

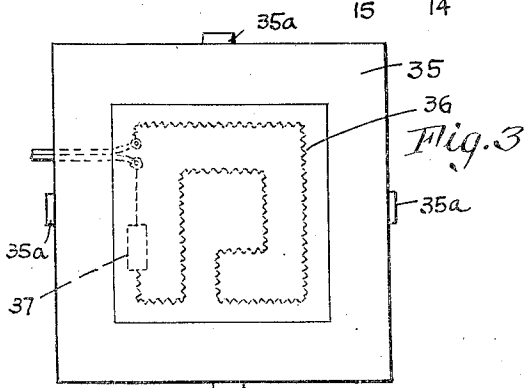
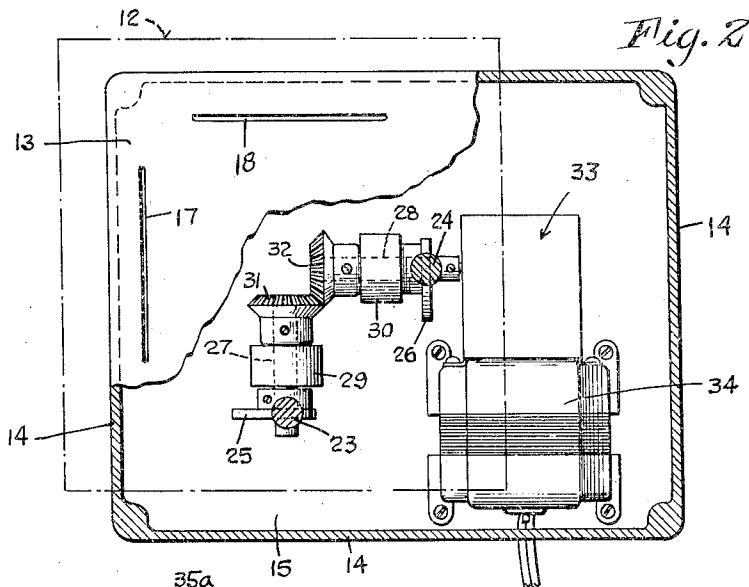
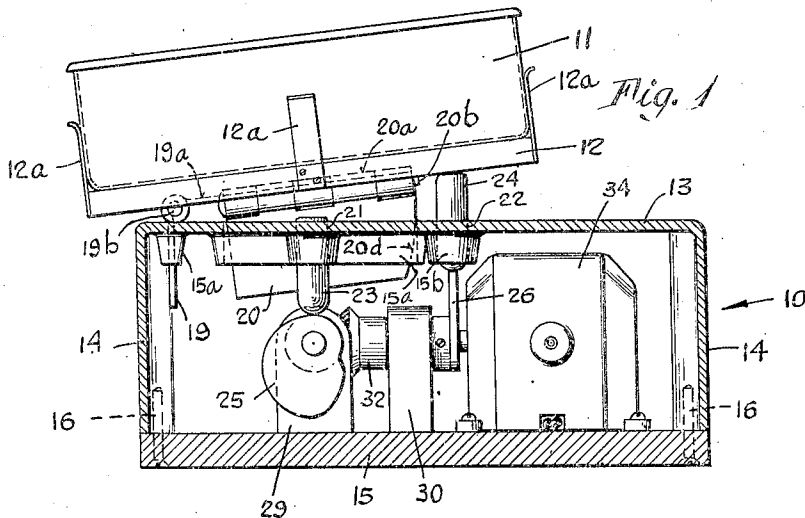
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AGITATING DEVICE

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AGITATING DEVICE

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The present invention relates to an agitating device and more particularly to a device for agitating a liquid in photographic developing and printing trays or tanks.

In the art of photography it is frequently desired to wash or treat the film or prints with developing, fixing or washing solutions and it is necessary to agitate these solutions and cause them to flow over the film or prints in order to secure an even and uniform treatment.

The present invention provides a simple, yet accurate agitating means for causing the liquid to move back and forth in the tank or tray and to be in continuous motion over the film or prints.

In the preferred form of the invention the tray carrying the solution is mounted to be oscillated about fixed horizontal intersecting axes. The oscillating means is driven so as to rock the tank sequentially about each axis in a predetermined timed relation. When the axes are disposed at substantially right angles with respect to one another, this produces a motion in the tank as would be obtained by hand operation, tilting the tank alternately from side to side and forward and backward.

A feature of the invention resides in the novel mounting means for the tank whereby the tank may be readily removed and replaced so that tanks requiring heating may be interchanged with those not requiring heating for the minimum of time.

Another feature of the invention resides in the simple yet effective drive for moving the tray about its fixed pivotal axes in predetermined timed relation.

The device of the present invention is simple in operation and construction and can be cheaply manufactured and assembled.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawings in which:

Figure 1 shows a side view of the device with the housing partly in section.

Fig. 2 is a top view, partly in section, with the plate shown in dot and dash lines.

Fig. 3 shows a plan view of another plate.

As shown in Fig. 1, the device comprises a base 10 and a tank 11 containing a suitable liquid for treating film or prints. While the tank may be mounted directly on the base it is at present preferred to detachably support it on a plate 12. The plate has resilient fingers 12a releasably holding the tray. This enables the trays to be readily applied or removed therefrom as required.

The base may take various forms. In the pre-

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ferred form of the invention it comprises a housing having a top 13, side walls 14 and a bottom member 15 secured thereto by screws 16.

According to the present invention novel mounting means is provided for the plate 12 which enables it to be rocked about fixed angularly related axes preferably disposed at 90° with respect to one another.

This is accomplished by providing the top 13 with slots 17, 18 extending therethrough and preferably disposed at right angles with one another. These slots slidably receive depending tongues 19, 20 pivotally mounted in the undersurface of the plate 12. The tongues may be pivoted to the plate in any manner. One way is to have the tongues formed as one leaf of a pair of leaf hinges with the other leaves 19a, 20a of the hinges secured to the undersurface of the plate 12 so that the hinge pins 19b, 20b form the pivots for the tray.

In the illustrated form of the invention the slots 17, 18 are disposed in spaced relation with the center of the tray as shown in Fig. 2 and as the tray is rocked about each hinge it will move about fixed axes disposed at substantially 90° with respect to one another and will cause the liquid in the tray to move back and forth with a swirling action.

While various means may be provided for rocking the tank plate about the axes, in the preferred form of the invention, the top 13 of the base is provided with a pair of apertures 21, 22 disposed oppositely from the slots 17 and 18 and carry driving members 23, 24 which are located on the other side of the center of the plate as shown in Fig. 2. These driving members 23, 24 are operated alternately by cams 25, 26 fixed to stub shafts 27, 28 carried in bearing posts 29, 30 on the base 15. The shafts are connected by bevelled gears 31, 32 and the stub shaft 28 is connected through a reducing gear 33 to an electric driving motor 34 to be operated at a relatively slow speed. The present preferred shaft speed is 40 R. P. M. but this speed can be varied as required by altering the reduction gear drive.

As the shafts rotate, the cams 25, 26 carried thereby lift the driving members 23, 24 alternately into engagement with the undersurface of the plate and cause the plate to rock about the opposing pivots 19b, 20b. This causes alternate tipping of the tray sideways and to the front and back and produces a back and forth swirling motion of the liquid therein.

The plate, since it merely rests on the housing and is connected thereto by the sliding connec-

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tion of the tongues, can be readily removed and replaced by other plates having similar tongues secured thereto if it is desired to use a larger tray.

If it is desired to keep the solution in the tray at a predetermined temperature, a plate 35 as shown in Fig. 3, may be substituted for plate 12. This plate has tank receiving fingers 35a and a heating unit 36 disposed within the plate. It is preferably an electrical heater unit and a thermostatic control switch 37 maintains the unit at a predetermined temperature required to keep the solution in the tray at the desired temperature.

If the top of the housing is relatively thin so that the slots and apertures do not produce sufficient grinding surfaces for the tongues and driving elements, the top may be provided with extended guide portions 15a surrounding each of the slots 17, 18 and guide portions 15b surrounding the apertures 21, 22. These extended guide surfaces insure that the tongues and driving members move in vertical planes in operation. Preferably, as shown in Fig. 1 the portions 15a, 15b extend into the interior of the housing thus leaving a flat exterior surface on the housing. If necessary one edge of each tongue can be curved as shown at 20d to enable the tongue to tilt laterally without interference with the guide 15a as the plate rocks about the opposite pivot.

When the agitator of the present invention is to be employed in the photographic art wherein acids are used, it is preferred that the exposed parts of the device be made of acid-resistant material.

One inexpensive manner of forming the device is to mold the housing, including the top and sides, as one piece and the bottom member as a separate piece to be secured in place to close the housing after the driving motor, gearing, shafts and cams have been assembled thereon. The projecting guide members 15a and 15b for the tongues and driving members may be molded integrally with the undersurface of the top. The plate 12 may be molded and have the pivots for the tongues molded therein. The driving members 23, 24 may be made of rod stock cut to the required size. The housing and plate can be molded of acid-resistant plastic and the tongues, pivots therefor and drive members made of acid-resistant metal or plastic. From this it will be seen that the device can be readily and cheaply manufactured and assembled.

Variations and modification may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. An agitating device comprising a base; a supporting plate; means mounting the supporting plate on the base for movement about a first axis spaced to one side of the center of the plate; means mounting the plate on the base for movement about a second axis located to one side of the plate and intersecting the first axis at a substantial angle at a point spaced from the center of the plate; and continuously operated means including gearing and drive elements actuated thereby to alternately apply a driving force to the plate to oscillate said plate alternately about said axes in predetermined timed relation.

2. An agitating device comprising a base; a supporting plate; means slidably carried by the base for detachably mounting the supporting plate on the base, said means including means mounting the plate on the base for movement about a first axis spaced to one side of the center

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of the plate and means mounting the plate on the base for movement about a second axis located to one side of the plate and intersecting the first axis with a substantial angle at a point spaced from the center of the plate; and continuously operated means for sequentially oscillating said supporting plate about said axes.

3. An agitating device comprising a base; a supporting plate; means pivotally mounting the supporting plate on the base including means spaced to one side of the center of the plate and forming one axis of movement for the plate and means spaced to a second side of the plate and providing a second axis for the plate intersecting the first axis at substantially a 90° angle at a point spaced from the center of the plate; and continuously driven means acting on said plate and alternately oscillating said supporting plate about said axes.

4. An agitating device comprising a base; a supporting plate; means spaced from the center of the plate for pivotally mounting the supporting plate on the base for movement about fixed axes intersecting at a large angle; and means for oscillating said supporting plate about said axes, including reciprocating means engaging the plate in spaced relation to the center of the plate and opposite the mounting means; means interconnecting the reciprocating means for movement in opposite directions; and means to drive the reciprocating means.

5. A device for agitating photographic developing and printing trays comprising a base; a plate adapted to receive a liquid-receiving tray thereon; means mounting said plate on said base for movement about an axis spaced to one side of the plate; means mounting said plate on the base for movement about a second axis disposed substantially at right angles with respect to the first axis and intersecting at a point to one side of the center of the plate; and continuously operated drive means for alternately rocking said plate about the two axes.

6. A device for agitating photographic developing and printing trays comprising a base; means for mounting a liquid-receiving tray on the base for rocking movement about a pair of intersecting axes including a pivotal mounting at one side of the base providing one axis and a pivotal mounting at another side of the tray providing a second axis intersecting with said first axis at a point to the side of the center of the tray; and continuously operated means alternately rocking said mounting means about said axes to cause the liquid and the tray to flow back and forth.

7. A device for agitating photographic developing and printing trays comprising a base; a plate adapted to receive a liquid-receiving tray thereon; means slidably carried by the base for detachably mounting the supporting plate on the base, said means including means mounting the plate on the base for movement about a first axis spaced to one side of the center of the plate and means mounting the plate on the base for movement about a second axis located on another side of the plate and intersecting the first axis with a substantial angle at a point spaced from the center of the plate; and means acting on said plate and oscillating said plate in predetermined timed relation about said axes to cause the liquid in said trays to flow back and forth.

8. A device for agitating photographic developing and printing trays comprising a base; a plate having means for securing a liquid-receiving tray thereto and heating means thereon for heating

the liquid in the tray; means mounting the supporting plate on the base for movement about a first axis extending along one side of the plate; means mounting the plate on the base for movement about a second axis located along another side of the plate and intersecting the first axis at a substantial angle at a point spaced from the center of the plate; and continuously operated drive means acting upon said plate and oscillating said plate about said axes to cause the liquid in the tray to flow back and forth.

9. A device for agitating photographic developing and printing trays comprising a base having substantially right angularly disposed slots therein; a plate having a liquid-receiving tray thereon; means for mounting the plate on the base for movement about fixed intersecting axes comprising tongues pivotally connected to the plate and slidable in the slot; and means for sequentially rocking said plate on said pivotal connection to cause the liquid in the tray to flow back and forth.

10. A device for agitating photographic developing and printing trays comprising a base having substantially right angularly disposed slots therein; a plate having a liquid-receiving tray thereon; means for mounting the plate on the base for movement about fixed intersecting axes comprising hinge members, each having one leaf secured to the plate and the other leaf sliding in the slot; and means for rocking said plate on the hinges in predetermined timed relation to cause the liquid in the tray to flow back and forth.

11. A device for agitating photographic developing and printing trays comprising a base having a pair of right angularly related slots and a pair of apertures disposed in opposed spaced relation thereto; a plate having a liquid-receiving tray thereon; means for mounting the plate on the base with the center thereof located between the slots and apertures, including tongues pivotally connected to the plate and slidable in the slots; and means for rocking the plate about said pivotal connections to cause the liquid in the tray to flow back and forth, including reciprocating members engaging the plate and slidably mounted in the apertures and drive means for reciprocating the members.

12. A device for agitating photographic developing and printing trays comprising a base having a bottom plate, sides and a top provided with a pair of right angularly related slots and a pair of apertures disposed in opposed spaced relation thereto; a plate having a liquid-receiving tray thereon; means for mounting the plate on the top of the base with the center thereof located between the slots and apertures, including tongues pivoted to the plate and slidable in the slots; means for rocking the plate about the pivotal connections to cause the liquid in the tray to flow back and forth, including reciprocating driving members engaging the plate and slid-

ably mounted in the apertures; and drive means mounted on the bottom plate and disposed within the sides for reciprocating the driving members.

13. A device for agitating photographic developing and printing trays comprising a molded base of acid-resisting plastic material having a bottom plate, sides and a top provided with a pair of right angularly related slots and a pair of apertures disposed in opposed spaced relation thereto; a plate of acid-resistant material having a liquid-receiving tray thereon, means for mounting the plate on the top of the base with the center thereof located between the slots and apertures, including acid-resistant tongues pivoted to the plate and slidable in the slots; means for rocking the plate about the pivotal connections to cause the liquid in the tray to flow back and forth, including reciprocating acid-resistant driving members engaging the plate and slidably mounted in the apertures; and drive means mounted on the bottom plate and disposed within the sides for reciprocating the driving members.

14. A device for agitating photographic developing and printing trays comprising a base having a bottom plate, sides and a top provided with a pair of right angularly related slots and a pair of apertures disposed in opposed spaced relation thereto; a plate having a liquid-receiving tray thereon, means for mounting the plate on the top of the base with the center thereof located between the slots and apertures, including tongues pivoted to the plate and slidable in the slots; means for rocking the plate about the pivotal connections to cause the liquid in the tray to flow back and forth, including a pair of reciprocating driving members engaging the plate and slidably mounted in the apertures; and drive means mounted on the bottom plate and disposed within the sides for reciprocating the driving members, said drive means including a cam for moving each of the driving members, an electrically operated drive device and gearing for actuating the cams in predetermined timed relation.

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