May 19, 1959 W. J. DRUCE 2,887,029

DEVELOPER FEED TANK APPARATUS

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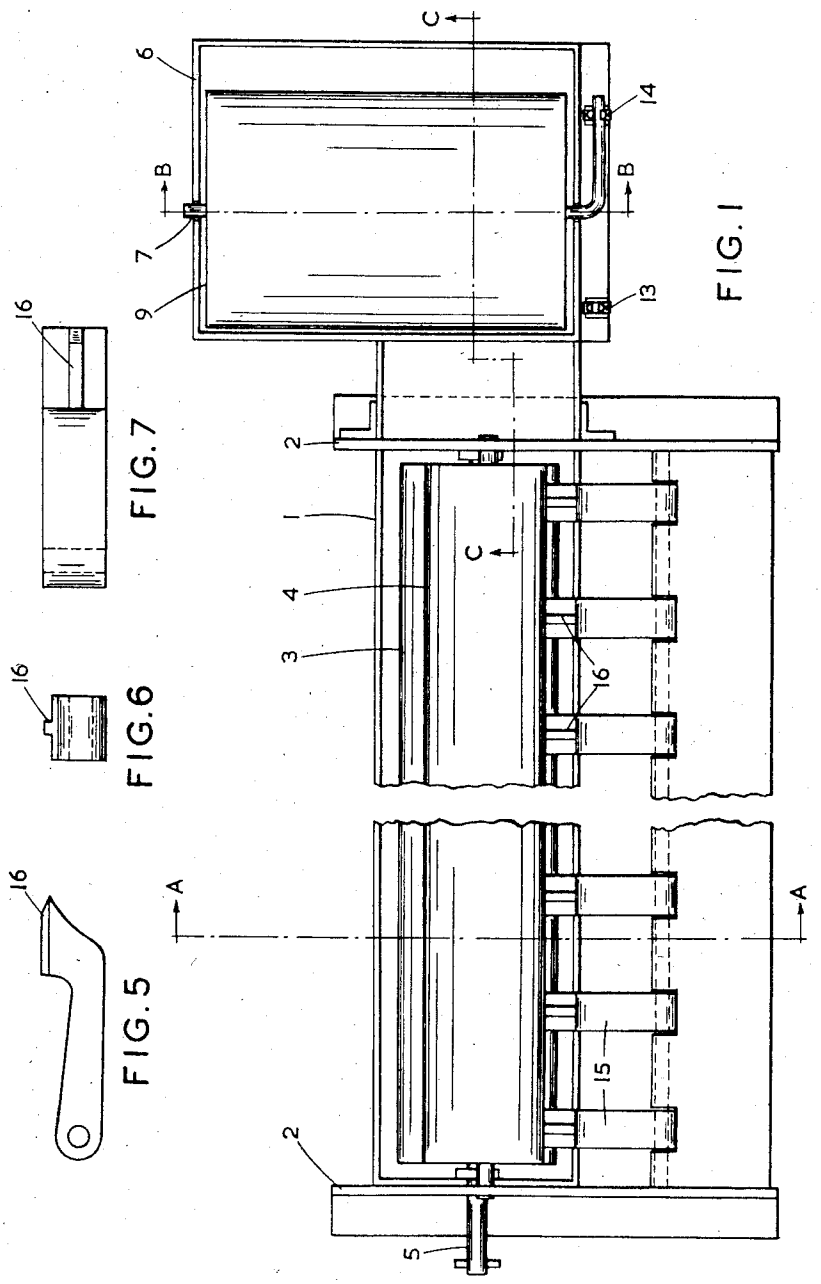

FIG. 1

FIG. 7

FIG. 6

FIG. 5

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FIG. 4

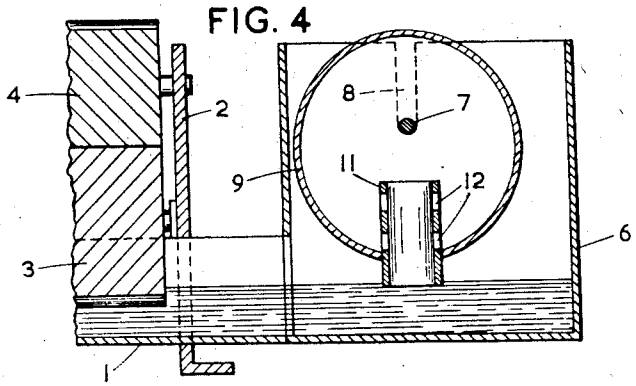


FIG. 3

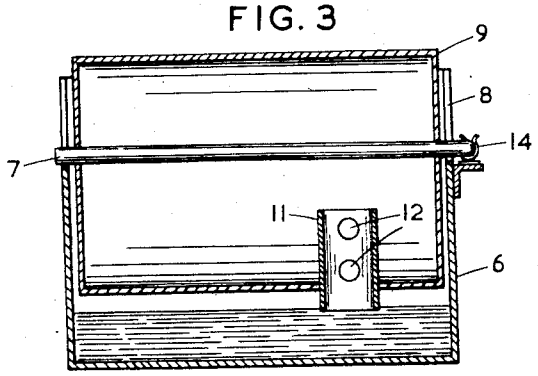
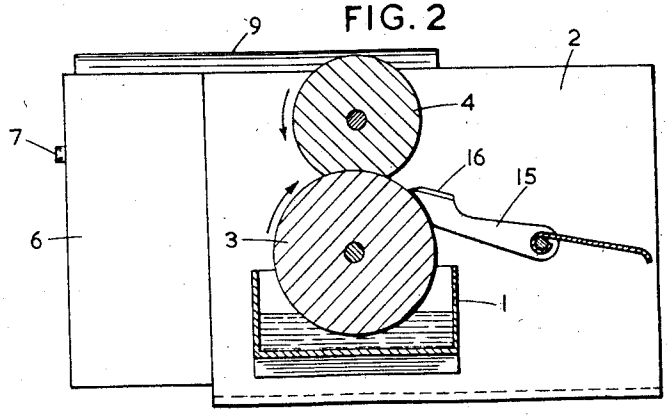


FIG. 2



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DEVELOPER FEED TANK APPARATUS

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Application April 20, 1954, Serial No. 424,474

Claims priority, application Great Britain April 7, 1954

1 Claim. (Cl. 95—89)

The invention relates to a semi-dry developer unit for use in photo-contact printing processes of the kind in which a sheet of sensitized paper after the printing operation is passed for development between a pair of rollers which take up and carry a film of developing solution, from a tank.

The invention is of particular application to a method and apparatus of the kind described and claimed in the co-pending application of the United Kingdom No. 12679/53.

The invention has among its objects to provide a developer unit in which the print is evenly wetted over the whole surface in its passage between the rollers of the developer unit; is readily removed in a semi-dry condition after its passage between the rollers, and in which the developer solution is maintained without substantial fluctuation in level in the tank of the developer unit.

According to the invention, the developer unit comprises a pair of rollers mounted in superposed relation with the lower roller in the tank of developer solution and means for controlling the level of liquid in the tank consisting of a feed tank in communication with the developer tank and a cylindrical drum mounted for vertical movement in guides in the feed tank with a short length of pipe, advantageously provided at a mid-position in the length of the drum and projecting both inwardly and outwardly of the drum, whereby the drum can be filled with the outwardly projecting end of pipe directed upwardly and after filling the drum rotated through 180° into the position in which the said end of pipe is downwardly directed and dips into the liquid in the feed tank.

According to the invention furthermore, lateral holes are drilled in that length of pipe projecting inwardly into the drum to facilitate even flow of liquid from the drum to the tank as the level of the liquid in the tank falls.

According to the invention furthermore, the lower of the two rollers is formed of a hard substance such as rubber and the upper of the two rollers made of a resilient substance such for example as porous rubber, the two rollers being in peripheral contact, so that the sheet of material to which the developer is to be applied on being passed between the rollers is covered over its entire surface with a thin even film of developer liquid, and on passing out between the rollers is semi-dried by the pressure exerted between the rollers. Thus it will be understood that the roller made of a resilient substance serves to absorb solution which is squeezed out on to the print on being passed in between the rollers and, excess liquid absorbed by the roller on the passage of the sheet out.

According to the invention furthermore, an adjacent series of fingers advantageously made of a plastic material are pivotally mounted to extend across the width of the lower of the rollers with their ends closely adjacent or lightly in contact with the periphery of the roller, whereby any tendency of the print to stick to the roller is avoided and the print peeled from the roller.

The invention further comprises the features of construction hereinafter described.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a plan view of the developer unit;
Figure 2 is a section on the line A—A of Figure 1;
Figure 3 is a section on the line B—B of Figure 1;
Figure 4 is a section on the line C—C of Figure 1; and
Figures 5, 6 and 7 are respectively side elevation, end elevation and plan of a finger.

In carrying the invention into effect according to the construction illustrated in the drawings, a long developer tank **1** of rectangular section is supported in brackets **2**. Mounted for rotation with the lower peripheral surface in contact with the liquid in the tank is a lower roller **3** made of hard rubber. Mounted above and in contact with the roller **3** and slightly out of vertical alignment is an upper roller **4** made of a resilient porous substance, such as sponge rubber having non-communicating cells. The rollers are of equal length and extend substantially the length of the tank **1**. The lower roller **3** is rotatable as through a shaft **5** projecting through a slot in one end bracket **2**, from a source of power. At the other end, the tank **1** extends through the bracket and is connected as by welding at a mid-position at the bottom of a transversely disposed feed tank **6** of rectangular section.

Eccentrically mounted on a shaft **7** which is adapted for limited rotation is a cylinder **9**. The shaft **7** together with the cylinder **9** is mounted in slots **8** formed in the end walls of the feed tank **6**. A short pipe **11** is mounted in the lower part of the cylinder **9** so as to project inwardly to a slightly greater extent than outwardly. Diametrically oppositely disposed pairs of holes **12** are formed in the inwardly projecting ends of the pipe **11**.

The shaft **7** on which the cylinder **9** is eccentrically mounted is extended and bent at right angles in such manner as to be adapted to be snapped into two fixed positions between two pairs of spring arms **13** and **14**, these two fixed positions corresponding to the filling position with the pipe **11** upwardly directed and the operative position in which the pipe is downwardly directed, and at 180° to the first or filling position.

Pivotally mounted in series to bear with their ends on the peripheral surface of the lower roller **3** are fingers **15** made of a plastic substance and formed to a section to present a rib **16** which is effective to prevent the developer solution collecting on it, and preventing an uneven application of developer to the leading edge of the print on ejection from between the developer rollers.

In operation, the sensitized print after being subjected in contact with the master to a source of light is passed between the rollers **3**, **4**. The roller **4** absorbs the developer solution which is evenly smeared over the whole surface of the print on passing in-between the rollers. On emerging, the upper roller **4** from which the solution has been pressed out by contact with the hard rubber roller **3**, is now effective to absorb any surplus liquid left on the print, which thus issues in a semi-dry condition.

The holes **12** serve to render the automatic feed of the feed tank **6** more sensitive, so that there is substantially no fluctuation in the level of the developer liquid in the tank **1**.

To fill the cylinder **9**, the cylinder is rotated until the projecting end of the pipe **11** is uppermost in which position the end of the shaft **7** is snapped between the spring arms **13** so that the cylinder is held against movement during the filling operation. After the filling operation is completed, the cylinder is rotated through 180° into the position in which the pipe **11** extends vertically

downwards and the bent end of the arm of the shaft 7 is snapped into position between the spring arms 14.

I claim:

Feed tank apparatus adapted to be connected to a developer tank for feeding a liquid supply to said developer tank and maintaining the level of the liquid in said developer tank, comprising a feed tank for holding liquid to be fed to the developer tank, a cylinder with sealed ends within said feed tank mounted for pivotal movement to a filling position and to an operative feeding position, a short open ended pipe sealed into the wall of the cylinder to project inwardly and outwardly to the cylinder, the outwardly projecting end of said pipe being adapted in the feeding position to dip into the liquid in said feed tank to maintain the level of the liquid in said feed tank which correspondingly maintains the level of the liquid in the developer tank in communication with said feed tank.

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