July 20, 1948. F. ELLAM 2,445,666

INKING DEVICE FOR ROTARY DUPLICATING MACHINES

Filed April 17, 1946

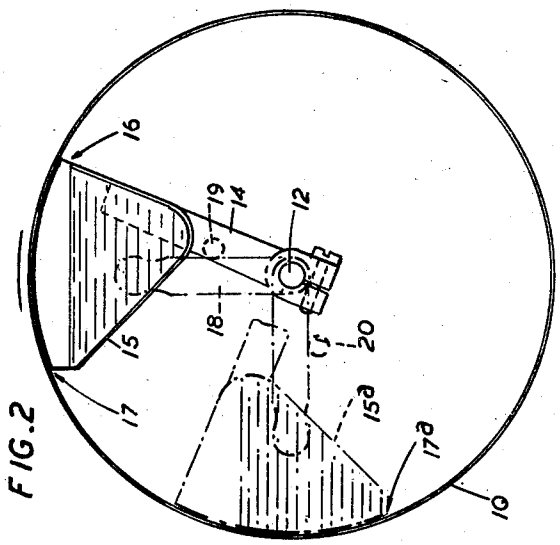


FIG. 2

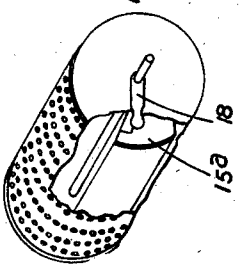


FIG. 4

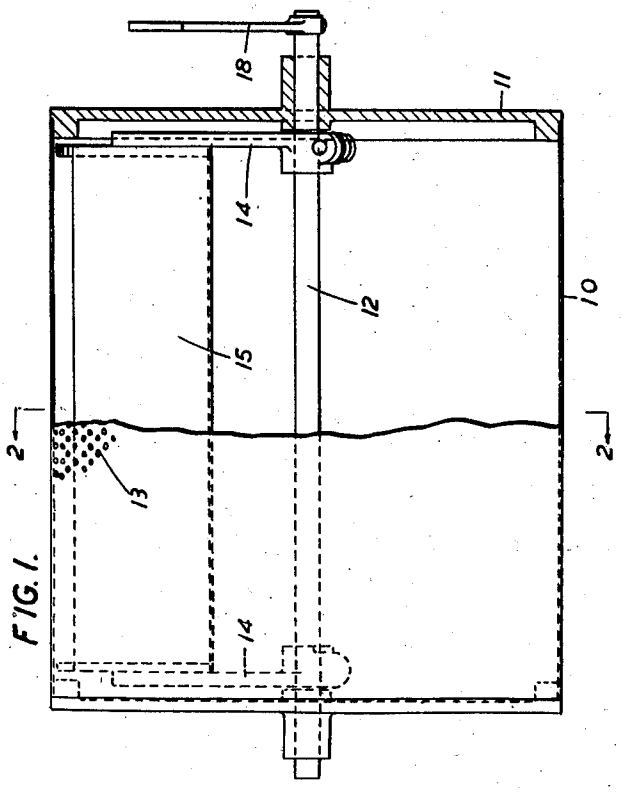


FIG. 1.

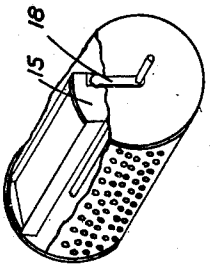


FIG. 3.

INVENTOR
FREDERICK ELLAM
Raifenbach & Hirschman
ATTORNEYS

Patented July 20, 1948

2,445,666

UNITED STATES PATENT OFFICE

2,445,666

INKING DEVICE FOR ROTARY DUPLICATING MACHINES

Frederick Ellam, Watford, England

Application April 17, 1946, Serial No. 662,831
In Great Britain May 4, 1945

3 Claims. (Cl. 101—119)

1

This invention relates to duplicating machines of the kind having a rotatable perforated metal cylinder covered peripherally with an inking cloth over which is secured a stencil of matter to be duplicated. In such machines, it is usual to charge the cylinder interiorly with a layer of ink and to force the ink through the perforations in the cylinder into the cloth covering, whence it passes, as the cylinder is rotated, through the stencil and on to sheets of paper, the forcing of the ink through the perforations in the cylinder being effected from time to time by means of an inking roller disposed within the cylinder and arranged to be advanced radially against the inner periphery of the cylinder. Such an arrangement has the disadvantage that immediately after the inking roller has been used the duplicated copies will be heavily inked and succeeding copies will be paler and paler until the inking roller is used again, and so on. In some cases, however, the inking roller is in action continually. A disadvantage of either of these systems is that after some time the ink charged into the cloth cover works to the trailing end and, to some extent, to the sides thereof and tends to soil the copies produced, and there is a tendency of the ink to become contaminated with particles which disintegrate from the surface of the inking roller. A still further disadvantage is that, after a large number of copies has been produced from a stencil of such a nature that only a portion is used for duplicating purposes, the remainder being blank, that part of the cloth which corresponds with the blank becomes over-inked, with the result that when the stencil is removed and replaced by another stencil on which the wording occupies the whole sheet, it is impossible to get an evenly balanced copy, even after running off hundreds of copies, and the only satisfactory solution is to change the inking cloth.

Such disadvantages are obviated by the present invention which is intended to charge the perforated cylinder and the cloth cover continuously but only with substantially that quantity of ink which will be required per revolution of the cylinder.

The invention consists in ink-feeding means for a rotary duplicating machine of the kind described, comprising a trough disposed within the perforated cylinder, the trough being closed except at that side which is directed towards the inner periphery of the cylinder, against which it fits closely, so that ink is free to flow by gravity through that part of the perforated wall of the cylinder opposite the open side of the trough,

2

while the trailing edge of the trough (i. e. that edge over which any part of the cylinder passes last as it moves away from the trough) is arranged to remove superfluous ink from the inner periphery of the cylinder and retain it in the trough. In consequence of this arrangement, ink is fed constantly to any part of the perforated cylinder which, for the time being, is opposite the open side of the trough, but practically all ink is removed from the inner periphery of the cylinder as it moves away from the trough, leaving, to pass to the cloth cover, only such an amount as is contained in the perforations themselves; hence all duplicated copies will be of the same density.

The trailing edge of the trough may constitute a doctor-blade for the removal of superfluous ink, or the trailing wall may be provided with a bar spring-urged radially outwards against the periphery of the cylinder.

In order to cut off the flow of ink when the machine is standing idle, the trough may be movable about the axis of the cylinder, its idle position being at the top of the cylinder, i. e. with its open side directed upwards, and its operative position being at about 90° to its idle position, i. e. with its open side directed towards one side of the cylinder, so that the cylinder then constitutes a retaining wall for the ink, which, however, passes by gravity into the perforations during such time as any particular part of the cylinder is acting as an ink-retaining wall.

The change of position of the trough from its inoperative position to its operative position and vice versa may be effected positively by means actuated from outside the cylinder. Alternatively, the trough may be carried by a counterbalanced or spring-influenced arm, the arrangement being purely automatic in that when the cylinder is rotated the friction between it and the trough will carry round the latter to its operative position and, when rotation of the cylinder ceases, the trough will return to its inoperative position under the influence of its counterweight or spring.

One form of the invention will be described with reference to the drawings, in which:

Figure 1 is a partly sectioned side elevation of a cylinder of a rotary duplicating machine;

Figure 2 is a section on the line 2—2, Figure 1;

Figure 3 is a broken perspective view on a smaller scale, showing ink-feeding means in the idle position; and

Figure 4 is a similar view showing the ink-feeding means in the operative position.

Referring to Figures 1 and 2, a cylinder 10

has ends 11 freely mounted on a shaft 12. The cylinder 10 is perforated as at 13 all over its surface. Within the cylinder and fixably mounted on the shaft 12 are two arms 14, carrying at their outer ends a trough 15 which extends the full length of the cylinder 10. The cylinder is arranged to rotate in an anti-clockwise direction (see Figure 2) and the leading edge 16 of the trough is close to, but not touching, the interior of the cylinder, while the trailing edge 17 is inclined towards the leading edge and is in contact with the cylinder so as to scrape its surface when said cylinder is rotated.

The shaft 12 extends through the ends 11 and is carried in bearings (not shown) to support the cylinder, and at one end carries an arm 18 fixed to said shaft. As the arm 18 and the arms 14 which carry the trough 15 are all fast on the shaft 12, the trough may be turned from the position shown at 15 (Figures 2 and 3) to that shown at 15^a (Figures 2 and 4), and this movement is limited by stops 19 and 20 (Figure 2), which are mounted on or integral with a stationary part of the duplicating machine.

When the duplicating machine is not in use, the trough is maintained in the idle position shown at 15, and the ink is kept out of contact with the cylinder 10, and therefore no overcharging of the inking-cloth can occur.

When the cylinder 10 is to be rotated for the purpose of duplicating, the arm 18 is moved from its vertical position to its horizontal position against the stop 20, and the trough is thereby moved to the position indicated at 15^a. Thus, the ink is allowed access to that portion of the periphery of the cylinder which extends between the trailing and leading edges of the trough, and fills the perforations 13. When the cylinder is rotated, the trailing edge, indicated at 17^a, wipes from the cylinder all the ink except that actually in the perforations, and the process is repeated for the next portion of the periphery to be exposed to the trough. Continuous rotation of the cylinder, therefore, results in the perforations being charged as they pass the trough, and the inking-cloth receives a steady supply. After use, the arm 18 is rotated to abut against the stop 19, thus returning the trough 15 to its idle position.

Inasmuch as the trailing edge 17 of the trough 15 removes all superfluous ink and retains it in the trough it follows that after use the interior of the perforated cylinder 10 will be clean as compared with a cylinder into which ink has been charged in the manner heretofore usual, hence, when using quick drying "emulsion inks" the effects of any tendency of residual ink to separate when the apparatus is standing idle are negligible, and to all intents and purposes the apparatus is always ready for use at a moment's notice provided the trough be kept charged with ink. Moreover, owing to the reduced amount of ink fed to the cloth cover at any time the removal of a stencil and its replacement by another will be a cleaner operation than heretofore.

If a counterbalanced arm is to be employed instead of an external arm for moving the trough into the operative and idle positions, this may advantageously be constituted by an extension on either or both of the arms 14 within the cylinder and, by selection of a suitable counterweight, the friction between the trailing edge of the trough and the inner periphery of the cylinder may be utilized to bring about automatic movement of the trough into the operative position on rotation of the cylinder.

Alternatively, a counterweight may be mounted externally of the cylinder, as on an extension on the arm 18, and stops may be provided on a fixed part of the machine to limit the travel of the trough to the sector defined by its idle and operative positions.

I claim:

1. A rotary duplicating machine having a supporting frame, a horizontal spindle carried thereby, a metal cylinder formed with perforations and rotatably mounted on the spindle, an inking cloth covering said cylinder peripherally and arranged to receive a stencil of matter to be duplicated, radial arms pivotally mounted on the spindle within the ends of the cylinder and movable independently of the rotation of the cylinder, a trough carried by the arms within the cylinder and having walls fixed relatively to one another, the trough being open at the side directed towards the inner periphery of the cylinder, those walls directed towards the inner periphery fitting closely against said periphery, and means for moving said trough from an idle position in which the radial arms are vertical and the walls of the trough retain any ink in said trough out of contact with the inner periphery of the cylinder, to an operative position, in which the pivoted arms are maintained in a substantially horizontal position, and in which said ink is held in the trough with direct access to the inner periphery of the cylinder by gravitational flow into the perforations therein, providing a continuous and even charge of ink to the cylinder during its rotation.

2. A rotary duplicating machine having a supporting frame, a horizontal spindle carried thereby, a metal cylinder formed with perforations and rotatably mounted on the spindle, an inking cloth covering said cylinder peripherally and arranged to receive a stencil of matter to be duplicated, radial arms pivotally mounted on the spindle within the ends of the cylinder and movable independently of the rotation of the cylinder, a trough carried by the arms within the cylinder and having walls fixed relatively to one another, the trough being open at the side directed towards the inner periphery of the cylinder, those walls directed towards the inner periphery fitting closely against said periphery, and means external of the cylinder for moving said trough from an idle position, in which the radial arms are vertical and the walls of the trough retain any ink in said trough out of contact with the inner periphery of the cylinder, to an operative position, in which the pivoted arms are maintained in a substantially horizontal position, and in which said ink is held in the trough with direct access to the inner periphery of the cylinder by gravitational flow into the perforations therein, providing a continuous and even charge of ink to the cylinder during its rotation.

3. A rotary duplicating machine having a supporting frame, a horizontal spindle carried thereby, a metal cylinder formed with perforations and rotatably mounted on the spindle, an inking cloth covering said cylinder peripherally and arranged to receive a stencil of matter to be duplicated, radial arms pivotally mounted on the spindle within the ends of the cylinder and movable independently of the rotation of the cylinder, a trough carried by the arms within the cylinder and hav-

ing walls fixed relatively to one another, the trough being open at the side directed towards the inner periphery of the cylinder, those walls directed towards the inner periphery fitting closely against said periphery, the trailing edge of the trough being arranged to constitute a doctor blade, and means for moving said trough from an idle position, in which the radial arms are vertical and the walls of the trough retain any ink in said trough out of contact with the inner periphery of the cylinder, to an operative position, in which the pivoted arms are maintained in a substantially horizontal position, and in which said ink is held in the trough with direct access to the inner periphery of the cylinder by gravitational flow into the perforations therein, providing a continuous and even charge of ink to the cylinder during its rotation.

FREDERICK ELLAM.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
762,165	Hainey	June 7, 1904
1,527,783	Braseur	Feb. 24, 1925
2,276,181	Foster	Mar. 10, 1942
2,333,382	Kent	Nov. 2, 1943