April 23, 1946. F. R. FORD 2,398,888

DUPLICATING MACHINE

Filed April 27, 1944 2 Sheets-Sheet 1

FIG. 1.

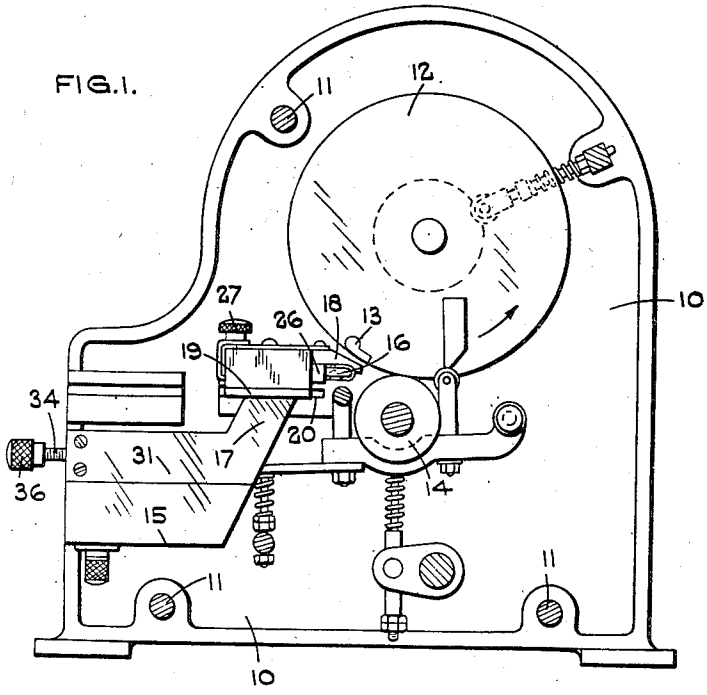


FIG. 3.

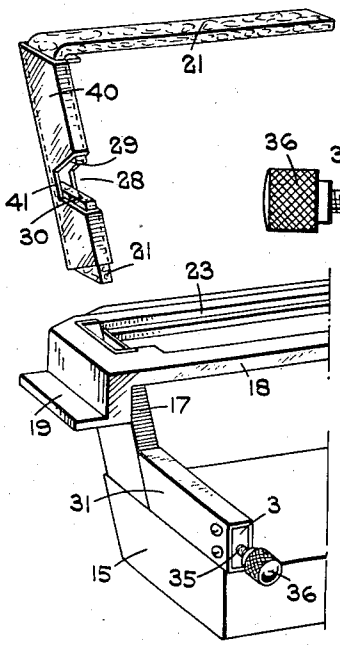
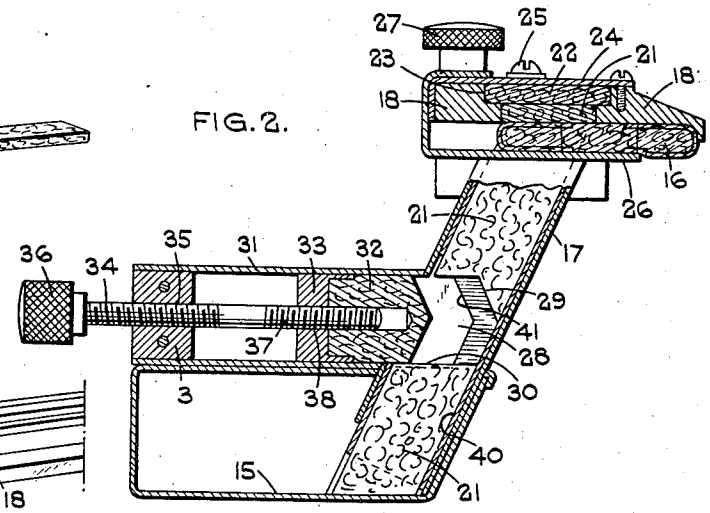


FIG. 2.



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FIG. 4.

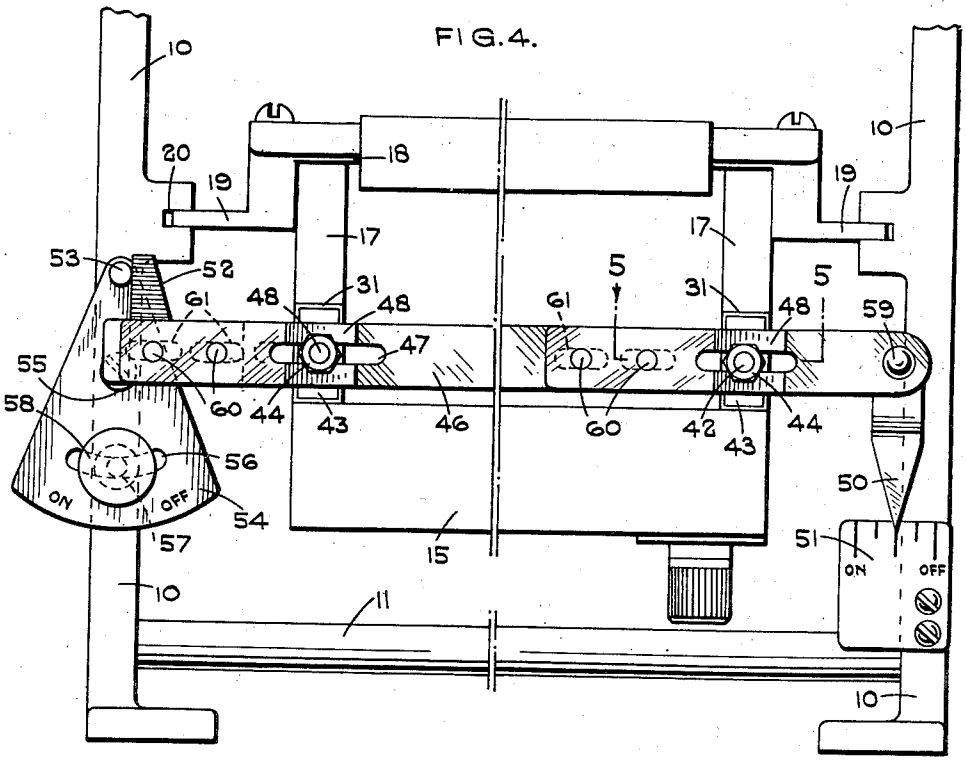
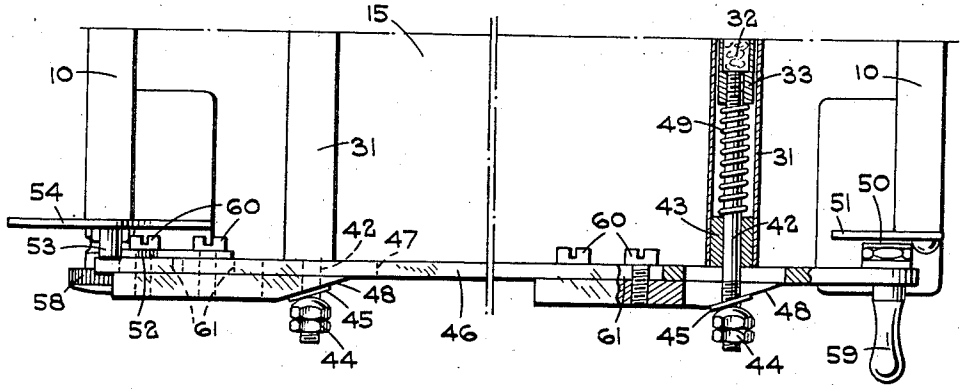


FIG. 5.



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UNITED STATES PATENT OFFICE

2,398,888

DUPLICATING MACHINE

Frank Ronald Ford, Sparkbrook, Birmingham, England

Application April 27, 1944, Serial No. 532,948
In Great Britain March 20, 1943

8 Claims. (Cl. 91—38)

This invention relates to duplicating machines of the kind wherein a master sheet bearing in reverse script the matter to be reproduced is mounted on a cylinder with which co-operates a pressure roller, the copy sheets being fed between the cylinder and pressure roller and being moistened by means of a moistening pad before coming into contact with the master sheet on the cylinder.

The object of the present invention is to provide improved means for controlling the flow of liquid from a reservoir to the moistening pad.

According to the present invention, liquid is conveyed to the operative surface of the moistening pad by an absorbent member having a gap therein, a movable absorbent member which can be adjusted into and out of said gap being provided for controlling the supply of liquid to said pad.

The gap may divide the absorbent member into two separate parts so that when the movable member is completely withdrawn from the gap, no liquid is conveyed to the moistening pad. The movable member, however, can be advanced into the gap, and the amount of liquid then conveyed to the moistening pad will depend upon the surface area of contact between the movable absorbent member and the absorbent members on each side of it.

The movable member may be formed with parallel edges adapted to make contact with mutually parallel surfaces on the stationary absorbsent member at opposite sides of the gap therein, the supply of liquid to the operative face of the moistening pad being regulated by varying the area of contact between the contacting parallel surfaces of the movable and stationary absorbent members.

Alternatively that part of the movable member which is adapted to engage in the gap may be formed with mutually convergent edges so that the member is spear shaped, and the edges of the gap in the stationary absorbent member may be correspondingly shaped.

In order that my invention may be clearly understood and more readily carried into practice, I have appended hereto two sheets of drawings wherein—

Figure 1 is a sectional side elevation of a duplicating machine embodying the present invention.

Figure 2 is a similar view, to an enlarged scale, of the moistener shown in Figure 1.

Figure 3 is a fragmentary perspective view of the moistener, with the parts thereof shown separated.

Figure 4 is an end view of a modified construction of moistener shown in position on the machine, and

Figure 5 is a plan view showing part of this modified moistener in section on the line 5—5 of Figure 4.

In the construction illustrated in Figure 1, the machine comprises spaced side members 10 secured together by tie-rods 11 and having mounted between them a transversely disposed impression cylinder 12 which is provided with a clip 13 for engagement with the leading edge of a master sheet bearing in reversed or mirror script the matter to be reproduced.

Beneath the cylinder 12 and parallel thereto is a pressure roller 14 by means of which copy sheets from a feed table (not shown) are brought into pressure contact with a master sheet on the cylinder 12 whilst passing through the machine.

Before reaching the nip between the roller 14 and cylinder 12 the copy sheets pass beneath a moistener which forms the subject of the present invention.

This moistener, shown in detail in Figures 2 to 4 of the drawings, may be of the general kind described in Patent No. 2,345,335, issued to me March 28, 1944, wherein there is a tank or reservoir 15 for the moistening liquid and spaced above this tank 15 is a housing for the moistening pad 16 with which the copy sheets are brought into contact, the liquid from the tank 15 being conveyed to the pad 16 by capillary action through wicks accommodated in inclined tubes 17 which connect the tank 15 with the pad housing.

Conveniently the wick tubes 17 are formed separately from the tank 15 and are of rectangular section, their width measured transversely of the machine being substantially less than their measurement in a front to rear direction.

The pad housing, to which the upper ends of the tubes 17 are attached, comprises a rigid plate 18 disposed transversely of the machine and provided at its ends with brackets 19 which slide into channels 20 in the inner faces of the frame members 10 so as to support the moistener as a whole.

The plate 18 is formed with a longitudinal recess which accommodates the main feed wick or wicks 21 and an auxiliary wick 22, this recess preferably taking the form of a slot 23 which is covered by a plate 24 secured by screws 25.

Detachably mounted beneath the rigid plate 18 is a carrier plate 26 for the moistening pad 16, which latter has its upper surface covered by the

plate 18 whilst one of its marginal portions projects beyond the plate 26 and is thus exposed on the underside.

Screws or equivalent means may be provided for drawing the plates 18, 26 together so that light pressure is established between the pad 16 and the underside of the feed wick 21, such an arrangement forming the subject of my co-pending application Serial No. 532,949, filed April 27, 1944.

In applying the present invention to such a construction between the tank 15 and the housing containing the moistening pad 26, the portions of the feed wick or wicks 21 disposed within the tubes 17 are divided so that a gap is formed in each as shown at 28 in Figures 2 and 3.

The end 29 of the upper wick section in each tube 17 may be cut in a V so that when the wick section is viewed from the side, the end 29 is defined by a horizontal line extending to about the centre line and then by a downwardly inclined line extending to the further edge of the wick.

The upper end 30 of the lower wick section is cut off obliquely so that the lower edge of the gap 28 extends horizontally when this wick section is in position in the inclined tube 17.

Each inclined tube 17 is provided with a horizontally arranged branch tube 31 extending above the tank 15, this branch tube 31 having a sectional shape and size similar to that of the main wick tube 17 and accommodating an absorbent member 32 which may comprise a short length of the material used for the feed wick or wicks 21, its vertical dimension being such that, when advanced, into the gap 28 it engages the edges 29, 30 of the upper and lower wick sections to the inclined tube 17.

This movable absorbent member 32 is slidably mounted in a suitable metal holder 33 in the horizontal tube 31, its forward end projecting from the holder 33. Preferably the forward end of the member 32 is of V shape, so that when fully advanced it completely fills the gap 28 aforesaid.

Suitable means are provided for advancing or retracting the holder 33 in the branch tube 31, such means preferably comprising a screw 34 carried by the holder 33 and which extends through a tapped hole 35 in a block closing the front end of the branch tube 31. For convenience of operation the screw 34 may have a knurled head 36, and its inner end may be formed with a thread 37 of opposite hand to that on the rest of the screw. The thread 37 engaging a tapped hole 38 through the base of the holder 33.

The arrangement may be such that the movable absorbent members 32 can be adjusted either individually or together. The effect of such adjustment being to vary the area of contact between the movable absorbent members 32 and the upper and lower wick sections in the tubes 17, and thereby to regulate the supply of liquid to the moistening pad 16.

To facilitate insertion of the feed wick or wicks 21 into the enclosed tubes 17, the separated wick sections associated with each such tube may be enclosed in a box-like carrier 40 which fits the cross-section of the tube 17 and which is cut away as at 41 so that the movable absorbent member 32 can enter the gap 28 between the wick sections.

An alternative form of operating means for the movable absorbent members 32 is shown in Figures 4 and 5 each of the carriers 33 in this case being provided with a plain cylindrical stem 42 which extends through a plain hole in the block 43 closing the front end of the tube 31 and a nut 44 and washer 45 may be provided at the outer end of the stem 42 to form an adjustable abutment thereon. The inner surfaces of these nuts 44 may be of part-spherical shape.

Mounted so that it can slide on the projecting stems 42, and disposed horizontally across the front of the tank 15, is a cam bar 46 which may be of flat section and which has two slots 47 through which the stems 42 extend. Adjacent each of the slots 47 the bar 46 is provided with an inclined step 48 and compression springs 49 are provided within the tubes 31 which tend to advance the movable absorbent members 32.

With such an arrangement, movement of the bar 46 in an endwise direction, controls the position of the two stems 42 in accordance with the position of the inclined steps 48 engaging the abutments on the stems, and means may be provided whereby the bar 46 can be set at any one of a number of positions each corresponding to a different position of the movable absorbent members 32 in the tubes 31.

One end of the cam bar 46 is provided with an indicating pointer 50 adapted to move over a scale 51 fixed to the adjacent side member 10 of the machine, this scale 51 being marked at spaced positions with the words "on" and "off" and with a number of divisions between these two markings.

At the opposite end thereof the cam bar 46 is provided with a projection 52 at one side adapted to be engaged by an adjustable stop pin 53.

This stop pin 53 is carried by a plate 54 which is angularly adjustable about a pivot 55 on the adjacent side member 10 of the machine. This plate may be approximately of sector shape, with the stop pin 53 disposed at the smaller end of the sector, and the pivot 55 may be situated on the centre line of the plate 54 intermediate the ends thereof.

Near its larger end the stop plate 54 is formed with an arcuate slot 56 through which extends a stud 57 fixed in the side member 10 of the machine, a clamping nut 58 being placed on this stud 57 so that the stop plate 54 can be retained in any adjusted position after turning it about its pivot 55 to vary the position of the stop pin 53.

In use the operator moves the cam bar 46 (for example, by means of a handle 59 thereon) to the position giving the desired results as regards reproduction of copies, and then adjusts the adjustable stop plate 54 so that the pin 53 is in engagement with the projection 52 on the cam bar 46. The plate 54 may be provided with "on" and "off" markings corresponding to those on the scale 51.

When work is finished, the cam bar 46 is moved until the indicating pointer 50 coincides with the "off" marking on the scale 51. In this position the movable absorbent members 32 will be out of the gaps 28 between the feed wick sections, so that no liquid will be fed to the moistening pad 16.

When restarting the machine, the operator moves the cam bar 46 endwise until the projection 52 thereon abuts the stop pin 53 so that the correct position for the cam bar 46 will thus immediately be obtained, and experiment to determine such position each time work is started will be unnecessary.

The inclined steps 48 and projection 52 aforesaid may be integral with or fixedly attached to

the cam bar 46, but it is preferable to form them as separate members capable of a limited adjustment longitudinally of the bar. For instance, the steps 48 and projection 52 may be secured to the bar 46 by screws 60 which pass through slots 61 in the latter, or alternatively the slots may be formed in the steps 48 and projection 52.

What I claim then is:

1. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube and a movable absorbent member guided in said branch tube and capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad.

2. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube, a movable absorbent member guided in said branch tube and capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad, a closure for the outer end of said branch tube and actuating means for said movable absorbent member, said actuating means extending longitudinally of said branch tube and through said closure.

3. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube, a movable absorbent member capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad, a holder for said movable absorbent member slidably mounted in said branch tube, a closure for the outer end of said branch tube and a stem connected to said holder and projecting through said closure, said stem having a screw-threaded engagement with said closure and being rotatable to effect adjustment of said movable absorbent member.

4. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube, a movable absorbent member capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad, a holder for said movable absorbent member slidably mounted in said branch tube, a closure for the outer end of said branch tube, a stem connected to said holder and projecting through said closure, a spring urging said holder towards said gap, an abutment on said stem external to said branch tube and a cam member interposed between said closure and said abutment and movable to retract said holder against the action of said spring.

5. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube, a movable absorbent member capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad, a holder for said movable absorbent member slidably mounted in said branch tube, a closure for the outer end of said branch tube, a stem connected to said holder and projecting through said closure, a spring urging said holder towards said gap, an abutment on said stem external to said branch tube, a cam member interposed between said closure and said abutment and movable to retract said holder against the action of said spring and an adjustable stop associated with said cam member and adapted on movement of the latter to define the optimum position of said movable absorbent member in relation to said gap.

6. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, part of said wick being disposed within said feed tube and having a gap therein, a branch tube associated with said feed tube, a movable absorbent member capable of adjustment into and out of said gap to vary the cross-section of capillary flow through said wick and, thus, to control the supply of liquid to said pad, a holder for said movable absorbent member slidably mounted in said branch tube, a closure for the outer end of said branch tube, a stem connected to said holder and projecting through said closure, a spring urging said holder towards said gap, an abutment on said stem external to said branch tube, a cam member interposed between said closure and said abutment, means comprising a bar carrying said cam member and movable to cause the latter to retract said holder against the action of said spring, an adjustable plate pivoted to said frame, a stop pin carried by said plate and co-acting with said means so as to prevent movement of said cam member beyond a position corresponding to the optimum position of said movable absorbent member in relation to said gap, and means for fixing said plate in its angularly adjusted position.

7. A moistening device for a duplicating machine having a rigid frame, comprising a moistening pad, a reservoir for moistening liquid extending transversely of said frame, a pair of feed tubes extending upwardly from opposite sides of said reservoir, stationary wicks for conveying liquid to opposite ends of said moistening pad, parts of said wicks being disposed within said feed tubes and each having a gap therein, branch tubes associated with said feed tubes, movable absorbent members capable of adjustment into and out of said gaps to vary the cross-section of capillary flow through each of said wicks and, thus, to control the supply of fluid to said pad, holders for said movable absorbent members slidably mounted in said branch tubes, closures for the outer ends of said branch tubes, stems

connected to said holders and extending through said closures, springs urging said holders towards said gaps, abutments on said stems external to said branch tubes, a bar extending transversely of said frame, said stems extending through longitudinal slots in said bar, cams on said bar interposed between said closures and said abutments, said bar being movable endwise to retract said holders against the action of said springs a projection on said bar, and an adjustable stop mounted on said frame and co-acting with said projection so as to prevent movement of said bar beyond a position corresponding to the optimum position of said movable absorbent members in relation to said gaps, and means for fixing said stop in its adjusted position.

8. A moistening device for duplicating machines comprising a moistening pad, a reservoir for moistening liquid, a feed tube extending upwardly from said reservoir, a stationary wick for conveying liquid to said moistening pad, a carrier tube engaging telescopically in said feed tube and having mounted therein in spaced relationship two portions of said wick, said feed tube and said carrier tube having openings in their sides opposite the space between the said wick portions, a movable absorbent member, a guide for said movable absorbent member, means for moving said absorbent member through said feed tube and carrier tube openings into and out of the gap between said wick portions to vary the cross-section of capillary flow through said wick and thus to control the supply of liquid to said pad.

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