June 1, 1954 R. M. FORD ET AL 2,679,801

DRIVING MECHANISM FOR SHEET-FEEDING DEVICES IN DUPLICATING AND LIKE MACHINES

Filed July 26, 1951 3 Sheets-Sheet 1

FIG. 1.

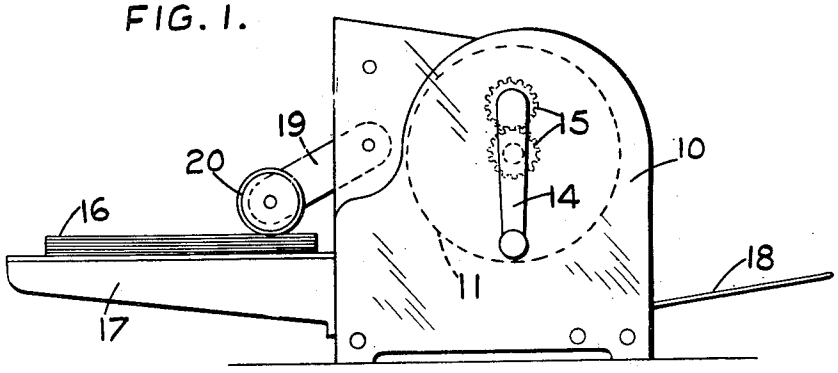
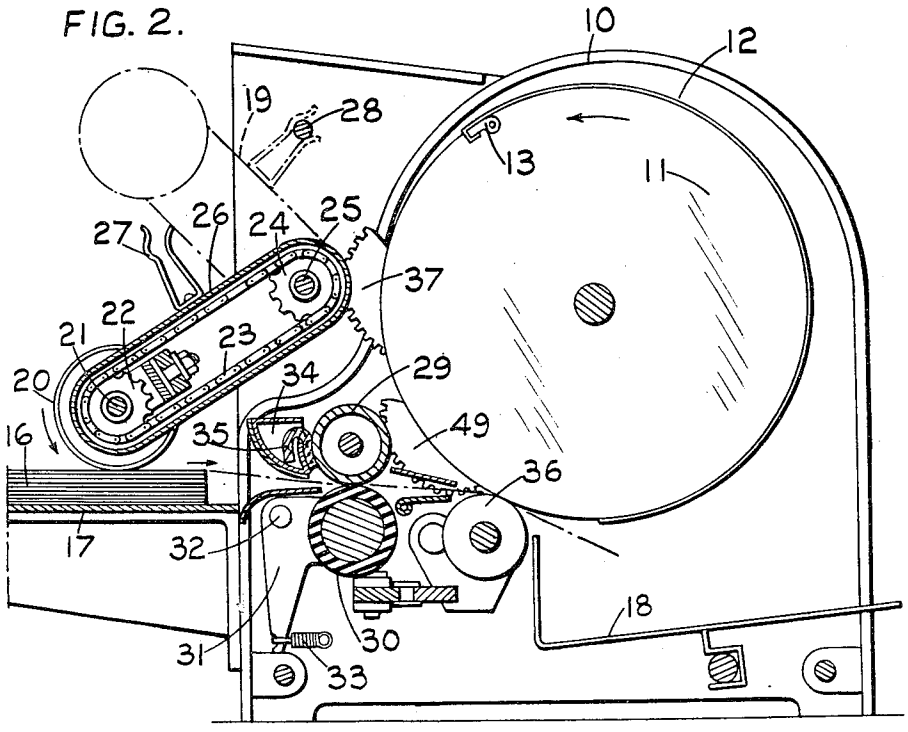


FIG. 2.



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June 1, 1954 R. M. FORD ET AL 2,679,801

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Filed July 26, 1951 3 Sheets-Sheet 2

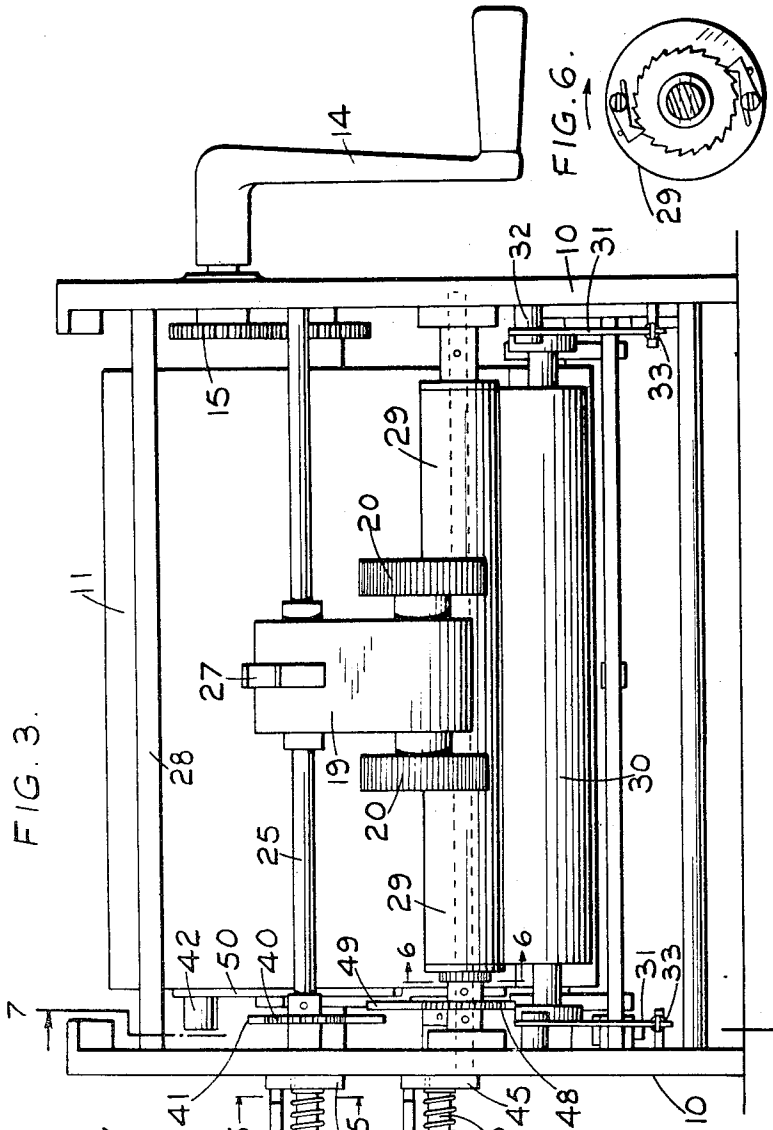


FIG. 3.

FIG. 6.

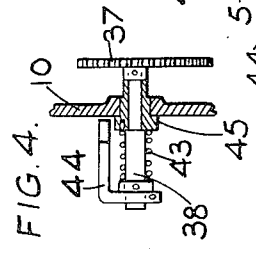


FIG. 4.

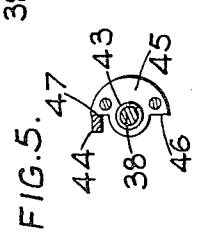


FIG. 5.

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June 1, 1954 R. M. FORD ET AL 2,679,801

DRIVING MECHANISM FOR SHEET-FEEDING DEVICES IN DUPLICATING AND LIKE MACHINES

Filed July 26, 1951 3 Sheets-Sheet 3

FIG. 7.

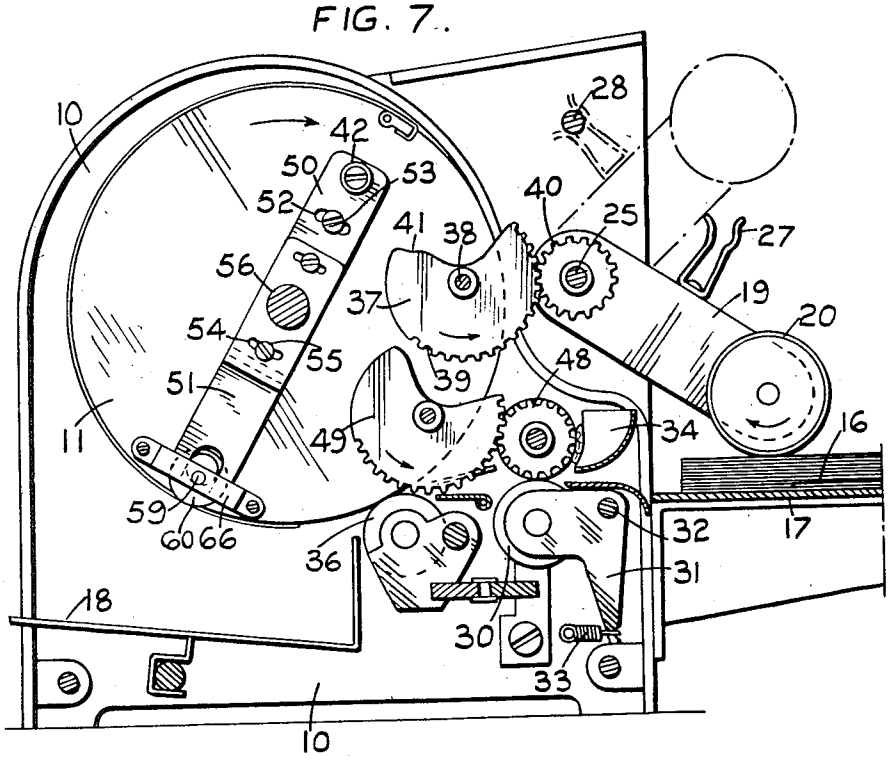


FIG. 8.

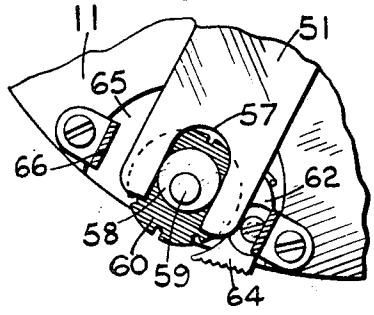
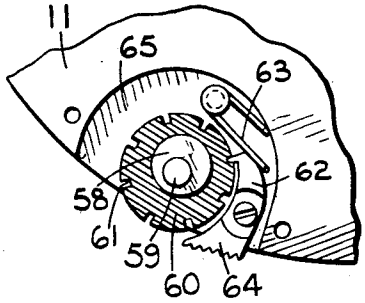


FIG. 9.



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UNITED STATES PATENT OFFICE

2,679,801

DRIVING MECHANISM FOR SHEET-FEEDING DEVICES IN DUPLICATING AND LIKE MACHINES

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Application July 26, 1951, Serial No. 238,656

Claims priority, application Great Britain August 4, 1950

3 Claims. (Cl. 101—132.5)

1

This invention relates to driving mechanism for sheet-feeding devices in duplicating and printing machines of the kind in which copy sheets are fed in succession to a rotary printing cylinder. The invention has particular application in duplicating machines of the type in which copy sheets are moistened with suitable solvent and passed in pressure contact with a master cylinder which carries a master sheet bearing in reverse type the matter to be duplicated.

The object of the present invention is to provide a new or improved driving mechanism for the sheet-feeding devices of machines of this kind.

As examples of sheet-feeding devices to which the invention is applicable, known constructions of rotary cylinder duplicating and like machines are provided with driving rollers which are rotated intermittently to feed copy sheets from a stack. Feed-in rollers are provided, also, and in duplicating machines a feed-in roller may function as a moistening roller for applying solvent liquid to the copy sheets as they pass between the feed-in rollers.

According to the present invention driving mechanism for a sheet feeding device in a machine of the kind specified comprises a driving member mounted for oscillation on the machine structure and having a toothed rack, the teeth of which engage with a pinion which is in driving connection with the sheet-feeding device of the machine, said driving member being oscillated periodically by means of an actuating member rotating with the cylinder and positioned so as to engage part of said driving member disposed in its path of rotation to move the driving member and cause rotation of said pinion to operate the sheet feeding device and feed a copy sheet into the machine.

The driving member may comprise a disc, having a cut-away part and with teeth provided on its circular periphery, the disc being mounted for pivotal oscillation about its own axis and the cut-away part providing an approximately radial face which is engaged by the actuating member.

The return movement of the driving member may be provided by a spring and suitable stops provided to limit the extent of pivotal movement of the disc-shaped driving member.

The actuating member may comprise a roller mounted on the end face of the cylinder and projecting endwise so that once during each revolution it engages the face of the driving member which is disposed in its path of rotation. Means may be provided for adjusting the position of this roller.

2

In a duplicating machine of the type having a master cylinder the sheet-feeding device passes a copy sheet to a further pair of rollers which then pass the sheet between the master cylinder and a co-operating pressure roller and according to a further feature of this invention there may be provided two driving members mounted for oscillation on the machine structure, one driving member having teeth which engage with a pinion operatively connected to the sheet-feeding device and the other driving member having teeth which engage with a pinion in driving connection with a further feed-in roller. This feed-in roller may constitute the moistening roller of the duplicating machine.

The sheet-feeding device may be of the kind disclosed in our pending application Serial No. 95,204, now abandoned.

The invention is illustrated in the accompanying drawings wherein:

Figure 1 is a side elevation of a duplicating machine to which the present invention may be applied.

Figure 2 is a section in side elevation through a machine as shown in Figure 1.

Figure 3 is a plan view.

Figure 4 is a detail showing the return spring on one of the driving members.

Figure 5 is a section on the line 5—5 in Figure 3.

Figure 6 is a detail showing the ratchet and pawl drive to the moistening roller.

Figure 7 is a section on the line 7—7 of Figure 3.

Figures 8 and 9 are details showing construction of the adjusting means for the actuating roller.

In the accompanying drawings the invention is shown as applied to a duplicating machine of the spirit process type, said machine having side frame members 10 between which is rotatably mounted a master cylinder 11 which carries a master sheet 12 secured by a clamp 13, suitable means being provided for rotating the master cylinder such as a handle 14 and a gearing 15. The copy sheets 16 are supported in a stack upon a table 17 and after passing through the machine are delivered onto a tray 18. The sheet-feeding device, generally indicated at 19, may be as disclosed in our pending application Serial No. 95,204, now abandoned, which includes mechanism for raising the table 17 in timed relationship with the feeding in of copy sheets from the stack 16.

The sheet-feeding device 19 includes a pair of rollers 20 which engage the copy sheets and are mounted upon a shaft 21 provided with a sprocket 22 which is driven by a chain 23 from sprocket 24

mounted upon a shaft 25, all carried in an enclosing casing 26 which is so mounted that the sheeting device can be moved from its operative position to the position shown in broken lines in Figure 2 where it is held by means of the clip 27 engaging a fixed rod 28.

The copy sheets pass from the stack 16 between a moistening roller 29 and a co-operating roller 30, the roller 30 being mounted between brackets 31 pivotally mounted at 32 on the machine frame and acted upon by springs 33. Any of the known means may be used for applying the solvent to the moistening roller and in the present case this has been shown generally as a liquid tank 34 and moistening pad 35. From the moistening roller the copy sheets then pass between the master cylinder 11 and a pressure roller 36, the construction and mounting of which may be of any suitable known form.

The driving mechanism for the sheet-feeding device comprises a disc 37 which is mounted on the machine frame for pivotal movement about its axis 38 and is provided on its periphery with a set of teeth forming a rack 39. This rack 39 engages with a pinion 40 provided on the shaft 25 of the sheet-feeding device so that rotation of the disc 37 causes driving of the sheet-feeding rollers.

The disc 37 has a cut-away part which provides an approximately radial face 41 disposed in the path of rotation of an actuating member which comprises a roller 42 carried on the end face of the master cylinder.

The roller 42 moves the disc 37 in one direction and the return movement is provided by means of a spring 43 as shown in Figures 3 and 4, said spring being provided on the axis 38 of the driving member and being fixed at one end in relation to the machine frame and fixed at the other end to a projecting lug 44 mounted on the spindle 38. Referring to Figure 5 it will be seen that the lug 44 engages with a stop plate 45 fixed on the machine frame, said plate having faces 46 and 47 which form stops to define the extent of pivotal movement of the driving member 37.

The axis of the moistening roller 29 is also provided with a driving pinion 48 and a further driving member is provided on the machine frame, this comprising a disc 49 of exactly similar construction and arrangement as the disc 37. This disc 49 is also arranged to be driven by the actuating roller 42 so as to oscillate in exactly the same manner as the disc 37 and there is provided a similar arrangement of stops and return spring.

The roller 42 is carried at the end of a lever which is made in two parts 50 and 51, the part 50 having a slot 52 through which passes a shouldered screw 53 the head of which prevents the lever from moving away from the end face of the master cylinder with which the shoulder of the screw 53 engages. The part 51 has two slots 54 through which pass screws 55 to secure the part 51 to the part 50. The two parts of the lever are mounted upon the axis 56 of the master cylinder.

The other end of the part 51 of this lever has an open-ended slot 57 within which works an adjusting cam 58. The cam 58 comprises a disc which is mounted eccentrically upon a stub shaft 59 which is carried in a bearing in the master cylinder and at its other end in a bearing formed in a strap 66 secured to the end face of the master cylinder.

As shown in Figures 8 and 9 the stub shaft 59 is provided with a drum 60 which has slots 61 in its circumference and a retaining pawl 62 is pivotally mounted on the end face of the master cylinder and provided with a retaining spring 63 which normally holds it in engagement with a slot 61 in the drum 60. The pawl is provided with a finger piece 64 so that it can be rocked out of engagement to allow the drum 60 to be rotated thus rotating the cam disc 58 for the purpose of adjusting the position of roller 42 on the end face of the master cylinder. The screw 53 and slot 52 permit of the adjustment without it being necessary to turn the screws 53.

The whole of the above described adjusting mechanism is housed in a recess 65 provided in the end face of the master cylinder.

By means of the cam disc 58, the roller 42 can be adjusted about the axis 56 of the master cylinder so as to vary its position in relation to the master sheet clip 13 and thus vary the position of the leading edge of a copy sheet to the clip 13 as the copy sheet is fed into the master cylinder.

The sheet-feeding device 19, as shown in our co-pending application Serial No. 95,204, incorporates a free-wheel device to prevent rotation of the feed rollers on the return movement of the driving mechanism. A free-wheel of the ratchet and pawl type as shown in Figure 6 is also provided between the pinion 48 and the moistening roller to allow the moistening roller to continue forward rotation as the copy sheet is pulled in by the master cylinder during the return movement of driving member 49.

What we claim then is:

1. In a machine of the kind specified having a rotary printing couple comprising a master cylinder and pressure roller coacting therewith, a feed tray arranged at the entrance to said printing couple, and a sheet feeding device adapted to advance copy sheets placed on said tray into said printing couple; the provision of drive mechanism for said device comprising, a mounting member at one end of said master cylinder and supported for angular adjustment about the axis thereof and carrying an actuating member, adjustable abutment means supported on said cylinder and having an abutment face coacting with the mounting member to determine positively its angular relationship to the cylinder and restrain it positively against displacement in either direction of rotation, a retaining device interengaging positively with spaced formations on the abutment means to retain same positively against any movement in its direction of adjustment while being manually releasable temporarily to permit said abutment means to be moved into any of a plurality of positions of adjustment defined by said formations transmission mechanism mounted on supporting structure of the machine and operatively connected with said sheet-feeding device, said transmission mechanism having an element disposed in the path of said actuating member for operation thereby at a time determined by the position of said abutment means.

2. In a machine of the kind specified having a rotary printing couple comprising a master cylinder and pressure roller coacting therewith, a feed tray arranged at the entrance to said printing couple, and a sheet feeding device adapted to advance copy sheets placed on said tray into said printing couple; the provision of drive mechanism for said device comprising, a mounting member at one end of said master

cylinder and supported for angular adjustment about the axis thereof and carrying an actuating member, adjustable abutment means in the form of a rotatable cam coacting at diametrically opposed positions on its periphery with opposed faces of said mounting member to determine positively its angular relationship of the mounting member to the cylinder and restrain it positively against displacement in either direction of rotation, said cam having a rotary operating member fixed thereto and presenting a circumferential face portion disposed near the circumference of the master cylinder and having a plurality of angularly spaced abutment formations around its periphery, a retaining device in the form of a displaceable finger piece mounted on the master cylinder biasing means urging the finger piece into interlocking engagement with one of said formations to retain the cam positively against rotation in either direction while permitting the finger piece to be temporarily displaced to enable the cam to be moved into any of a plurality of positions of adjustment defined by said formations transmission mechanism mounted on supporting structure of the machine and operatively connected with said sheet-feeding device, said transmission mechanism having an element disposed in the path of said actuating member for operation thereby at a time determined by the position of said abutment means.

3. In a machine of the kind specified having a rotary printing couple comprising a master cylinder and pressure roller coacting therewith, a feed tray arranged at the entrance to said printing couple, and a sheet-feeding device adapted to advance copy sheets placed on said tray into said printing couple, the provision of

drive mechanism for said device comprising, a mounting member in the form of a lever carrying an actuating member, said lever being pivoted to said cylinder coaxially therewith, one end of said lever lying adjacent to the periphery of said cylinder and having an open-ended slot, the master cylinder having a recess behind said end of the lever, a rotary adjustment member having a drum disposed in said recess and a cam fixed to the drum and disposed in the slot of the lever to coact positively and simultaneously with opposed inner edge-faces of the slot a finger piece pivoted to the master cylinder and disposed in said recess the drum having a plurality of angularly spaced slots, a detent on said finger piece for engaging selectively in one of said slots depending upon the angular position of the drum and spring means urging the detent into such position of engagement to retain the cam positively against rotation in either direction, transmission mechanism mounted on supporting structure of the machine and operatively connected with said sheet-feeding device, said transmission mechanism having an element disposed in the path of said actuating member for operation thereby at a time determined by the position of said abutment means.

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