

Sept. 13, 1955

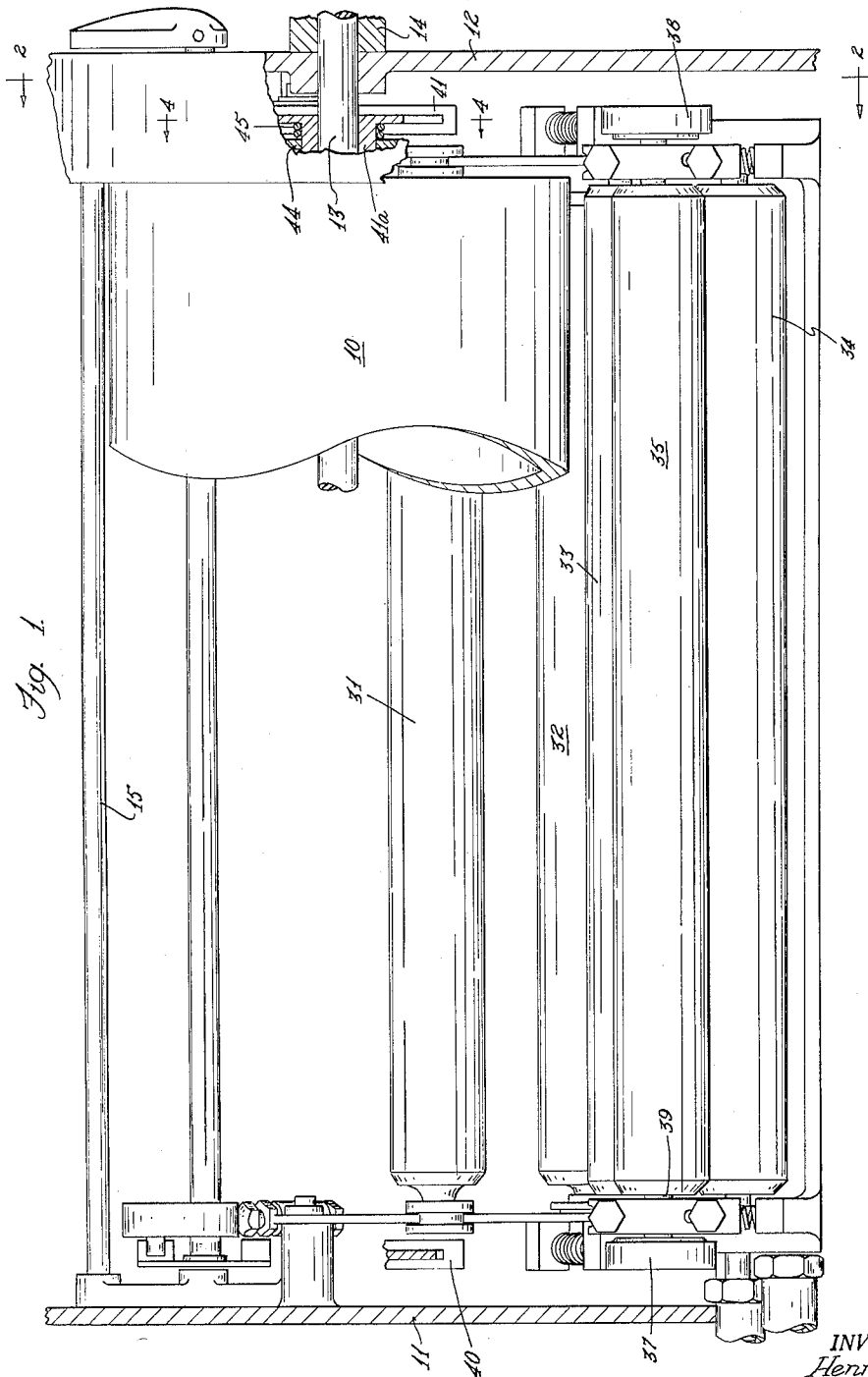
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2,717,549

MASTER SHEET CLAMP MECHANISM FOR DUPLICATING MACHINES

Filed July 22, 1952

5 Sheets-Sheet 1



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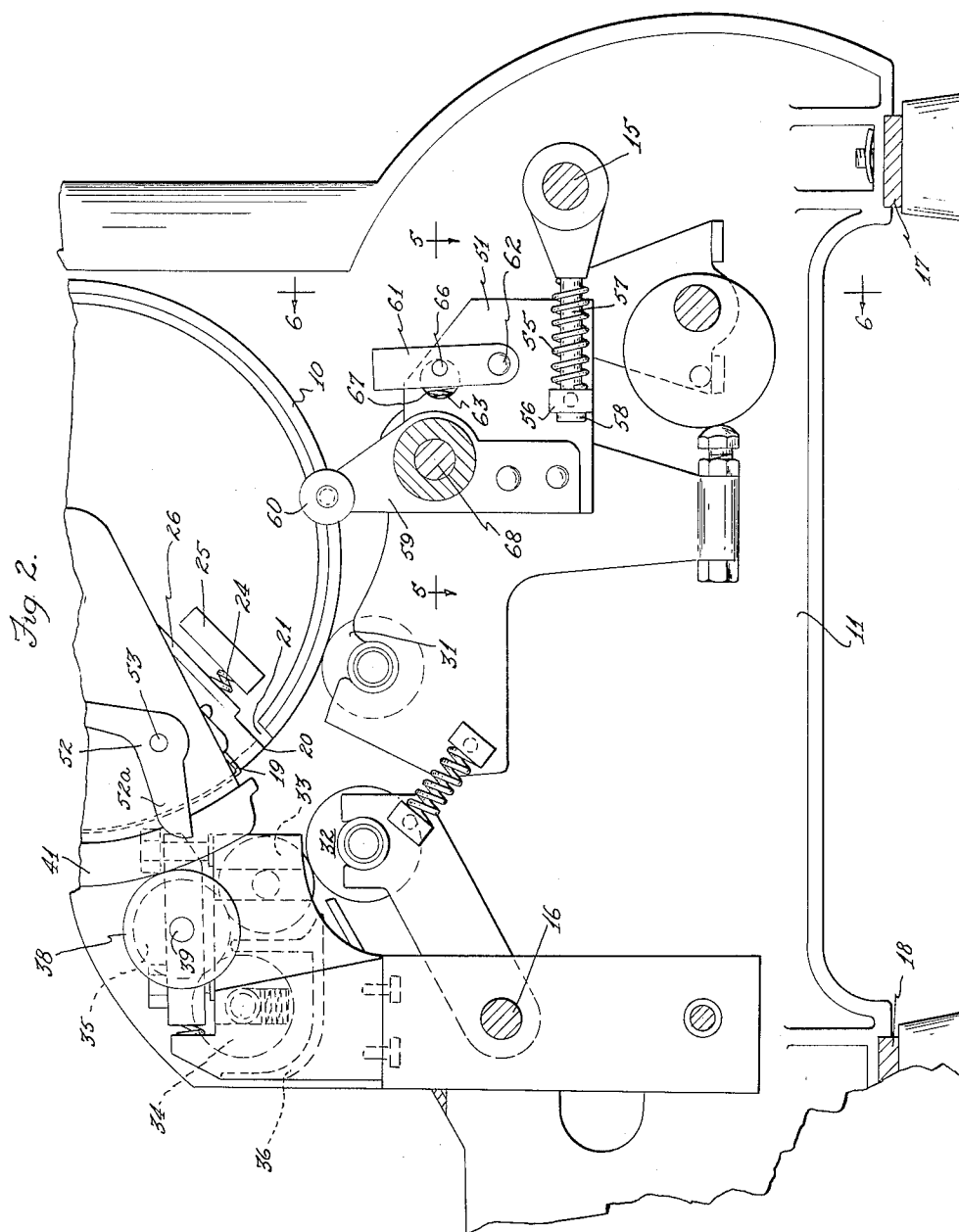
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MASTER SHEET CLAMP MECHANISM FOR DUPLICATING MACHINES

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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

Fig. 4.

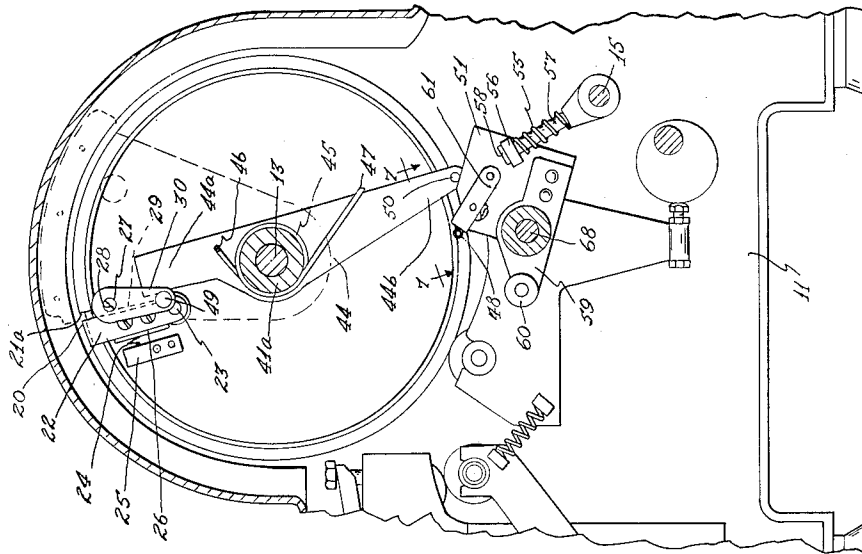
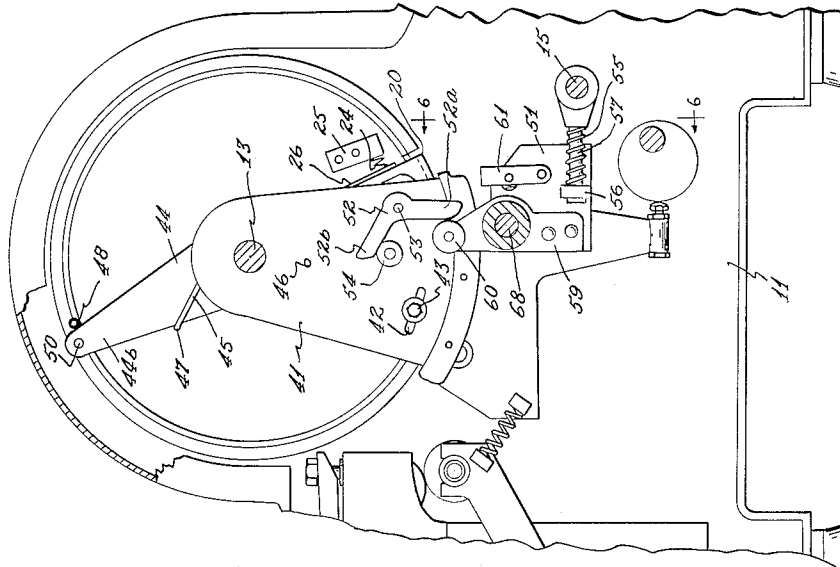


Fig. 3.



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Fig. 5.

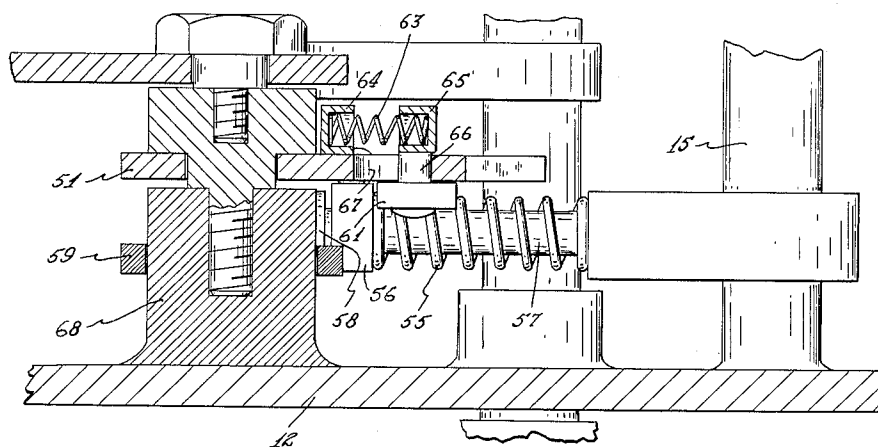
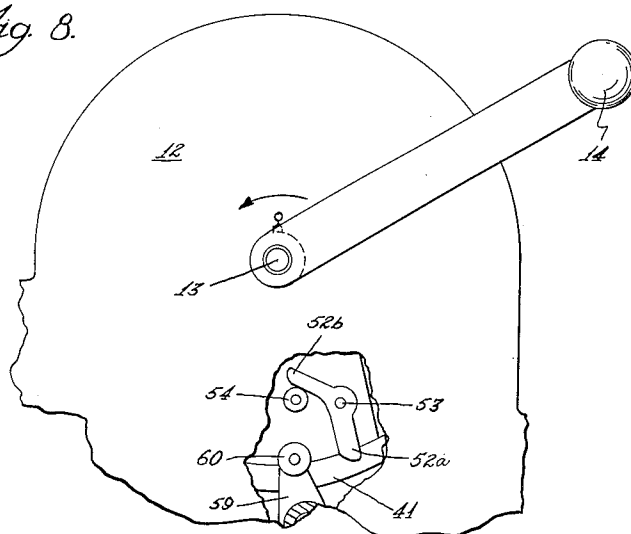


Fig. 8.



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5 Sheets-Sheet 5

Fig. 7.

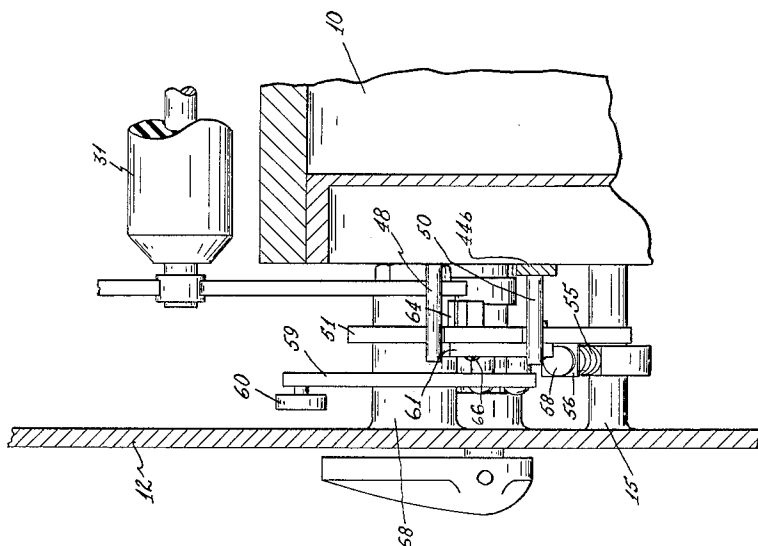
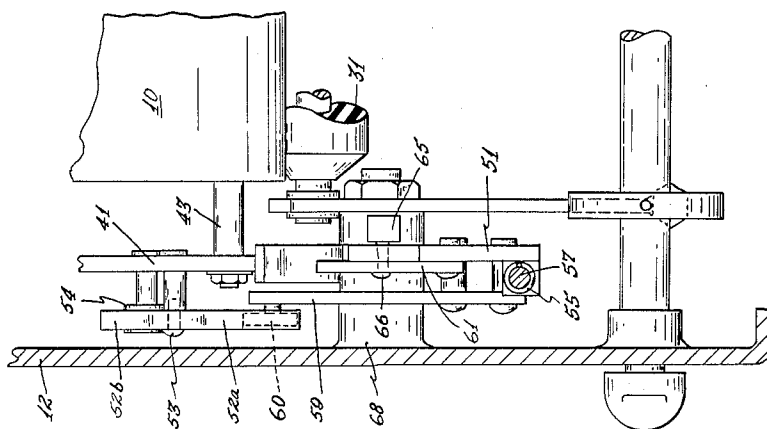


Fig. 6.



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MASTER SHEET CLAMP MECHANISM FOR DUPLICATING MACHINES

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Application July 22, 1952, Serial No. 300,157

3 Claims. (Cl. 101—132)

The present invention relates to improvements in duplicating machines and particularly to improvements in the mechanism by which the master sheet clamp on the duplicating drum of a rotary drum type of duplicating machine is opened and closed. My invention is shown in connection with a machine such as that disclosed in my application, Serial No. 284,153, filed April 24, 1952, for Improvements in a Duplicating Machine.

It is the purpose of the present invention to provide a novel mechanism by which the master sheet clamp on the duplicating drum of a duplicating machine can be opened and closed and the drum can be held in a stationary position while the clamp is opened by simple manipulation of the handle. In machines of this character the necessity for changing the master sheets or inserting block out sheets and removing them from the master sheet clamp arises very frequently. It is essential therefore that the means by which the master sheet clamp is opened and closed be as simple from the operational standpoint as possible. The novel mechanism herein provided is of such nature that the operations are kept simple.

It is a further purpose of my invention to provide a master sheet clamp operating mechanism for duplicating machines wherein the master sheet is clamped to a rotating drum, which mechanism embodies means operable by reverse rotation of the drum from its normal direction, to open the master sheet clamp, the same means being reset by forward rotation of the drum for continued duplicating operation to enable the master sheet clamp to be reopened on the next revolution of the drum if desired. The particular mechanism utilizes parts mounted at one end of the drum and requires no particular modification of the drum and master sheet clamp construction.

The nature and advantage of my invention will appear more fully from the following description and the accompanying drawings illustrating a preferred form of the invention. 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 plan view partly in section of a duplicating machine such as that shown in my prior application hereinbefore identified with my improved master sheet clamp operating mechanism applied thereto;

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1, the drum being rotated to a different position;

Figure 3 is a view like Figure 2 on a smaller scale showing the parts in the initial position for beginning the operation of opening the master sheet clamp;

Figure 4 is a view taken on the line 4—4 of Figure 1, showing the parts in the position they occupy at the completion of the opening of the master sheet clamp;

Figure 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Figure 2;

Figure 6 is a fragmentary view taken on the line 6—6 of Figure 3;

Figure 7 is an enlarged fragmentary sectional view taken on the line 7—7 of Figure 4; and

Figure 8 is a fragmentary side view showing a portion of the machine.

Referring now in detail to the drawings, my invention is shown as applied to a duplicating machine of the type generally described in my prior application above identified. In this machine a master sheet carrying drum 10 is mounted for rotation in two side frames 11 and 12 by a shaft 13. A handle 14 is provided on the shaft 13 for rotating the drum. The side frames 11 and 12 are connected together by several cross rods such as 15 and 16 and by cross bars 17 and 18 to provide a supporting framework.

In this machine the master sheet 19 is clamped to the drum by a master sheet clamp 20 which is in the nature of a bar that extends lengthwise of the drum and a slot 21 provided in the periphery of the drum. At its ends this bar has arms such as 22 which extend inwardly at the end of the drum and which are pivoted to the drum at 23. The arms are normally pressed in a direction to clamp a master sheet between the clamp 20 and the adjacent face 21a of the drum by springs 24 which are seated in blocks 25 at the ends of the drum and which press against plates 26 on the arms 22. In order to open the master sheet clamp 20 against the pressure of the springs 24, a shaft 27 extends through the drum and has flattened faces at its ends, one of which is indicated at 28 in Figure 4 of the drawings, for engaging a bearing plate 29 on each of the arms 22. The shaft 27 has a lever arm 30 thereon at one end of the drum. This lever arm can be rotated to rotate the shaft 27 and move the arms 22 against the pressure of the springs 24 to release the master sheet clamp 20. This master sheet construction thus far described is shown in my prior Patent No. 2,597,804.

The duplicating machine shown herein has a pressure roller 31 which is adapted to press copy sheets against a master sheet on the drum. The copy sheets are moistened and fed to the drum 10 and the pressure roller 31 by combined feeding and moistening rollers 32 and 33. A fountain roller 34 and a transfer roller 35 transfer liquid from a trough 36 to the moistening roller 33. The moistening roller mechanism is driven from the drum by providing two wheels 37 and 38 on the ends of the shaft 39 for the transfer roller 35. These wheels 37 and 38 are engaged by driving cams 40 and 41 that are fixed to the ends of the drum 10. These driving cams fit on the shaft 13 as illustrated in Figures 1 and 3 of the drawings and are secured adjustably to the drum by means of slots 42 in the cams and clamp bolts 43 which extend through the slots 42 and are threaded into the ends of the drum 10. Adjustment is necessary for the driving cams in order that the rotation of the moistening roller assembly may be properly timed with the approach of the master sheet so as to provide the proper margin at the head of the copy sheet. It is obvious of course that many different ways of adjusting the cams with respect to the drum may be employed.

My improved mechanism for releasing the master sheet from the drum by opening and closing the master sheet clamps 20, utilizes the cam 41. Between the cam 41 and the end of the drum I mount a clamp opening lever 44 rotatably on the hub 41a of the cam 41. The lever 44 is restricted in its rotation with respect to the cam 41 by a spring 45 which is wound around the hub 41a. One end 46 of the spring 45 is secured to the cam 41. The other end 47 of the spring 45 is hooked over the lever 44 so as to urge the lever 44 to rotate in a clockwise direction with respect to the cam 41. A stop pin 48 on the drum limits the movement of the lever 44 by the spring 45. The lever 44 has a portion 44a positioned to engage a pin 49 on the lever 30. The other end 44b of the lever

44 has a pin 50 thereon which is adapted to engage a toggle plate 51.

The toggle plate 51 and its associated parts to be described hereinafter cooperate with the pin 50 and a gravity stop lever 52 to enable the operator to open and close the master sheet clamp 20 by merely turning the drum in the right direction. The gravity lever 52 is pivoted to the cam 41 by a pivot pin 53. As shown in Figures 2 and 3 of the drawings, the lever 52 is prevented from rotation by a stop member 54 on the cam 41. The lever 52 is so constructed that its finger 52a is heavier than its finger 52b so that it tends to assume a position with the finger 52a downward. The toggle plate 51 normally stands in the position illustrated in Figure 2, being held in this position by a mechanism comprising a spring 55, a block 56 pivoted in the plate 51 and a rod 57 which is pivoted on the cross tie rod 15 and extends through the block 56 and through the spring 55. The rod 57 has a head 58 thereon. The plate 51 supports an arm 59 which extends up between the side frame 12 and the cam 41 in the path of the finger 52a of the lever 52 and has a roller 60 thereon for engaging the finger 52a. The plate 51 also has a trip arm 61 pivoted thereon by a pivot pin 62 and held normally in the position shown in Figure 2 by a spring 63. One end of the spring 63 (see Figure 5) is seated in a block 64 fixed to the plate 51 and the other end seats in a block 65 that is mounted on a pin 66 which is fixed in the lever arm 61. An aperture 67 in the plate 51 permits limited movement of the arm 61.

The operation of the mechanism just described is as follows:

In normal rotation, the drum begins its duplicating cycle at the position where the cams 40 and 41 first engage the wheels 37 and 38. The parts are shown in Figure 2 just after the beginning of a duplicating cycle when the cams 40 and 41 have started to rotate the wheels 37 and 38 to cause the rollers 32 and 33 to advance and moisten a copy sheet. To open the master sheet clamp, the operator advances the drum in the normal counterclockwise direction until the finger 52a of the lever 52 passes over the roller 60. This point is indicated by providing markers on the handle and on the side frame 12 of the machine as indicated in Figure 8 of the drawings.

The operator next turns the drum in the reverse direction or clockwise as far as he can. When the drum is turned in a clockwise direction from the stop position indicated by the markers on the handle and on the frame 12, the finger 52a engages the roller 60. Since the stop 54 on the cam 41 prevents rotation of the lever 52, the finger 52a will swing the arm 59 and the cam plate 51 about the pivotal mounting on the pin 68 from the position shown in Figure 3, thus enabling the finger 52a to clear the roller 60. The toggle spring mechanism 55-58 completes movement of the plate 51 and the parts thereon to the position shown in Figure 4.

Continued rotation of the drum in a clockwise direction brings the master clamp 20 up to the position shown in Figure 4. This rotation also brings the lever 44 into position where its pin 50 engages the cam plate 51. Since the cam plate 51 is prevented from moving any further by the head 58 of the over center plunger 57, continued clockwise movement of the drum 10 rotates the lever 44 with respect to the drum 10 so as to bring the portion 44a of the lever 44 against the pin 49 on the arm 30, rotating the arm 30 in a direction to cause the shaft 27 to move its flat faces away from the plates 29 and force the arms 22 to move toward the blocks 25, thus opening the master clamp 20 as indicated in Figure 4. While this clockwise rotation causes the master clamp to open, the pin 48 on the drum 10 rides over the lever 61, depressing it against the spring 63. As soon as the pin 48 reaches the end of the lever 61, the lever 61 will snap upwards to counter-lock the drum by engagement of the pin 48 with the end of the lever 61. The master sheet

can be replaced or reset as desired. Then the drum is turned in a counterclockwise direction to close the master clamp. The pin 48 pushes against the end of the lever 61 to turn the cam plate 51 and then rides over the end of the lever 61. This allows the pin 50 to clear the plate 51 and the spring 47 acts to return the lever 44 to its normal position, thus allowing the master sheet clamp 20 to close under pressure of the springs 24. The drum can then be rotated in a counterclockwise direction for duplicating. On the first rotation the cam 41 will engage the plate 51 and return the plate 51 to the original position illustrated in Figures 2 and 3. Continued duplicating operations are then carried out in the usual manner until it is again desired to release the master sheet clamp for any purpose.

It is believed to be evident from the foregoing description that I have provided a simple mechanism whereby the master sheet clamp may be opened and closed entirely by manipulation of the handle by which the drum is rotated. The parts are all enclosed and once the operator is taught the simple manipulations necessary, there is no difficulty encountered in opening and closing the master sheet clamp whenever desired.

Having thus described my invention, I claim:

1. In a duplicating machine, a drum, a master sheet clamp on the drum, a lever pivoted on the drum shaft at one end of the drum and operably connected to the clamp whereby a slight rotational advance of the lever with respect to the drum opens the clamp, and means cooperating with said lever, operable by rotation of the drum in reverse direction to normal duplicating rotation, to cause said rotational advance of the lever and to hold the drum stationary for insertion and replacement of master sheets, said means comprising a lever stop member adjacent to said end of the drum and pivoted on an axis parallel to the drum axis, means connected to the member operable yieldingly to hold the member in a position in the path of said lever as the lever is rotated with the drum and in a second position angularly offset about the axis of said member from the first named position out of the path of said lever, an arm projecting from said member and offset therefrom in the direction of the pivotal axis of said member out of the path of said lever, a cam on the drum offset circumferentially of the drum from the said lever adapted to engage the said member in normal rotation of the drum and move the member out of the path of said lever, the movement of the member out of the path of said lever bringing said arm into overlapped relation to the adjacent end of the drum, a stop lever pivoted on the cam to engage and ride over the arm upon rotation of the drum in normal direction when the arm is overlapped with the drum, and a stop on the cam positioned to engage the stop lever and prevent its riding over the arm when the drum is rotated in reverse direction, whereby to turn said member on its axis into the path of said lever by said reverse rotation of the drum.

2. In a duplicating machine, a drum, a shaft for the drum, a master sheet clamp on the drum, a cam fixed to one end of the drum and having a hub on said shaft, a lever pivoted on said hub between the drum and the cam, said lever having an end portion projecting radially beyond the drum surface, a spring connecting the lever and the cam and urging the lever to turn about the hub in a clockwise direction, a stop on the drum limiting the turning movement of the lever by said spring, the lever being operably connected to the clamp whereby a slight rotational movement of the lever in a counterclockwise direction away from said stop means opens the clamp, a lever stop member adjacent to said end of the drum movable into and out of the path of the end portion of said lever, means on the cam and lever stop member operable by rotation of said drum in a clockwise direction to bring said lever stop member into position to engage the said end portion of said lever and cause movement of the lever away from the stop on the drum in a counter-

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clockwise direction, to open the clamp upon further turning of the drum in a clockwise direction, and means on said lever stop member engageable by said cam upon rotation of the drum in a counterclockwise direction, to remove the lever stop member from the path of the end portion of said lever.

3. In a duplicating machine, a drum, a shaft for the drum, a master sheet clamp on the drum, a cam fixed to one end of the drum and having a hub on said shaft, a lever pivoted on said hub between the drum and the cam, said lever having an end portion projecting radially beyond the drum surface, a spring connecting the lever and the cam and urging the lever to turn about the hub in a clockwise direction, a stop on the drum limiting the turning movement of the lever by said spring, the lever being operably connected to the clamp whereby a slight rotational movement of the lever in a counterclockwise direction away from said stop means opens the clamp, a

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plate adjacent to said end of the drum and pivoted on an axis parallel to the drum axis, a toggle spring mechanism connected to the plate operable to hold the plate in a position in the path of said lever as the lever is rotated with the drum and in a second position angularly offset about the pivotal axis of the plate from the first named position and out of the path of said lever, an arm fixed to the plate and offset out of the paths of said lever and said cam, and means on the drum operable by rotation of the drum in a clockwise direction to engage the arm and move said plate from the second named position to the first named position.

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