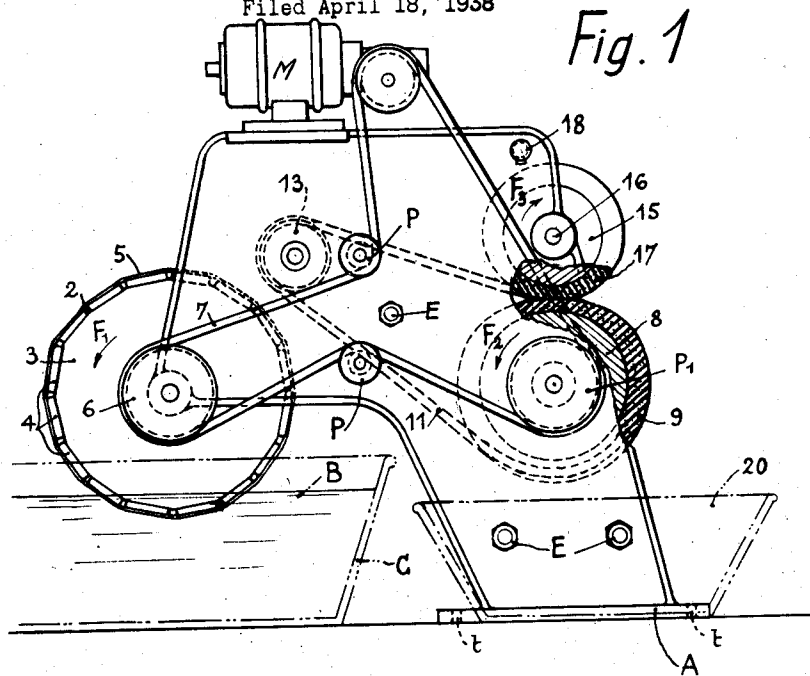
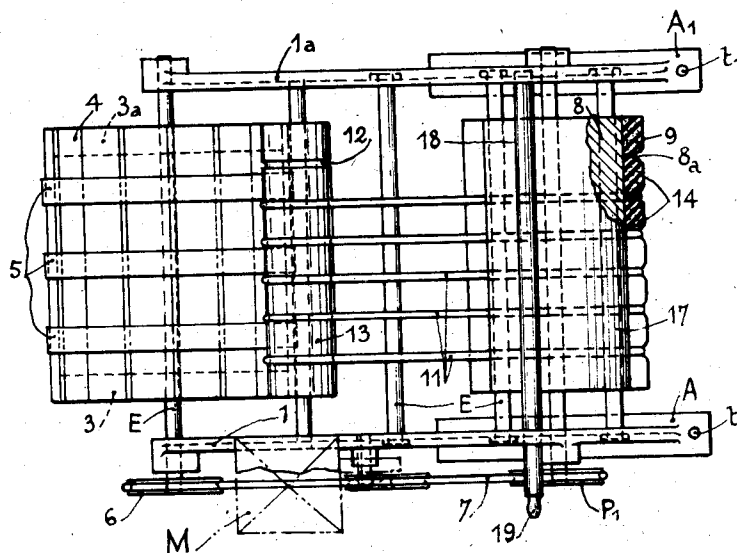


Fig. 2



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MACHINE FOR THE TREATMENT OF PHOTOGRAPHIC PRINTS

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6 Claims. (Cl. 95—89)

The present invention relates to apparatus for washing and drying photographic prints leaving the developing tank and for immersing these prints into the fixing bath.

5 It is known that the operator who wishes to develop photographic prints must, after having removed them from the developing bath, dip them into a tank containing washing water, and then into the fixing bath. This operation, which quickly grows tiresome for a great number of prints, further involves the disadvantage of soil-
10 ing the fixing bath due to the constant additions of traces of developer remaining on the prints, and the greater disadvantage of gradually reducing the concentration of said fixing bath by the addition thereto of washing water carried along by the prints.

The object of the present invention is to eliminate these disadvantages.

20 The apparatus according to the present invention is of the type including two driving cylinders having their peripheries made of a resilient material, applied against each other and located substantially above a tank for receiving the spent washing water, and a sprinkling device for ensuring the dripping of water along the surfaces of said cylinders.

30 According to an essential feature of the present invention, both of these driving cylinders have at least their periphery made of a sponge-like matter, for instance spongy rubber, and at least one of these cylinders is provided, on its periphery, with projections or gaps preventing adhesion of the prints on the surface thereof.

35 According to another feature of the present invention, the sprinkling means are disposed, with respect to the driving cylinders, in such manner that the washing water drips along said cylinders on the surface thereof from which the prints are introduced between said cylinders.

40 According to still another feature of the present invention, the cylinders are applied against each other with a pressure corresponding substantially to that necessary for obtaining the expelling by compression of the water present in the prints into the pores of the spongy matter.

45 According to still another feature of the present invention, the drive of the prints leaving the above mentioned cylinders is effected through the intermediate of a set of endless belts, of small section, located apart from one another, and leading to the next bath. These belts, preferably of circular section, are driven by the driving cylinder, around which they pass with a pressure
55 sufficient for producing grooves in said cylinder,

the two parts of each belt extending on either side of a cylinder being inclined in such manner that the liquid that might be carried along by said belt drops back into the tank.

5 According to still another feature of the present invention, the device is provided, substantially under the end of the conveying belts, with a cylinder the outer surface of which is not adhesive, partly immersed in the treatment bath and rotating in the same direction as the driving
10 cylinders.

According to still another feature of the present invention, this last mentioned cylinder is constituted by two flanges or cheeks assembled by means of spacing members adapted to leave a
15 certain interval between them, suitably spaced rubber rings preventing the prints from penetrating between the spacing members.

Other features of the present invention will result from the following detailed description
20 of a specific embodiment thereof.

A preferred embodiment of the present invention will be hereinafter described, with reference to the accompanying drawing, given merely by way of example, and in which:
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Fig. 1 is a side elevational view, with parts cut away, of an apparatus made according to the present invention;

Fig. 2 is a corresponding plan view.

30 The device shown by the appended drawing includes a frame, essentially constituted by side members 1, 1a, interconnected by transverse spacing members E, and supporting the chief elements of the machine. Each of these side members is provided, at its lower part, with a
35 base A, A', provided with holes t, t' intended to permit its fixation to a suitable support, such for instance as a table. The shape of these members is such that it permits (Fig. 1) of placing between them a tank C containing the fixing
40 bath B.

At one of the ends of the frame, there is jour-
nalled a cylinder 2, dipping in bath B and constituted by two side discs of cheeks 3, 3a, interconnected by transverse spacing members 4 dis-
45 posed along generatrices of said cylinder. In order to prevent the photographic prints to engage between said spacing members, I provide a certain number (for instance three) of bands or rings 5, for instance of rubber, along the pe-
50 riphery of the cylinder. This particular arrangement might be replaced by another equivalent one. For instance, cylinder 2 might be solid and it might be provided, on its periphery, with alternate projections and recesses, consisting for
55

instance of longitudinal or annular grooves opposing adhesion of the photographic prints to the periphery of the cylinder.

Cylinder 2 is given a rotary movement, in the direction of arrow F^1 , owing to the provision of a pulley 6 cooperating with a belt 7 driven by motor M and passing around two grooved pulleys P, adapted to turn freely on their respective axes, and a pulley P^1 rigid with the driving cylinder 8.

This cylinder 8 is provided with peripheral annular grooves 8a and its periphery is constituted by a layer 9 of a spongy resilient matter, for instance spongy rubber. This cylinder serves to drive a plurality of belts 11, of relatively small section, of round shape in the example shown by the drawing, which pass in said grooves 8a on cylinder 8 and in grooves 12 of a freely rotating pulley 13 journaled in side members 1, 1a. The tension of these belts is such that it produces, on the periphery of driving cylinder 8, owing to grooves 8a, bulging projections 14, which prevent adhesion of the photographic prints to the driving cylinder. This cylinder is driven by belt 7 in the direction of arrow F^2 .

Substantially under cylinder 8, there is a tank 20.

A cylinder 15 mounted on an axis 16, journaled in side members 1 and 1a of the frame and adapted to rotate freely, is applied against cylinder 8 with a suitable pressure, tangentially therewith, this cylinder 15 being free to rotate about its axis. The periphery of this cylinder 15 is covered with a layer 17 of a spongy matter, for instance spongy rubber. This cylinder 15 is driven in the direction of arrow F^3 by its engagement with the driving cylinder 8.

A pipe 18, provided with apertures along its periphery, receives washing water from a connection 19 and constantly sprinkles this water onto the periphery 17 of cylinder 15.

The water that has dripped along cylinders 15 and 8 finally drops into tank 20.

The machine above described works in the following manner:

The photographic prints, coming from the developing bath, are inserted manually between cylinders 8 and 15.

On the other hand, the washing water supplied by pipe 18 is driven along by the periphery of cylinder 15, which is imbibed with water. It should be noted that, as a consequence of the rotation of cylinder 15, the washing water from pipe 18 is necessarily driven toward the right hand side of the group of driving cylinders and cannot flow back toward the other side of said group of cylinders.

The periphery 9 of the driving cylinder 8 is also soaked with water, and when they come into contact, the two spongy layers act as sponges which are drained from a liquid. In other words, these layers, from the initial contact generatrix to the generatrices thereof located in the common plane of the cylinder axes, are subjected to a pressure which increases up to a value sufficient for driving off the washing water. The latter drips onto the print E and washes it, any traces of developer as may be present thereon being mixed with the washing water. Between the generatrices of contact corresponding to the maximum pressure and the last generatrices of contact (on the left hand side of the common plane of the axes of the cylinders), the pressure that is exerted on the spongy layers decreases gradually until it finally becomes zero. The

spongy matter sucks in the liquid constituted by the washing water and the traces of developer and thus ensures the drying of the print and of the driving belts 11.

Belts 11 act as conveying means for bringing the print thus washed and dried substantially above cylinder 2 (Fig. 1). This last mentioned cylinder causes the print to drop into bath B, where it is immersed as a consequence of the liquid stream produced by the rotation of cylinder 2 in direction F^1 . When the print, softened by its immersion in the preceding bath, tends to adhere to cylinder 2, it is detached therefrom, as soon as it is immersed into the bath, by the flow of liquid between the transverse members 4 of said cylinder 2.

It should be noted that both parts of belt 11 are inclined in such manner that the liquid that might be driven along by capillarity by said belt, despite the drying thereof, cannot go as far as the space above tank C and drops back into tank 20.

It will be readily understood that the arrangement above described has the advantage of avoiding soiling of the fixing bath by introduction therein of traces of developer and eliminates the weakening of the fixing bath by addition thereto of washing water, since the prints are dried previously to their introduction into said fixing bath.

Of course, the means for supporting and driving the cylinders might be modified within the scope of the invention.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of the present invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition, and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A machine of the type described, for the treatment of photographic prints, which comprises, in combination, a frame, two superposed cylinders journaled in said frame having at least their peripheries made of a spongy matter, said cylinders being pressed against each other along a common generatrix, at least one of said cylinders being provided with projections on its periphery for preventing adhesion of the prints thereon, and means for sprinkling water over the top of the upper cylinder, at least one of said cylinders being adapted to be rotated about its axis for driving the prints between said cylinders.

2. A machine according to claim 1 in which said sprinkling means are positioned with respect to said cylinders in such manner as to pour water on the side thereof from which the prints are inserted between said cylinders.

3. A machine according to claim 1 in which said cylinders are applied against each other with a pressure sufficient for driving off the water present in the pores of said spongy matter that correspond to the parts of said cylinders in contact with each other along said common generatrix.

4. A machine of the type described, for the treatment of photographic prints, which comprises, in combination, a frame, two superposed cylinders journaled in said frame having at least their peripheries made of a spongy matter, said cylinders being pressed against each other

- along a common generatrix, at least one of said cylinders being adapted to be rotated about its axis for driving the prints between said cylinders, a third cylinder, freely journaled in said frame, parallel to the first two cylinders, a plurality of belts, passing around the lower of the two first mentioned cylinders and around the third mentioned cylinder, so as to form grooves and projections in said lower cylinder which prevent adhesion of the prints thereon, said belts acting as conveyers for said prints, and a fixing tank located under the third mentioned cylinder, whereby the prints conveyed by said belts drop into said fixing tank.
5. A machine according to claim 4, further including a cylinder, mounted in said fixing tank so as to be partly immersed in the bath present

therein, and having a nonadhesive surface, said last mentioned cylinder being adapted to turn in the same direction as the two first mentioned cylinders.

6. A machine according to claim 4, further including a cylinder including two discs parallel to each other, transverse spacing members interposed between said discs, and rubber rings engaged around said transverse members so as to prevent the prints from engaging between said transverse members, said last mentioned cylinder being journaled in said frame so as to be partly immersed in the bath present in said fixing tank and being adapted to turn in the same direction as the two first mentioned cylinders.

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