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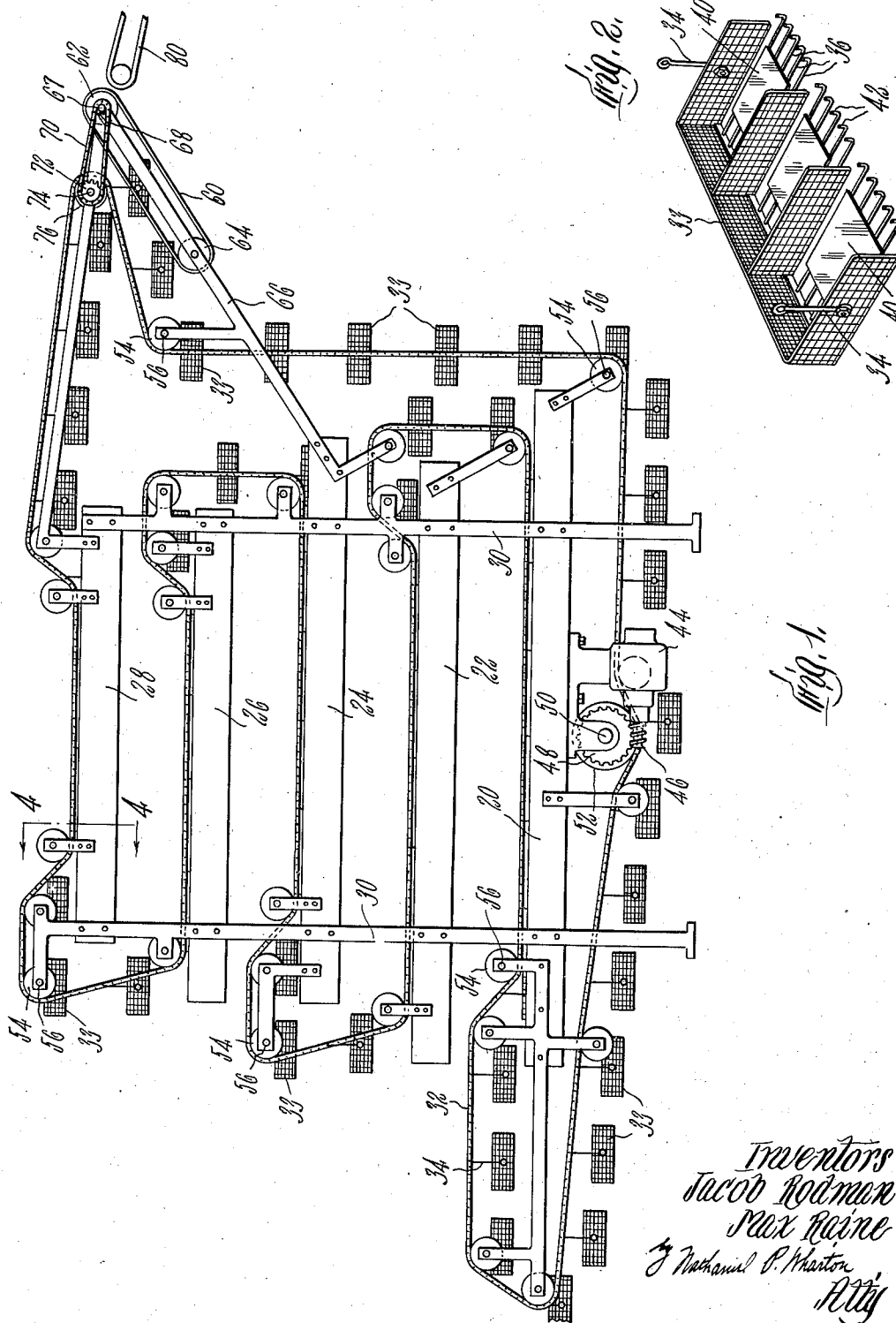
J. RODMAN ET AL

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APPARATUS FOR TREATING PHOTOGRAPHIC PRINTS

Filed Dec. 22, 1939

3 Sheets-Sheet 1



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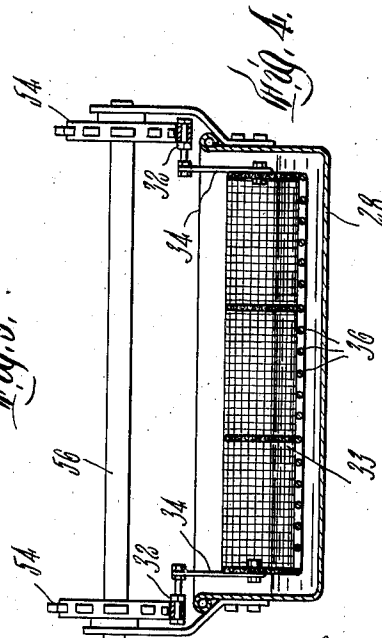
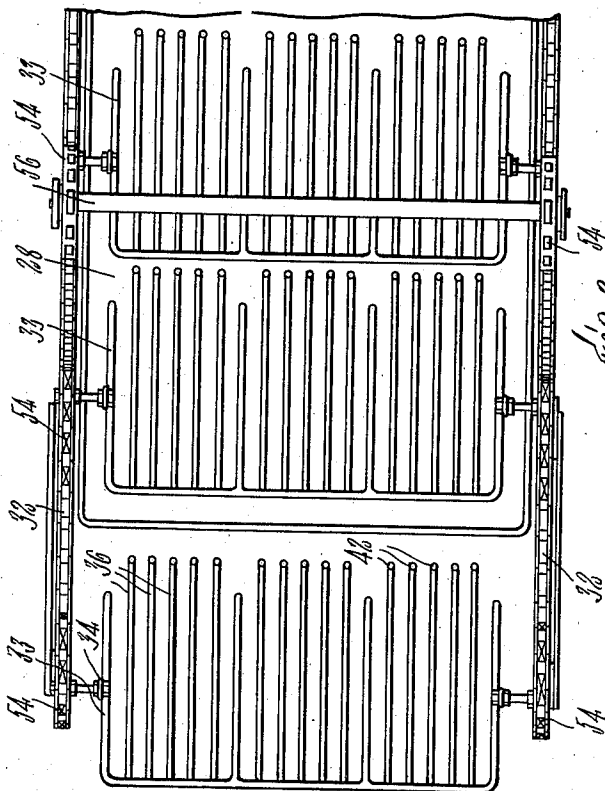
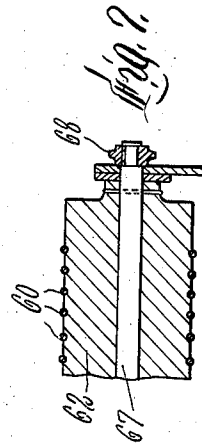
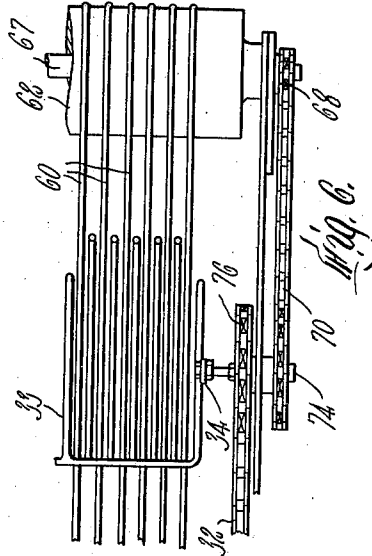
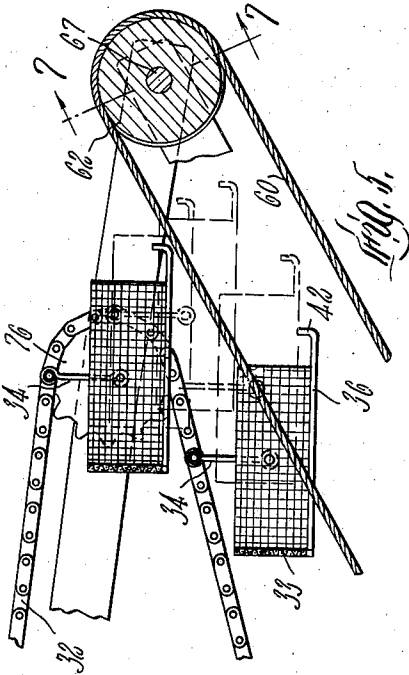
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APPARATUS FOR TREATING PHOTOGRAPHIC PRINTS

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3 Sheets-Sheet 2



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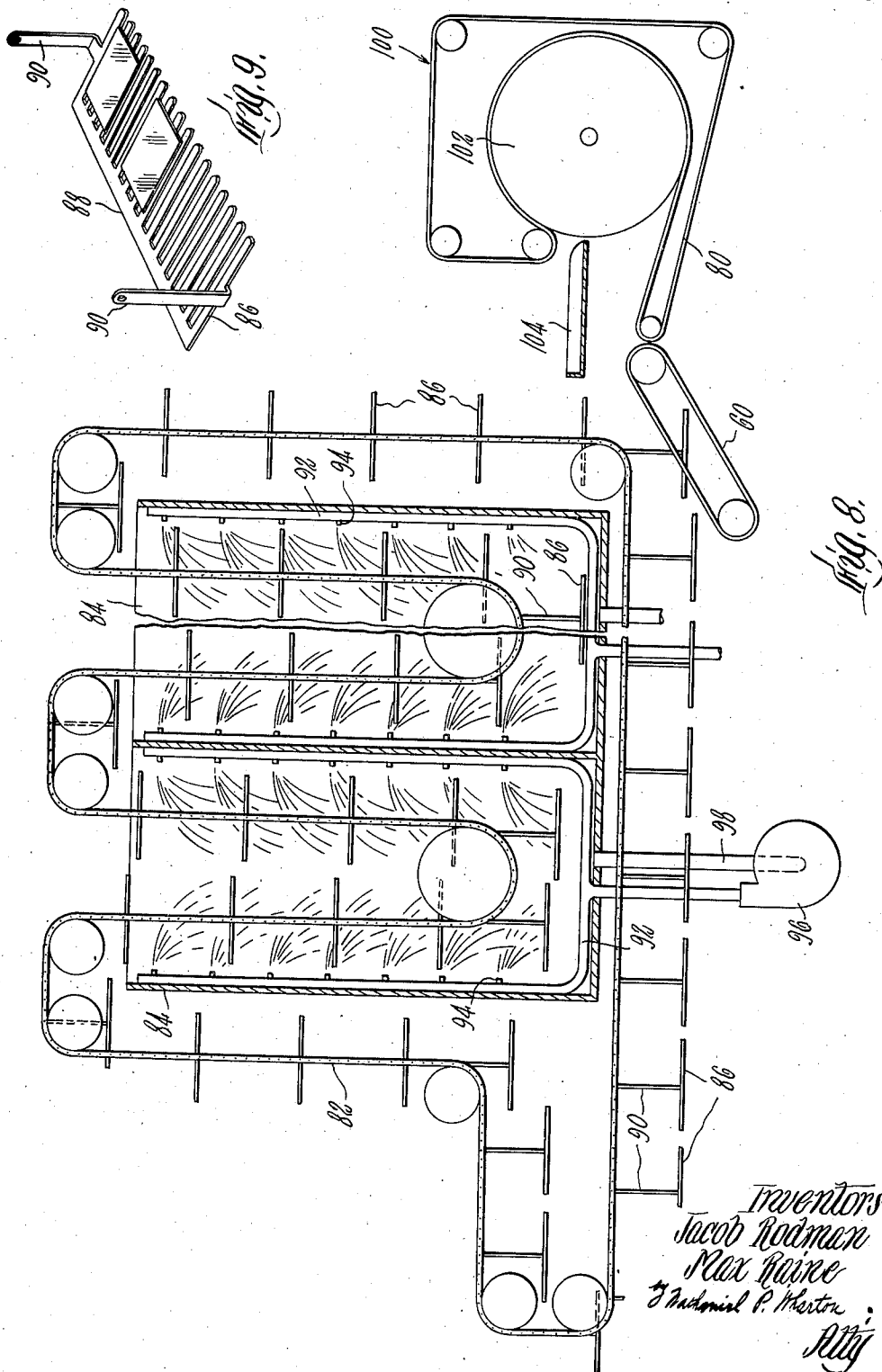
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APPARATUS FOR TREATING PHOTOGRAPHIC PRINTS

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING
PHOTOGRAPHIC PRINTS

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Application December 22, 1939, Serial No. 310,538

1 Claim. (Cl. 95—89)

This invention relates to a method of and apparatus for treating photographic prints which have been exposed and developed.

In the usual process of making photographic prints, each print is individually exposed to light through a negative for a suitable brief period of time. The exposed print is then immersed in a developing solution wherein the image is produced. Upon the conclusion of this step, the print is at once removed to a slightly acidic aqueous bath for a brief wash to arrest further development and is then transferred to a fixing solution in which it is kept for a suitable period, say, from 10 to 15 minutes or more. After the print has thus been fixed, it must be thoroughly washed. In handling large numbers of prints, the accumulated prints in the fixing bath and in the washing baths tend to cling together so as to retard the action of the fixing solution in the fixing bath and to retard the washing of the prints in subsequent baths.

It is an object of the present invention to provide apparatus for subjecting a series of prints individually to the fixing and washing steps so that the action of the fixing solution and the washing water will be uniform and thorough. According to the invention, individual prints are successively placed on a constantly moving conveyer which includes a series of individual print holders. The conveyer moves the prints separately into a suitable container wherein the prints are subjected to a liquid fixing treatment for a suitable period of time. Since each individual print is subjected to such treatment separately, the duration of the treatment can be for a minimum period of time since there is no danger of retardation due to overlapping prints. After each print has progressed through the container wherein it receives the fixing treatment, it travels out of such container and into another container wherein it is treated with wash water. A plurality of such containers is preferably employed so as to ensure thorough washing. When the print moves out of the last container, it is automatically stripped from its holder and transferred to a suitable receptacle or directly to drying apparatus from which it is ultimately delivered in finished form.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the illustration of certain embodiments thereof on the drawings of which

Figure 1 is a diagrammatic elevational view of apparatus embodying the invention.

Figure 2 is a perspective view of one of the holders shown in Figure 1.

Figure 3 is a fragmentary plan view of a portion of the apparatus shown in Figure 1, the parts being shown on a larger scale.

Figure 4 is a section on the line 4—4 of Figure 1, shown on a larger scale.

Figure 5 is a fragmentary view, in section, showing a portion of the conveyer and stripping means illustrated in Figure 1.

Figure 6 is a fragmentary plan view of the portion of the apparatus shown in Figure 5.

Figure 7 is a fragmentary sectional view on the line 7—7 of Figure 5.

Figure 8 is a diagrammatic elevational view of a modified form of apparatus embodying the invention.

Figure 9 is a perspective view of one of the holders shown in Figure 8.

The apparatus illustrated in Figure 1 comprises a series of elongated shallow tanks 20, 22, 24, 26 and 28. Five such tanks are illustrated, but a larger or smaller number may be employed as desired. These tanks may be supported by suitable framework 30 and may be arranged one above another as shown to economize on floor space. Also supported by the framework 30 is an endless conveyer consisting of a pair of flexible chains 32 or belts. These chains follow parallel paths and support between them a series of holders 33 for separate photographic prints. As shown in Figure 2, each holder may be suspended from the chains 32 by a pair of links 34 and may be made with three sides of wire netting or similar material and an open fourth side. The bottom of the holder is comb-like and consists of a series of horizontal parallel rods 36 which terminate at the open side of the holder. These rods directly support individual prints 40 which are laid thereon. The free ends of the rods 36 may be turned up as at 42 so as to prevent possible premature loss of prints from the holders. As indicated in Figure 2, the holders may be multiple so as to have a plurality of compartments, each compartment having three sides of wire netting and the fourth side open. In order to drive the conveyer at a constant speed, suitable apparatus may be provided such as an electric motor 44 having a worm 46 on the shaft, this worm meshing with a gear 48 mounted on a shaft 50 with a pair of sprocket wheels 52. The sprocket wheels engage the chains 32 of the conveyer and thus keep the conveyer in constant motion at a predetermined speed when the motor 44 is operating. The path of the endless conveyer

is determined by a series of suitably positioned sprocket wheels 54, these wheels being mounted in pairs on shafts 56 so as to keep all portions of the chains 32 in step. The shafts 56 are jour-
naled in suitable bearings carried by the frame 30.

In the operation of the apparatus thus far described, the prints are laid in the holders 33 as the holders pass a loading station at the extreme left-hand end of the apparatus as illustrated in Figure 1. The conveyer is moved at a constant predetermined speed through a definite path so that holders are immersed in the lowermost tank 20 and are moved slowly through this tank. Upon reaching the further end of the tank, the holders are raised from the tank 20 and carried to the tank 22. Thus they are immersed successively in the other remaining tanks 22, 24, 26, and 28, the total time of immersion depending upon the length of the tanks and the rate of progress of the conveyer. The liquids employed in the tanks may be as desired. For example, the lowermost tank 20 may contain a fixing solution, the other four tanks containing wash water which may be renewed as desired by any apparatus suitable for the purpose. After the holders emerge from the uppermost tank 28, they are carried to a discharge station shown at the upper right-hand portion of the apparatus as illustrated in Figure 1.

For the automatic removal of the prints from the holders reaching the discharge station, an auxiliary conveyer 60 is provided, this conveyer consisting of a plurality of narrow belts which pass around a pair of parallel spaced rolls 62 and 64 mounted on a suitable frame 66 attached to the main frame 30. The roll 62 is mounted on a shaft 67 on which is also mounted a sprocket wheel 68. The sprocket wheel 68 is connected by a chain 70 to a sprocket wheel 72 mounted on a shaft 74 on which is also mounted a pair of sprocket wheels 76. The chains 32 pass around the sprocket wheels 76 and thereby drive the shaft 74 which in turn drives the shaft 67 by means of the chain 70. Thus the conveyer 60 is driven by the conveyer 32. As indicated in Figures 1, 5, and 6, the holders 33 at the discharge station are in such relation to the auxiliary conveyer 60 that the individual belts of the conveyer 60 pass between the teeth 36 of the bottoms of the holders. Thus the moving belts of the conveyer 60 lift the prints from the bottoms of the holders and strip the prints from the holders. The prints are then carried over the roll 62 and may be dropped into a suitable receptacle or upon a moving apron 80 of a drying apparatus such as is indicated in Figure 8.

Instead of immersing the prints in pools or baths of liquids, the prints may be subjected to a series of sprays by apparatus such as is illustrated in Figures 8 and 9. As therein shown, an endless conveyer 82 is guided in a predetermined path past a loading station, and through a series

of vessels or containers 84 to a discharge station where the prints are automatically stripped from the holders by a suitable auxiliary conveyer 60. The conveyer 82 may consist of a pair of chains or belts from which are suspended a series of holders 86 consisting of a comb-like bottom 88 suspended by a pair of links 90 from the chains. The containers 84 are vertically elongated and of sufficient size to make room for a descending and an ascending column of holders. Within each of the containers 84 are mounted suitable spray pipes 92 having nozzles 94 through which any desired solution or wash water may be sprayed so as to fall continuously upon the up-turned faces of the prints carried by the holders 86 within the containers 84. The liquid in any container may, if desired, be re-circulated by a suitable pump 96 which is connected to the container by a pipe 98. In the case of wash water, the water may be re-circulated if desired, or, if water is abundant, it may be supplied in a constantly fresh stream and allowed to flow off to waste. Any desired number of containers may be employed according to the extent of treatment or washing to be given to the prints. After the holders have emerged from the last of the containers 84, they come into stripping relationship with the conveyer 60 which automatically transfers the prints from successive holders to a moving apron 80 of a drying machine 100 which is preferably of a type well known in the art. The apron 80 is endless and is driven at a constant speed to carry the prints slowly around a heated drum 102 which drives off the moisture. The dried prints are automatically discharged onto a platform 102 or any desired receptacle.

It is evident that various modifications and changes may be made in the embodiment of the invention herein shown and described without departing from the spirit or scope thereof as defined in the following claim.

We claim:

Apparatus for treating photographic prints, comprising in combination an endless conveyer including a series of holders, the bottom of each of said holders being comb-like and comprising substantially parallel, spaced teeth on which said prints are adapted to be supported, means for subjecting said prints as they are supported on said teeth to a succession of aqueous treating baths, a drier drum on which said prints are adapted to be dried after their subjection to said baths, an endless apron for carrying said prints about said drum, and a device for automatically transferring said prints to said apron from said holders after their subjection to said baths, said device comprising a series of spaced, endless carriers passing into the spaces between said teeth so as to lift said prints from support on said teeth and transfer them to said apron.

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