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A. W. CAPS ET AL

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PHOTOGRAPHIC PRINT TREATING AND CONVEYING APPARATUS

Filed Nov. 27, 1928

4 Sheets-Sheet 1

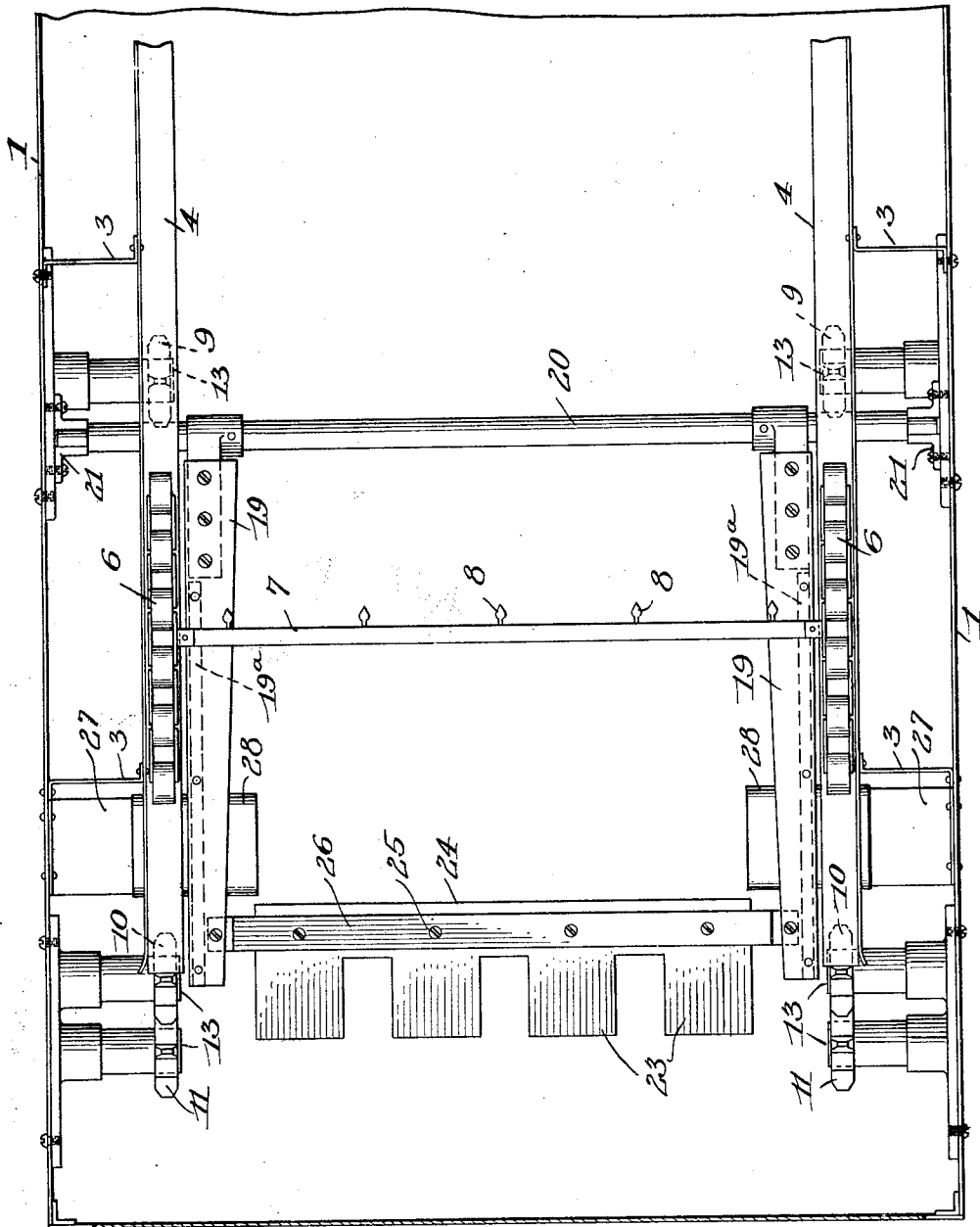


Fig. 1

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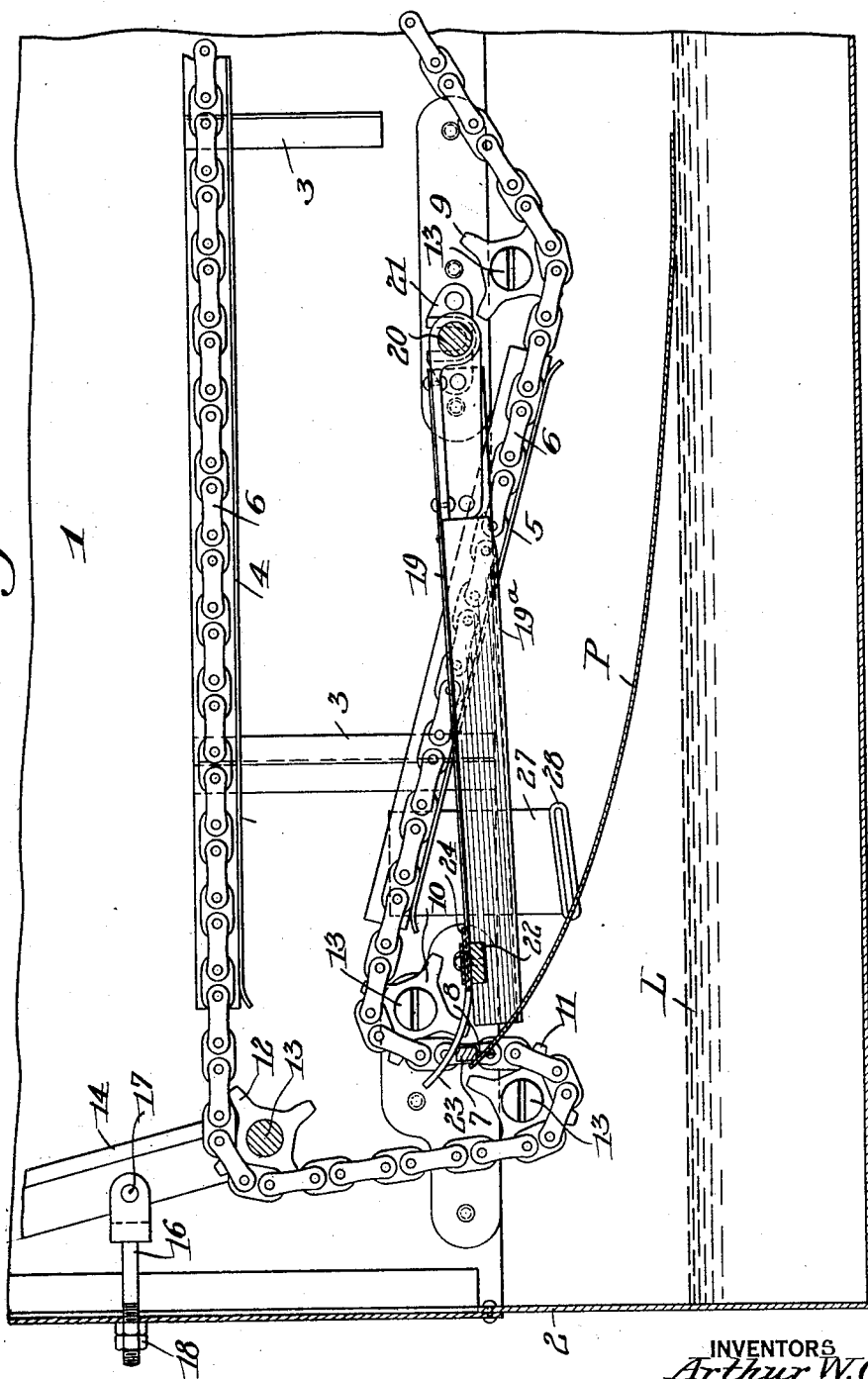
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Fig. 3



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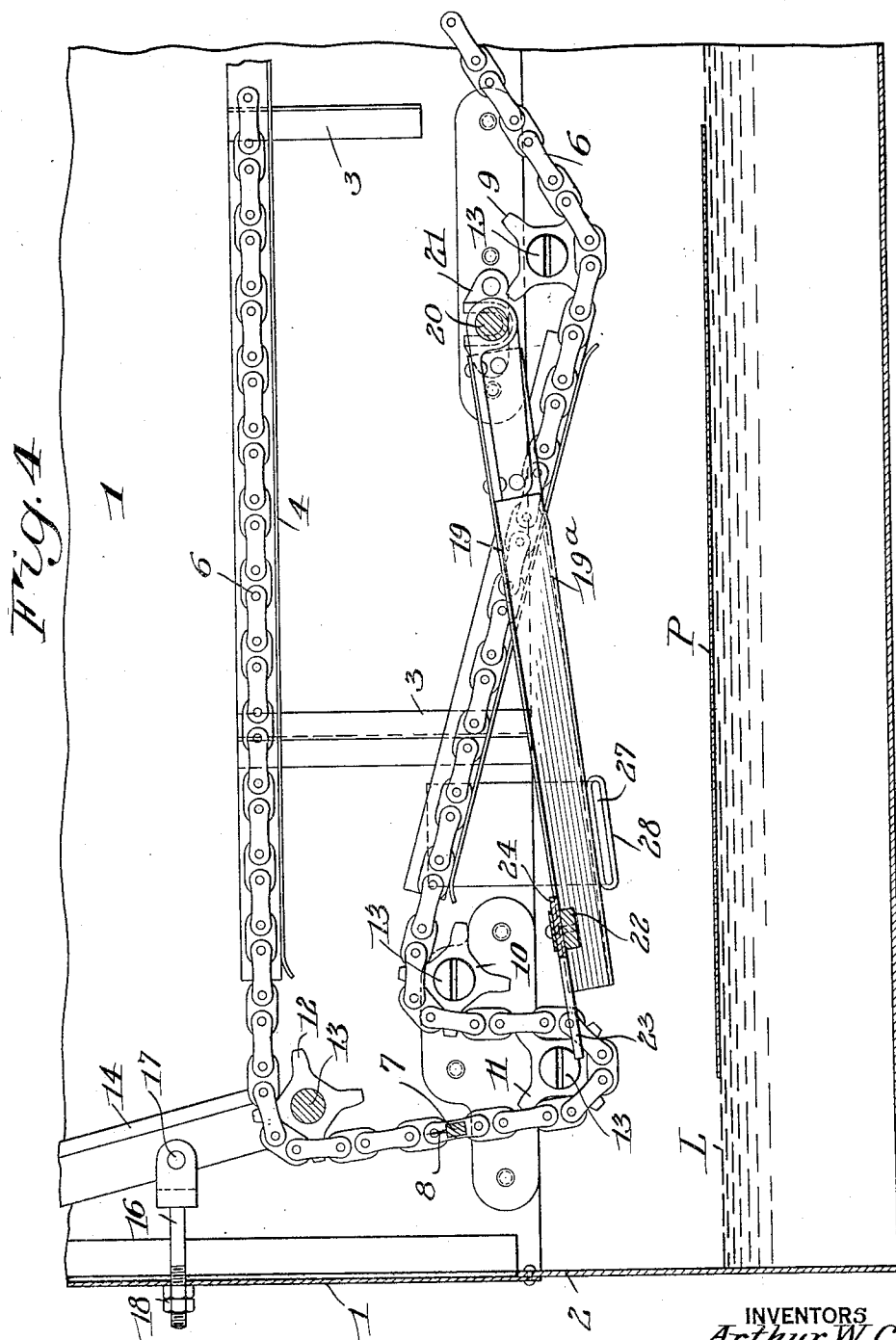
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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PHOTOGRAPHIC PRINT TREATING AND CONVEYING APPARATUS

Application filed November 27, 1928. Serial No. 322,264.

Our present invention relates to photography and more particularly to apparatus for conveying and treating exposed photographic prints and it has for its object to provide a simple, quiet and efficient mechanism of this character particularly adapted for use in connection with automatic or semi-automatic commercial cameras in which the film sheets are fed through an exposing apparatus, picked up, conveyed, and delivered to a final liquid treating bath. Improvements are directed in part to the relative arrangements of the carrier and receiving receptacle and to the means for stripping a print from the carrier and transferring it to the receptacle at a desired point.

To these and other ends the invention resides in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a fragmentary top plan view of a liquid treating tray or receptacle in a developing apparatus provided with a print conveyor and stripper constructed in accordance with and illustrating one embodiment of our invention;

Fig. 2 is a central longitudinal vertical section therethrough showing the stripper being actuated to its starting or set position;

Fig. 3 is a similar view showing the stripper during its period of operation; and

Fig. 4 is a similar view showing the stripper at the conclusion of its movement.

Similar reference numerals throughout the several views indicate the same parts.

As before stated, our improvements are particularly adapted to automatic commercial cameras but in the accompanying drawings the exposing apparatus and accompanying arrangements for preliminarily manipulating and treating the exposed prints are not shown as they are not necessary to an understanding of the invention which we have shown applied to the final liquid treating bath to which the print is subjected and which may be a hypo fixing or washing operation. Referring more particularly to the

drawings, 1 indicates a casing of a preferably light type photographic print developing apparatus embodying at its bottom a liquid container 2 the level of the liquid of which is indicated at L. Supported on the side wall of the casing 1 by brackets 3 are tracks or supporting guideways 4 and 5 upon which travels at each side of the machine a flexible chain 6. These chains jointly constitute a print conveyor having an entering and returning path above the receptacle and the fluid therein. The chains are connected at intervals by print holding and carrying bars 7 provided with a plurality of relatively spaced print impaling devices 8. At another point in the travel of the conveyor through the machine the exposed print to be treated is picked up by one of these bars on its impaling pins and carried in the manner shown in Figs. 2 and 3, the print being indicated at P.

The conveyor with the print on the impaling holder 7 enters the chamber above the liquid in the direction of the arrows at the point A; passes under a guiding sprocket 9; thence upwardly slightly at an incline over a guiding sprocket 10; thence downwardly around a sprocket 11; upwardly over a sprocket 12 and finally rearwardly again along track 4 which holds it from sagging to a point of exit B. In entering the chains are similarly supported on the lower tracks 5. One of the mounts 13 for the sprockets may be a drive shaft for the conveyor or the drive shaft may be elsewhere located. The sprockets 12 and the shaft therefor on the upper reach of the chain conveyor are preferably carried in bearings on yoke arms 14 hung from a shaft 15 to pivot from an upper point while bolts 16 pivoted thereto at 17 extend through the casing 1 and are provided with jam nuts 18. Through adjustment of these nuts any slack in the chain due to stretching or wear can be taken up.

As the print trails into the receptacle impaled on the holder 8 the latter travels during its forward progress and engages to meet a substantially horizontally disposed rising and falling stripping device embodying a pair of arms 19 carried on the rock shaft 20

bridging the receptacle and turning in an open bearing 21 carried on the side walls of the casing so that the stripping device may be removed bodily from the apparatus when
 5 desired. The outer forward ends of these arms are connected by a transverse bar 22 provided with forwardly projecting spaced flexible fingers 23. These fingers may be
 10 formed from a serrated or indented sheet of heavy rubber 24 held down by screws 25 and a keeper plate 26. With the assistance of track 5 which backs up the chain in each instance, the holder 7 engages the arm 19
 15 on their under side with a camlike action and raises them to a starting position above itself and the print as shown in Fig. 2 until the bar slips off the ends of the arms and releases the latter. At this point the impaling devices
 20 8 which have been travelling forwardly and substantially horizontally are reversed to a downward position with the print loosely held thereon as shown in Fig. 3. The stripper
 25 arms 19 immediately fall of their own weight, as shown in that figure, and are of such a length that the flexible fingers 23 at their ends engage and wipe downwardly
 30 against the bar and as these fingers preferably alternate with the impaling pins 8, they effectively strip the print from the pins and it falls to the surface of the fluid in the receptacle, as shown in Fig. 4. The stripper
 35 arms are caught by stops 27 projecting from the side walls of the casing 1, which stops are preferably covered by rubber as at 28 to act as buffers and deaden the sound when ar-
 40 resting and limiting the movement of the stripper. The latter is then in a position to be again picked up and actuated in the same manner by a succeeding print carrying im-
 45 paling bar or holder as the one just described passes upwardly and away, as shown in Fig. 4.

The stripper, as shown by the drawings on their face, is, of course, comprised between
 45 the side chains of the conveyor for free cooperation with the pin bars thereof. The latter, being of metal, are not allowed to come in contact with the metal of the stripper arms 19, however. Instead, a plate or shoe 19^a of
 50 insulating or dielectric material such as hard rubber is interposed by securing one such shoe to each arm as shown to take the contact. The purpose of these shoes is two-fold. First,
 55 unlike materials wear better and metal working against hard rubber in the presence of water has been found to be a very durable combination. Second, the hard rubber being
 60 an insulator, there is no galvanic action set-up which may cause the electro-deposit of silver on the stripper arms from the photo-
 65 graphic chemicals that are carried over from the print treating apparatus. This feature is more specifically described in Patent No. 1,803,002, granted April 28, 1931, for an in-
 70 vention of Arthur W. Caps on an application

which was copending with the present case. As explained therein, there is another point that may be called to attention here and that is that the metal to metal contact in the pres-
 70 ence of the hypo solution seems to cause an erosion of the metals. This is a marked distinction to the silver coating above referred to. Where the silver is coated on the metal, the metal remains bright underneath but
 75 where the erosion takes place, the metal seems to rot and soon wears away.

A print handling device constructed in accordance with our invention substantially as shown and as above described works accu-
 80 rately and efficiently as well as quietly and will endure without repair or adjustment for a long period of use.

We claim as our invention:

1. In a photographic apparatus, the combination with a conveyor for exposed photo-
 85 graphic prints having a print holding device thereon, movable through a path of travel extending forwardly and then downwardly of a stripper for removing the print from the
 90 conveyor embodying a rising and falling arm arranged to be held in elevated position by said holding device while the latter is moving forwardly and to move downwardly to sweep a print from said holding device while
 95 the latter is moving downwardly.

2. In a photographic apparatus having a liquid receptacle, the combination with a conveyor for exposed photographic prints having a print holding device thereon, movable
 100 through a path of travel extending forwardly and then downwardly of a stripper for transferring the print from the conveyor to the receptacle embodying a rising and falling arm arranged above the receptacle to move
 105 into and out of cooperation with the holding device, said arm being held in elevated position by said holding device while the latter is moving forwardly and being released thereby substantially at the end of the forward
 110 movement thereof so that said stripper may drop downwardly by gravity to strip a print from said holding device while the latter is moving downwardly.

3. In a photographic apparatus, the combination with a conveyor for exposed photo-
 115 graphic prints having a print impaling and carrying holder thereon, of a stripper for removing the print from the conveyor embodying flexible fingers cooperating with the
 120 holder in alternation with the impaling devices thereon.

4. In a photographic apparatus, the combination with a conveyor for exposed photo-
 125 graphic prints having a print impaling and carrying holder thereon, of a stripper for removing the print from the conveyor embodying an arm arranged to swing in the path of the holder and provided with flexible engag-
 130 ing fingers cooperating with the holder in

alternation with the impaling devices thereon.

5 5. In a photographic apparatus, the combination with a conveyor for exposed photographic prints having a print impaling and carrying holder thereon, of a stripper for removing the print from the conveyor embodying an arm arranged to swing in the path of the holder and provided with flexible engaging fingers cooperating with the holder in
10 alternation with the impaling devices thereon, said arm being substantially vertically movable and having a downward direction when operatively engaging the holder.

15 6. In a photographic apparatus including a liquid treating receptacle the combination with a conveyor for exposed photographic prints movable in a path above and over the receptacle and also downwardly toward the
20 receptacle, and a print impaling and carrying holder thereon, of a stripper for transferring the print from the conveyor to the receptacle arranged to engage the holder in a downward direction during the downward
25 travel of the conveyor.

7. In a photographic apparatus including a liquid treating receptacle, the combination with a conveyor for exposed photographic prints movable in a path above and over the
30 receptacle and also downwardly toward the receptacle, and a print impaling and carrying holder thereon, of a stripper for transferring the print from the conveyor to the receptacle arranged to engage the holder in a downward
35 direction during the downward travel of the conveyor, said stripper being actuated by the holder during its travel toward the stripping point.

8. In a photographic apparatus including
40 a liquid treating receptacle, the combination with a conveyor for exposed photographic prints movable in a path above and over the receptacle and also downwardly toward the receptacle, and a print impaling and carrying
45 holder thereon, of a stripper for transferring the print from the conveyor to the receptacle arranged to engage the holder in a downward direction during the downward travel of the conveyor, said stripper embodying flexible fingers cooperating with the
50 holder in alternation with the impaling devices thereon.

9. In a photographic apparatus including a liquid treating receptacle, the combination
55 with a conveyor for exposed photographic prints movable in a path above and over the receptacle and also downwardly toward the receptacle, and a print impaling and carrying holder thereon, of a stripper for transferring
60 the print from the conveyor to the receptacle arranged to engage the holder in a downward direction during the downward travel of the conveyor, said stripper embodying a substantially horizontal rising and falling
65 pivoted arm.

10. In a photographic apparatus including a liquid treating receptacle, the combination with a conveyor for exposed photographic prints movable in a path above and over the
70 receptacle and also downwardly toward the receptacle, and a print impaling and carrying holder thereon, of a stripper for transferring the print from the conveyor to the receptacle arranged to engage the holder in
75 a downward direction during the downward travel of the conveyor, said stripper embodying a substantially horizontal rising and falling pivoted arm actuated in timed relation to the progress of the holder through the movement of the carrier.

11. In a photographic apparatus, the combination with a carrier for exposed photographic prints having a print holding bar provided with relatively spaced print impaling devices, of a stripper for removing a
85 print from the bar embodying flexible fingers operating in the path of the bar to engage the latter in alternation with the impaling devices thereon.

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