

Nov. 17, 1931.

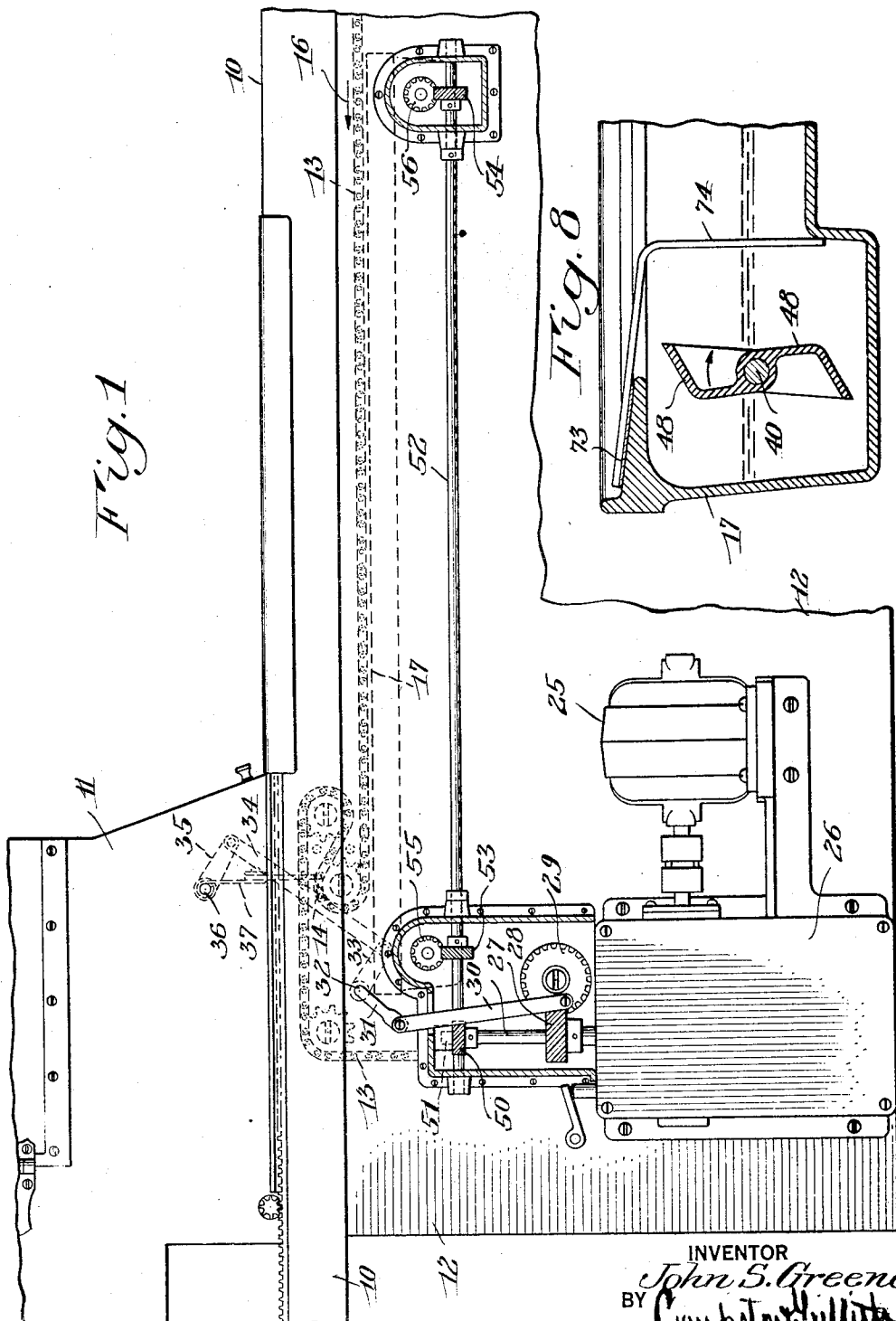
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1,832,297

PHOTOGRAPHIC PRINT TREATING APPARATUS

Filed Dec. 24, 1928

3 Sheets-Sheet 1



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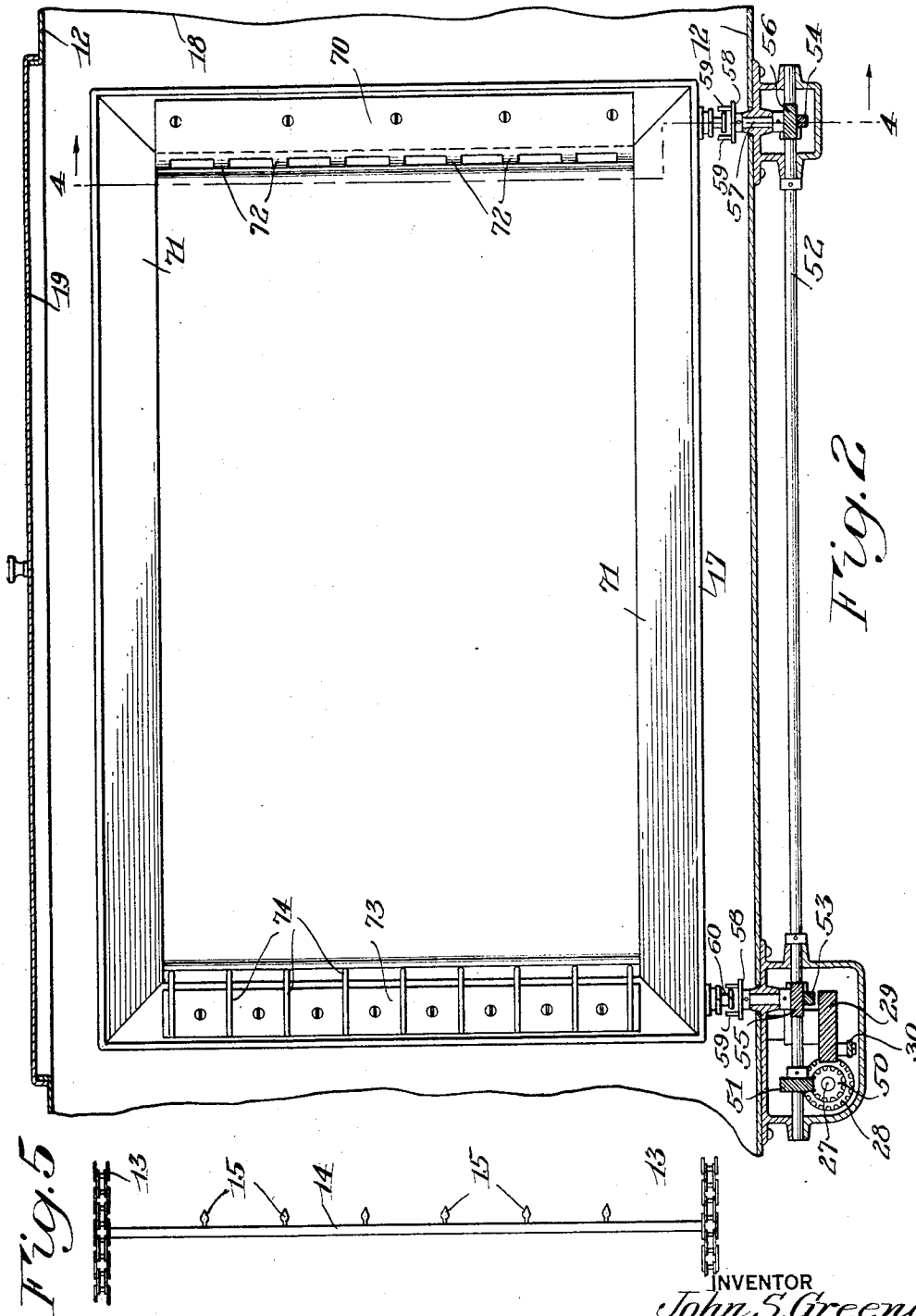
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PHOTOGRAPHIC PRINT TREATING APPARATUS

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3 Sheets-Sheet 2



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PHOTOGRAPHIC PRINT TREATING APPARATUS

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3 Sheets-Sheet 3

Fig. 3

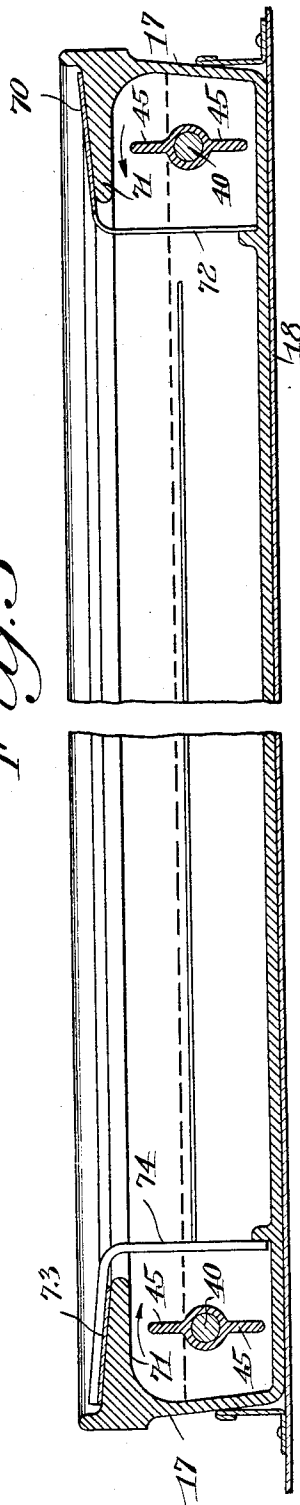


Fig. 4

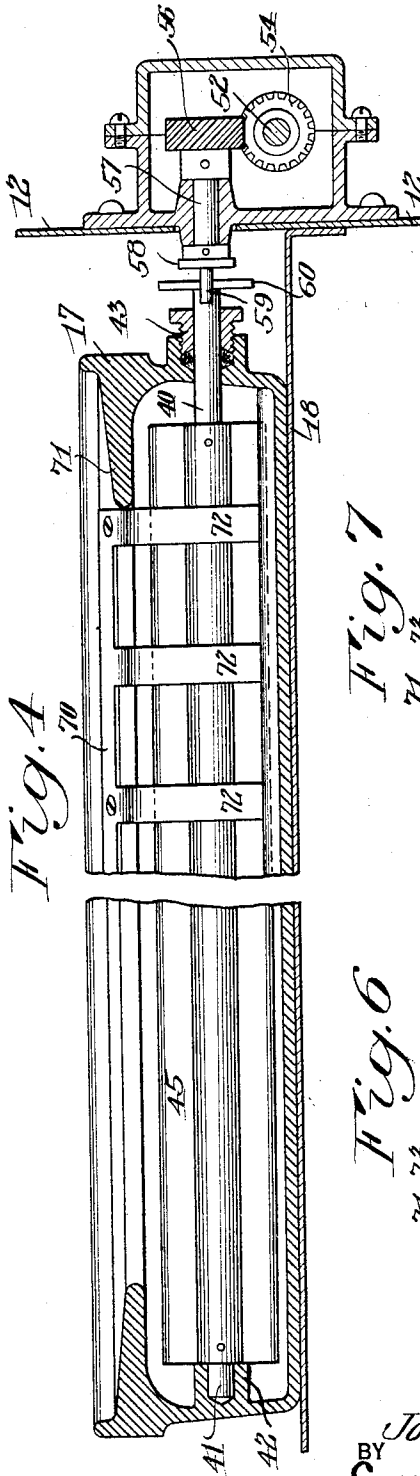


Fig. 7

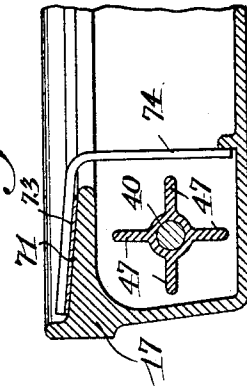
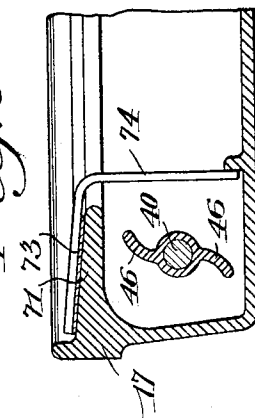


Fig. 6



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PHOTOGRAPHIC PRINT TREATING APPARATUS

Application filed December 24, 1928. Serial No. 328,112.

This invention relates to apparatus for treating photographic prints, and has for its principal object the provision of simple, efficient and satisfactory means for submerging the print in a treating liquid so that all parts of the print may be acted upon thoroughly by the liquid.

Another object of the invention is the provision of simple and effective mechanism for agitating a body of print treating liquid to promote the rapid and complete treatment of prints by the liquid.

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 side elevation of a fragment of a photographic apparatus illustrating the invention applied thereto;

Fig. 2 is a plan of a receptacle for holding a photographic print treating liquid, illustrating features of the invention, parts of the associated casing being shown in section;

Fig. 3 is a vertical section taken longitudinally through the apparatus shown in Fig. 2;

Fig. 4 is a transverse vertical section taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a view showing details of part of the photographic print conveying mechanism;

Fig. 6 is a fragmentary vertical section showing agitating mechanism of a slightly different form from that shown in Fig. 3;

Fig. 7 is a similar view illustrating another form of agitating mechanism, and

Fig. 8 is a similar view illustrating still another possible form of agitating mechanism.

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

Although the present invention is capable of many different uses, it is here disclosed by way of example in connection with a photographic copying machine having horizontal frame members 10 which support a camera casing 11 rising above the frame members

and a casing 12 suspended below the frame member, this latter casing containing various mechanisms for handling the photographic prints produced by the camera.

Among these mechanisms there may be included print conveying means such as the endless chains 13, partially illustrated in Figs. 1 and 5, between which pin bars 14 extend, each of these pin bars carrying forwardly extending pins 15 arranged to impale photographic prints and to carry the prints along in a manner known to those skilled in the art. This conveying means is arranged to receive prints which have been exposed within the camera 11 and to convey them through suitable developing and washing baths. After being developed and washed, the prints are carried along the horizontal portion of the conveying mechanism shown in Fig. 1 from right to left, that is, in the direction of the arrow 16, and are deposited into a receptacle such as the tray 17 illustrated in dotted lines in Fig. 1, and shown more in detail in Figs. 2, 3 and 4. This tray may rest, for example, upon a horizontal plate or shelf 18 and may be removable from the casing 12, by a horizontal sliding movement, through a door 19 (Fig. 2) formed in the side of the casing.

The print conveying means 13 may be driven either continuously or intermittently by suitable driving mechanism such as the motor 25, which, through a gear box 26, is connected to suitable sprockets for driving the chains 13. A vertical shaft 27 extending upwardly from the top of the gear box is driven preferably continuously, whether the chains 13 be driven continuously or intermittently, and this shaft 27 carries a spiral gear 28 meshing with another spiral gear 29 to which is pivoted a connecting rod 30 which acts to oscillate a crank arm 31 on a shaft 32. This shaft carries an arm 33 connected by a link 34 to an arm 35 on a shaft 36 upon which is mounted a member 37 for removing the prints from the conveying means so that they drop into the tank 17. It will be understood by those skilled in the art that the member 37, during its oscillation, comes into contact with a print impaled upon

the pins 15 of a pin bar 14, and knocks the print off of these pins so that it is released from the conveying means and falls downwardly by gravity.

Since this print removing device is located near the forward end of the tray 17, the prints when released will fall into this tray, the forward end of the print which had been impaled on the pin bar dropping near the forward end of the tray, or left hand end when viewed as in Figs. 1, 2 and 3, while the rear end of the print, which trails along during the movement of the conveying means, will be at the rear end of the tray or at some intermediate point therein, depending upon the length of the print. Accordingly, the print is deposited substantially flat on the surface of the treating liquid (for instance, a fixing solution) within the tray. Unless some means is provided for submerging the print or causing the treating liquid to flow over it, it may float substantially on the surface of the liquid for a considerable length of time and thus may fail to become thoroughly impregnated and fully treated by the liquid.

According to the present invention, the means for submerging the print comprises mechanism for creating waves in the liquid within the tray 17, and in the preferred embodiment of the invention this mechanism includes movable agitating members within the tray.

Referring now especially to Figs. 3 and 4, the tray 17 is provided with two shafts 40, one adjacent each end of the tray, each of these shafts being journaled at one end as at 41 in a boss 42 formed on the inner side wall of the tray, the other end of the shaft extending through the opposite side wall of the tray through a liquid tight stuffing box 43. Each shaft carries one or more members for agitating the liquid in the tray so as to produce waves. In the preferred embodiment shown in Fig. 3, these members comprise two straight fins 45 extending radially outward from the shaft 40 diametrically opposite to each other and throughout substantially the entire length of the shaft, being just enough shorter than the width of the tray so that the ends 41 of the shafts may be disengaged from the bosses 42.

In Fig. 6 there is shown a slightly different form of agitating member, which comprises curved fins 46. Fig. 7 shows still another form, in which four straight fins 90° apart are employed, thus producing an agitating member which is cross shaped in cross section. Fig. 8 illustrates still another possible form of agitating member. In this instance, the shafts 40 are provided with fins 48 which have straight portions extending outwardly from each of the shafts 40 and other straight portions arranged at an angle to the first straight portions as illustrated clearly. An

agitating member of this form is particularly efficient in operation, as it not only creates a wave, but also tends to throw liquid from the ends somewhat toward the center of the tray, so that some of it may fall on the top of the print, and so that the liquid within the tray is thoroughly stirred up.

All of the various possible forms of agitating members disclosed in Figs. 3, 6, 7 and 8 are more or less similar to a paddle wheel, and may be conveniently referred to as paddle members.

The two shafts 40 carrying the agitating or paddle members are preferably rotated in opposite directions, the shaft at the forward or left hand end of the tray being rotated in a clockwise direction when viewed as in Fig. 3, while the shaft 40 at the right hand or rear end of the tray is rotated in a counterclockwise direction. Thus in both cases the portion of the paddle member above the shaft rotates toward the center of the tray while the portion below the shaft moves away from the center. It is found in practice that such movement of the agitating members creates a wave motion in the liquid within the tray, the waves progressing from the ends toward the center of the tray. These waves flow over the print which was deposited on the surface of the liquid, and in practice quickly submerge this print so that it is acted upon thoroughly and satisfactorily by the treating liquid. Furthermore, the agitating members keep the liquid stirred up, thus keeping it of uniform strength and consistency, promoting uniform and effective treatment of the prints.

For rotating the shafts 40 to cause the paddle members to agitate the liquid, various means might be employed. In the present instance, the shafts are driven from the shaft 27, above mentioned, which extends upwardly from the gear box 26. This shaft projects some distance above the gear 28, and carries at its upper end a spiral gear 50 meshing with another spiral gear 51 on a shaft 52 which extends horizontally along the side of the casing 12 of the apparatus. This shaft 52 carries two spiral gears 53 and 54, one being right hand and the other left hand, which gears mesh with spiral gears 55 and 56 on shafts 57 which are in axial alinement with the shafts 40 mounted on the tray 17.

These shafts 57 extend through the side of the casing of the apparatus and carry disks 58 (Figs. 2 and 4) from which pins 59 project inwardly toward the tray. These pins cooperate with elongated plates 60 mounted on the adjacent ends of the shafts 40, the distance between the pins 59 on each disk 58 being slightly greater than the narrow dimension of the plate 60 but less than the length of the plate, so that the pins and plate form a separable driving connection between each shaft 57 and the associated shaft 40. This

permits the tray 17 to be withdrawn from the apparatus through its door 19 without disconnecting any shafts or clutches, the plates 60 sliding out from between the pins 59 by a simple axial movement. Since one of the gears 53 and 54 is right hand and the other left hand, as above mentioned, the two shafts 40 will be driven in opposite directions in the manner desired.

To prevent the prints within the tray from becoming tangled in the agitating mechanism, guard means is provided for holding the prints out of contact with the agitating mechanism. At the right hand or rear end of the tray, this guard means may comprise a plate 70 (Figs. 2, 3 and 4) secured to the top of the inwardly extending flange 71 of the tray and provided with downwardly extending fingers 72 which form a grating or grid in front of the agitating member and prevent a print from coming into contact therewith. The fingers 72 are comparatively wide, as shown, so that as the trailing end of the wet print is dragged over the rear end of the tray by movement of the conveying means, these wide fingers will cause friction and create a drag on the print and tend to straighten it out so that it will lie flat when it is released from the conveying means and falls into the tray.

At the forward end of the tray, guard means of slightly different form is employed. In this instance, a plate 73 is fixed to the top of the inwardly extending flange 71 at this end of the tray, and fingers 74 of stiff wire are soldered to the top of the plate 73 and are bent downwardly to form a grating to hold a print out of contact with the associated agitating member. At the forward end of the tray it is not desired to create a drag on the print, but on the contrary friction between the print and the tray should be reduced to a minimum so that if the forward end of the print happens to fall on the tray instead of directly into the liquid, it may slide easily off of the tray into the liquid. The rounded and comparatively small surfaces of the wires 74 create much less friction upon the wet print than the wide flat fingers 72 at the rear end of the tray, and it is for this reason that different forms of guards are provided at the two ends of the tray.

It will be observed that an inwardly extending flange 71 is provided near the top of the tray on all sides thereof, and that the agitating members are placed within the cove or pocket under this flange, so that any splashing of liquid occasioned by the agitating members simply wets the underside of the flanges and does not splash over the sides of the tray.

Preferably the entire tray 17 is made of rubber, as are also the paddle members carried by the shafts 40, while these shafts themselves may be of metal. The guard devices 70, 73 and 74 are preferably also of metal,

although other material might be employed effectively.

In operation, a print is carried along by being impaled upon the pins 15 on a pin bar 14 on the endless conveying members 13. As the forward end of this print reaches a point near the forward end of the tray 17 (the rear end trailing along some distance behind the forward end) it is removed from the conveying means by operation of the print removing arm 37, so that the print falls substantially flat onto the surface of the treating liquid (for example, fixing solution) within the tray 17. The movement of the paddle members on the shafts 40 in the tray agitate the treating liquid in such manner as to cause waves therein, which travel from the ends of the tray toward the center and pass over the top of the print and quickly submerge it, so that it is fully impregnated with the treating liquid and thoroughly acted upon thereby. When the print has been submerged, another print may be deposited in the tray by the conveying means and the submerging action will take place on this second print. A number of prints may thus be accumulated within the tray, if desired instead of being removed therefrom one at a time.

While certain embodiments of the invention have been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details shown, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. In a photographic apparatus, the combination with a relatively long, shallow receptacle for containing a photographic print treating liquid, of a rotatable member having a fin thereon for agitating said liquid to cause waves therein for submerging a print.

2. In a photographic apparatus, the combination with a relatively long shallow receptacle for containing a photographic print treating liquid, of mechanism for agitating the liquid within said receptacle to cause waves therein for submerging a print, said mechanism including a member rotatable in one direction adjacent one side of said receptacle and a member rotatable in the opposite direction adjacent the opposite side of said receptacle.

3. In a photographic apparatus, the combination with a receptacle for containing a photographic print treating liquid, said receptacle having depressions to provide greater depth of liquid adjacent opposite sides of the receptacle than at intermediate points, of a plurality of shafts within said receptacle substantially above said depressions, mechanism for driving said shafts in opposite directions, and a paddle-like mem-

ber associated with each shaft for agitating said liquid adjacent said depression to create waves therein.

4. In a photographic apparatus, the combination with a receptacle for containing a photographic print treating liquid, of mechanism adjacent one side of said receptacle for creating waves in said liquid travelling from said side toward the center of said receptacle, mechanism adjacent another side of said receptacle for creating waves travelling from said other side toward the center of the receptacle, and means for depositing a print within said receptacle between said mechanisms, so that the waves created thereby will flow over and submerge the print.

5. In a photographic apparatus, the combination with a relatively long, shallow receptacle for containing a photographic print treating liquid, of a rotatable member having a fin thereon for agitating said liquid to cause waves therein for submerging a print, the front surface of said fin being recessed so that said fin tends to project liquid bodily in addition to creating waves.

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