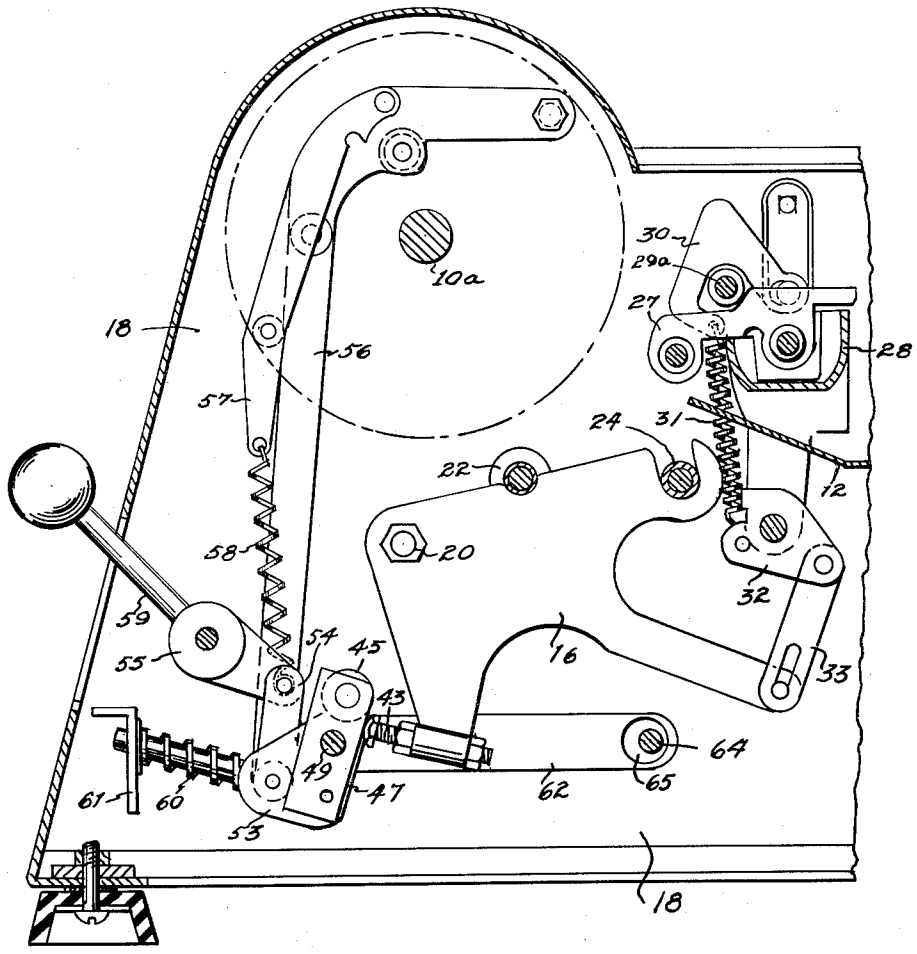
Nov. 8, 1955 H. P. KEIL 2,722,885

PRESSURE CONTROL FOR DUPLICATING MACHINES

Filed June 30, 1952 4 Sheets-Sheet 1

Fig 1



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PRESSURE CONTROL FOR DUPLICATING MACHINES

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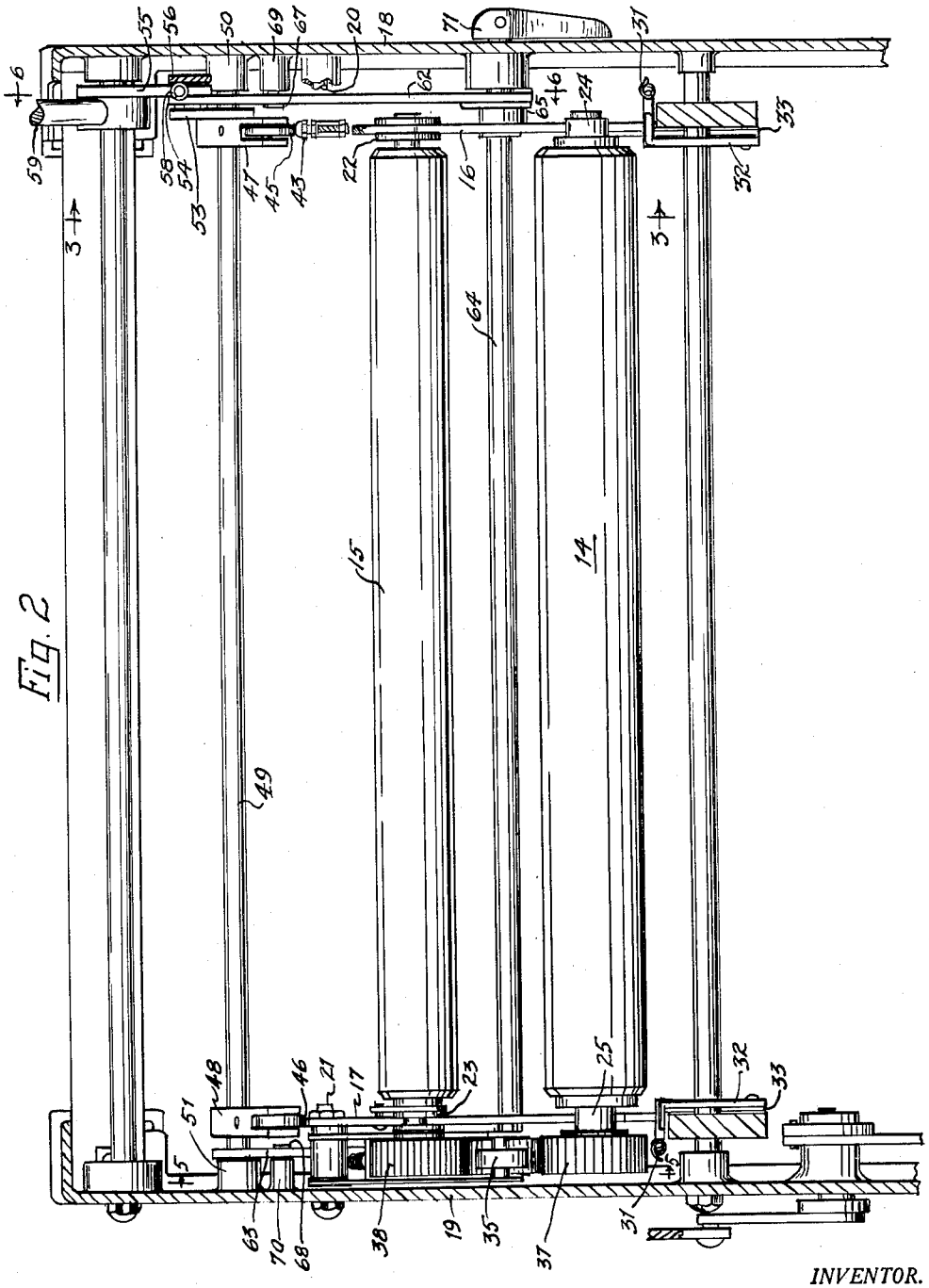


Fig. 2

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PRESSURE CONTROL FOR DUPLICATING MACHINES

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Fig. 3

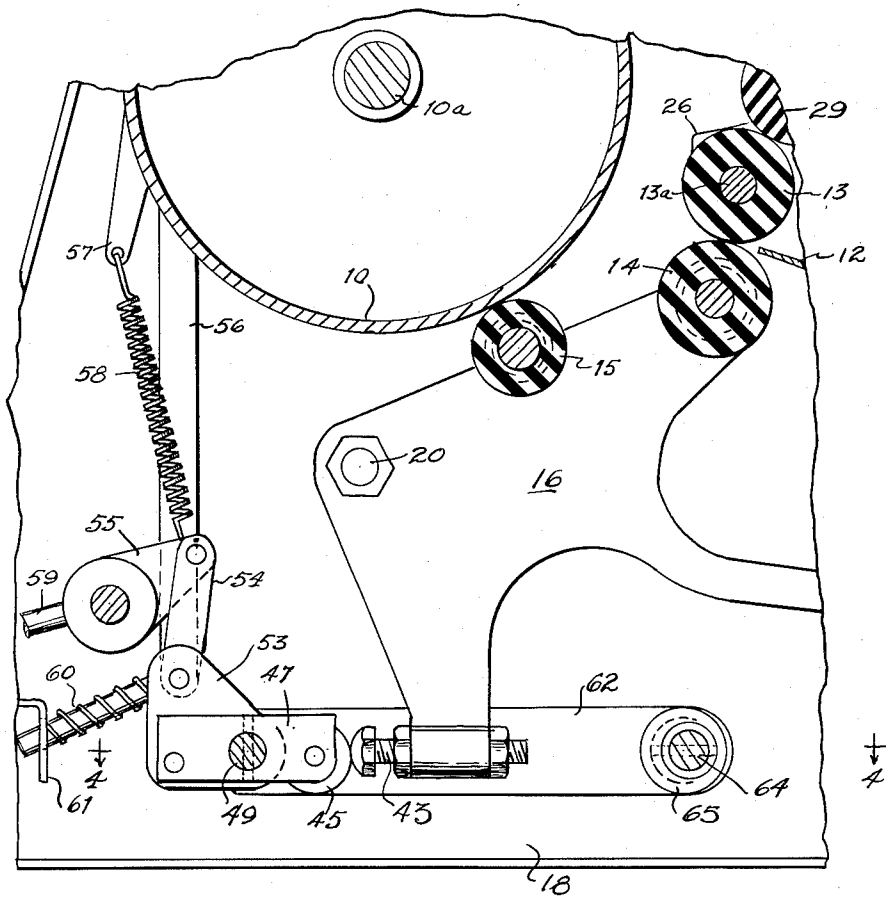
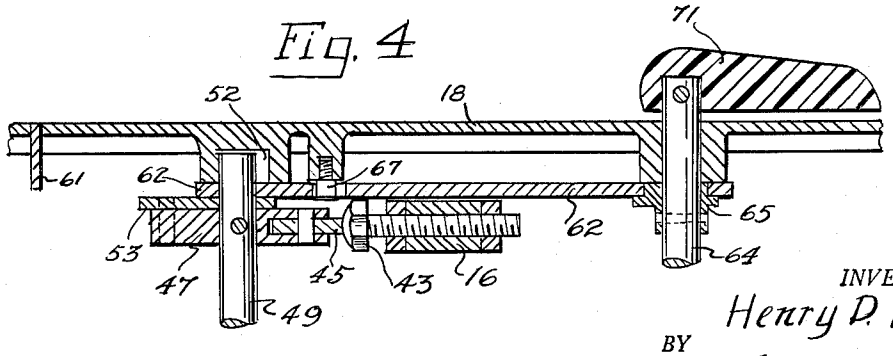


Fig. 4



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PRESSURE CONTROL FOR DUPLICATING MACHINES

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Fig. 5

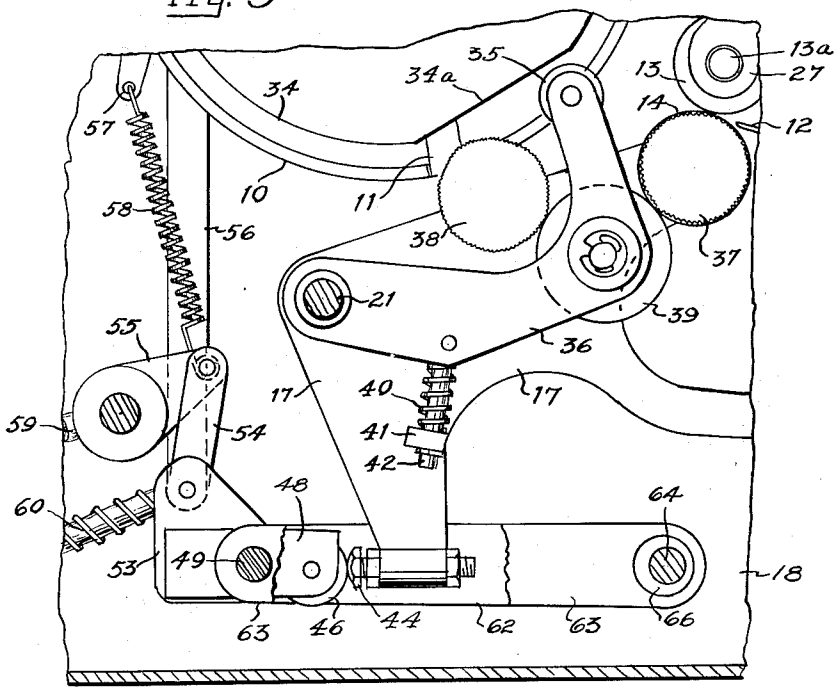
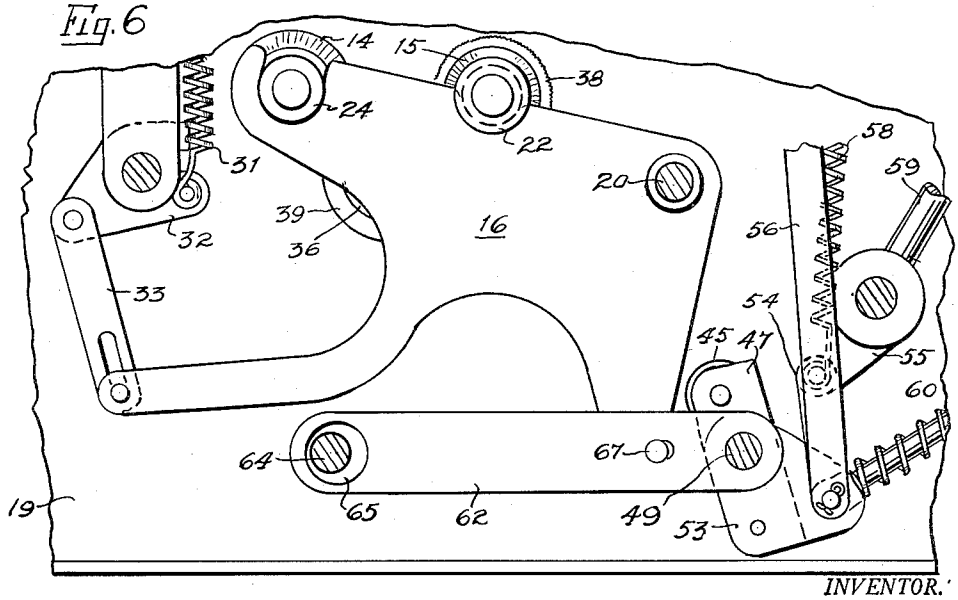


Fig. 6



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2,722,885

PRESSURE CONTROL FOR DUPLICATING MACHINES

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Application June 30, 1952, Serial No. 296,283

5 Claims. (Cl. 101—132)

The present invention relates to improvements in the pressure control for duplicating machines of the type shown in application, Serial No. 279,287, which I filed March 29, 1952, for improvements in Duplicating Machines. In a machine of this character the drum carries a master copy which has the legend to be reproduced placed thereon in hectographic ink and in reverse to what it is to appear on the copies. Copy sheets are fed into engagement with the master sheet on the drum and moistened on the surface that engages the master copy on the drum with a solvent for the hectograph ink. The copy sheets are pressed into intimate engagement with the master copy by a small roller. It is necessary to maintain the proper pressure between the small roller and the drum in order to obtain the best copies. This is particularly true in the machine shown in my prior application wherein the drive of the moistening mechanism is accomplished through engagement of the drum with the pressuer roller and a drive by the pressure roller of the feeding and moistening rollers that advance and moisten the copy sheet. In this machine, provision is made for releasing the pressure between the pressure roller and the drum and between the moistening roller couple at the end of each run of copies.

It is the purpose of the present invention to provide a novel mechanism by which the pressure of the pressure roller toward the drum is controlled in such a way that the repeated release and engagement of the pressure roller with the drum can be accomplished without interfering with the pressure adjustment and the pressure adjustment may be changed at any time.

It is also a purpose of the present invention to provide a novel construction embodying the pressure roller and its supporting arms, a pressure release mechanism by which the pressure roller is separated from the drum, together with a novel pressure adjusting mechanism interposed in the release mechanism for regulating the amount of pressure between the drum and the pressure roller when they are engaged.

The nature and advantage of my invention will appear more fully from the following description and the accompanying drawings wherein a preferred form of the invention is shown. It should be understood however, that the drawings and description are illustrative only and are not intended to limit the invention except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a sectional view taken longitudinally through the duplicating machine of my prior application mentioned hereinbefore, showing the mechanism by which the pressure roller and the associated moistening roller assembly are interconnected with the drum;

Figure 2 is a plan sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2, but showing the parts in operating position with the pressure roller in engagement with the drum;

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a sectional view taken on the line 5—5 of Figure 2; and

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 2, looking at the same mechanism as Figure 3 but in the opposite direction.

Referring now in detail to the drawings, a duplicating machine embodying my invention employs a drum 10 to support a master sheet. A suitable gripping mechanism 11 is provided on the drum for holding a master sheet and copy sheets are fed to the drum from a feed tray 12 by moistening and feeding rollers 13 and 14. The moistened copy sheets are pressed against the drum by a pressuer roller 15. The drum 10 is rotated by means of its shaft 10*a* and an operating handle, not shown. The present invention concerns itself with the mechanism whereby the pressure of the roller 15 against the drum is readily adjusted in a machine of this character and retained at the desired adjustment even though the pressure roller 15 may be shifted many times between its operative position as shown in Figure 3, and the released position shown in Figure 1. The pressure roller 15 is connected by a mechanism, described hereinafter, to the roller 14, once during each duplicating cycle of the drum, in order to advance copy sheets to the drum.

As shown best by Figures 1 and 2, the rollers 14 and 15 are supported by levers 16 and 17 which are pivoted to the side frames 18 and 19, pivot pins 20 and 21 being provided on the side frames 18 and 19 for this purpose. The roller 15 has bearing members 22 and 23 at its ends that seat in recesses in the tops of the levers 16 and 17. The roller 14 also has bearings 24 and 25 at its ends, which bearings are supported in notches in the levers 16 and 17. The roller 13 has its shaft 13*a* mounted in brackets 26 and 27, which brackets are pivotally supported in the ends of a moistening liquid trough 28. Yielding pressure is applied downwardly on the roller 13 through a transfer roller 29, a portion of which is shown in Figure 3, and the shaft 29*a* of which is shown in Figure 1 of the drawings. The members 30 exert a downward pressure on the shaft 29*a* when the rollers 14 and 15 are raised. The pressure is exerted through the medium of springs 31, levers 32 and links 33 which connect to the levers 16 and 17. The details of this mechanism are shown more fully and described in my prior application referred to hereinbefore. They are described here merely to give sufficient background for the understanding of the present invention.

Referring now in particular to Figures 2 and 5, the drum 10 has a control cam 34 at the end thereof adjacent to the side frame 19. This control cam is adapted to engage a roller 35 which is mounted in the free end of a lever arm 36 that is pivoted to the pivot pin 21 for the lever 17. The rollers 14 and 15 have knurled wheels 37 and 38 on their shafts 14*a* and 15*a* beyond the bearings 25 and 23. These wheels 37 and 38 are adapted to be engaged by a connecting wheel 39 that is carried on the lever arm 36 whenever the flat portion 34*a* of the cam 34 is opposite the roller 35 on the lever arm 36. The wheel 39 preferably has its drive surface made of some yieldable material such as synthetic rubber so that it will have adequate driving engagement with the wheels 37 and 38 to transfer the rotative movement of the pressure roller 15 to the moistening and feeding rollers 13 and 14. The lever arm 36 is yieldingly pressed in a direction to engage the wheel 39 with the wheels 37 and 38 by a spring 40 which is interposed between a block 41 on the lever 17 and lever arm 36. A guide pin 42 is provided for the spring 40.

The levers 16 and 17 have adjustable stop pins 43 and 44 at their lower ends. These stop pins, as shown

in my prior application, are adapted to engage rollers 45 and 46 that are provided on trip levers 47 and 48. The trip levers 47 and 48 are fixed to a floating shaft 49 that extends between the side frames 18 and 19 and fits in bosses 50 and 51 on the side frames 18 and 19 respectively. These bosses have enlarged openings, as shown at 52 in Figure 4, to receive the ends of the floating shaft 49. The trip lever 47 is connected by a plate 53 fixed thereto, and a link 54 to a hand lever 55 which controls the master sheet gripping mechanism 11 on the drum 10 and provides a lock for the drum through the levers 56 and 57 and the spring 58. The details of this control are old as shown in my application, Serial No. 791,881, filed December 15, 1947, for a motor driven duplicating machine. The lever 55 has a handle 59 that projects beyond the side frame 18 so that it is readily accessible. A toggle spring mechanism 60 is provided between the member 53 and a bracket 61 on the side frame 18 to hold the trip levers 47 and 48 in either the position shown in Figure 2 or that shown in Figure 3.

It will be appreciated that by adjusting the floating shaft 49 horizontally toward and away from the stop members 43 and 44, the levers 16 and 17 can be made to exert more or less pressure to hold the pressure roller 15 against the drum 10. This adjustment must be such that the control mechanism just described, continues to perform its function in all positions. The shaft 49 has two links 62 and 63 fitted over it at the ends adjacent to the bosses 50 and 51. These links extend horizontally inside the side frames 18 and 19 and are supported at their forward ends by a cross shaft 64 and eccentrics 65 and 66 which are fixed to the cross shaft 64 and journalled in the links 62 and 63 respectively. The links 62 and 63 are guided by guide pins 67 and 68 which are secured in bosses 69 and 70 on the side frames 18 and 19. The shaft 64 has a hand piece 71 thereon outside the side frame 18. By rotating the hand piece 71, the cams 65 and 66 may be made to move the links 62 and 63 endwise a limited amount which will of course, move the shaft 49 toward or away from the stop members 43 and 44. This limited movement is not great enough to interfere with the control operations of the members 54, 55, 56, 57 and 58, yet it provides ample variation in the pressure of the roller 15 against the drum 10 when the parts are in the position illustrated in Figure 3.

It is believed that the nature and advantage of my invention will be apparent from the foregoing description.

Having thus described my invention, I claim:

1. In a duplicating machine, side frames, a master sheet supporting drum mounted for rotation in said frames, a pressure roller beneath the drum for pressing sheets against the drum, levers supporting the ends of the pressure roller and pivotally supported by the frames to carry the roller into and out of pressure contact with the drum, said levers having depending portions for engagement with trip levers to move the pressure roller carrying levers in a direction to lift the pressure roller, a pressure control shaft journalled in the frame, a handle on the control shaft, eccentric cams fixed on the pressure control shaft adjacent to the side frames, links journalled on the cams, a rock shaft journalled in the free ends of the links, means on the frame supporting the free ends of the links and said rock shaft for movement endwise of the links in response to rotation of said eccentric cams, trip levers fixed on the rock shaft in alignment with the depending portions of said pressure roller levers, and means to turn the rock shaft.

2. In a duplicating machine, side frames, a master sheet supporting drum mounted for rotation in said frames, a pressure roller beneath the drum for pressing sheets against the drum, levers supporting the ends of the pressure roller and pivotally supported by the frames to carry the roller into and out of pressure contact with the drum, said levers having depending portions for engagement with trip levers to move the pressure roller carrying levers in a direction to lift the pressure roller, a pressure control shaft journalled in the frame, a handle on the control shaft, eccentric cams fixed on the pressure control shaft adjacent to the side frames, links journalled on the cams, a rock shaft journalled in the free ends of the links, means on the frame supporting the free ends of the links and said rock shaft for movement endwise of the links in response to rotation of said eccentric cams, trip levers fixed on the rock shaft in alignment with the depending portions of said pressure roller levers, a toggle spring mechanism connected to one of said trip levers and the adjacent side frame, operable to hold the trip levers either in a position to separate the pressure roller and drum, or in position to lift the pressure roller against the drum, a hand lever, and a link connecting the hand lever and one of said trip levers for moving the trip lever between the aforesaid positions.

3. In a duplicating machine having a master sheet drum, and a pressure roller movable between operative position in pressure engagement with the lower surface of the drum and inoperative position spaced below the drum, and having rock levers carrying the pressure roller together with a shaft having means to shift said levers from inoperative to operative position, a support for said shaft comprising links in which the ends of said shaft are journalled, means supporting the links for endwise movement, a pressure control shaft spaced from the first named shaft, eccentrics on said last named shaft on which said links are journalled, and a handle for turning the pressure control shaft.

4. In a duplicating machine, side frames, a master sheet supporting drum mounted for rotation in said frames, a pressure roller beneath the drum for pressing sheets against the drum, levers supporting the ends of the pressure roller and pivotally supported by the frames to carry the roller into and out of pressure contact with the drum, said levers having depending portions for engagement with trip levers to move the pressure roller carrying levers in a direction to lift the pressure roller, a pressure control shaft journalled in the frame, eccentric cams fixed on the pressure control shaft adjacent the side frames, links journalled on the cams, a rock shaft journalled on the free ends of the links, bosses on the side frames adjacent the rock shaft, shaft receiving slots in the bosses, the end of the rock shaft being seated in said slots, said slots being elongated horizontally to secure the rock shaft for limited horizontal movement in response to rotation of the eccentric cams, trip levers mounted on said rock shaft in alignment with the depending portions of the pressure roller supporting levers, and means on the rock shaft to rotate the rock shaft.

5. In a duplicating machine having a master sheet drum and a pressure roller for pressing sheets against said drum, means supporting the pressure roller against said drum whereby the movement of the roller against the drum is individually controlled at both ends of the roller, and means for varying the pressure of the roller against the drum while maintaining the individual movement of the ends of the roller toward the drum, said first named means comprising separate levers pivoted to the side frames of the machine, each lever supporting one end of the pressure roller, said levers having depending portions thereon, adjustable stops mounted at the lower edges of the depending portions of said levers, a rock shaft mounted in the side frames, trip levers mounted on the rock shaft in alignment with the adjustable stops, said stops pressing against the trip levers to hold the ends of the pressure roller in contact with the drum, said pressure varying means comprising bosses in the side frames, slots in the bosses receiving the ends of the rock shaft, said slots being elongated in a direction parallel to the direction of adjustment of the stops to allow the rock shaft to be moved a limited distance toward and away from the said stops, a pressure control shaft journalled in the

side frames, means to rotate the shaft, eccentric cams fixed on the shaft adjacent the side frames, links journalled on the cams, the free ends of said links being mounted on the rock shaft adjacent its ends whereby to move the rock shaft toward and away from the adjustable stops upon rotating the pressure control shaft.

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