

[54] HECTOGRAPHIC DUPLICATING MACHINE

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[30] Foreign Application Priority Data

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[58] Field of Search 101/132, 132.5, 415.1, 468, 101/472, 147

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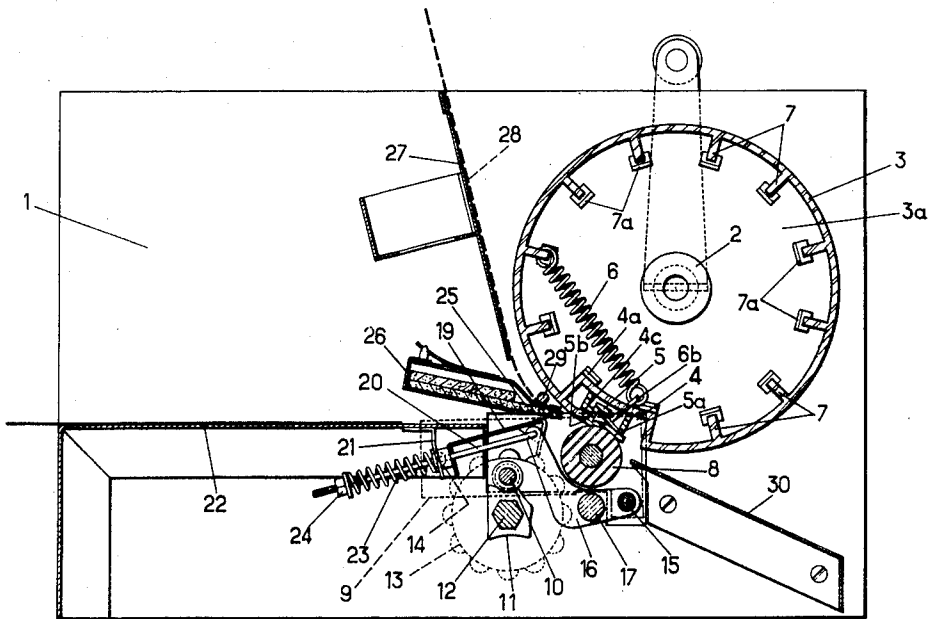
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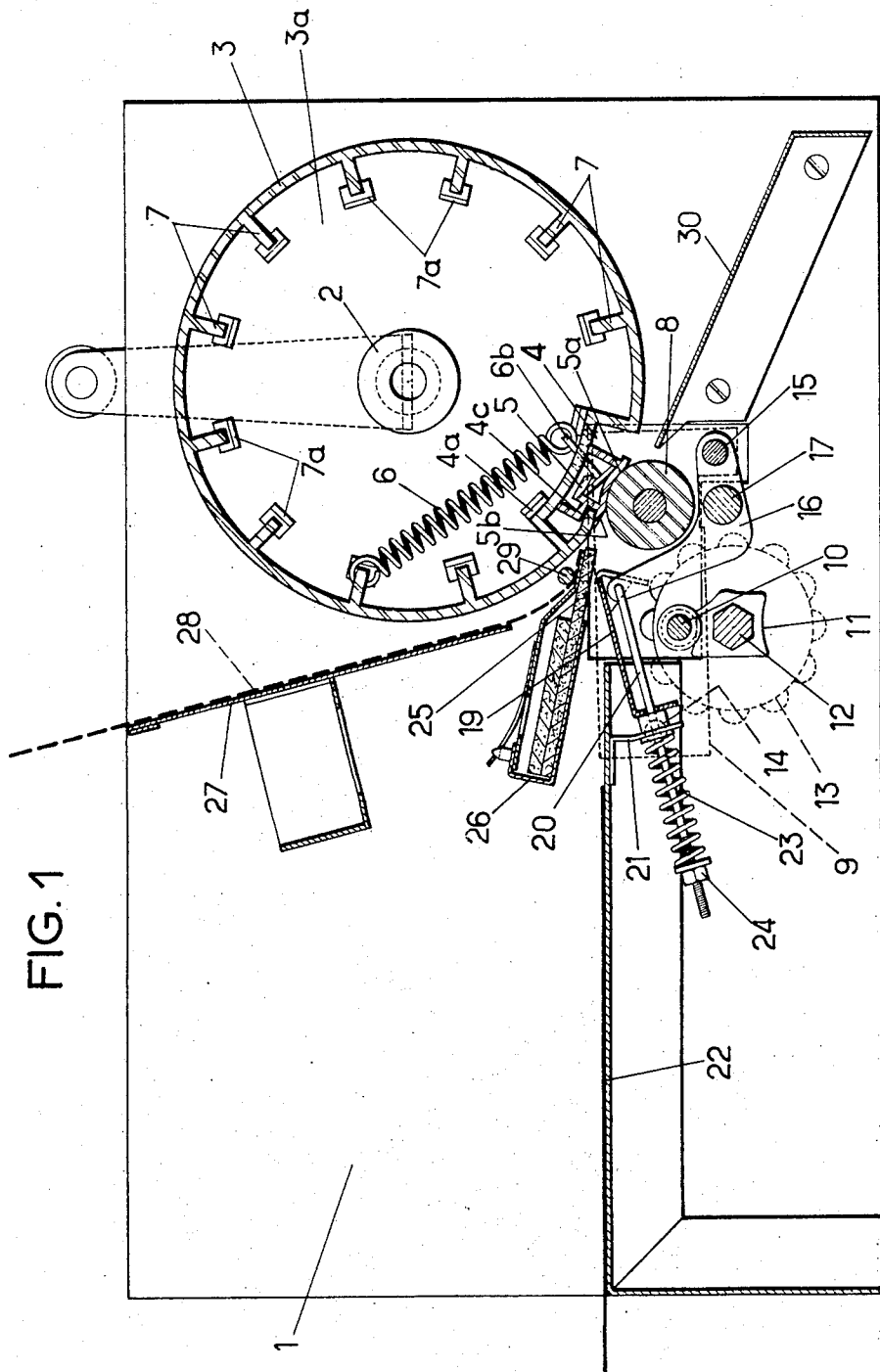
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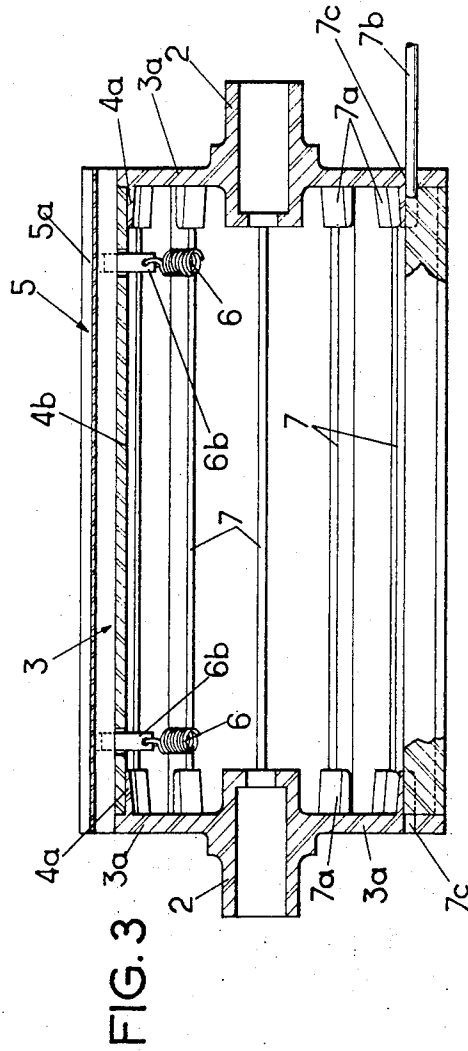
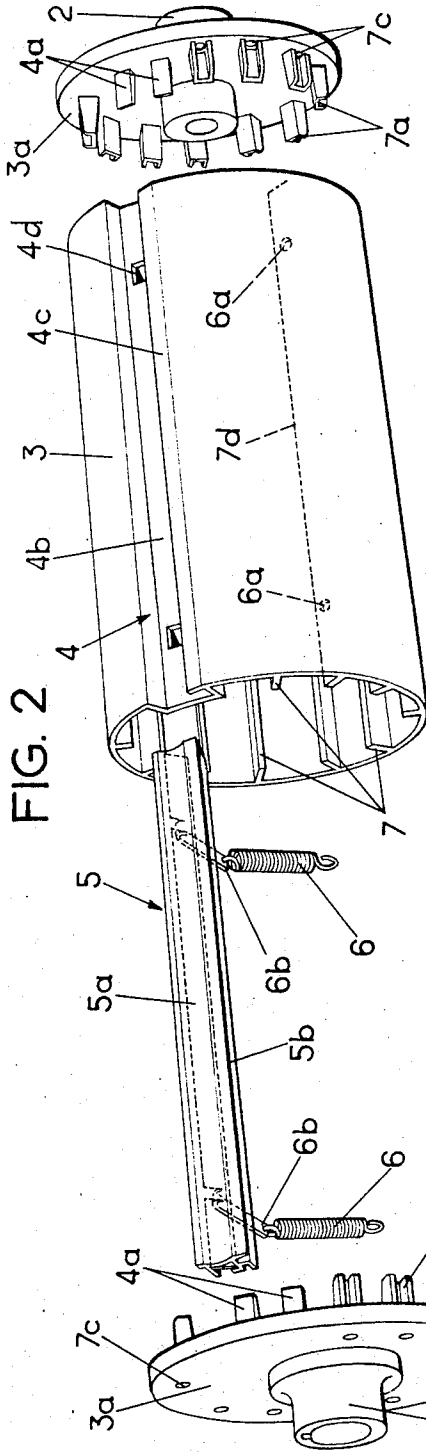
[57] ABSTRACT

Hectographic duplicator comprises a master clamp formed by one edge of a groove in the pressure cylinder of the duplicator and a bar seated in said groove, together with a stationary moistening pad cooperating with a moistening table adapted to be retracted away from the pad at the end of each operating cycle.

7 Claims, 3 Drawing Figures







HECTOGRAPHIC DUPLICATING MACHINE

SUMMARY OF THE INVENTION

This invention relates to a new hectographic duplicator of the type in which the sheets to be printed are moistened by contact with a moist pad.

It is known that in duplicators of this type the moist pad and its support are actuated by a cam or roller, or by a lever controlled by appropriate motion transmitting means so as to keep it away from the sheet to be printed for the time necessary to introduce the sheet to be introduced.

Such devices are expensive and the inertia of their components limits the speed of operation of the machines with which they are equipped.

Moreover, hectographic duplicators of conventional types generally comprise a master mounting clamp carried by the printing cylinder which consists of a casting which can be finished only in a rather expensive manner.

The hectographic duplicator according to the present invention is characterized by the use of a stationary moistening pad against which the paper to be printed is pressed by a moistening plate which can retract, when the pressure cylinder is pressed, at the end of each cycle, into a longitudinal depression provided in a movable bar carried by the printing cylinder. This bar is received in a groove in the printing cylinder and cooperates with one of the edges of said groove to form a clamp for holding the master.

In this position, the clamp is held closed, with the bar normally pressed against the cooperating groove edge by springs, but the clamp may be opened by turning the printing cylinder slightly in a direction opposite to its normal direction of rotation, whereupon the immobilization of this bar by the pressure cylinder permits introduction of the master.

As a consequence of their structure the printing cylinder and the clamp may be made by an extrusion process which reduces their cost.

One of the valuable characteristics of the new duplicator according to the invention resides in the fact that, regardless of the deformations and forces to which the various components are subjected, the various movements are all symmetrically transmitted with respect to the ends of the printing cylinder, so that the pressure cylinder aligns itself perfectly with respect to the printing cylinder and the moistening table aligns itself in like manner with respect to the stationary moistening pad.

As a consequence of this perfect alignment a consistently regular moistening and printing results and any risk of creasing of the paper or the master is eliminated.

The reduction in the number and weight of the movable parts which is characteristic of the new invention makes possible a greater speed of operation and a substantial reduction in the cost of the machine. The bar which forms part of the clamp for the master is preferably made, like the printing cylinder, from an extrudable plastic material, and is seated with substantial play in a groove provided for this purpose along one generatrix of the printing cylinder. The bar is provided with a lip for holding the master.

It is this substantial play which makes it possible to open the clamp for the master, as has already been indicated.

In order to introduce or remove a master it suffices to rotate the cylinder backward. The immobilization of the bar by the pressure cylinder then opens the clamp against the resistance of the spring or springs. The clamp closes automatically when the operator ceases to exert pressure on the printing cylinder.

The machine is preferably equipped with a table permitting the master to be oriented in advance so that it is positioned opposite the groove defined by the said clamp between the lip thereon and the lip formed by the corresponding edge of said groove.

The two ends of the axis of the pressure cylinder are carried by two arms which oscillate about a fixed shaft carried by the stationary part of the machine parallel to the printing cylinder. The oscillating arms are connected to each other by a first pressure rod subjected at its median point to the pressure of a cam, the variable position of which is controlled by a shaft, by means of a control knob for example, and which tends to press said pressure cylinder against the printing cylinder.

The two oscillating arms are also connected by a second "moistening" rod the central part of which swings one end of a lever, when the pressure cylinder engages in the depression in said bar, about a shaft parallel to the printing cylinder and attached to the stationary part of the machine. The other end of this lever carries pivot means which permits a moistening table to oscillate in all directions on said lever. The lever is pivotally attached to the central part of the edge of said table adjacent the generatrix of contact between the pressure cylinder and the printing cylinder.

The central part of the opposite edge of the moistening table is resiliently mounted on a bracket attached to the stationary frame of the machine so as to be able to follow the movement of said lever while remaining free to oscillate with respect to said lever in order to permit the uniform distribution of the pressure and movement transmitted by said lever, which pressure tends to press said moistening table against the moistening pad above the moistening table parallel to the printing cylinder and close thereto. This resilient mounting is provided by a pin fixed to the moistening table the free end of which pin is biased by a spring attached to said bracket. The tension of this spring is adjustable by means of a suitable nut.

This possibility of oscillating the moistening table is essential in order to permit compensation for variations due to unequal wear in the moistening pad and differences in thickness in the paper to be printed and which passes between the moistening table and the pad.

Another particular characteristic of the new duplicator resides in the fact that the point about which said lever pivots is so selected as to further press the moistening table against said pad as said table tends to be pulled further along by the friction of the paper to be printed when the speed of advance of this paper between the table and the pad increases. This permits a correct moistening to be obtained regardless of the speed of advance of the paper.

The characteristics of the present invention will be better understood from a reading of the following description of a preferred embodiment thereof, which is given purely by way of illustration and example, with reference to the accompanying drawings, on which:

FIG. 1 is a central sectional view of the new duplicator taken in a plane perpendicular to the axis of its printing cylinder;

FIG. 2 is an exploded perspective view of this printing cylinder and its two end covers, showing the bar for clamping the master and the longitudinal groove for seating this bar in said cylinder; and

FIG. 3 is a diametral section taken through the printing cylinder of the new duplicator near said groove and clamp for the master.

FIG. 1 shows that the machine comprises a frame having two parallel end members one of which is indicated at 1 on FIG. 1.

Between the end members is mounted a printing cylinder 3 supported by journals 2 fixed to the end covers 3a cooperating with said cylinder.

The cylinder 3 and the two end covers 3a are connected by the cooperation between the internal ribs 7 of the cylinder 3, which are produced by extrusion, and the U-shaped members 7a shown, in particular, on FIG. 2. Fusing of the material of which these components 7a are made causes them to adhere to the ribs 7. This fusion is produced by introducing a rod 7b carried to a high temperature into the holes 7c shown in particular at the left of FIG. 2.

Once this fusion has been completed, which occurs of course after mounting of a bar 5 (also shown in FIG. 2) in the longitudinal groove 4 in the cylinder 3, the assembly becomes essentially integral. Its cost of manufacture is reduced by the use of an extruded cylinder 3.

In alignment with the groove 4 the two covers 3a have no U-shaped members 7a, but carry instead two flat members 4a which seat against the bottom 4b of the groove 4. The clamping bar 5 is connected to a predetermined rib 7d by two draw springs 6 passing through holes 6a shown in broken lines.

The springs 6 are attached to the inside of the clamping bar 5 by the tabs 6b also shown in FIG. 3. This latter figure shows a rod 7b inserted in one of the holes 7c. This rod is provided to fuse the ribs 7 and the U-shaped member 7a together.

A pressure cylinder 8, shown on FIG. 1, during each rotation of the cylinder 3 enters a depression 5a in the bar 5. This pressure cylinder is carried by two symmetrically positioned arms 9 one of which is shown in broken lines on FIG. 1.

A rod 10, also shown on FIG. 1, connects the two arms 9. This rod, hereinafter called the pressure rod, engages a cam 11 fixed to a shaft 12 carried by the frame 1 and which may be turned by a knurled knob 13 shown in broken lines on FIG. 1. Each of the two oscillating arms 9 is pivotally mounted at 14 on one of the end members 1 of the frame of the machine. The fixed shaft 12 acts through the cam 11 to urge the pressure rod 10, and consequently the pivotally mounted arms 9, and the pressure cylinder 8 against the cylinder 3, with the amount of pressure depending on the position of the cam 11, which is determined by that of the knob 13. The duplicator comprises a second rod 15 connecting the two arms 9, and the central part of this rod 15 actuates a lever 16 pivotally mounted on shaft 17 carried by the end members constituting the frame 1 whenever the pressure cylinder 8 enters and leaves the depression 5a in the clamping bar 5, thus swinging the arms 9 which carry the rod 15. This lever 16 retracts a moistening table 19 pivotally attached to said lever, which table is mounted to move with a shaft 20 resiliently carried by a bracket 21 attached to the entrance table 22 fixed to the frame 1. The lever 16 is tensioned by a spring 23 resting against said bracket. The com-

pression of this spring may be adjusted by means of a nut 24.

A moistening pad 25 mounted in a pad carrier 26 fixed to the frame 1 is positioned above the moistening table 19. Retraction of the moistening table 19 widens the gap between the table 19 and the pad carrier 26 so that a sheet of paper to be printed may be slipped therebetween. A panel 27, also fixed to the frame 1, makes it possible to properly locate the master 28 which passes under a guide 29 toward the slot in the master clamp, which slot is opened as has been hereinbefore described by reverse movement of the cylinder 3.

This slot is defined by an inwardly bent lip 4c on one of the edges of the groove 4 and the lip 5b of the bar 5. Consequently, when the cylinder 3 is turned clockwise from the position shown in FIG. 1, and the roller 8, seated in the depression 5a in the clamping bar 5, tends to hold the clamping bar against such rotation, a small space opens up between the lip 4c at the edge of the cylinder and the tapered lip 5b of the clamping bar, which space is wide enough to permit the insertion of a master or stencil. Relative movement between the cylinder lip 4c and the bar lip 5b is permitted because, as seen in FIG. 2, the slots 4d have a circumferential length substantially greater than the thickness of the tabs 6b in a circumferential direction. An output table 30, attached to the frame 1, receives the printed sheets.

It will of course be appreciated that the embodiment which has just been described may be modified as to detail without thereby departing from the basic principles of the invention as defined by the following claims.

What is claimed is:

1. Hectographic duplicator which comprises:
 - a rotatably mounted printing cylinder and a rotatably mounted pressure cylinder defining a sheet printing gap therebetween,
 - means carrying said pressure cylinder for swinging movement toward and away from said printing cylinder and means urging said pressure cylinder toward said printing cylinder,
 - said printing cylinder having a longitudinal groove in its peripheral surface,
 - a clamping bar seated in said groove and being narrower than said groove so as to be movable therein transversely of said groove,
 - said bar being provided with a longitudinal depression positioned to receive said pressure cylinder once during each rotation of said printing cylinder, and thereby permit said printing cylinder to swing closer to the axis of said printing cylinder,
 - one edge of said clamping bar and an adjacent edge of said groove being provided with cooperating lips for gripping a master therebetween,
 - means including a moistening pad and a moistening table defining a moistening gap in front of said printing gap, said moistening table being movable between a first position narrowing said moistening gap and a retracted position permitting said moistening gap to widen so that a sheet may be inserted therein;
 - and means responsive to swinging movement by said pressure cylinder for moving said moistening table between said first and second positions.
2. Duplicator as claimed in claim 1 comprising resilient means urging said lips toward each other in one direction circumferential of said printing cylinder, with a

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force weaker than that exerted by said means urging said pressure cylinder toward said printing cylinder, so that when said pressure cylinder is in the depression in said clamping bar, said clamping bar is held stationary when said printing cylinder is rotated a short distance in a direction moving said groove lip away from said clamping bar lip, to thereby permit one end of a master to be inserted between said lips.

3. Duplicator as claimed in claim 1 in which said clamping bar and at least the peripheral wall of said printing cylinder are made of substantially constant section and an extrudable material so that they may be manufactured by an extrusion process.

4. Duplicator as claimed in claim 1 in which said printing cylinder comprises a cylindrical wall and end members made of a readily fusible material so that they may be caused to adhere to each other by heating regions of contact therebetween.

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5. Duplicator as claimed in claim 1 comprising a lever actuated by swinging movement of said pressure cylinder and pivotally connected to the central part of said moistening table so as to permit said moistening table to swing into a position parallel to said moistening pad.

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6. Duplicator as claimed in claim 5 comprising adjustable spring means biasing said moistening table to regulate the pressure exerted by said table against said moistening pad.

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7. Duplicator as claimed in claim 5 in which said lever is mounted to pivot about a point which causes any increase in friction between said moistening table and paper being fed thereover to increase the pressure with which said moistening table is urged toward said moistening pad.

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