Our invention relates to new and useful improvements in apparatus for processing photographic materials and is directed more particularly to the provision of apparatus for treating photographic materials with solutions.

The principal objects of the invention are directed to the provision of apparatus for treating a plurality of sheets or plates of photographic material with solutions.

While in this description of the invention, reference is made to the fixing of sheets in a hypo bath, the apparatus is not to be understood as limited in its use thereto.

It is common practice to fix developed paper prints, sheet film, and the like in a hypo bath in a tray. In an attempt to obtain the proper fixing the tray is rocked, the prints or sheets are constantly agitated, and the lowermost sheets are successively removed to the top of the bath or stack, all of which requires constant manipulation by the operator.

Too, the prints and sheets adhere to one another which prevents the proper contact of the surfaces thereof with the hypo solution wherefor the manipulation referred to consumes considerably more fixing time than would be the case were the surfaces of the prints or sheets in contact with the hypo solution at all times.

According to this invention the apparatus is constructed and arranged so that the prints or sheets are caused to continuously circulate around and through the hypo solution. We have found, due to the novel arrangement of the apparatus, that the prints are spaced apart vertically in different planes during the entire fixing time. That is, as the prints move around the tank in and through the hypo solution, they arrange themselves in layers so that upper prints are spaced above lower ones whereby the prints do not adhere to one another and their surfaces are in contact with the solution.

The apparatus is such that manual manipulation of the prints is unnecessary and, because the prints are spaced apart vertically in the liquid, the fixing time is greatly reduced over that of the method above referred to.

One of the primary purposes of the invention is to provide structural and operational improvements in devices of the class to which reference has been made, which improvements not only simplify the structure such as but also provide important distinct advantages in durability and the like.

With the above primary objects in view, it is another object of our invention to provide a construction of the above described character which is simple and compact in accordance with the desires and demands of purchasers and which is not only distinctive in its appearance and practical in its value but also reliable in its operation and efficient in its use.

Other objects of our invention include: first, the securing of a greater degree of accuracy in the manner of work performed therewith than has heretofore been possible with prior devices known in the art; second, the provision of a construction which may be readily installed with respect to the various purposes for which it is intended, and third, the provision of such other improvements in and relating to apparatus for processing photographic materials of the type above referred to as are hereinafter described and claimed.

All of the above objects we accomplish by means of such structure and relative arrangements of parts thereof, as will fully appear by a perusal of the description below and by various specific features which will be hereinafter set forth.

To the above cited and other ends and with the foregoing and various other novel features and advantages and other objects of our invention as will become more readily apparent as the description proceeds, our invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claims hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Fig. 1 is a plan view of sheet processing apparatus embodying the novel features of the invention;

Fig. 2 is a side elevational view of the apparatus shown in Fig. 1 with a portion of the tank broken away;

Fig. 3 is a sectional plan view on the line 3-3 of Fig. 2; and

Fig. 4 is a vertical sectional elevational view through the director casing with the propeller mechanism associated therewith.

Referring now to the drawings more in detail, the invention will be fully described.

A tank is represented by 1 which has a bottom wall 2 and a peripheral side wall 3.

The tank and parts coming in contact with the hypo solution will be formed from such materials as will resist the action of the solution. Certain types of stainless steel may be used in the practice of the invention.

Upper and lower straps 8 and 10 have lugs such as 12 which are secured to the wall 6 of the
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tank. These straps are formed to receive and support a cylindrical shell or hollow casing 14 adjacent a side of the tank.

The casing has a member 16 extending across its lower end which carries a bearing 18 for the lower end of a vertical shaft 20. The bearing 18 may be of any desired construction.

An electric motor 22 at the upper end of the casing is supported thereby.

The motor 22 may be of any desired form but in the embodiment of the invention shown it has ears 24 to which supporting members 26 are secured and these in turn are secured to the casing 16.

A shaft 26 of the motor 22 is connected by a resilient coupling 28 to the vertical shaft 20. As the motor is energized, the shaft 20 is rotated thereby.

Lower and upper bladed propellers 30 and 32 are fixed to the shaft 20 in spaced relation so as to be rotated thereby. Said propellers may have blades of any desired form.

Inlets 34 are provided at the lower end of the casing and an outlet 36 is provided in a side thereof. Said outlet 36 will preferably be in the form of an elongated slot, as shown.

An upper transverse wall 40 is disposed within the casing above the propeller 32 and is held in place by ears 42 secured to the casing. There may be a space in the wall 40 around the shaft or if desired suitable journal means for the shaft may be associated with said wall.

A baffle or deflector 44 preferably formed in an arc of a circle extends from the members 8 and 16 to one side of the tank wall 8, as shown. The deflector extends upwardly from the bottom wall 4 to the upper edge of the tank or to a point adjacent thereto.

The straps 8 and 12 are so formed that in conjunction with the side wall of the tank they form a receiver for the propeller mechanism. That is to say, the casing 14 may be inserted in and removed from the receiver as may be desired while the casing may be adjusted angularly in said receiver.

With the propeller mechanism in the receiving means and with the hypo solution in the tank, the motor is operated to rotate shaft 20 in the direction of the arrow shown.

As the shaft 20 rotates propellers 30 and 32, the solution is drawn into the casing by lower propeller 30. The blades of the propellers are of different or opposite pitch or angles, as shown in Fig. 4. The solution entering inlets 34 tends to move upwardly in the casing 14 but wall 40, closing the upper end of the casing, and the upper propeller 32 restrains upward movement of the liquid so as to tend to force it downwardly whereby the propellers operating in opposition to each other discharge the solution through outlet 36.

The solution entering the casing and being discharged, it assumes a swirling motion about the tank and carries film sheets or prints therearound and these are directed past the casing by member 44.

The casing 14 may be turned in the receiver to locate the discharge outlet 36 as may be desired to vary the swirling or circular movement of the solution.

With a multiplicity of prints or sheets in the solution being carried around the tank thereby they assume separated relationship. That is the prints disposed horizontally move in vertically spaced planes so that there is sufficient solution between them and in contact with the surfaces thereof.

This disposition of the prints may be accounted for by the manner of discharge of the solution through the vertically disposed elongated discharge slot 35 but is highly desirable since the prints having the solution in contact with the entire surface thereof are thoroughly fixed in a relatively short time interval.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all modifications and variations as full within the meaning and purview and range of equivalency of the appended claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. Apparatus for processing a plurality of flat sheets of photographic material having a processing liquid comprising in combination, a circular tank having a horizontal bottom wall and a circular peripheral wall extending vertically upwardly therefrom, an elongated tubular shell having an imperforate side wall and a lower end disposed adjacent said bottom wall and extending therefrom vertically upwardly and closely adjacent an inner side of said peripheral wall at one side of said tank and terminating adjacent the upper edge of said wall, said shell provided with inlet means thereinto closely adjacent said lower wall and an elongated relatively narrow vertically disposed discharge outlet in a side thereof having opposite ends terminating upwardly and downwardly from said inlet and bottom wall and the upper edge of said peripheral wall, said outlet of the shell disposed adjacent and spaced from an adjacent portion of said peripheral wall and is directed in one direction and toward said peripheral wall at a point forwardly thereof, upper and lower rotatable liquid propelling means in said shell for discharging liquid out said outlet and circulating the same around said tank, and an elongated sheet-like baffle having its transverse width disposed vertically and a forward vertical end secured to said shell and a rear vertical end secured to said peripheral wall, said baffle being bowed outwardly intermediate its forward and rear ends towards said peripheral wall of the tank and having its forward end disposed inwardly of the inner longitudinal edge of said discharge outlet and extending from said shell to said wall in a direction opposite to said one direction.

2. Apparatus for processing a plurality of flat sheets of photographic material in processing liquid comprising in combination, a circular tank having a horizontal bottom wall and a circular peripheral wall extending vertically upwardly therefrom, an elongated tubular shell having an imperforate side wall and a lower end disposed on said bottom wall and extending therefrom vertically upwardly and closely adjacent an inner side of said peripheral wall at one side of said tank and terminating at its upper and adjacent the upper edge of said wall, said shell provided with inlet means thereinto closely adjacent said lower wall and an elongated relatively narrow vertically disposed discharge outlet in a side thereof and having opposite ends terminat-
ing upwardly and downwardly from said bottom wall and inlet and the upper edge of said peripheral wall, said discharge outlet of the shell disposed adjacent and spaced from an adjacent portion of said peripheral wall and is directed in one direction and toward said peripheral wall at a point forwardly thereof, rotatable liquid propelling means in said shell for discharging liquid out said outlet and circulating the same around said tank, and an elongated sheet-like baffle having its transverse width disposed vertically and a forward vertical end secured to said shell and a rear vertical end secured to said peripheral wall, said baffle being bowed outwardly intermediate its forward and rear ends towards said peripheral wall and having its forward end disposed inwardly of the inner longitudinal edge of said outlet and extending from said shell to said wall in a direction opposite to said one direction, said liquid propelling means including vertically spaced simultaneously rotatable propellers disposed above and below and adjacent upper and lower ends of said discharge outlet having radially extending blades arranged on rotation thereof to propel liquid downwardly and upwardly to and through said outlet.

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