

Sept. 8, 1959

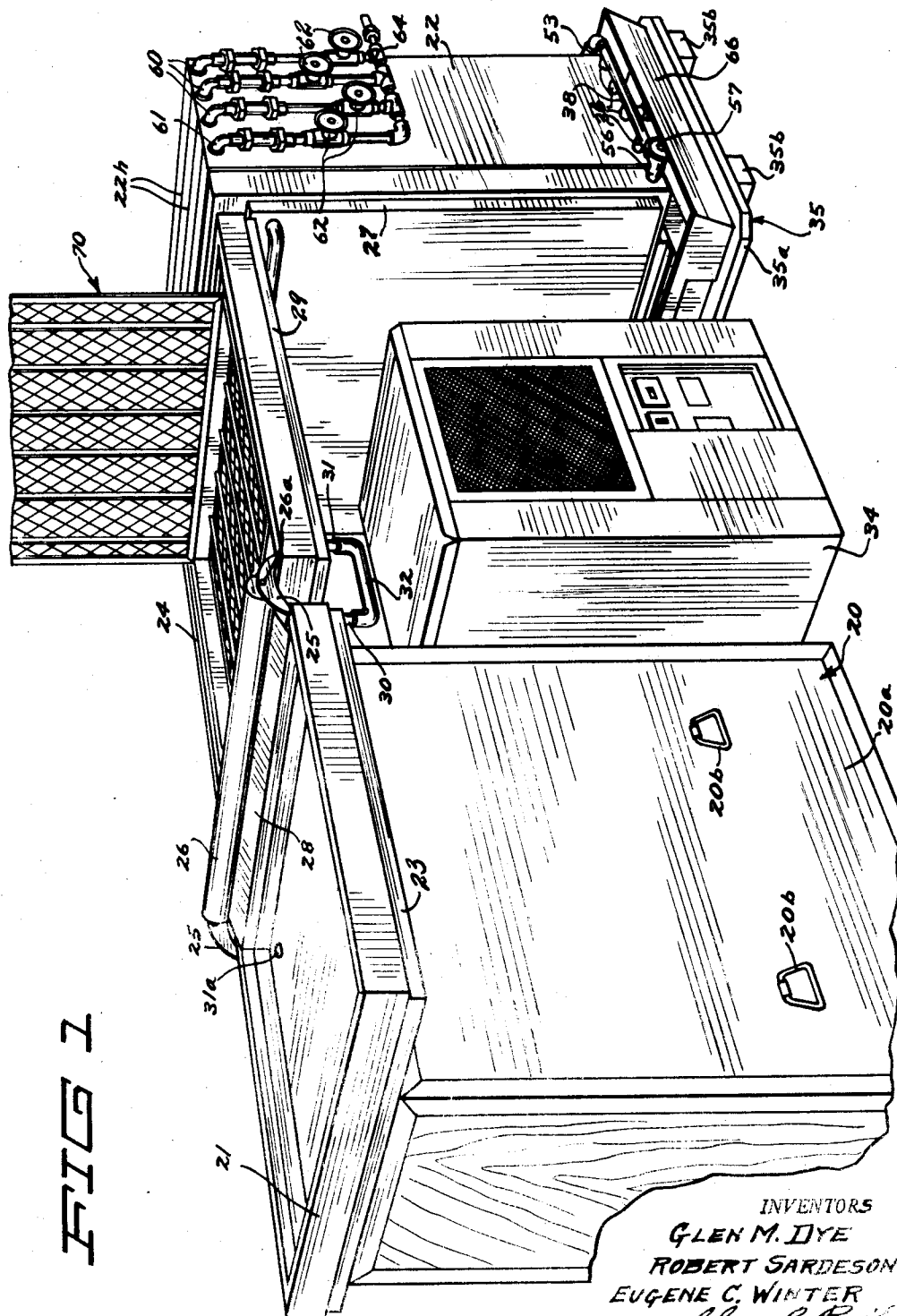
G. M. DYE ET AL

2,902,914

APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

Filed Sept. 12, 1952

7 Sheets-Sheet 1



INVENTORS

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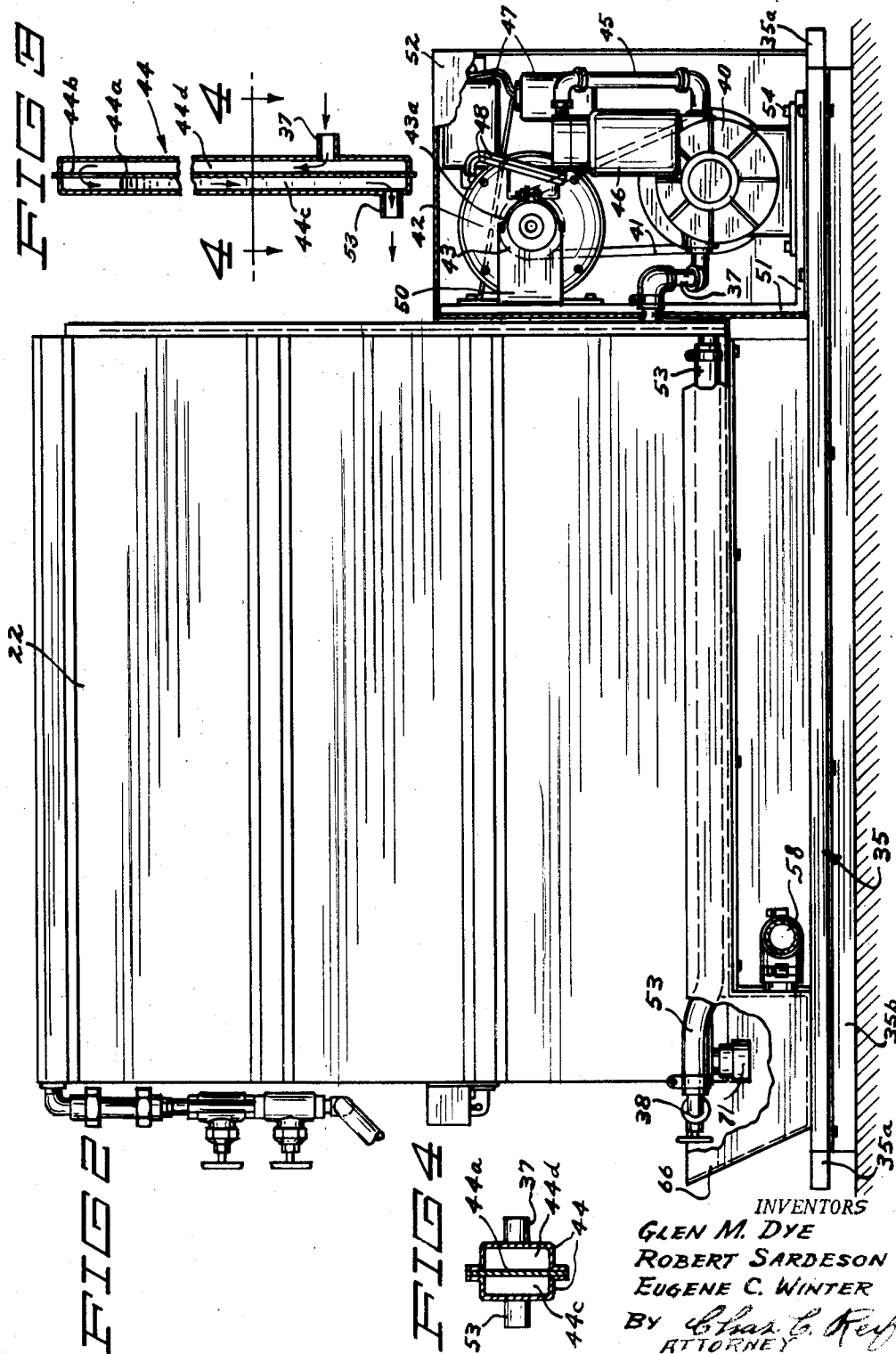
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2,902,914

7 Sheets-Sheet 2



Sept. 8, 1959

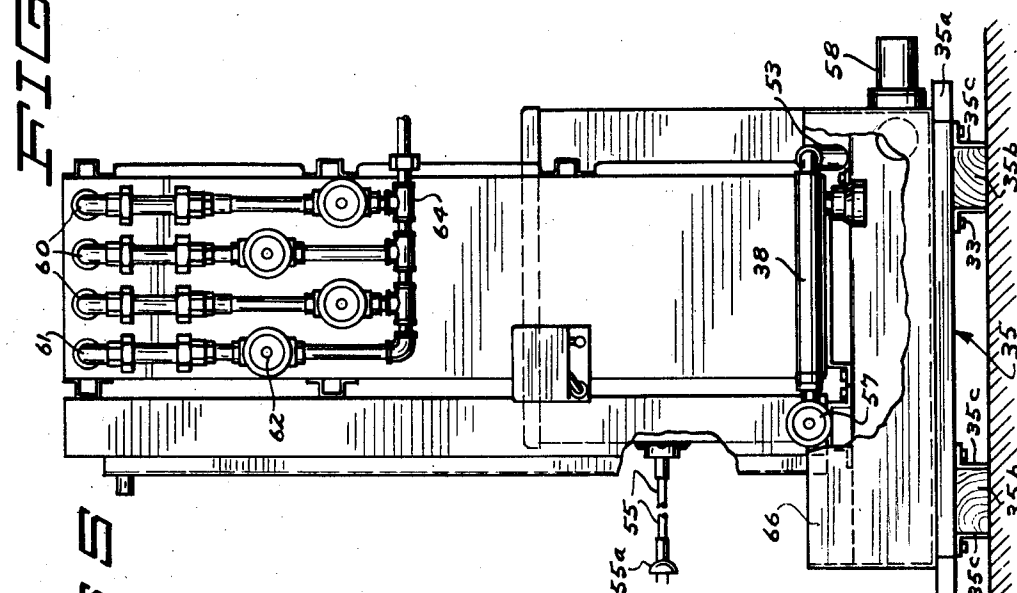
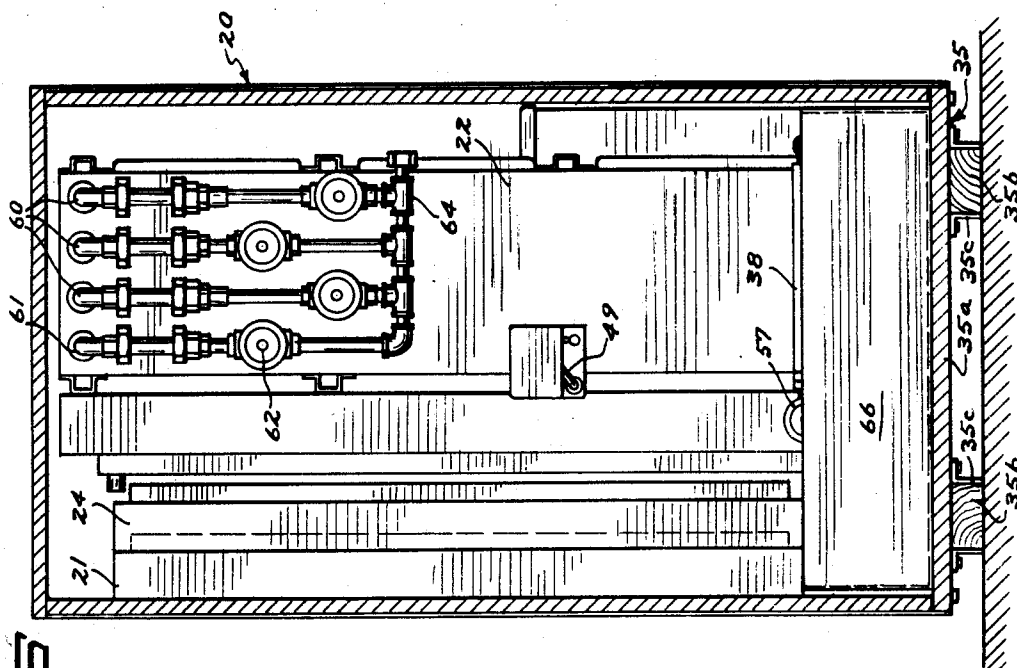
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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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7 Sheets-Sheet 3



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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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7 Sheets-Sheet 4

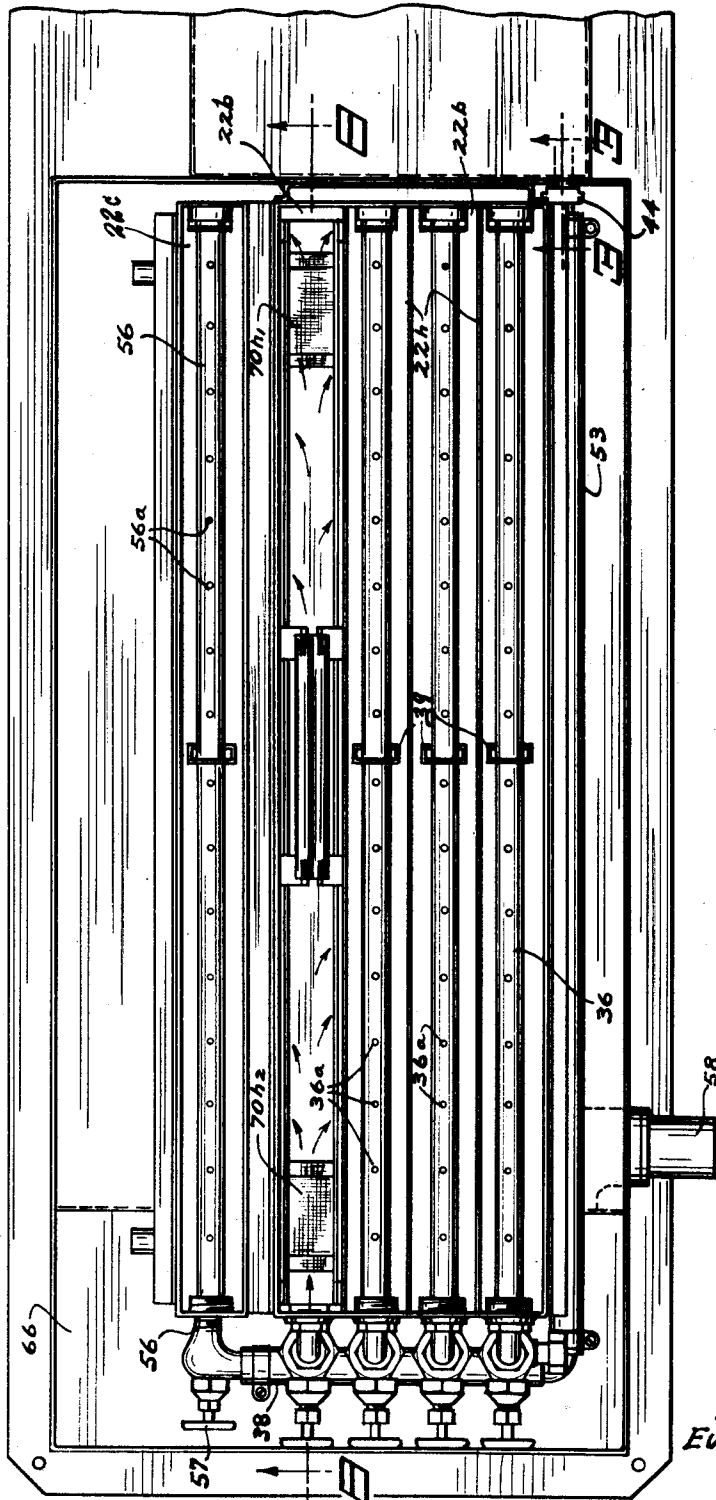


FIG. 7

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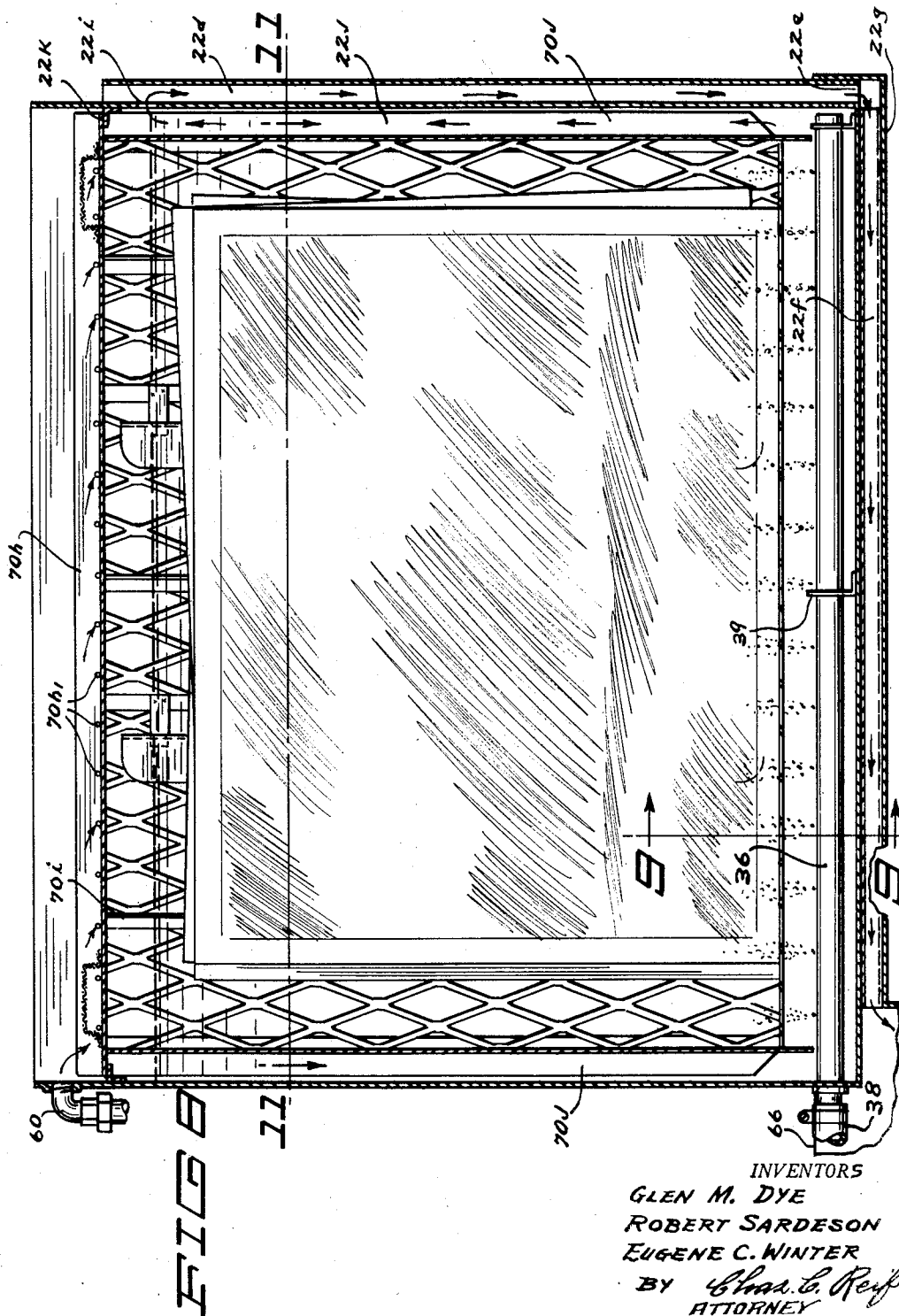
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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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7 Sheets-Sheet 6

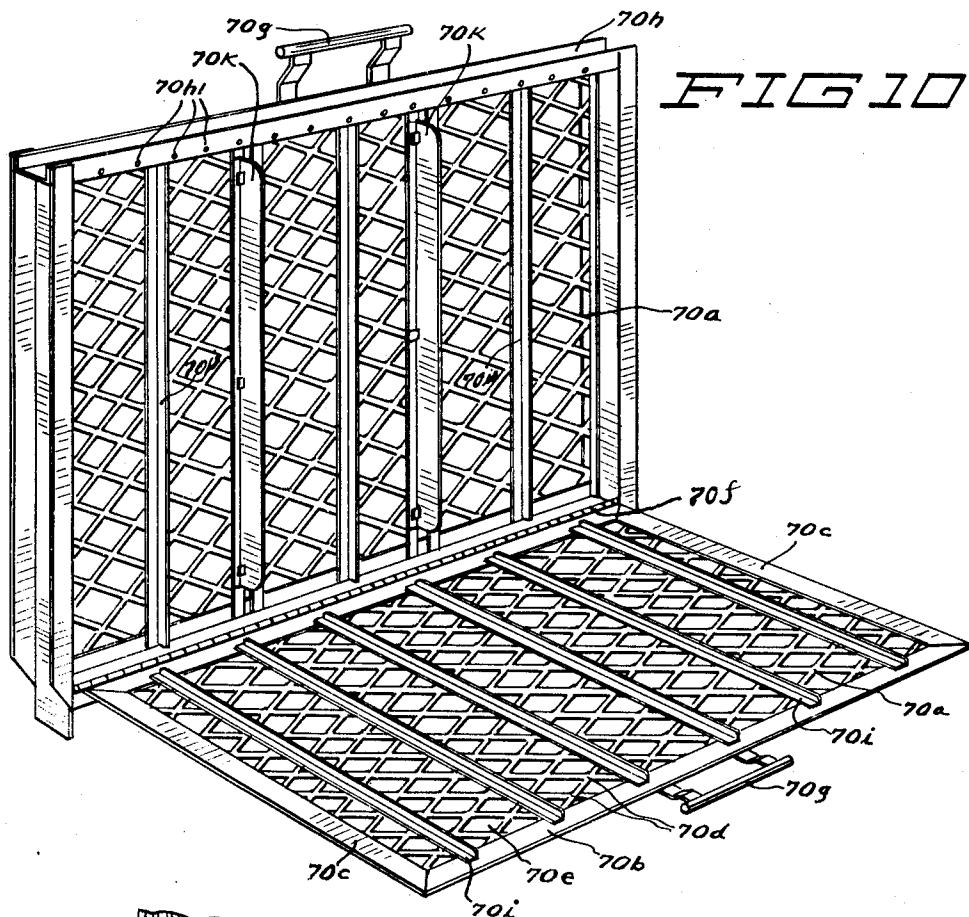


FIG 10

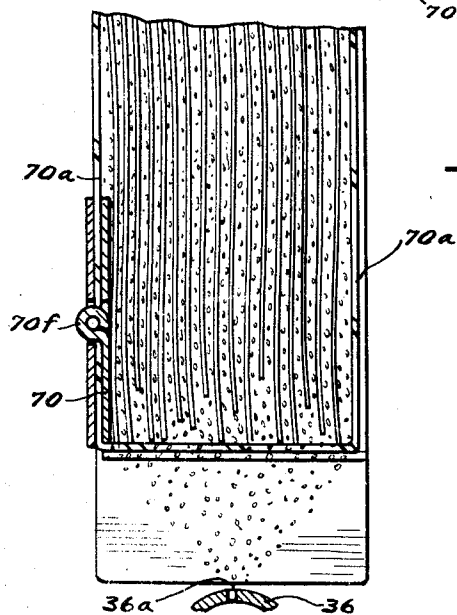


FIG 9

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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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FIG 11

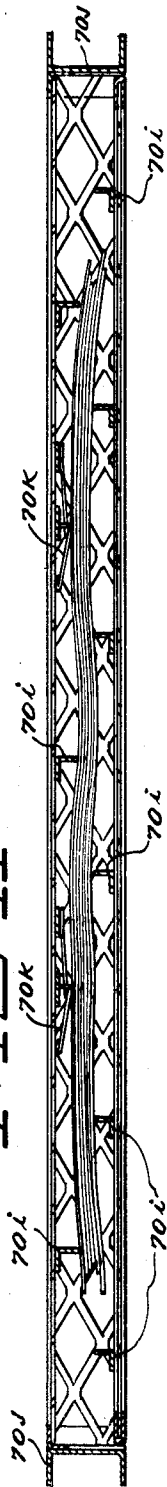


FIG 12

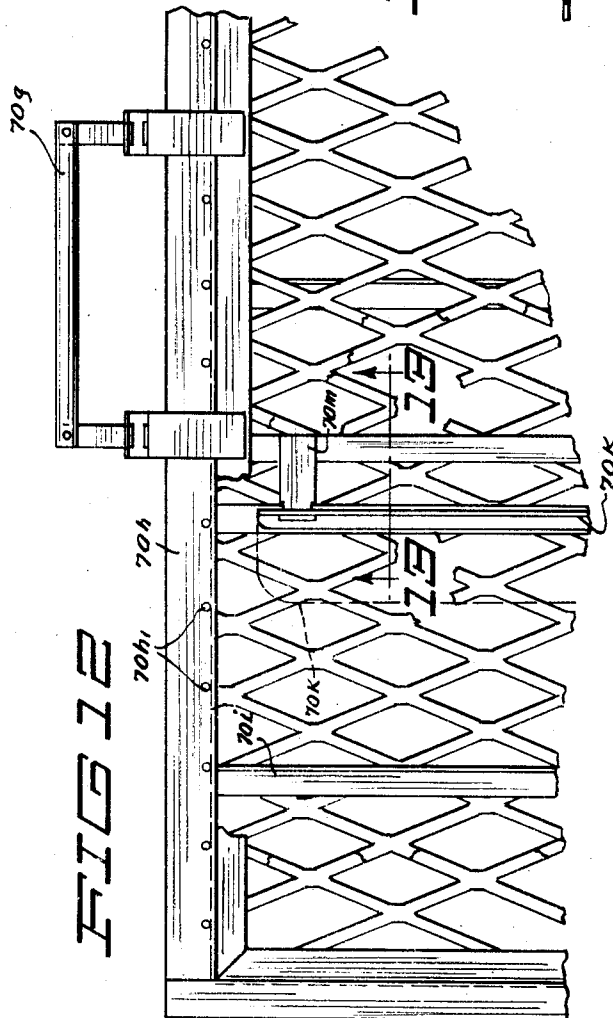
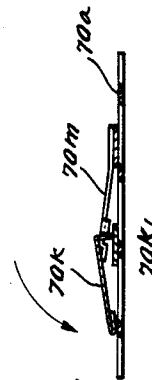


FIG 13



FIG 14



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APPARATUS FOR TREATING PHOTOGRAPHIC SHEETS

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Application September 12, 1952, Serial No. 309,290

6 Claims. (Cl. 95—97)

This invention relates to an apparatus for treating photographic sheets. As is well known, photographic films or plates after being exposed are placed in a developing liquid, then transferred to a shortstop solution, then placed in a fixing solution and then placed in a washing liquid.

It is an object of this invention to provide a device comprising a cabinet, a washing device including a container, a pair of trays adapted to receive respectively a developing liquid and a shortstop solution, said trays being capable of being placed in substantially horizontal operating position supported on said cabinet and container, a temperature regulating means for one or more of said solutions constructed to be disposed between said cabinet and container and beneath said trays, said container temperature controlling means and trays being disposable in said cabinet for transportation and shipping.

It is another object of the invention to provide such an apparatus as set forth in the preceding paragraph, said trays being separate so as to be placed one in the other and disposable in nested and parallel relation when placed in said cabinet.

It is also an object of the invention to provide such an apparatus as set forth in the preceding paragraph save one, together with a holder for photographic sheets having adjacent substantially parallel sides of openwork formation arranged to be disposed in either of said trays and in said container so that it will also be contained in said cabinet.

It is another object of the invention to provide a washing device for photographic prints comprising a container for washing liquid, one or more conduits adjacent the bottom of said container and extending substantially throughout the length thereof, the same having openings spaced longitudinally thereof, means for forcing air through said conduit or conduits and through said openings into said liquid, means for supplying liquid to said container in a second conduit or conduits extending substantially throughout the length of said container adjacent the top thereof and having spaced openings longitudinally thereof, and means for holding said sheets in said liquid exposed to said liquid between the conduit or conduits at the top and bottom of said container respectively and a discharge passage extending from adjacent the bottom of said container to adjacent the top thereof whereby said liquid moves downwardly in said container and said air moves upwardly in said liquid.

It is still another object of the invention to provide such an apparatus as set forth in the preceding paragraph, said container having a second chamber therein adapted to contain a fixing solution, one or more conduits extending throughout the length of said chamber adjacent the bottom thereof having openings therein spaced longitudinally thereof, and a discharge passage for said second chamber.

It is further an object of this invention to provide a novel and highly efficient print washing device.

It is also an object of this invention to provide a holder

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for photographic sheets having substantially parallel sides of openwork formation and spaced a short distance apart, one of said sides being swingably connected so that it can swing toward and away from the other side so that films, plates or prints can be disposed in said holder.

Another object of the invention is to provide such a holder as is set forth in the preceding paragraph, said sides each having a handle at their top portions, said handles being disposed in close relation when said holder is closed so that said holder can be held by said handles and placed in or removed from a container.

It is another object of the invention to provide such a holder as set forth in the preceding paragraph save one, said sides having plate-like members secured thereto in spaced relation throughout the length thereof and extending inwardly, said members on said respective sides being arranged in staggered relation.

It is also an object of this invention to provide such a holder as set forth in the preceding paragraph save two, one of said sides having one or more partitions secured thereto adapted to extend across said holder to divide the same into two or more chambers, said partitions being respectively constructed with means for holding them in either a position parallel to said side or substantially perpendicular to said side.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a perspective view of the apparatus of this invention;

Fig. 2 is a view in side elevation of a portion of the apparatus;

Fig. 3 is a vertical section taken substantially on line 3—3 of Fig. 7;

Fig. 4 is a horizontal section taken substantially on line 4—4 of Fig. 3;

Fig. 5 is a view in front elevation of a portion of the apparatus, some parts being broken away;

Fig. 6 is a view in end elevation with the container shown in vertical section;

Fig. 7 is a top plan view of a portion of the apparatus;

Fig. 8 is a vertical section taken on line 8—8 of Fig. 7;

Fig. 9 is a partial vertical section taken on line 9—9 of Fig. 8;

Fig. 10 is a perspective view of a holder for photographic sheets shown in open position;

Fig. 11 is a horizontal section taken substantially on line 11—11 of Fig. 8;

Fig. 12 is a partial view in side elevation of said holder for photographic sheets;

Fig. 13 is a horizontal section taken on line 13—13 of Fig. 12; and

Fig. 14 is a view similar to Fig. 13 showing the parts in different positions, said sections being taken as indicated by the arrows.

Referring to the drawings, particularly Fig. 1, an apparatus for treating photographic prints is shown, the same comprising a cabinet 20. While said cabinet might be made in various forms, in the embodiment of the invention illustrated it is shown of box-like or parallelo-piped form substantially rectangular in vertical and horizontal cross section. Said cabinet 20 has a door 20a which may be swung open, the same being provided with swinging handles 20b. Said cabinet 20 has a flat top and a tempering panel or casing 23 supported on cabinet 20 and a tray 21 is shown resting on said casing 23. The apparatus also includes a washing and fixing device for said sheets including a casing 22 comprising a container having chambers 22b and 22c for receiving respectively a washing liquid and fixing solution. Casing 22 has a

tempering panel or casing 27 disposed at and engaging one side thereof and a second tray 24 has an end portion resting on and supported on casing 27, the other end of tray 24 being supported from tray 21 through brackets 25 secured to tray 21. Said brackets 25 carry a roller or cylindrical member 26 having trunnions 26a carried in brackets 25. A third tempering panel or casing 29 underlies and is connected to tray 24. A drain plate 28 is provided, the same being disposed over one end of tray 21 and extending under roller 26. The trays 24 and 21 are separable and tray 21 is of such size that it is receivable in tray 24, or in other words, it nests therein. Said casings 23 and 24 have short conduits 30 and 31 extending downwardly from corners thereof which are adjacent when the trays are in the relation shown in Fig. 1, and said conduits are then connected by the conduit 32 for conveying the tempering fluid. There is a drain opening 31a shown for tray 21 in Fig. 1. When the apparatus is in the position shown in Fig. 1, a temperature regulating device 34 for the liquid used is conveniently disposed between cabinet 20 and the device 22, the same extending under the trays 21 and 24. Device 34 circulates tempering fluid through panels or casings 23, 27 and 29, which panels are connected in series. While various temperature regulating devices might be used for member 34, the one illustrated is of the type disclosed and claimed in U.S. Letters Patent No. 2,690,327, dated September 28, 1954, which is assigned to the assignee of the present application. The device 22 is preferably supported upon a support or platform 35, which together with cabinet 20 and member 34, rest upon the floor or other support. As shown in Fig. 5, platform 35 comprises a top plate 35a and supporting members or timbers 35b extending longitudinally thereof and connected thereto by the angle brackets 35c and the bolts 33.

When the apparatus is to be transported or shipped, the tray 21 is separated from tray 24 and disposed therein. The device 22 with panel 29 will be then placed in one end of cabinet 20. Member 34 will then be placed in cabinet 20 alongside member 22 and the nested trays 21 and 24 with panels 23 and 27 will then be placed in cabinet 20 alongside member 34. The apparatus can thus be arranged in a very compact condition in cabinet 20 for transportation or shipping.

The washing chamber 22b in casing or container 22 has therein adjacent the bottom thereof and extending substantially throughout the length thereof, one or more conduits 36 which in the embodiment of the invention illustrated are shown as three in number. Conduits 36 have holes or openings 36a spaced longitudinally thereof. Conduits 36 extend through small angles 39 secured to the bottom of casing 22 which form supports for said conduits. Conduits 36 extend to a common conduit or manifold 38 which extends to and is connected to a conduit 53. Conduit 53 extends to adjacent the bottom of and communicates with a chamber 44c formed in a narrow casing 44 secured to one end of casing 22. Chamber 44c is formed at one side of a partition plate 44a in member 44 and communicates with a chamber 44d at the other side of partition 44a. Partition 44a has an opening 44b therein below the top of casing 44 and chambers 44c and 44d communicate through said opening. A conduit 37 extends from adjacent the bottom of chamber 44d to the discharge side of a fan or air compressor 40. Chamber 44c fills with water to the level in washing chamber 22b, when the air compressor 40 is not in operation. When said compressor is operating, all water in chamber 44c and conduits 36 is blown out through openings 36a. Member 40 has a rotating element driven by a belt 41 extending over a driving pulley thereon and also running over a pulley 42 secured to the driving shaft 43a of an electric motor 43. Member 40 has an air supply and air intake conduit 45 which is connected to an air filter 46. Control members 47 are

shown for motor 43 as are also some of the electrical conductors or cables 48. In Figs. 5 and 6 a switch 49 is shown for motor 43. Motor 43 is supported on a U-shaped bracket 50 secured to an angle-shaped bracket 51 having a vertical side extending along one vertical wall of a casing 52 disposed at one end of casing 22 and resting on supporting plate 35a upon which casing 22 rests and to which casings 22 and 52 are secured. Member 40 has a base flange secured to the horizontal portion of bracket 51 by the bolts 54. A conduit 55 is shown in Fig. 5 which extends from motor 43 and carries a connecting plug 55a adapted to be placed in an electrical socket connected to a source of electric current. The washing chamber 22b has partitions 22h extending longitudinally thereof between the conduits 36, as shown in Figs. 1 and 7. These partitions as shown divide chamber 22b into four compartments.

The fixing chamber 22c in casing 22 has a conduit 56 extending substantially throughout the length thereof adjacent the bottom thereof and having holes or openings 56a spaced longitudinally thereof. Conduit 56 communicates with manifold 38 and is controlled by a hand-operated valve 57. A conduit 58 is shown in Figs. 5 and 7 extending into container 22, and the same forms a drain connection for drain tank 66. Said connection 58 will normally be connected to a sewer.

The casing 22 has extending thereinto adjacent the top thereof, conduits 60 which extend into chamber 22b and a conduit 61 which extends into chamber 22c, said conduits being disposed adjacent the tops of said chambers. Conduits 60 and 61 are provided with valves 62 respectively for controlling the flow of liquid there-through. Conduits 60 and 61 are connected to a common conduit or manifold 64 which will be connected to a source of water supply. Casing 22 has an extension portion 22d which has an outer wall extending parallel to the end wall of said casing and has side walls also extending to and secured to the end wall of said casing. Portion 22d has an opening 22e in its bottom. Said opening communicates with a passage 22f formed by a member or portion 22g secured to the bottom of casing 22 and extending to a drain tank 66 supported upon plate 35a. One end wall of casing 22 has a discharge opening 22i which communicates with passage 22d and also with a discharge passage 22j which is formed by the bottom of a channel 70j. This passage 22j is formed by said end wall of casing 22 and one channel 70j.

A holder 70 for the photographic sheets is shown in Figs. 1, 8 and 10 to 14. This holder comprises a pair of side members 70a of foraminous or openwork formation, the same comprising side bars 70b and end bars 70c at right angles thereto. The said sides also comprise the narrow strips 70d crossing each other at angles to form the openings 70e. One side 70a is divided adjacent its lower end and provided with the hinge 70f so that said side 70a is swingable about the axis of hinge 70f toward and from the other side 70a, as seen in Fig. 1. The sides 70a are provided at their tops and central portions with the handles 70g which when the holder is in closed position are adjacent each other so as to be grasped by the hand of the operator. The bottom of the holder 70 is also of openwork formation similar to the sides, as shown in Fig. 11. A channel member 70h is secured to the top of the side members 70a, as shown in Fig. 10, said channel having its open side facing upwardly and having a plurality of holes 70h1 extending through one or both sides thereof and spaced longitudinally thereof, as shown in Fig. 10. The channel 70h has adjacent each end thereof another short channel made of screen material with flanges secured to the bottom of channel 70h. This forms a sort of dam or stop at the end of channel 70h and functions to prevent too much of a rush of water in said channel and to secure efficient distribution. Said sides 70a have been secured thereto and extending between the bars 70b the members 70i shown as in the form of angle bars and

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having one of their sides extending inwardly, as clearly shown in Figs. 10 and 11. The members 70i on the respective sides 70a are arranged in staggered relation, as shown in Fig. 11. A channel member 70j is secured to each end of the holder 70 and extends substantially from the top to the bottom thereof, the bottom of said channel, as shown in Fig. 10, extending some distance below the flanges of said channel. One of the sides 70a is also provided with one or more partition members 70k, shown in Figs. 11 to 14. The members 70k are shown as having an end 70kl at right angles thereto. Member 70k extends through a resilient member 70m secured at one end to a plate secured to the side 70a. One end of member 70m is offset and engages the inner side of the portion 70kl. Member 70k can thus be swung to the position shown in Fig. 13 when it will extend at right angles to the sides 70a and between the same or in the position shown in Fig. 14 when it will be disposed at a small angle to and adjacent the side 70a to which it is secured. The casing 22 has secured to the inner side of its end walls adjacent the top thereof small angles 22k which extend inwardly and form supports for the holder 70, as shown in Fig. 8. A drain spout 71 is shown at the bottom of one corner of casing 22.

When the device is set up for use it occupies the position shown in Fig. 1. The developing solution is placed in tray 21 and the holder 70 may be placed in said tray as it is shown in tray 24. The prints can be placed in the tray and it can be in closed or open position. When the films, plates or prints are sufficiently developed, the holder can be readily transferred to tray 24 which will contain the stop bath or shortstop solution. Alternatively the plates, films or prints could be placed in tray 21 without the holder. If this is done, the prints can be transferred to tray 24 by sliding them over the roller 26. As they move over the roller the developing solution thereon will be largely removed by roller 26 and will drain back on the drain plate 28 into tray 21. The holder 70 will be in the position shown in Fig. 1 and the films, plates or prints will be disposed in the same when they are transferred to tray 24. When the films, plates or prints are ready to be fixed, holder 70, which is then closed, will be transferred by the operator holding the handles 70g to the fixing chamber 22c. This chamber will contain a fixing solution, such as hypo. Air will be supplied at the bottom of said chamber by conduit 56 for a short period. During most of the fixing period conduit 56 is closed by valve 57. When the sheets are properly fixed, the holder will be lifted from chamber 22c and will be placed in one of the compartments of chamber 22b. During washing, the air from conduit 38 is continuously supplied through the conduits 36 and the openings 36a. This air passes upwardly and tends to keep the prints separated and from being matted together which is a tendency of wet prints. The air passing upwardly through the descending water also causes very efficient and uniform movement and circulation and gives a much improved washing effect. Coloring matter has been placed in the water supplied by conduit 60 and in a few seconds this is uniformly distributed throughout the compartments in washing chamber 22b. The washing done by the apparatus is done in a shorter time than previously and in a superior manner. When short or small films or prints are used in the holder, the partition members 70k are put in the position shown in Fig. 13 and form smaller compartments in the holder. The members 70i are provided so that when long films or prints such as shown in Fig. 11 are in the holder, they will be held in substantially vertical position and will not fold downwardly. The prints, films or plates are thus very easily and conveniently handled and the holder 70 can be quickly transferred from tray 24 and placed in either of the compartments of chamber 22b. It will be obvious that when the device is to be put into use that motor 43 and the air supplying member 40 will be put into operation by throwing switch 49.

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As previously stated, when the device is to be transported or shipped, the casing 22 and its platform 35 will be placed in one end of cabinet 20. Member 34 will be placed in cabinet 20 and the trays 21 and 24 placed in nested position and also placed in one end of cabinet 20. One or more holders can be disposed in casing 22 when it is placed in cabinet 20. The apparatus is thus compactly received in cabinet 20 and can be readily handled and transported. Casing 44 and contained structure is provided to keep water from flowing into compressor 40 when the latter is inoperative.

From the above description it will be seen that we have provided a novel and highly efficient apparatus for handling photographic sheets. The sheets can be very conveniently handled and the washing thereof is done quickly and in an excellent manner. The device has been actually demonstrated in actual practice and is being commercially made.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicants' invention, which generally stated, consists in an apparatus capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. An apparatus for treating photographic sheets having in combination, a container adapted to hold liquid, a plurality of spaced conduits adjacent the bottom of said casing extending substantially throughout the length thereof and having spaced openings therein, means for forcing air through said conduits and openings and into said liquid, means for delivering water to said container adjacent the top thereof, a holder for said sheets having openwork sides spaced a comparatively small distance apart disposable in said container, holding means in staggered opposed relation respectively on the facing sides of said holder for resiliently holding photographic sheets therebetween in suspended position, means on said container for positioning said holders in vertical alignment with said conduits, and a perforated channel formed in the top of said holder for having liquid pass therethrough into said container.

2. An apparatus for treating photographic sheets having in combination, a container adapted to hold liquid, a plurality of spaced conduits adjacent the bottom of said casing extending substantially throughout the length thereof and having spaced openings therein, means for forcing air through said conduits and openings and into said liquid, a holder for said sheets having openwork sides spaced a comparatively small distance apart disposable in said container, said holder having a trough at its upper side having spaced holes therein, means for supplying liquid to said trough and to said container through said holes, said holder having a channel at one side extending downwardly from adjacent the top of said container to adjacent the bottom thereof and forming with a portion of said container a discharge passage for said liquid, said portion having an outlet opening adjacent the top of said container whereby said liquid moves downwardly in said container from said trough and upwardly in said discharge passage and said air moves upwardly in said container.

3. The structure set forth in claim 2, said portion of said container and a wall of said container forming a discharge passage receiving said liquid through said outlet opening.

4. An apparatus for treating photographic sheets having in combination, a container adapted to hold liquid, a plurality of spaced conduits adjacent the bottom of said casing and having longitudinally spaced openings therein, means for forcing air through said conduits and openings and into said liquid so that said air moves upwardly through said liquid, a holder for said sheets having openwork sides spaced a comparatively small distance apart

disposable in said container, holding means on the facing sides of said holder for resiliently holding said photographic sheets in suspended position, said holder having a perforated channel extending along the top thereof and integral therewith for receiving liquid from a supply source and distributing the same throughout the length of said container, a discharge passage for liquid formed by one end of said holder extending upwardly and outwardly of said container from adjacent the bottom of said holder whereby said liquid moves downwardly through said holder in said container and said air moves upwardly through said holder in said container.

5. An apparatus for treating photographic sheets having in combination, a container adapted to hold liquid, means for supplying liquid adjacent the top of said container, means for supplying air under pressure extending substantially across the bottom of said container, a holder for photographic sheets extending substantially the full length of said container, said holder having foraminous hinged sides, opposed holding means in staggered relation respectively on the facing of said sides for resiliently holding said photographic sheets in suspension therebetween, means for suspending said holder in said container, a perforated channel along the top of said holder for first receiving said supply of liquid whereby said liquid passes through said perforations to wash said photographic sheets and fill said container, one end of said holder forming a rising discharge passage with one end of said container, and an outlet for said rising discharge passage adjacent the top of said container.

6. The structure set forth in claim 5, and means pivotally carried on one of the facing sides of said holder for forming compartments to contain photographic sheets of relatively small sizes.

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