Jan. 1, 1957 H. L. MALONE ET AL 2,775,933

PHOTOGRAPHIC COPYING APPARATUS

Filed July 1, 1955 2 Sheets-Sheet 1

Fig. 1

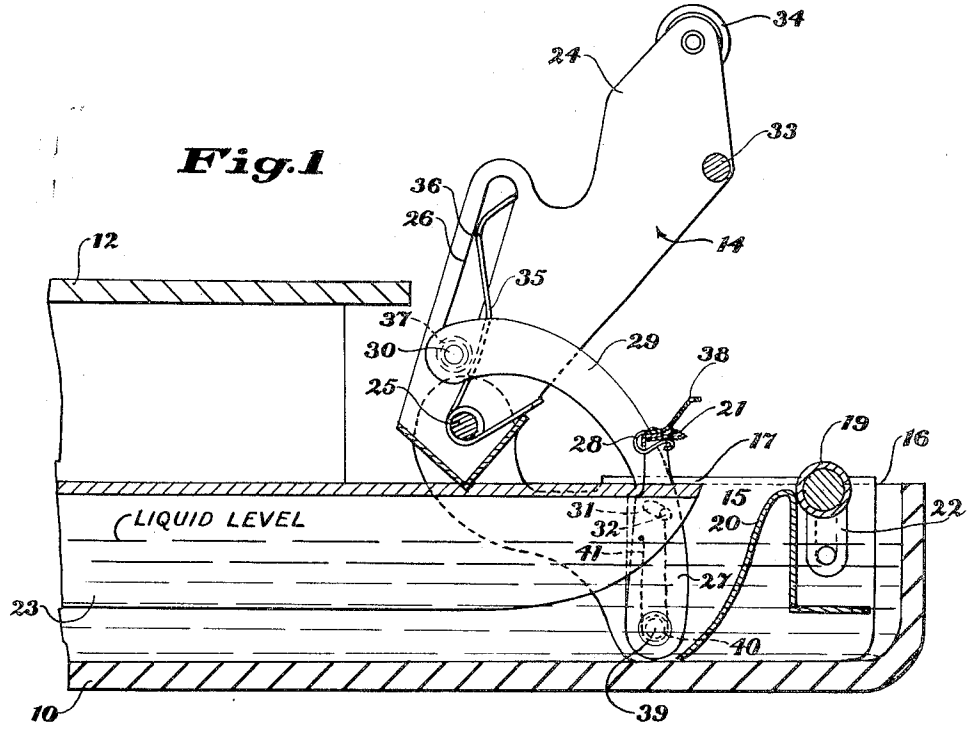
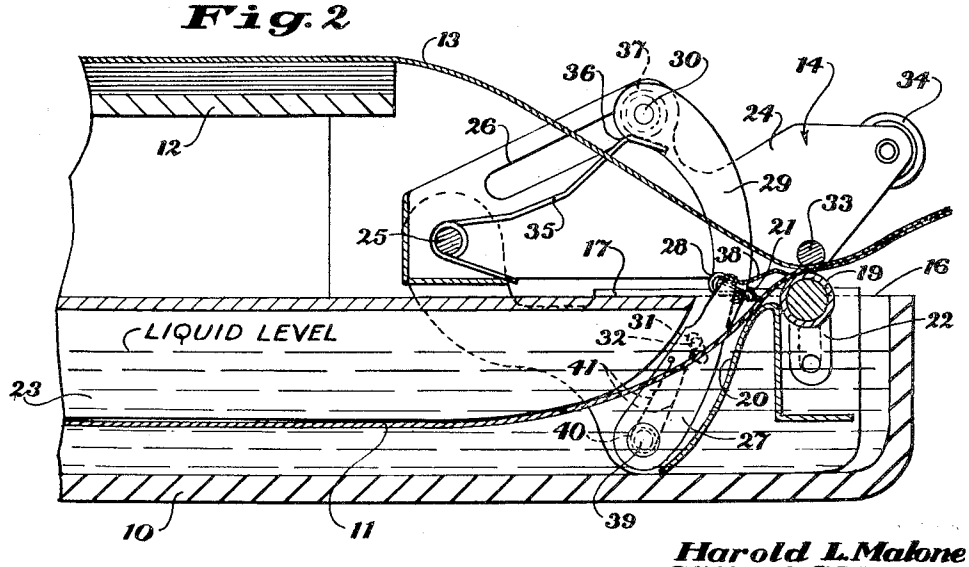


Fig. 2



Harold L. Malone
Clifford G. Vroom
INVENTORS

BY Daniel J. Mayne
Frank R. Gollon

ATTORNEYS

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PHOTOGRAPHIC COPYING APPARATUS

Filed July 1, 1955 2 Sheets-Sheet 2

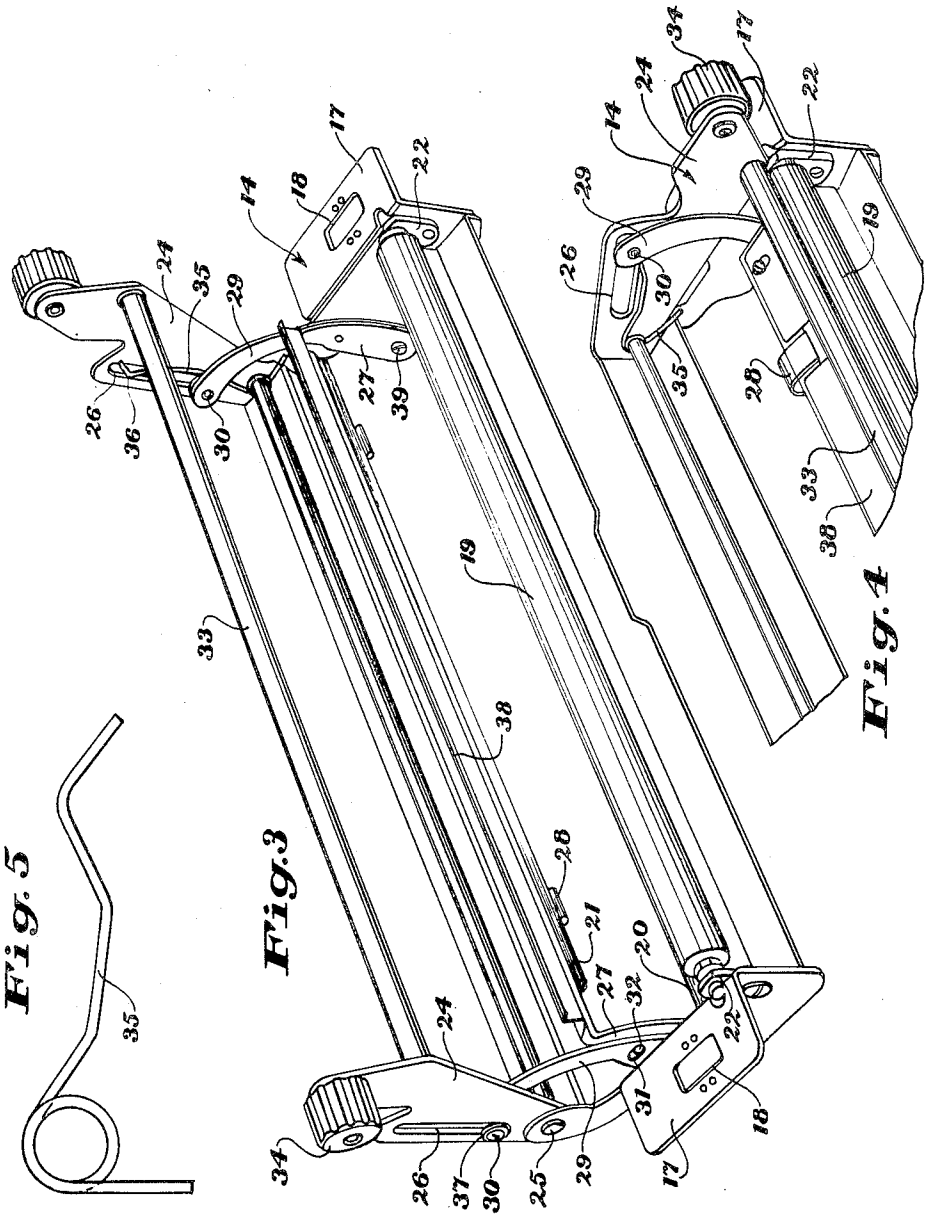


Fig. 4

Fig. 3

Fig. 5

Harold L. Malone
Clifford G. Vroom
INVENTORS
Daniel el. Mayne
BY Frank R. Gollon
ATTORNEYS

United States Patent Office

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PHOTOGRAPHIC COPYING APPARATUS

Harold L. Malone and Clifford G. Vroom, Rochester, N. Y., assignors to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey

Application July 1, 1955, Serial No. 519,546

10 Claims. (Cl. 101—131)

This invention relates to photographic reproduction and more particularly to a photographic copying apparatus. Specifically, it relates to a photographic processing and image-transfer device whereby an exposed sensitized photographic sheet may be processed in a suitable liquid and withdrawn in contact with a second sheet, which is non-sensitized, to cause transfer of an image from the first sheet to the second.

In United States Patent No. 2,596,756, granted May 13, 1952, Henry C. Yutzy and Edward C. Yackel describe a process wherein a film or paper support, coated with a substantially unhardened silver halide gelatin emulsion containing a pigment or dye and a tanning developing agent, is exposed to a suitable two-tone subject, such as a line or half-tone subject, after which the sensitized film or paper is processed by immersion in an alkaline solution. This processing results in the developing of the exposed image and the simultaneous hardening or tanning of the gelatin in the exposed and developed areas. Thereafter, the excess fluid is squeegeed from the processed sheet which is then pressed, while still moist, into contact with a non-sensitized sheet of paper having an absorbent surface. Upon separating the two sheets, it will be found that a stratum of the unexposed and, therefore, unhardened areas of emulsion layer has been transferred to the sheet of absorbent paper. This process thus produces a direct-positive image. Moreover, although the image is immediately discernible upon separation of the two sheets because of the pigment or dye in the transferred emulsion, this image will darken further upon exposure to light since the transferred emulsion also contains sensitized silver halide together with the developing agent and has carried over with it some of the alkaline solution of the processing bath.

This process is especially useful since it permits making several reproductions from the exposure of a single sensitized sheet. This is possible because in the transfer of unhardened gelatin to the absorbent sheet only a stratum thereof is carried over. The processed sheet may be again wetted in the alkaline solution, squeegeed and pressed against a second absorbent sheet whereby a second stratum of the unhardened gelatin will be transferred. It is possible to repeat this a number of times before the unhardened gelatin is exhausted to the extent that no longer are acceptable copies obtainable.

Since the specific composition of the emulsion, as well as a number of modifications thereof, and the chemistry of the process are fully disclosed in the above-identified patent and actually form no part of the present invention, we have omitted such data in this specification. We refer to this process, however, in that the apparatus disclosed below, which comprises the present invention, is particularly adapted for use in this process and in such variations thereof as may occur to those skilled in this art.

The apparatus described herein comprises an improvement over those disclosed in United States Patent No. 2,666,384, granted January 19, 1954, to Henry C. Yutzy and Guy D. Aydlett and in the pending application for

United States Patent, Serial No. 311,914, filed September 27, 1952, by David L. Babcock and Matthew N. Nowak. In the latter patent there is disclosed apparatus for carrying out in a simple and effective manner the several steps of the process described above. This apparatus includes a processing tank or tray and means for supporting the absorbent, non-sensitized paper or image-receiving sheet above the liquid level in said tank and in such position relative to the exposed sensitized sheet, which has been immersed in the solution in said tank, that, as both sheets are simultaneously withdrawn from the apparatus, a simple, manually-operable mechanism squeegees the excess solution from the processed sensitized sheet and immediately thereafter presses this processed sheet into intimate contact with the image-receiving sheet to effect the transfer of an image. A deficiency inherent in this apparatus, however, results from the fact that the spacing between the squeegee, which removes excess solution from the processed sheet, and the roller, which presses the two sheets into intimate contact, remains constant as these elements are moved from operative to inoperative position and the design of the apparatus is such that in the operative position these elements must be relatively close together. This makes difficult the threading of the end of the image-receiving sheet between the roller and the squeegee prior to the operation of the mechanism and makes it all but impossible to employ the sheet supporting means above the tank as a storage device for a stack of sheets which may be withdrawn, one by one, either manually or automatically with each operation of the roller and squeegee mechanism.

This difficulty is corrected by the apparatus described in the above-cited pending application of David L. Babcock and Matthew N. Nowak. In the apparatus of the latter application there is employed a novel linkage between the squeegee and pressure roller elements which permits these to become separated a relatively greater distance as these are simultaneously rotated into an inoperative position. Such not only facilitates the threading of the image-receiving sheets between the squeegee and pressure roller but also permits a quantity of image-receiving sheets to be stacked upon the supporting means above the processing tank from which single sheets may be withdrawn as they are required. The latter apparatus, however, still has inherent therein certain deficiencies which are effectively overcome by the apparatus of the present application.

The primary shortcoming of the apparatus of Babcock and Nowak is the fact that the degree of pressure which is exerted by the pressure elements upon the processed sensitized sheet and image-receiving sheet to effect the transfer of an image is manually controlled by the operator by the force he exerts upon the handle of the device. It will be obvious that such manually-applied force will vary which will result in non-uniformity of the image transfers. In the apparatus of the present invention the force is automatically exerted by resilient means whereby it remains constant and, therefore, provides uniform results. Just as is the degree of pressure which is exerted upon the two sheets automatically controlled, so is the pressure of the squeegee upon the processed sensitized paper automatically controlled.

The pressure elements of the present invention which effect the transfer of the image are also of an improved nature. A roller which serves as the lower pressure element is positioned in adjustable end mountings by means of which the pressure exerted on this roller by the upper pressure member with which it coacts may be made uniform along its length. The upper pressure member differs from the rollers employed in the apparatus of United States Patent No. 2,666,384 and of the above-cited patent application in that a fixed rod is em-

ployed instead which makes line contact with the lower roller. Such rod being fixed is not wetted to the degree that a roller would be by making contact with the end of the wet processed sensitized sheet and it is immediately dried when it makes contact with the back of the next image-receiving sheet which is to be used to make a succeeding transfer. The roller used in the above-described patent and patent application tends to wet a correspondingly larger part of the back of the succeeding image-receiving sheet inasmuch as it will roll thereon to transfer a correspondingly larger amount of solution. Another feature of the present invention is the splash guard which attaches to the squeegee mounting and renders inconsequential the tendency of the curl of the end of the processed sensitized paper to throw solution upwardly as it passes from under the squeegee.

It is, therefore, an object of the present invention to provide a new and improved photographic copying apparatus.

It is a further object of this invention to provide a new and improved processing and image-transfer apparatus which is adapted for the production of a plurality of copies from a single exposed sensitized sheet.

It is a still further object of this invention to provide an apparatus of the character described which includes novel, manually-operable means which by a single manipulation both squeegees the excess liquid from the processed sensitized sheet and immediately thereafter presses this sheet into contact with the image-receiving sheet as the two sheets are withdrawn from the apparatus.

It is a still further object of this invention to provide an apparatus of the character described in which the pressure elements which effect the transfer of the image to the image-receiving sheet automatically provide a constant pressure on the sheets passing therebetween.

It is a still further object of this invention to provide an apparatus of the character described in which the squeegee automatically exerts a constant pressure upon the processed sensitized paper.

It is a still further object of this invention to provide in an apparatus of the character described cooperating pressure elements which are relatively adjustable to secure uniform pressure exerted along the length thereof and which are designed to reduced to a minimum the carry-over and deposit of processing solution to the back of a succeeding image-receiving sheet.

It is a still further object of this invention to provide in an apparatus of the character described a guard which precludes the upward throwing of processing solution by the end of the processed sensitized paper as it passes from under the squeegee.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings, and it will be understood that many changes may be made in the details of construction and arrangement of parts shown and described without departing from the spirit of the invention as expressed in the accompanying claims. We, therefore, do not wish to be limited to the exact details shown and described as the preferred form only has been shown by way of illustration.

In the drawings:

Fig. 1 is a vertical sectional view of one end of a processing and image-transfer apparatus taken through the squeegee and pressure-exerting mechanism and illustrating the several elements thereof rotated into an inoperative position;

Fig. 2 is a similar sectional view showing the same mechanism in operative position and illustrating further the manner in which the sensitized and image-receiving sheets are operated upon by the squeegee and pressure elements;

Fig. 3 is a perspective view of the squeegee and pressure-exerting mechanism in inoperative position and removed from the end of the processing tank;

Fig. 4 is a perspective view of an end of the same mechanism, the pressure and squeegee elements, however, being in operative position; and

Fig. 5 is an enlarged plan view of the resilient means which functions to releasably retain the squeegee and pressure-exerting mechanism in operative position.

A preferred embodiment of the present invention, illustrated in Figs. 1 to 5, includes the tank 10 in which the exposed sensitized sheet 11 is processed, the shelf 12 for supporting the image-receiving sheet 13, or rather a quantity or stack of non-sensitized sheets, above the liquid level in said tank, and the squeegee and pressure-exerting mechanism 14, the manual operation of which functions to squeegee the excess liquid from the processed sheet and to immediately thereafter press this sheet into intimate contact with a non-sensitized sheet, as the two sheets are withdrawn from the apparatus.

The tank 10 is provided at one end with an opening 15 through which the exposed sensitized sheet 11 may be inserted in the tank. The opposite sides 16 of said tank are adapted to receive thereon the offset portions 17 of the squeegee and pressure-exerting mechanism 14 by means of which the latter is correctly supported relative to the opening 15 in said tank. Apertures 18 in the offset portions are adapted to receive positioning pins (not shown) which project from the tank sides 16, the rotation of said pins functioning to lock said mechanism 14 in position upon said tank. Extending lengthwise of said mechanism 14 are a pressure roller 19 and the downwardly sloping surface 20 which is adapted to coact with squeegee 21, as will be later explained. The ends of the pressure roller 19 are mounted in vertically adjustable bearings 22 in order that the roller may be adjusted relative to the coacting pressure element 33 to insure obtaining uniform pressure along the length of the roller. The tank 10 is further provided with depending fins 23 which extend backward from the opening 15, the purpose of which is to guide and to hold the inserted sensitized paper below the liquid level in the tank. Positioned above the tank is the shelf 12 which, as previously explained, supports the image-receiving sheets 13.

The mechanism 14 includes a pair of members 24 which are rotatably mounted about an axis 25 and which are provided with elongated slots 26, the purpose of which will become later evident. Secured between the members 24 is the fixed rod 33 which cooperates with roller 19 to exert the necessary pressure upon the superposed sheets 11 and 13 as these are withdrawn therebetween. Rotatably mounted about a second axis 39 is pair of arms 27, between the ends of which is secured squeegee 21 by means of the spring clips 28 which resiliently hold the squeegee. Rotatably mounted about the same axis 39 is also a second pair of arms or links 29, the free ends of which are provided with projections 30 which are adapted to be received and ride in the slots 26 in members 24. To facilitate the riding of the projections 30 in the slots 26 the former are preferably provided with nylon rollers 37. It will be apparent from an inspection of Figs. 1 and 2 that rotation of the members 24 will cause the links 29 to similarly rotate as the projections 30, or rather the rollers 37, ride in said slots 26. Each of said pair of arms 27 is interconnected with one of said pair of links 29 whereby rotation of the latter also produces rotation of the arms 27. The latter connection is a lost-motion connection which permits limited relative rotation between each arm 27 and each link 29 and is effected by means of the pins 32 which are integral with arms 27, each pin projecting into a slotted aperture 31 formed in each of the links 29. The limited relative rotation between arm 27 and link 29 permitted by this construction is opposed, however, by spring means 40 which urges each arm 27 to rotate clockwise, as noted in Fig. 1, within the limits imposed by the pin and slot. Spring means 40 is preferably a coil spring wound about axis 39, the spring

ends 41 being attached to the arm and link to bias these apart. By this arrangement rotation of the members 24 into operative position will effect through the links 29 a similar rotation of the arms 27 whereby squeegee 21 will make contact with the sloping surface 20 against which it will resiliently press due to the resilient urging of the spring 40.

As previously described, the upper pressure element 33 is secured between the members 24, the rotation of which into operative position causes the element 33 to press upon the roller 19. It has been found that a roller does not function entirely satisfactory as the upper pressure member since, in rolling upon the sheets passing thereunder, it is substantially wetted by contact with the end of the processed sensitized sheet 11 if the latter is not completely covered by the end of the image-receiving sheet 13. This solution is then carried over by such roller to the back of the subsequent image-receiving sheet if a second transfer is to be made which is undesirable. Such transfer of solution to the back of a subsequent image-receiving sheet can be kept at a minimum by using a fixed round rod 33 as the upper pressure element. The latter in not rotating makes only a line contact with the sheets passing thereunder and is, therefore, not wetted to the extent that a roller would be. Thus only a minimum quantity of processing solution can be carried over to the back of a subsequent sheet 13 by the fixed rod 33.

The members 24 are also provided with handles 34 by means of which the operator may rotate the members into operative and inoperative positions. However, the required pressure between the rod 33 and roller 19 is effected not by the pressure exerted by the operator but rather by a novel arrangement of parts which is a feature of the present invention. The required pressure between the rod 33 and the roller 19 is obtained by the resilient urging of the projections 30 toward the ends of the slots 26 as the members are rotated clockwise into operative position. The resilient urging is obtained by the action of the wire spring 35 which is coiled about axis 25, the free end of which spring is provided with an offset portion 36 which projects across the slot 26 to function as a resiliently biased cam to force the projections 30 toward the ends of the slots 26 after these have been moved over the offset portion 36 by the rotation of the members 24. This urging of the projections 30 toward the ends of slots 26 causes the members 24 to be thus releasably held in operative position without the need for the operator to exert any pressure upon the handles 34. In fact, it is advisable that the operator release the handles 34 after the members 24 have been rotated into operative position in order that the pressure exerted by the rod 33 upon pressure roller 19 may be constant as will be determined by the resiliency and form of the wire spring 35.

The arms 27 which mount the squeegee 21, as previously described, has secured thereto a splash guard 38 which, when the squeegee is rotated into operative position, is caused to lie in close proximity to the pressure roller 19 and to cover the squeegee 21. This arrangement serves the purpose of precluding the curl of the end of the processed sensitized paper from throwing processing solution when the paper is withdrawn from under the squeegee.

The operation of the apparatus is as follows. With the members 24 rotated into inoperative position, as seen in Fig. 1, the rod 33 is raised to its topmost position above the pressure roller 19 while the squeegee 21 is similarly disengaged from contact with the downwardly sloping surface 20. The exposed sensitized sheet 11 is passed through the opening 15 and immersed in the processing solution with the sensitized surface up, the end of the sheet protruding from the opening to overlie the downwardly sloping surface 20 and the pressure roller 19. After the required processing time has elapsed, the top sheet is withdrawn from the stack of image-receiving sheets 13 lying on top of shelf 12 by grasping an end of the sheet to bring

it even with the end of the sensitized sheet 11 which protrudes from the opening 15. With the sheet ends thus held together the operator grasps a handle 34 to rotate the members 24 into operative position whereby the rod 33 presses the pair of sheets against the pressure roller 19. In order that this pressure between rod and roller may be constant, it is determined wholly by the resilient urging of the projections 30 toward the ends of slots 26 by the wire spring 35 and it is, therefore, desirable that the operator, as previously stated, release the handle 34 after the members have been so rotated. While the members 24 are held in such position by the operation of the wire springs 35, the squeegee 21 is similarly spring pressed against the downwardly sloping surface 20. With the sheet ends held together the operator withdraws the sheets with a firm, steady pull. The sheets may now be readily stripped apart with the result that a stratum of unhardened gelatin has been transferred from the sensitized to the image-receiving sheet by the pressure exerted upon the sheets by the coacting rod 33 and pressure roller 19.

Although the squeegee and pressure-exerting mechanism 14 is described in this application as a separate unit, as illustrated in Figs. 3 and 4, it is apparent that this unit need not be made separate and removable from the tank 10 but may instead be formed as an integral part thereof. Although we have not described the use of any temperature control means for use with the disclosed processing tank, it will also be apparent that any conventional heating element, thermostat, heat exchange means, etc., may be utilized in the described apparatus in accordance with the requirements of the process.

From the foregoing description, it will be apparent that we have provided means for obtaining all the objects and advantages of this invention.

What we claim and desire to secure by Letters Patent of the United States is:

1. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a sloping surface and a roller at said end adjacent to said opening, a pair of members having slots therein pivotally mounted at the opposite sides of said tank adjacent to said opening and being adapted to be rotated into operative and inoperative positions, a pressure member secured to and extending between said members and being adapted to engage said roller when said members are rotated into operative position, a pair of arms pivotally mounted at one end thereof at the opposite sides of said tank, the other end of each of said arms being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated, a squeegee, means mounting said squeegee between said pair of arms whereby rotation of the latter causes the squeegee to be moved into contact with said sloping surface when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

2. A device according to claim 1 wherein said resilient means comprises a spring member having a bent section which overlies a portion of one of said slots to function as a spring-biased cam which urges the projection riding in said slot toward one end thereof as the projection is moved over said bent section when said members are rotated toward operative position.

3. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof, a pair of pressure elements mounted in said tank above the liquid level and adjacent to said opening, a pair of members having slots therein pivotally mounted at the opposite sides of said tank adjacent to the opening therein whereby these may be selectively rotated into operative and inoperative positions, a third pressure element secured to and extending between said members and being adapted to engage

one of said pair of pressure elements when said members are rotated into operative position, a pair of arms pivotally mounted at one end thereof at the opposite sides of said tank, the other end of each arm having a projection, said projections being adapted to ride in the slots of said members when the latter are rotated, a squeegee, means mounting the squeegee between said pair of arms whereby rotation of the latter causes the squeegee to make contact with the other of said pair of pressure elements when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots as the projections are moved toward said end by the rotation of said members toward operative position, whereby said members are releasably held in such operative position.

4. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a sloping surface and a roller at said end adjacent to said opening, a pair of members having slots therein rotatably mounted at the opposite sides of said tank about a first axis and adjacent to said opening and being adapted to be rotated into operative and inoperative positions, a pressure member secured to and extending between said members and being adapted to engage said roller when said members are rotated into operative position, a pair of arms rotatably mounted at one end thereof at the opposite sides of said tank about a second axis, a squeegee secured to and extending between the other ends of said pair of arms, a pair of links rotatably mounted at one end thereof at the opposite sides of said tank about said second axis, the other end of each of said pair of links being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated to cause said pair of links to similarly rotate, each of said pair of arms being resiliently interconnected with one of said pair of links whereby rotation of the links causes rotation of the arms to cause the squeegee to move into contact with said sloping surface when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

5. A device according to claim 4 wherein said resilient means comprises a pair of spring members each having a bent section which overlies a portion of one of said slots to function as a spring-biased cam which urges the projection riding in said slot toward one end thereof as the projection is moved over the bent section when said members are rotated toward operative position.

6. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof, a pair of pressure elements mounted in said tank above the liquid level and adjacent to said opening, a pair of members having slots therein rotatably mounted at the opposite sides of said tank about a first axis and adjacent to the opening therein whereby these may be selectively rotated into operative and inoperative positions, a third pressure element secured to and extending between said members and being adapted to engage one of said pair of pressure elements when said members are rotated into operative position, a pair of arms rotatably mounted at one end thereof at the opposite sides of said tank about a second axis, a squeegee secured to and extending between the other ends of said pair of arms, a pair of links rotatably mounted at one end thereof at the opposite sides of said tank about said second axis, the other end of each of said pair of links being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated to cause said links to similarly rotate, each of said pair of arms being interconnected with one of said pair of links whereby rotation of the links also produces rotation of the arms to cause the squeegee to contact the other of said pair of pressure elements when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots as the projections are moved toward said end by the rotation of said members toward operative position whereby said members are releasably held in such operative position.

7. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a squeegee surface and a pressure element at said end adjacent to said opening, a pair of members having slots therein pivotally mounted at the opposite sides of said tank adjacent to said opening and being adapted to be rotated into operative and inoperative positions, a second pressure element secured to and extending between said pair of members and being adapted to engage said first pressure element when said members are rotated into operative position, a pair of arms pivotally mounted at one end thereof at the opposite sides of said tank, the other end of each of said arms being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated to cause said arms to similarly rotate, a squeegee, means mounting said squeegee between said pair of arms whereby rotation of the latter causes the squeegee to be moved into contact with said squeegee surface when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

8. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a squeegee surface and a pressure element at said end adjacent to said opening, a pair of members having slots therein pivotally mounted at the opposite sides of said tank adjacent to said opening and being adapted to be rotated into operative and inoperative positions, a second pressure element secured to and extending between said members and being adapted to engage said first pressure element when said members are rotated into operative position, a first pair of arms pivotally mounted at one end thereof at the opposite sides of said tank, the other end of each of said first pair of arms being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated to cause said first pair of arms to similarly rotate, a squeegee, a second pair of arms mounting said squeegee therebetween, said second pair of arms being adapted to be rotated by the operation of said first pair of arms whereby rotation of the latter causes the squeegee to be moved into contact with said squeegee surface when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

9. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a sloping surface and a roller at said end adjacent to said opening, a pair of members having slots therein rotatably mounted at the opposite sides of said tank about a first axis and adjacent to said opening and being adapted to be rotated into operative and inoperative positions, a round rod secured to and extending between said members and being adapted to engage said roller when said members are rotated into operative position, a pair of arms rotatably mounted at one end thereof at the opposite sides of said tank about a second axis, a squeegee secured to and extending between the other ends of said pair of arms, a pair of links rotatably mounted at one end thereof at the opposite sides of said tank about said second axis, the other end

of each of said links being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated to cause said links to rotate with said members, a lost-motion connection between each of said pair of arms and one of said pair of links permitting limited relative rotation between the arm and link and spring means opposing said relative rotation whereby rotation of the links causes rotation of the arms to cause the squeegee to be resiliently pressed against said sloping surface when said members are rotated into operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

10. In a processing and image-transfer apparatus, a tank for containing a processing liquid, said tank having an opening above the liquid level at one end thereof and provided with a sloping surface and a roller at said end adjacent to said opening, a pair of members having slots therein pivotally mounted at the opposite sides of said tank adjacent to said opening and being

adapted to be rotated into operative and inoperative positions, a fixed rod secured to and extending between said members and being adapted to engage said roller when said members are rotated into operative position, a pair of arms pivotally mounted at one end thereof at the opposite sides of said tank, the other end of each of said arms being provided with a projection, said projections being adapted to ride in the slots of said members when the latter are rotated, a squeegee, means mounting said squeegee between said pair of arms whereby rotation of the latter causes the squeegee to be moved into contact with said sloping surface when said members are rotated into operative position, a splash guard fixed to said means mounting said squeegee and adapted to cover the squeegee and the path therefrom to said roller when said members are in operative position, and resilient means adapted to urge said projections toward one end of said slots whereby said members are releasably held in operative position.

No references cited.