March 28, 1950

H. G. ROBINSON
MASTER SHEET CLAMPING MEANS
FOR DUPLICATING MACHINES

2,502,278

Filed Jan. 31, 1948

5 Sheets-Sheet 1

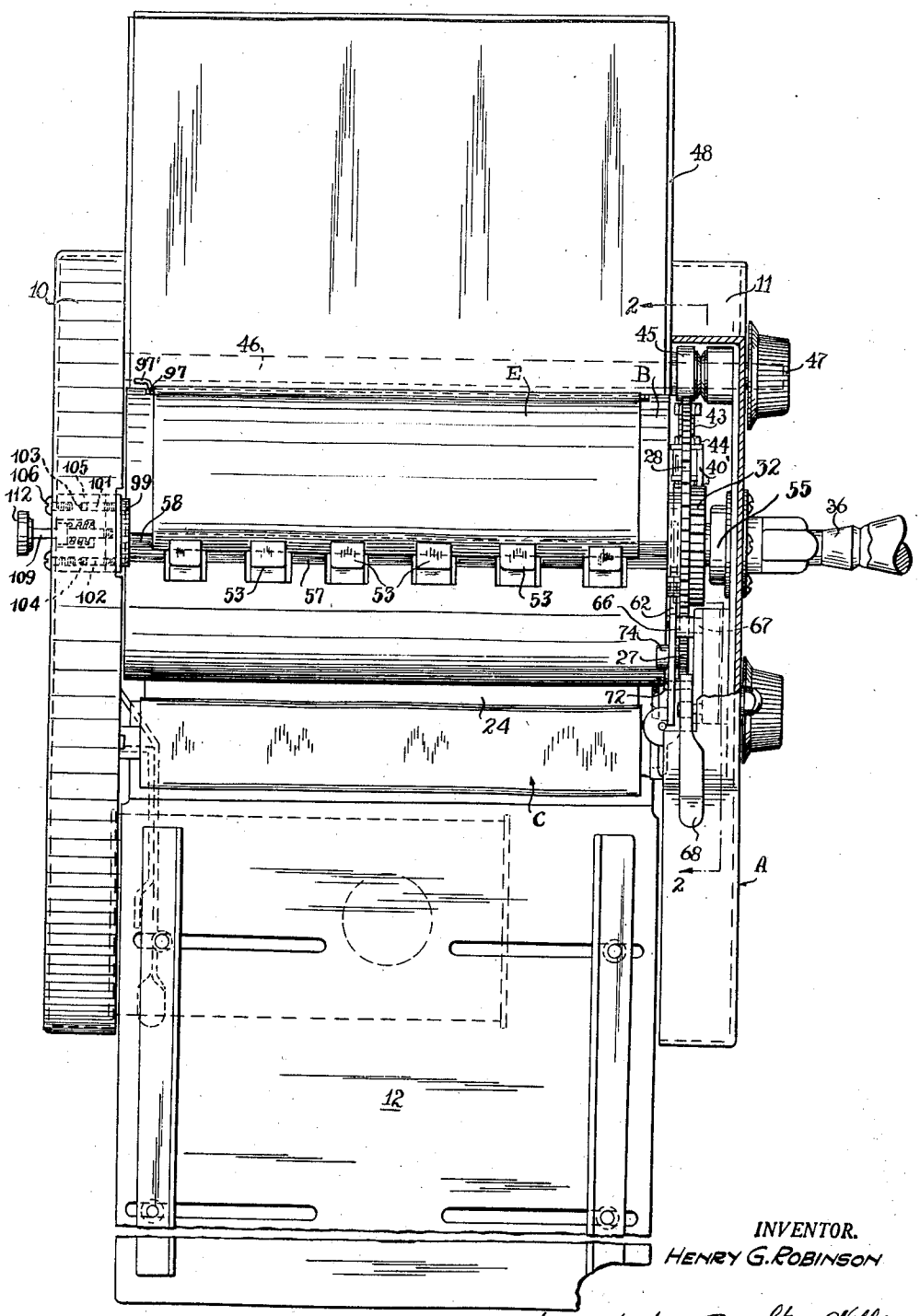



FIG. 1

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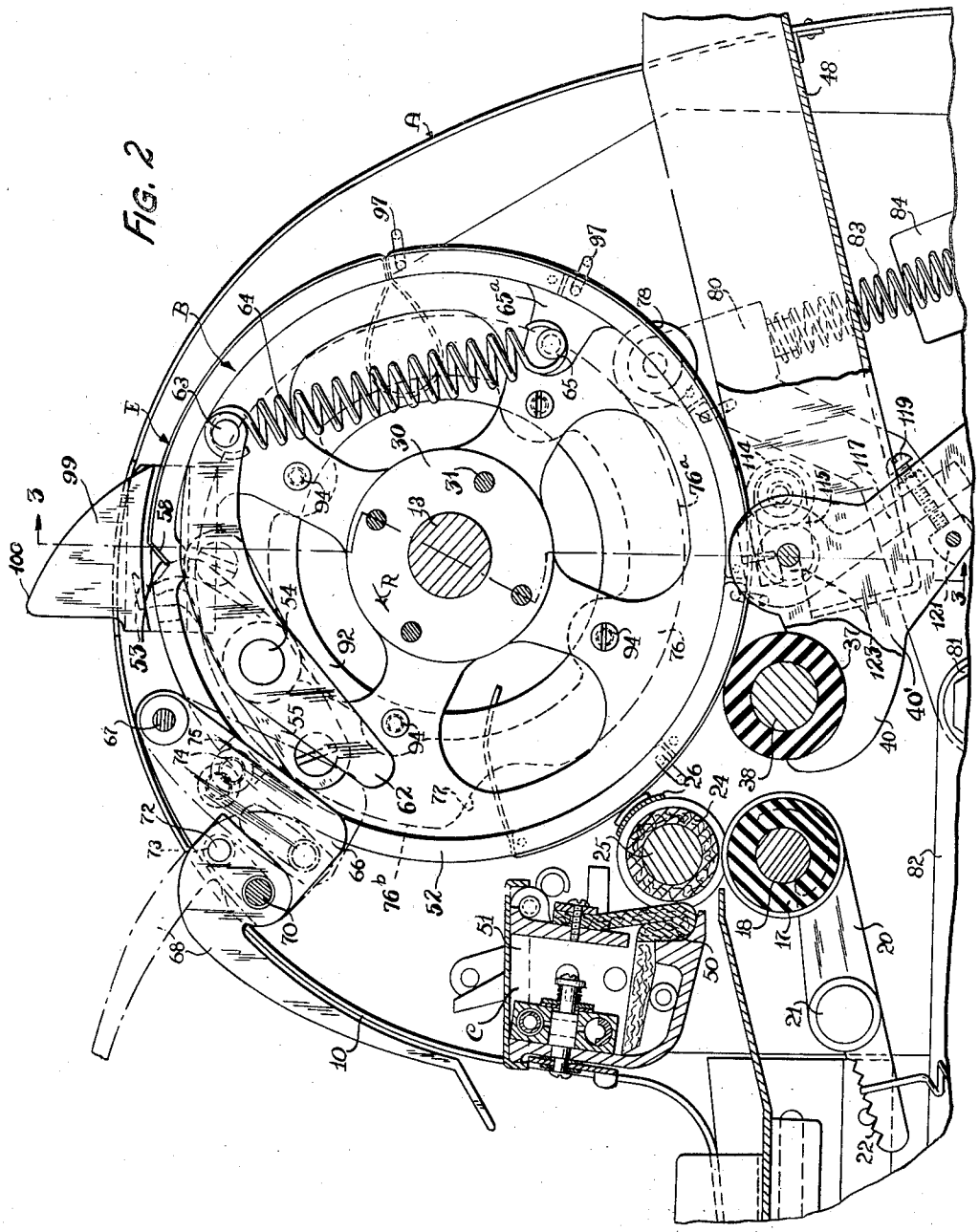
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5 Sheets-Sheet 2

FIG. 2



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5 Sheets-Sheet 3

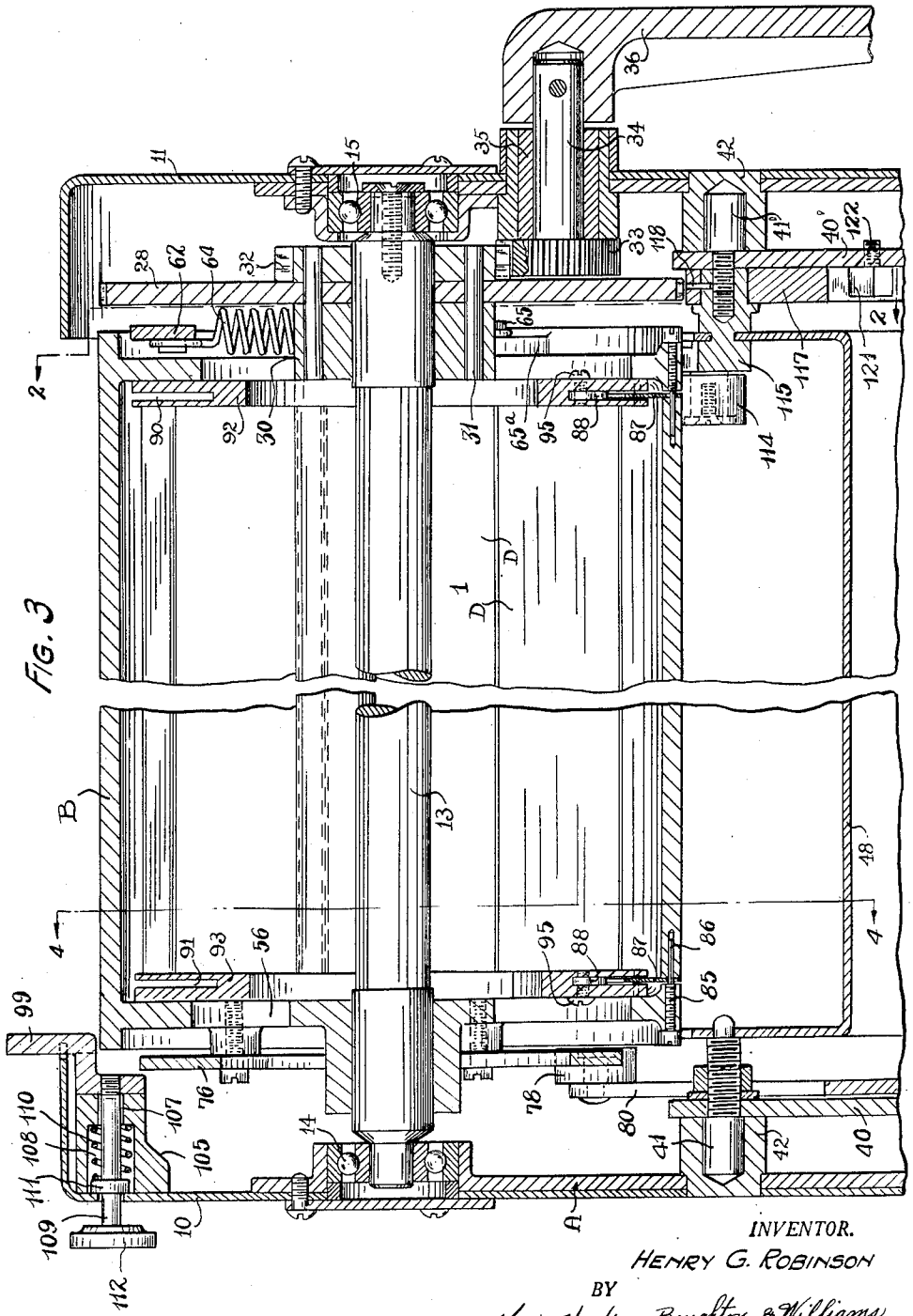


FIG. 3

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MASTER SHEET CLAMPING MEANS
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Filed Jan. 31, 1948 5 Sheets-Sheet 4

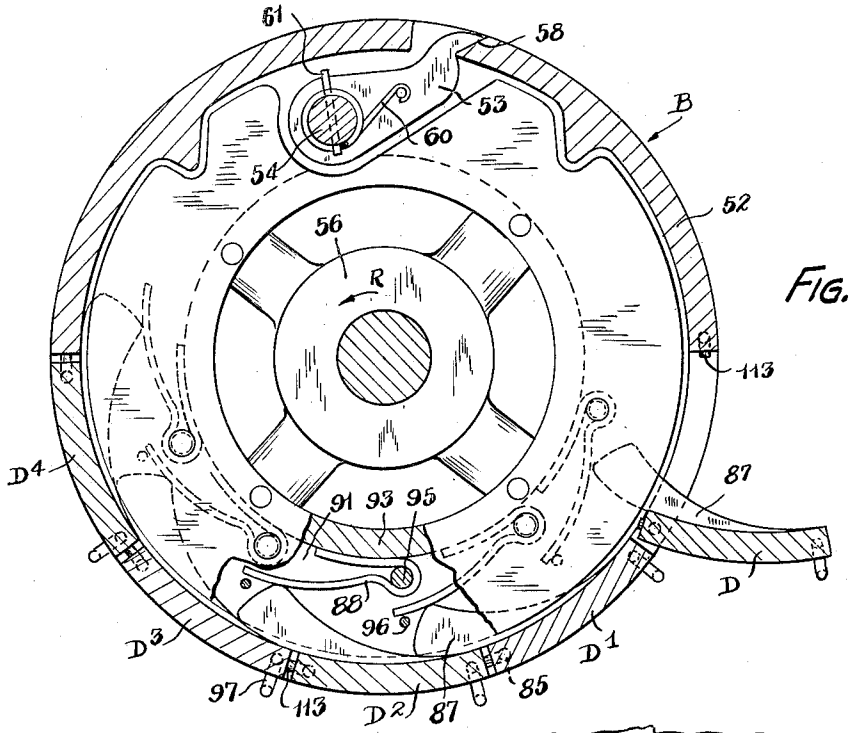



FIG. 4

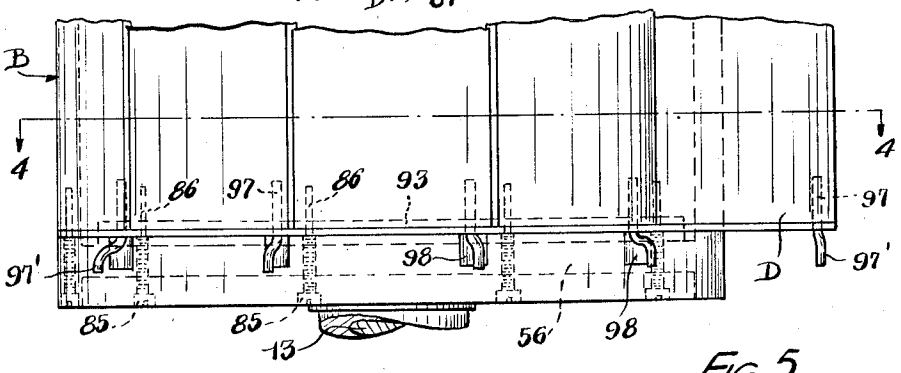



FIG. 5

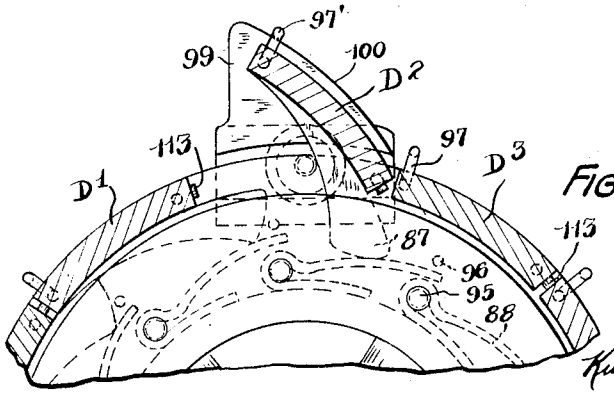



FIG. 6

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March 28, 1950 H. G. ROBINSON 2,502,278

MASTER SHEET CLAMPING MEANS FOR DUPLICATING MACHINES

Filed Jan. 31, 1948 5 Sheets-Sheet 5

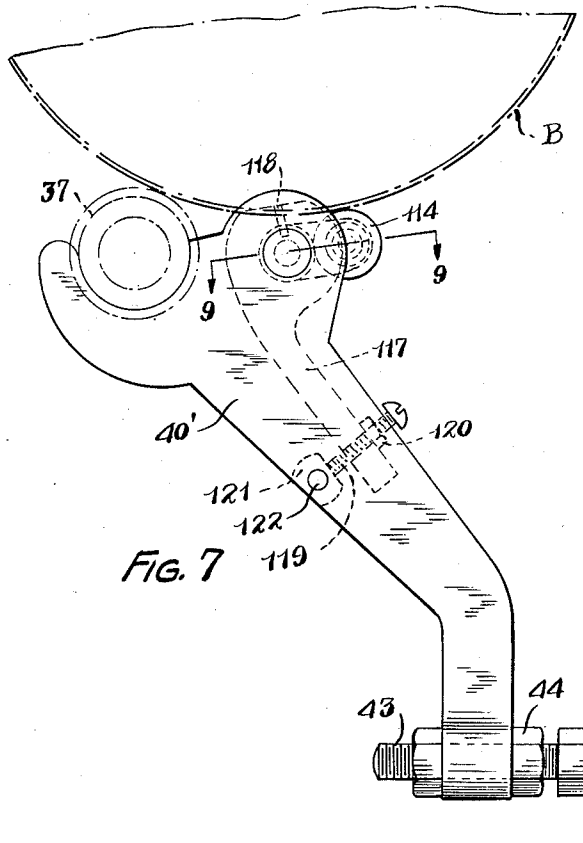



FIG. 7

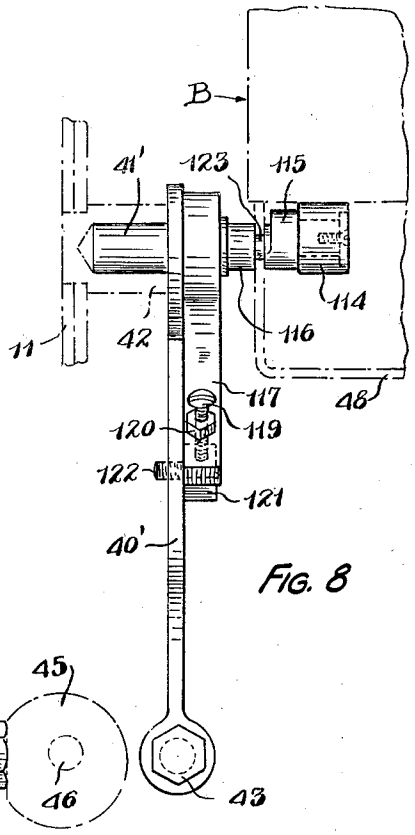



FIG. 8

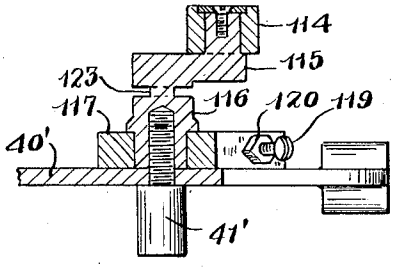



FIG. 9

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Patented Mar. 28, 1950 2,502,278

# UNITED STATES PATENT OFFICE

2,502,278

## MASTER SHEET CLAMPING MEANS FOR DUPLICATING MACHINES

Henry G. Robinson, Lakewood, Ohio, assignor to The Lamson & Sessions Company, Cleveland, Ohio, a corporation of Ohio

Application January 31, 1948, Serial No. 5,590

12 Claims. (Cl. 101—132)

1

The present invention relates to duplicating apparatus of the type wherein data on a master sheet, which is secured to a rotatable drum, is transferred either directly or indirectly to a copy sheet; and is an improvement on the invention disclosed and claimed in my copending application Serial No. 592,225, filed May 5, 1945, issued to Patent No. 2,479,865 on August 23, 1949, the present application being a continuation-in-part thereof.

My prior application, referred to above, discloses a duplicating machine of the character mentioned wherein the drum for supporting the master sheet is formed in part by movable portions that can be raised to insert or tuck into the interior of the drum parts of the master sheet which it is desired not to reproduce on the copy sheets. In the embodiment shown in said application the movable sections of the drum are pivoted about their trailing edges, however, it is understood that they could be slidably supported for reciprocation radially of the axis of the drum, if desired, or could be movably mounted in other manners.

In order that a duplicating apparatus of the type mentioned will produce satisfactory copies of the desired data on the master sheet, it is necessary that the movable sections conform to, or lie in, the cylindrical surface of the drum during operation of the machine. Also, the external surface of the drum must be free of projections or recesses throughout the portion thereof upon which the master sheet is secured, which portion comprises substantially the entire length of the drum except for a narrow band at each end of the drum. Because of these requirements, and the fact that the ends of the drum are rendered inaccessible due to the housing of the apparatus, the provision of satisfactory means for lifting the movable sections presents a difficult problem.

The principal object of the present invention is the provision in a duplicating machine, of the character referred to, of novel means for raising the movable sections of the drum which means is simple in construction and convenient to operate.

Another object of the invention is the provision in a duplicating machine of the character referred to, of a novel means which is operable from the exterior of the machine for selectively raising the movable sections of the drum.

A more specific object of the invention is the provision in a duplicating machine of the character referred to, of novel means including a cam selectively positionable for cooperation with projections upon the movable sections of the drum for effecting raising of any or all of the movable sections of the drum.

2

A further object of the invention is the provision in a duplicating machine of the character referred to, of a means for counteracting the tendency of the movable sections of the drum to open as they pass over the roller which effects the transfer of the data from the master to the copy sheet.

The invention further resides in certain novel features of construction, and combinations and arrangement of parts, and further objects and advantages thereof will be apparent to those skilled in the art to which it pertains from the following description of the present preferred embodiment thereof, described with reference to the accompanying drawings in which similar reference characters represent corresponding parts throughout the several views, and in which:

Fig. 1 is a plan view of a duplicating machine embodying the present invention with parts of the frame or housing broken away to show portions of the operating mechanism of the machine;

Fig. 2 is a fragmentary sectional view, taken approximately on the line 2—2 of Figs. 1 and 3;

Fig. 3 is a fragmentary sectional view taken approximately on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged sectional view through the master sheet carrying drum, shown in the preceding figures, the section being taken approximately on the line 4—4 of Figs. 3 and 5 with parts broken away to more clearly show the construction;

Fig. 5 is an enlarged elevational view of the left-hand end of the master carrying drum as viewed in Fig. 1 the drum being rotated from its position illustrated in Fig. 1;

Fig. 6 is an enlarged fragmentary view, partly in section and partly in elevation, illustrating the manner in which the movable sections are opened by the mechanism of this invention;

Fig. 7 is a detached front elevational view to an enlarged scale showing the lever on which is mounted the novel mechanism for preventing the movable sections of the drum from opening during operation of the machine;

Fig. 8 is a side elevational view of the parts shown in Fig. 7, as seen from the right of Fig. 7; and,

Fig. 9 is a fragmentary sectional view taken substantially on the section indicating line of Fig. 7.

The invention is herein illustrated and described as embodied in a duplicating machine

known commercially as "Ditto," however, it is to be understood that the invention is susceptible of various modifications and alternative constructions and is applicable to various types of duplicating machines other than the particular machine illustrated. For the most part, the duplicating machine shown and described herein is well-known in the art and is similar to that shown in U. S. Patent to Marchev, No. 2,145,729, and only those parts which are necessary to a complete understanding of the present invention are herein illustrated and described in detail.

Referring to the drawings, the duplicating machine shown therein comprises a frame, designated generally by the reference character A, and including two sheet metal side members 10, 11 and a feed table 12. At the discharge end of the table 12, and disposed between the side members 10, 11, is a master carrying drum B fixed to a shaft 13 journaled in the side frame members 10, 11 by anti-friction bearings 14, 15, see Fig. 3. The drum B is adapted to have a master sheet or sheets secured thereto in a manner hereinafter specifically described.

The copy sheets are fed to the drum B by a rubber roller 17 fixed to a shaft 18, see Fig. 2, opposite ends of which shaft are journaled in the ends of levers 20, one at either side of the machine, which levers are, in turn, journaled intermediate their ends upon a shaft 21 extending between the side frame members 10, 11. The opposite ends of the levers 20 are provided with a plurality of notches 22 adapted to have the upper ends of springs 23 engage therein. The lower ends of the springs 23 are connected by pins, not shown, to the side frame members 10, 11. The springs 23 yieldably urge the roller 17 against a composition roller 24, located directly above the roller 17, and the pressure with which the roller 17 engages the roller 24 can be adjusted by moving the upper ends of the springs 23 from one to another of the notches 22.

The roller 24 is on a shaft 25, opposite ends of which are journaled, in a manner not shown, in members carried by the side frame members 10, 11. Extending across the upper surface of the roller 24 is a plate 26 shaped to conform to the circumference of the roller and which prevents the copy sheets from being drawn around the roller during operation of the machine. The right-hand end of the shaft 25, as the machine is viewed in Fig. 1, is provided with a gear, not shown, fixedly secured thereto, which gear is continuously in mesh with a gear 27. The gear 27, in turn, meshes with a gear 28 mounted on one end of the shaft 13. The gear 28 is fixedly secured by pins 31 to the right-hand end member 30 of the drum B, which pins also project through a gear 32 continuously in mesh with a pinion 33 fixed to a shaft 34, see Fig. 3. The shaft 34 is rotatably supported by a suitable bearing 35 in the side frame member 11 and projects through the side frame member, the outer end of the shaft being provided with a crank 36. Hence, when the operator turns the crank 36, the shaft 34 and the pinion 33 are rotated thus causing gears 32, 28 and drum B to rotate. Rotation of gear 28 in turn causes rotation of gear 27 and roller 24 and, since the rollers 17 and 24 are in frictional engagement, the roller 17 rotates in unison with the roller 24.

As the copy sheets are fed to the drum B by the rollers 17 and 24, they are pressed against the master sheet or sheets carried by the drum B by a rubber roller 37 mounted on a shaft 38 journaled in bell crank levers 40 and 40' one at either side of the machine. The levers 40 and 40' are pivotally connected to the side frame members 10, 11 through the medium of pins 41 and 41' connected to the levers intermediate their ends and rotatably supported in members 42 secured to the side frame members. The ends of the levers 40 and 40', opposite to the ends which support the roller 37, project in a downward direction and are each provided with an apertured boss to receive screws 43 adjustably secured thereto by jam nuts 44, see Figs. 7 and 8. The heads of the set-screws 43 abut cams 45 fixed to a shaft 46 which is journaled in the side frame members 10, 11. The shaft 46 is provided at its right-hand end, as viewed in Fig. 1, with a knurled knob 47 so that the shaft may be rotated to adjust the pressure with which the roller 37 presses the copy sheets against the master sheet or sheets on the drum B. A detachable tray 48 is provided at the opposite side of the drum B from the feed table 12 for receiving the copy sheets after they have passed between the master drum B and the roller 37.

As the copy sheets are fed through the machine, each copy sheet is moistened on the side which comes in contact with the master sheet or sheets on the drum B by the composition roller 24 which is supplied with a solvent for the ink, or the like, on the master sheet by mechanism designated generally by the reference character C. This mechanism C comprises a felt strip 50 continuously urged into engagement with the composition roller 24, the felt strip forming the lower forward portion of a chamber 51 supplied with the solvent in a conventional manner. The construction of the mechanism C referred to is similar to that shown in U. S. Patent No. 2,145,729 as are the other parts of the machine thus far described, with the exception of the drum B, and will not be herein further described. Reference is made to the aforesaid patent for a complete showing and description thereof.

The drum B is so constructed and arranged that a selected portion or portions of one or a plurality of master sheets supported on the drum may be duplicated or reproduced on a single copy sheet during one pass through the machine. To this end the cylindrical wall or surface 52 of the drum B has a plurality of apertures therein adapted to receive a portion or portions of a master sheet or sheets. As shown, the cylindrical wall 52 comprises a plurality of movable segments hinged at one end to the drum proper. In the particular embodiment illustrated, five segments D, D1, D2, D3 and D4 are employed, but it is to be understood that more or less segments may be provided, as required. Each of the segments D to D4 are alike and hence a description of one is a description of all.

In addition to the construction previously described, the drum B includes means for clamping one end of a master sheet to the cylindrical wall or surface 52 of the drum. This means comprises a plurality of clamping members 53 which are supported in spaced relationship on a shaft 54, the shaft being journaled in members 55 which are fixed to the right-hand member 30, previously referred to, and to the left-hand end member 56 of the drum B. The outer ends of the clamping members 53 project through spaced, axially aligned openings in the cylindrical wall of drum B, which openings are circumferentially spaced in a counterclockwise direction from the segment D, see Figs. 2 and 4. These

openings each merge with a V-shaped recess or groove 57, extending axially of the drum adjacent the outer ends of the clamping members and the lower surface of each of the members, adjacent its outer end, is sloped to cooperate with the adjacent sloping surface 58 of the groove 57. The members 53 are supported on the shaft 54 for limited angular movement thereabout and are continuously urged in a clockwise direction, as viewed in Fig. 4, by springs 60 which are operatively connected to the members 53 and to pins 61, the latter being fixed in the shaft 54 and extending outwardly through suitable slots in the hubs of the members 53.

The construction just described is such that upon rotation of the shaft 54 in a counterclockwise direction, as viewed in Figs. 2 and 4, the members 53, after the elapse of a short lost-motion movement, are moved with the shaft as a unit to disengage their free ends from the inclined surface 58 of the groove 57 so that the end of a master sheet may be inserted therebetween. When the shaft 54 is rotated in the opposite direction, the clamping members 53 are permitted to move in a direction toward the inclined surface 58 and are ultimately individually urged thereagainst by their respective springs 60 thereby clamping the end of the master sheet to the drum. In the particular embodiment shown, six clamp members 53 are employed, however, it is to be understood that any desired number may be used.

The right-hand end of the shaft 54 is provided with a lever 62 fixed intermediate its ends to the shaft 54. The right-hand end of the lever 62, as viewed in Fig. 2, carries a pin 63 to which the upper end of a tension spring 64 is connected so that the shaft 54 is continuously urged in a clockwise direction, as viewed in Fig. 2, which is the direction of movement for causing the clamping members 53 to engage with the end of the master sheet E. The lower end of the spring 64 is connected to a pin 65 projecting from a lug 65a formed integral with the drum B. The end of the lever 62, opposite to the end connected to the spring 64, is adapted to be selectively engaged by the free end of the lever 66 pivotally connected to the end frame member 11 by a pin 67. The lever 66 is adapted to be rotated about its pivot 67 by a hand lever 68 which is pivotally connected to the end frame member 11 by a pin 70. The lever 68 is provided with a pin 72 which continuously engages within a slot 73 in the lever 66.

When the parts are in the position shown in full lines in Fig. 2, the drum B is free to rotate and the clamping members 53 are in their engaging position. When it is desired to move the clamping members to their disengaged position, the lever 66 is moved into engagement with the lever 62 by rotating the hand lever 68 in a clockwise direction. Continued movement of the hand lever, after the lever 66 has engaged the lever 62, moves the latter and thus rocks the clamping members 53 into the position shown in dot-dash lines in Fig. 2, which is their disengaged position. Initial movement of the lever 66 also engages a roller 74, carried by the lever 66, within a slot 75 in the end of the drum B, thus locking the latter against rotation.

A cam 76, having a concentric dwell 76a, a lobe 76b and a depression 77, is secured to the outer face of the end member 56 of the drum B, see Figs. 2 and 3. This cam is continuously engaged by a roller 78 connected to the rear end of a lever 80 which is pivoted intermediate its ends on a stub shaft 81 projecting from the side frame member 10. The front end of the lever 80 is operatively connected to a lever 82 also pivotally supported on the shaft 81, which lever is actuated upon actuation of the lever 80 by the cam 76 to supply solvent, in the manner disclosed in the aforementioned U. S. Patent No. 2,145,729, to the chamber 51 of the moistening apparatus C. The roller 78 is continuously urged toward the cam 76 by a compression spring 83 interposed between the lever 80 and a bracket 84 fixed to the inside of the frame A.

The members or segments D to D4 may be movably connected to the drum proper in any suitable manner. As shown, each segment is supported for pivotal movement about an axis parallel to the axis of the drum and located adjacent to the trailing side of the segment, referring to the direction of rotation of the drum during operation, which direction is indicated by the arrow R in the various figures. This pivotal mounting of the segments D to D4 to the drum proper is effected by screws 85, the reduced inner ends 86 of which project into suitable holes in the ends of the segments. The screws 85 also project through holes in members 87, one of these members being positioned adjacent each end of each segment in a slot in the inner face of the latter so that the screws 85 connect the said members to the segments. Each of the members 87 has a portion thereof projecting radially inwardly of the drum, see Fig. 4, where they are engaged by springs 88 located in annular grooves 90, 91 in disks 92, 93, respectively. The disks 92 and 93 are fixed to the inner faces of the end members 30, 56, respectively, of the drum as by screws 94. The springs 88 are more or less U-shaped and are held in position in the grooves 90, 91 by screws 95, the parts of the springs which are not engaged by the members 87 abutting the bottom of the grooves. The construction is such that the inwardly extending parts of the members 87 act as cams and cooperate with the springs 88 to resiliently hold the segments D to D4 in either open or closed position as shown in Fig. 4, pins such as 96 being provided to limit the outward movement of the springs 88 when the segments are in open position.

In order to selectively move the segments D, D1, D2, D3 and D4 to open position, the segments, in accordance with this invention, are each provided with members or pins 97 connected to the sides of the segments adjacent those edges thereof which are the leading edges when the drum is rotated. The members or pins 97 are fixed within suitable apertures in the segments and project axially of the drum into apertures or recesses 98 in the surface of the drum adjacent to the segments. The engagement of the members 97 with the bottoms of the recesses 98 limits the movement of the segments towards the center of the drum so that the outer surfaces of the segments, in their closed positions, are substantially coextensive with the surface of the drum. The free end of each of the members or pins 97 is offset radially and axially of the drum to provide an axially extending portion 97' spaced slightly above the surface of the drum. These portions 97' constitute means by which the segments may be raised to open position as hereinafter described.

A stationary cam member 99 is reciprocatingly

mounted upon the upper portion of the frame member 10 for movement axially with respect to the drum B for the purpose of selectively engaging the portions 97' of pins 97 and thereby effect movement of the corresponding segment or segments to open position when the drum is rotated. As seen in Figs. 2, 3 and 6, the cam member 99 has an inclined camming surface 100, extending angularly with respect to the surface of the drum, and an arcuately curved bottom surface adapted to project over the edge of the surface of the drum, in relatively closely spaced relationship thereto, when the cam member is in its forward position. The construction is such that when the cam 99 is projected forwardly, as hereinafter described, it is disposed in the path of the portions 97' of the pins 97 which are affixed to the movable segments D to D4. Hence, when the drum is rotated in the direction indicated by the arrow R, the portions 97' of pins 97 successively engage the cam 99 and ride up the inclined surface 100 thereof thereby moving the corresponding movable segment of the drum to open position. The height of the cam 99 is such that the segment or segments are moved to fully open position by the time that the portion 97' of its pin 97 moves over the top of the cam, the segment being retained in open position as previously described by the action of the spring 88 bearing upon the member 87.

The cam 99 is reciprocably mounted for movement into and out of the path of the portions 97' of pins 97 by means of spaced dowel pins 101 and 102 which are secured to the cam 99 and are slidably received in bores 103 and 104 of a mounting member or boss 105 secured to the side member 10 of frame A. As shown in the drawings, this boss or mounting member 105 is shown as secured to the side member 10 by screws or other suitable means 106 although it will be understood that the member 105 may be formed integrally with the side member 10 if desired.

The mounting member 105 is provided with a bore 107, which is counterbored as indicated at 108, and the side member 10 is provided with an opening communicating with the counterbore 108 but of smaller diameter than the said counterbore. An actuating member, illustrated as a rod 109, projects through the opening in the member 10 and the bores 107 and 108 of member 105, the inner end of the rod 109 being secured to the cam member 99. Disposed within the counterbore 103, and surrounding the rod 109, is a compression spring 110 which cooperates with the bottom of the counterbore 108 and with a collar 111 upon rod 109 to normally retain the cam member 99 in its retracted position as shown in Figs. 1 and 3. The outer end of rod 109 is provided with a knob or handle 112 by which the rod 109 may be moved towards the drum against the action of spring 110 thereby disposing the cam 99 in the path of the pins 97 as previously described. When the knob 112 is released, the cam 99 is automatically returned to its retracted position by means of spring 110 so that the movable segments of the drum such as D, etc., will not be inadvertently moved to open position when the drum is later rotated to effect reproduction of the data on the master sheet carried thereby.

The construction just described provides a convenient and easily operated means by which a movable segment or segments of the drum may be readily moved to open position for the purpose of inserting a portion or portions of the master sheet into the interior of the drum which inserted portions correspond to data on the master sheet which it is not desired to reproduce upon copy sheets. The segments such as D which have been moved to open position are closed, after the pins 97 thereon have passed by the cam 99 or the latter has been retracted, by the operator simply pressing upon the outer surface of each open segment. This deflects the springs 88 of the open segment sufficiently to allow the members 87 to move, from a position in which the spring cooperates with the said members to hold the segment open, to the position in which the spring cooperates with the members 87 to hold the segment in closed position.



The trailing edges of each of the movable segments D to D4 are provided with a plurality of projecting plugs or buttons 113, see Figs. 4 and 6, formed of rubber, leather or the like, which engage the leading edge of the next succeeding segment when the segments are in closed position. For example, the plugs or projections 113 on the trailing edge of segment D engage the leading edge of segment D1, etc., the plugs or buttons 113 on segment D4 engaging the adjacent edge of surface 52 of the drum. That edge of surface 52 of the drum which is adjacent the leading edge of segment D is also provided with similar plugs or buttons 113. These plugs or buttons serve to firmly grip the master sheet E when a portion thereof is "tucked in" or inserted within the drum as indicated by the dotted lines in Fig. 2 thus preventing the inserted portion from being pulled out of the drum during the normal operation of the machine.

The action of the springs 88 is sufficient to retain the segments D to D4 in closed positions except for the interval during which the trailing edges of the segments pass over the roller 37. At this time, however, the pressure of the roller 37 acts upon the trailing edges of the segments in a direction which tends to pivot them outwardly with the result that the segments move slightly with respect to the surface of the drum. This movement of the segments is undesirable since it tends to loosen or tear the master sheet supported upon the drum by exerting force upon the portion of the master sheet extending over the segments. In order to counteract this action of the roller 37, and thereby prevent the movable portions of the drum from moving as just mentioned, the arm 49' which supports the roller 37 is provided with a second roller 114 disposed in a position to contact the leading edge of a movable segment, such as D, at the same time that the roller 37 is contacting the trailing edge of the segment D. As shown in Figs. 2 and 7, this roller 114 is relatively short in an axial direction and is of smaller diameter than the roller 37.

The roller 114 is journaled upon the outer arm of a crank-like member 115 the other arm 116 of the crank member being pivoted to the arm 49' by a suitable stud or the like 41' the head of which is cylindrical to provide a pivot for the arm 49' as previously described. The arm 116 of the crank 115 is provided with a substantially cylindrical portion, adjacent the arm 49', to which an adjusting arm 117 is secured by means of a pin 118 or the like. The arm 117 has an elongated portion extending parallel with a corresponding elongated portion of the arm 49' and

this portion of the arm 117 is provided with an adjusting screw 119 which is threaded through the arm 117 and is provided with a jam nut 120. The end of the screw 119 is adapted to engage a projection 121 upon the arm 40', which projection is illustrated as a separate element connected to the arm 40' by a screw or the like 122 but it will be understood that this projection may be formed integrally with arm 40' if desired.

As was previously described and as shown in the aforementioned Patent 2,145,729, the outer end of the arm 40' is provided with a screw or stud 43 which cooperates with the cam 45 for adjusting its position to thereby adjust the pressure between the roller 37 and the drum B, the arm 40' being pivotable about the head of the stud 41' mounted in the boss 42. When the arm 40' has been adjusted to provide the desired pressure between roller 37 and drum B the arm 117 may then be adjusted relative to the arm 40' by means of screw 119 so that the roller 114 exerts sufficient pressure upon the drum B to counteract the pressure of the roller 37 in its tendency to open segments such as D. The arm 116 of the crank 115 is preferably provided with a groove 123 to receive the usual notch in the forward portion of the detachable tray 48 as shown in Fig. 2. While only the arms 40' have been shown as provided with a roller 114 it will be apparent that a similar roller may be provided on the similar arm 40 if so desired.

In operation, a master sheet E, containing the data which is to be either partially or completely reproduced upon the copy sheets, is connected to the drum B by clamping one end thereof between the inclined surface 58 and the clamping members 53. The free part of the master sheet may be merely wrapped around the drum or one or more portions may be enclosed within the drum, for example, a portion or portions not to be reproduced may be so disposed. This insertion of a portion of the master sheet into the drum is accomplished by opening the proper segment or segments D to D4 and tucking the undesired part or parts of the master sheet in the opening therebetween and the next adjacent segment or adjacent edge of the surface of the drum as the case may be. The opening of a segment or segments D to D4 is readily effected by simply pushing inwardly on the knob 112 and rotating the drum whereupon the cam 99 engages the pin 97 of the segment to be opened, the segment moving to open position as the portion 97' of the pin moves over the surface 100 of the cam. Releasing the knob 112 causes the cam to be retracted from the path of the pins by the action of the spring 110 so that the cam is not left in position to open the segments during the operation of the machine. After the undesired portion of the master sheet has been inserted in the drum, the open segment is closed by the operator pressing thereon, the manner in which a portion of the master sheet is disposed within the drum being illustrated in dotted lines in Fig. 2. This operation may then be repeated for inserting other portions of the master sheet within the drum. After the master sheet has been properly disposed on the drum, as just described, the machine is operated in the conventional manner by simply turning the crank 36, the roller 114 counteracting any tendency of the segments D to D4 to move in an opening direction as their trailing edges pass over the roller 37.

While the invention has been described in considerable detail and as applied to a commercially known duplicating machine it is to be understood that the invention is not limited to the particular construction shown or to the particular type of duplicating machine shown but may be otherwise incorporated and embodied in other types of machines. Various modifications and adaptations of the invention will readily suggest themselves to those skilled in the art and therefore the invention is not to be considered as limited to the exact construction herein shown and described but only as required by the spirit and scope of the appended claims.



Having thus described my invention, I claim:

1. In a duplicating machine having a hollow rotatable drum with a cylindrical surface adapted to carry a master sheet from which copies are to be made, the drum being provided with movable means for clamping said sheet thereto and having a portion of the cylindrical surface movable for insertion of a portion of said master sheet that improvement which comprises a projection on said movable portion of said drum surface extending slightly above the surface of said drum adjacent an end thereof, and means adapted to be projected over a portion of the surface of said drum adjacent the end thereof and into the path of said projection for engagement therewith as the drum is rotated to effect movement of said movable portion relative to the surface of said drum thereby providing an opening into the interior of the drum for insertion of a portion of the master sheet carried upon the surface of said drum.

2. The combination as defined in claim 1 and in which the said means is a non-rotatable cam and is provided with means normally maintaining the said cam retracted out of the path of said projection, the combination further comprising means by which the said cam may be moved into the path of said projection against the force of the said means normally tending to retain the cam in its retracted position.

3. The combination as defined in claim 1 and in which said means for engaging the said projection is a non-rotatable cam member, the combination further comprising means mounting said cam member for reciprocation into and out of the path of said projection, means for normally holding said cam out of the path of said projection, and means by which said cam may be moved into the path of said projection against the force of the last-mentioned means.

4. A duplicating machine comprising a frame, a hollow cylindrical drum rotatably mounted in said frame and adapted to carry a master sheet from which copies are to be made, a portion of the periphery of said drum being formed by a segment pivoted adjacent an edge thereof to swing outwardly relative to the remainder of the periphery about an axis extending parallel with the axis of the drum, a roller adapted to engage copy sheets with said master sheet on the drum with sufficient force to effect transfer of the data from the master sheet to the copy sheets, and means cooperating with said pivoted segment during the time that the region of said segment which is adjacent to the its pivotal axis is passing over said roller to prevent movement of said segment about its pivotal axis due to the force exerted by said roller.

5. The combination as defined in claim 4 and in which the last-mentioned means comprising a roller mounted for engagement with said segment adjacent another edge thereof at the time

when the edge adjacent the pivotal axis is passing over the first-mentioned roller.

6. A combination as defined in claim 4 and further comprising means for adjusting the force exerted by the means for counteracting the force of said roller upon said segment.

7. A duplicating machine comprising a frame, a hollow cylindrical drum rotatably mounted in said frame, clamping means on said drum for securing to the drum an edge of a master sheet from which copies are to be made, a portion of the periphery of said drum being formed by a segment pivoted adjacent an edge thereof to swing outwardly relative to the remainder of the periphery of the drum about an axis extending parallel with the axis of the drum thereby providing an opening into the interior of the drum for insertion of a portion of the master sheet, a projection on said pivoted segment extending above the surface of said drum adjacent an end thereof, means carried by said frame and adapted to be moved into the path of said projection to engage the latter and to swing the segment to open position, a roller cooperating with said drum for engaging copy sheets with the master sheet upon the latter with sufficient force to effect transfer of the data of the master sheet to the copy sheet, and means cooperating with said pivoted segment during the time that the region thereof adjacent its pivotal axis is passing over said roller to prevent the segment from swinging relative to the surface of the drum about its pivotal axis due to the force exerted by said roller.

8. A combination as defined in claim 7 and in which the said means adapted to be disposed in the path of said projection is a non-rotatable cam, the combination further comprising means for normally maintaining said cam out of the path of said projection.

9. A combination as defined in claim 7 and further comprising means for adjusting the pressure exerted by the last-mentioned means upon said pivoted segment.

10. A combination as defined in claim 7 and in which the last-mentioned means comprises a roller, the combination further comprising means for adjustably mounting the last-mentioned roller for cooperating with said segment adjacent an edge thereof when the edge of said segment adjaecnt its pivotal axis is passing over said first-mentioned roller.

11. A hollow rotatable drum for a duplicating machine or the like, comprising a cylindrical surface adapted to carry a master sheet, means for clamping an edge of a master sheet to said surface, the said surface having an aperture therethrough extending substantially axially thereof and adapted to enable a portion of the master sheet to be inserted therethrough into the interior of the drum, a segmental member movable with respect to said cylindrical surface and adapted to substantially close said aperture in one position in which position the said segment cooperates with said cylindrical surface to provide a substantially continuous smooth surface with the inserted portion of the master sheet extending between a longitudinal edge of said aperture and the adjacent edge of said segment, and resilient means carried by one of said edges and adapted to engage a part of the inserted portion of said master sheet to thereby hold the latter in engagement with said other edge.



12. In a duplicating machine, the combination of a hollow rotatable drum having a cylindrical surface adapted to carry a master sheet, means for clamping an edge of a master sheet to said surface, the said surface having an aperture therethrough extending substantially axially thereof and adapted to enable a portion of the master sheet to be inserted therethrough into the interior of the drum, a segmental member movable with respect to said cylindrical surface and adapted to substantially close said aperture in one position in which position the said segment cooperates with said cylindrical surface to provide a substantially continuous smooth surface with the inserted portion of the master sheet extending between a longitudinal edge of said aperture and the adjacent edge of said segment, resilient means carried by one of said edges and adapted to engage a part of the inserted portion of said master sheet to thereby hold the latter in engagement with said other edge and to resist movement of said segment from its said one position, a projection on said movable segment extending slightly above the outer surface of the latter adjacent an end of said drum, and means adapted to be projected into the path of said projection for engagement therewith as the drum is rotated and to effect movement of said segment relative to said cylindrical surface so that a portion of said master sheet may be inserted through said aperture or removed therefrom.

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