March 18, 1952 R. M. FORD 2,589,789

BED AND PLATEN DUPLICATING MACHINE

Filed Nov. 26, 1948 5 Sheets-Sheet 1

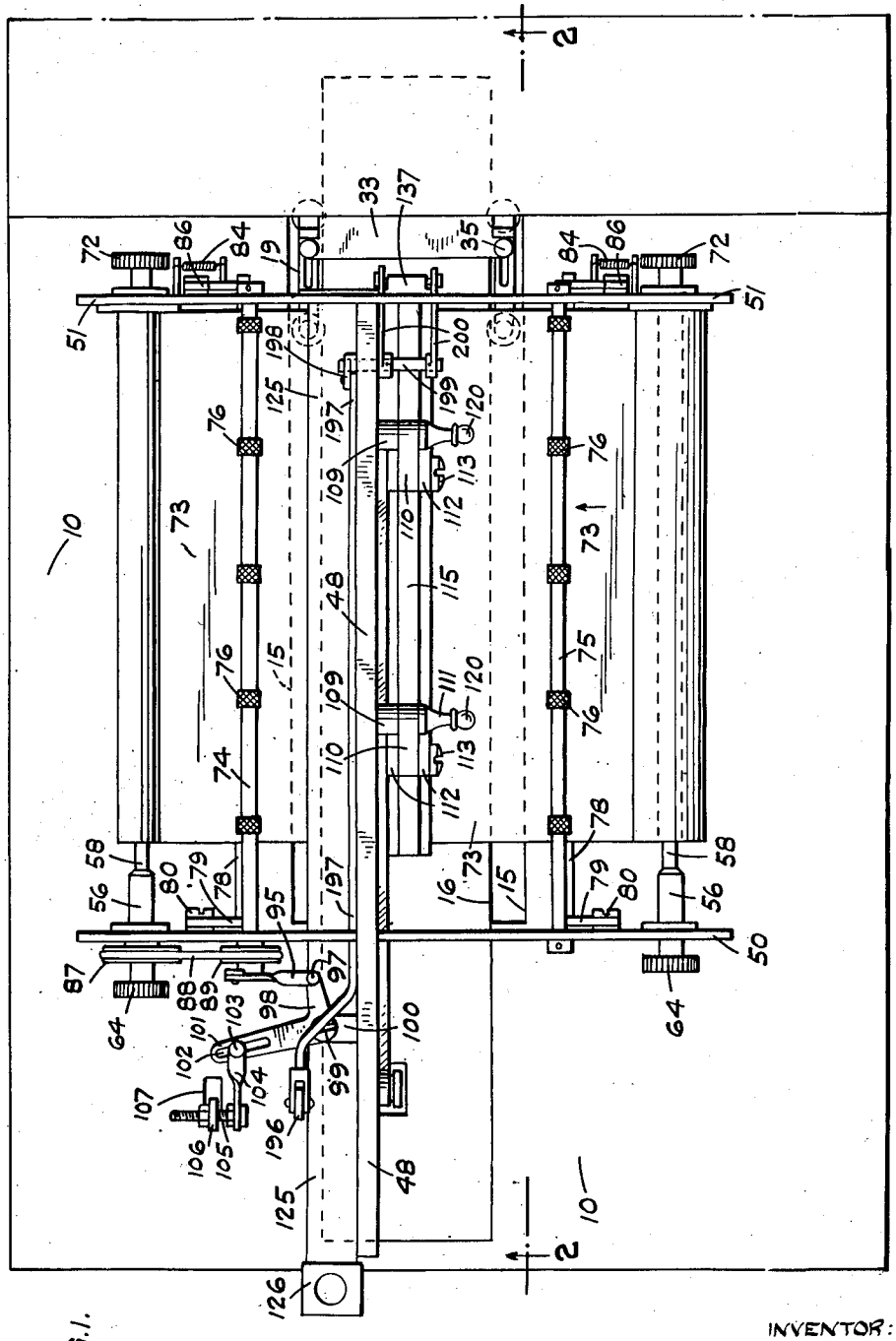


FIG. 1.

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BED AND PLATEN DUPLICATING MACHINE

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FIG. 3.

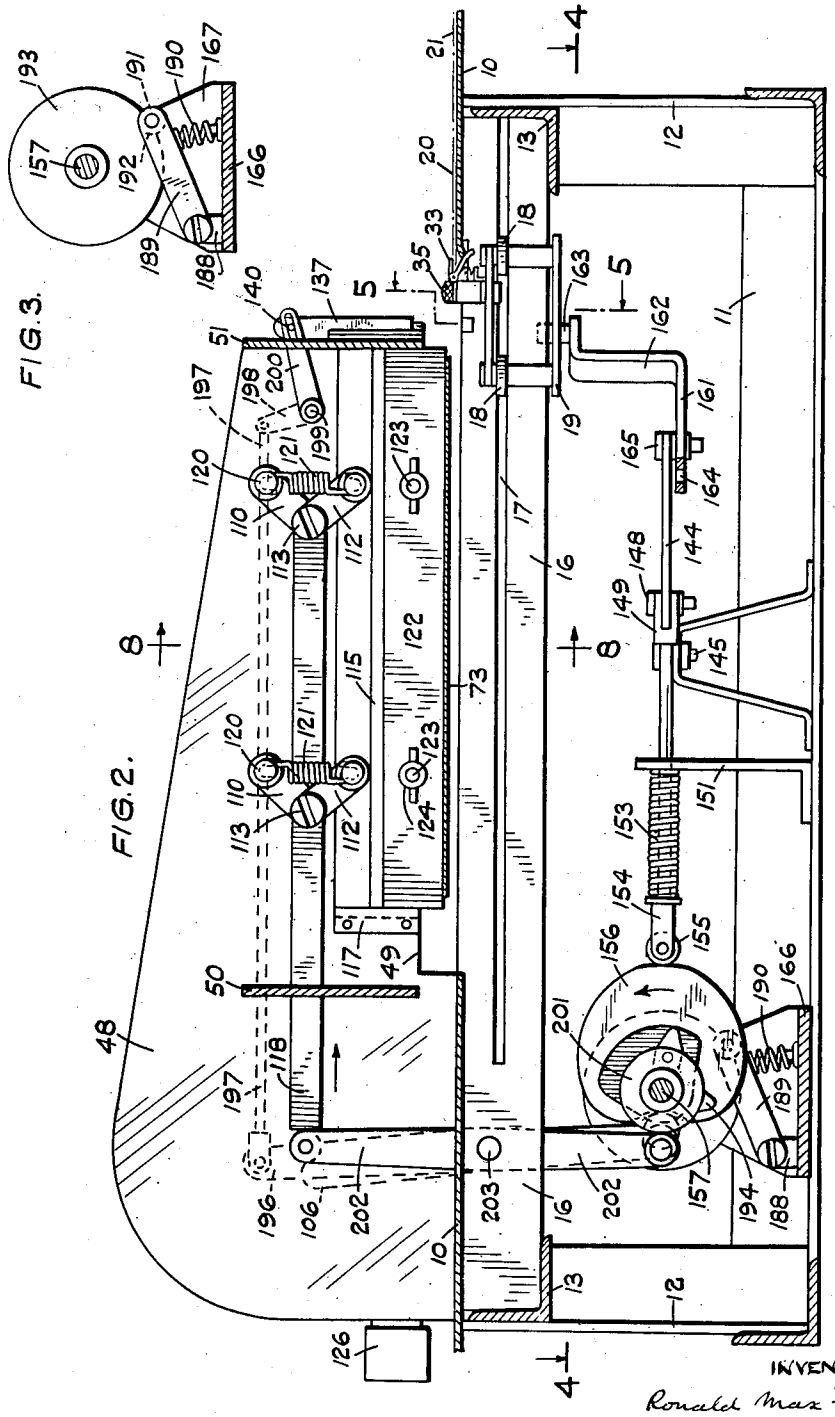


FIG. 2.

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BED AND PLATEN DUPLICATING MACHINE

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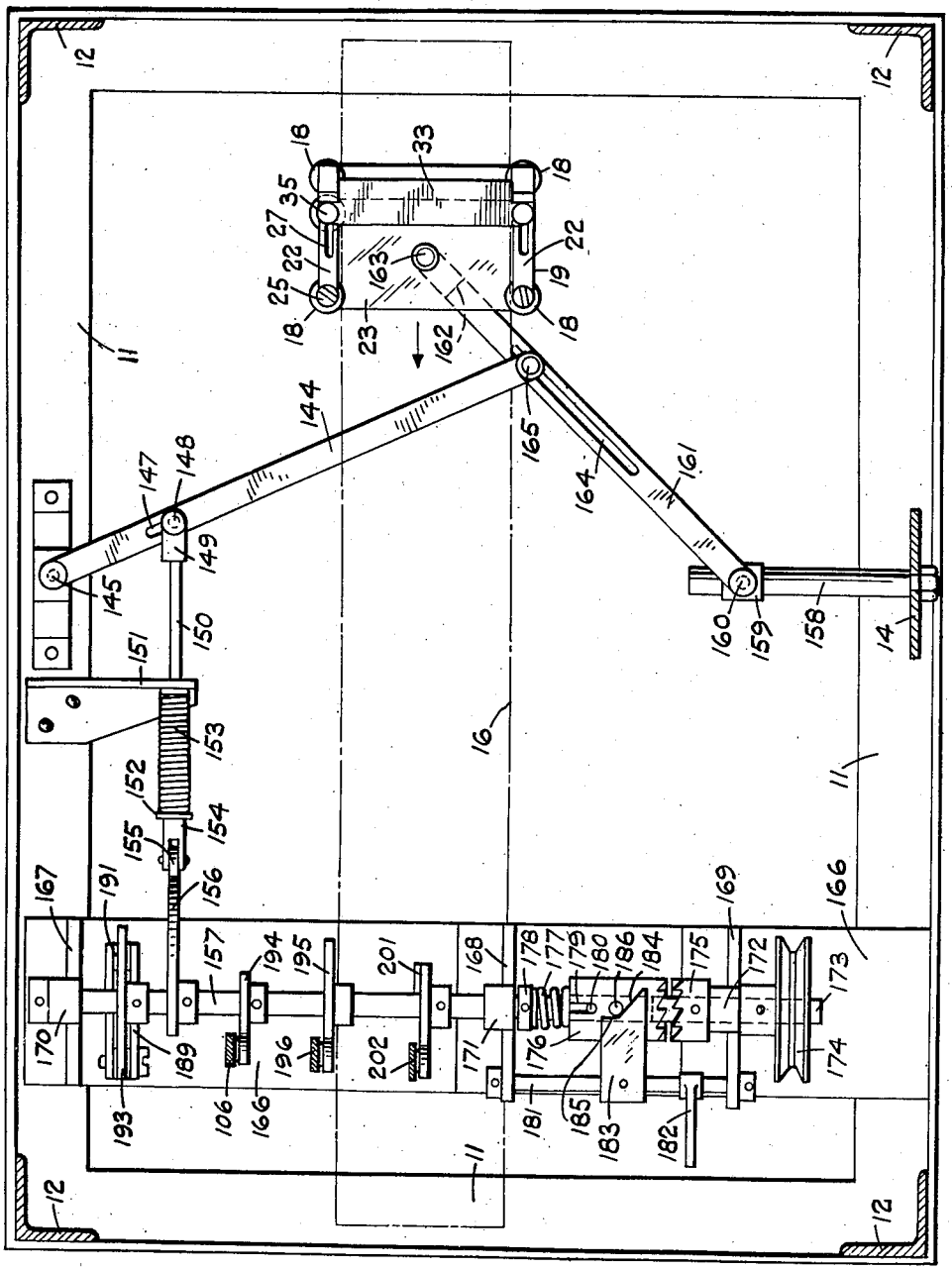


FIG. 4.

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BED AND PLATEN DUPLICATING MACHINE

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FIG. 5.

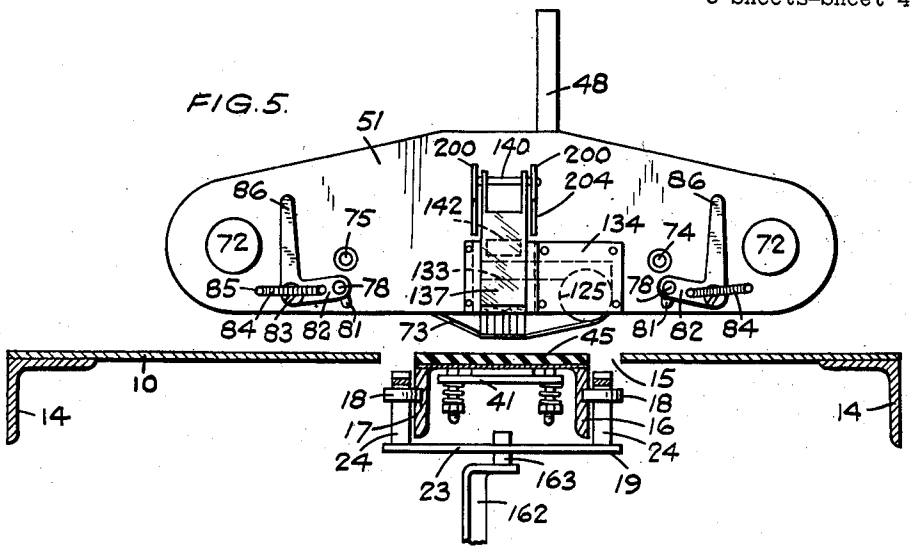


FIG. 6.

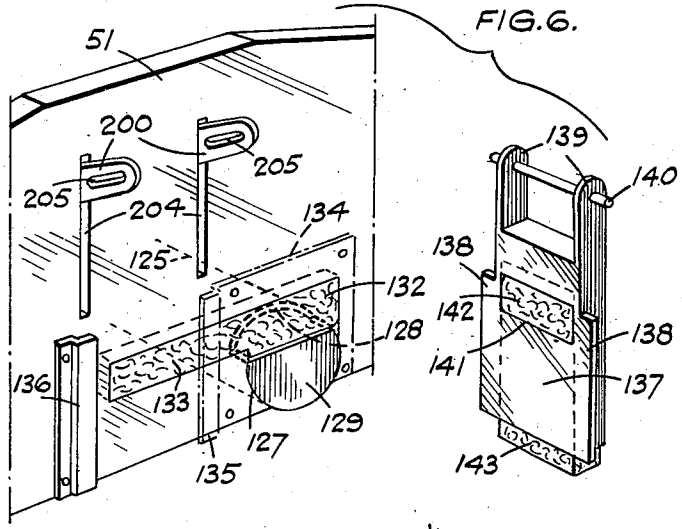
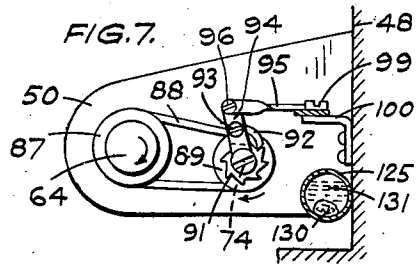


FIG. 7.



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March 18, 1952 R. M. FORD 2,589,789

BED AND PLATEN DUPLICATING MACHINE

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FIG. 8.

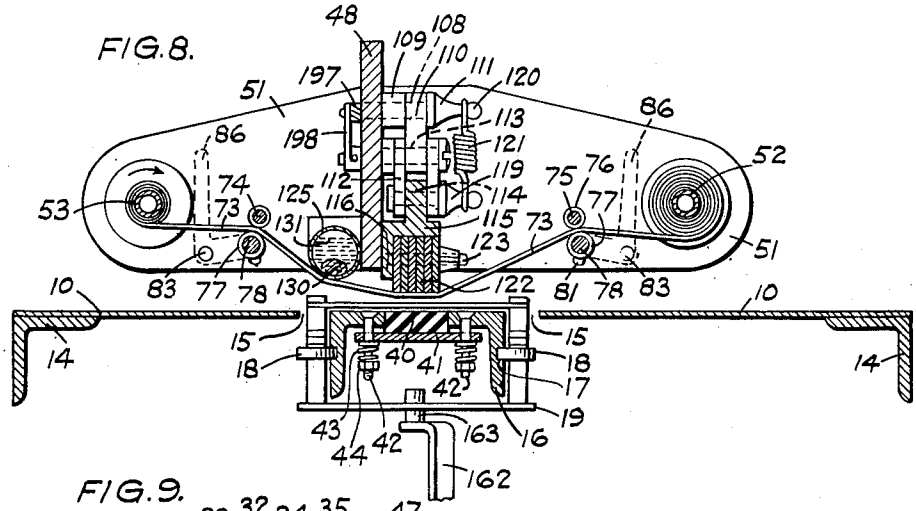


FIG. 9.

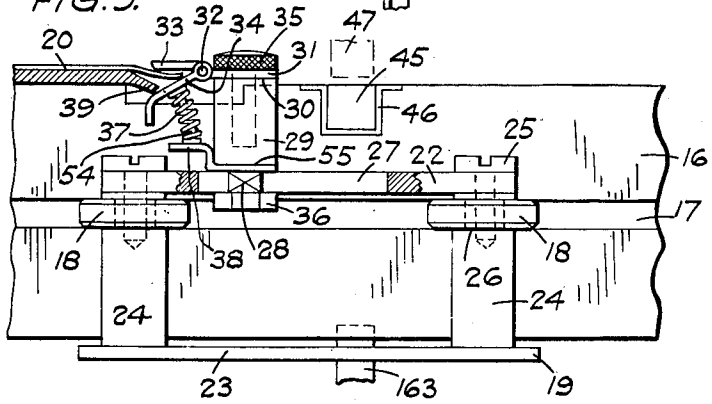
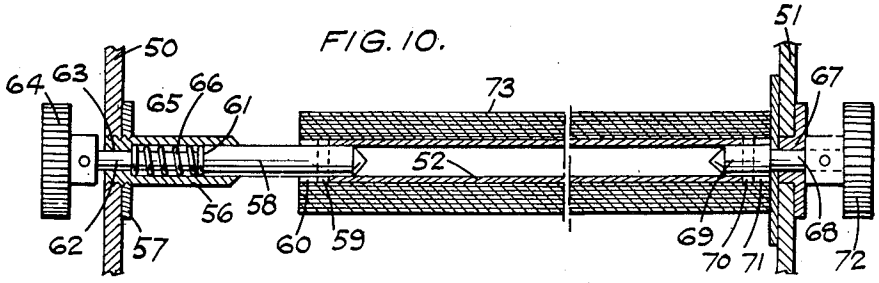


FIG. 10.



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Patented Mar. 18, 1952

2,589,789

UNITED STATES PATENT OFFICE

2,589,789

BED AND PLATEN DUPLICATING MACHINE

Ronald Max Ford, Birmingham, England

Application November 26, 1948, Serial No. 62,040
In Great Britain December 4, 1947

7 Claims. (Cl. 101—134.5)

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This invention relates to duplicating machines of the kind in which a master sheet is used on which the matter to be reproduced appears in reverse, and in which the copy sheets are moistened and brought into pressure contact with the said matter. The present invention is particularly applicable to machines for use in posting ledger sheets from a master sheet having marked thereon a plurality of items arranged in lines. The machine is constructed so that one or more lines may be reproduced at a single operation.

According to the present invention the copy sheets are moved from a feed position into register but out of contact with the matter to be reproduced on the master sheet and the copy sheets are moistened, and one of the sheets, i. e. the copy sheet or the master, is moved into pressure contact with the other and then separated, after which the copy sheet is moved away from the master sheet either by returning it to the feed position or otherwise. The movement of the copy sheets into and out of the position at which the copying is effected may be in the plane of the copy sheet.

For instance the master sheet may be disposed above a printing table and the copy sheets may be moved one by one on to the table from a feed position to a position under the portion of the matter on the master sheet which is to be reproduced, and then the portion of the master sheet bearing the matter to be reproduced is moved transversely to the surface of the table into pressure contact with the copy sheet; then the said portion of the master sheet is moved away from the surface of the copy sheet, and finally the copy sheet is moved to the side of the table either by returning it to the feed position or otherwise.

The machine may incorporate a suitable support incorporating two or more spaced parallel rollers for the master sheet, these rollers being carried on an arm or bracket above a table, and a reciprocating clip may be provided for moving the copy sheet in and out under the master sheet in a direction parallel to the axes of the rollers. Moistening may be effected by drawing the copy sheet under and in contact with a moistening member and the latter may have an automatic up and down motion to allow the clip holding the copy sheet to pass under it and back again.

The pressure member which presses a portion of the master sheet down on to the surface of the copy sheet may be operated by an automatic toggle action.

An automatic feed may be provided for the master sheet whereby it is fed through a space

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equal to the spacing of the lines thereon after each operation. Preferably this automatic feed is capable of being placed out of action so that the master sheet may be moved by hand if and when desired.

The machine may incorporate a power unit, a clutch and a camshaft upon which are mounted cams for operating mechanism producing the automatic motion of the moistener, the pressure member and the feed of the master, or any of these motions in the required succession. The reciprocating motion of the clip which carries the copy sheets in and out of the moistening position may be as nearly as possible at uniform speed, and it may be driven through suitable gearing on the power-operated camshaft.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a sectional view in side elevation showing the check device for the camshaft;

Figure 4 is a section on the line 4—4 of Figure 2;

Figure 5 is a section on the line 5—5 of Figure 2;

Figure 6 is a perspective view showing the separate parts of the moistening device;

Figure 7 is a view in end elevation showing the means employed for moving the master sheet;

Figure 8 is a section on the line 8—8 of Figure 2;

Figure 9 is a sectional view in side elevation showing the means for moving the copy sheets; and

Figure 10 is a sectional view in side elevation showing one of the rollers upon which the master sheet is mounted.

In the construction illustrated the machine comprises a feed table 10 mounted on the top of a supporting structure including a rectangular base frame 11 built up of angle-section members, vertical legs 12 at the corners, which are also of angle section, horizontal angles 13 secured to the legs and extending across the ends of the frame, and longitudinal angles 14 secured to the legs and arranged at opposite sides of the table support. The feed table 10 is mounted on the horizontal flanges of the angles 14.

The feed table 10 is provided with an opening 15 in which is located a longitudinal bar 16 of inverted channel form. This member is fixed at its ends to the frame members 13 and it serves to support a printing table. On its outer side

this channel 16 is provided with guide grooves 17 forming guides for rollers 18 of a carriage 19, which is moved automatically forwards and backwards along the channel 16.

The carriage 19 is for the purpose of drawing the copy sheets, one of which is indicated at 20, forwardly over the top surface of the inverted channel 16, and for returning the sheets to the end portion 21 of the feed table.

The carriage comprises a rectangular bottom plate 23 to which are attached four upwardly-projecting posts 24, there being two posts at each side of the channel 16, and the bottom plate extending under the channel. Each of the posts 24 is shouldered at 26, and mounted on each post is a roller 18, the rollers being supported on the shoulders 26. The pairs of posts 24 at each side of the channel 16 are connected by top plates 22 secured to the post by screws 25. The top plates 22 are provided with longitudinal slots 27, and adjustably mounted in these slots are the square stems 28 of studs 29. The stems 28 are provided with threaded end portions upon which nuts 36 are secured, and the studs can be adjusted along the slots 27 and secured by the nuts 36. Extending across the top of the channel 16 is a top plate 31. This plate at its ends rests upon shoulders 30 on the studs 29, and the plate 31 is secured in position by screws 35. The plate 31 is cranked upwardly at one of its edges and then extended, as shown at 33, and hinged to the plate 31 at 32 is a gripper plate 34. This gripper plate is acted upon by two compression springs 37 which engage at their lower ends projections 54 upon plates 38 clamped in position between shoulders 55 on the studs 29 and the plate 22. The plates 33 and 34 form a gripper for the copy sheet 20. The carriage 19 moves forwardly and backwardly along the channel 16, and in Figure 2 it is shown at the backward extremity of its movement. The spring-loaded plate 34 when the carriage is in this position engages a downwardly-projecting lip 39 of the table 10 so that the clip is automatically opened, allowing the leading edge of the copy sheet 20 to be pushed between the plates 33 and 34. When the carriage is moved forwardly the spring-loaded plate 34 moves away from the part 39, causing the plate 34 to pivot upwardly and to grip the leading edge of the copy sheet and pull it along over the top of the channel 16.

The top of the channel 16 is provided with an elongated rectangular slot in which is mounted a strip of rubber or other yielding material, this strip resting upon a plate 41 which can slide up and down upon pins 42. The plate 41 is acted upon by a compression spring 43 which resists resiliently any downward movement of the rubber strip 40. The springs 43 engage nuts 44 on the pins 42. The members 40, 41 form a printing table.

At a suitable position the upper surface of the channel 16 is provided with a transverse recess in which is mounted a pad 45 of rubber or other yielding material, which may be mounted in a metal carrier 46. It is at this position that the copy sheet is acted upon on its upper side by a moistening member 47 as the copy sheet is drawn along the top of the channel.

A bracket 48 is attached to the feed table, or to the frame supporting it, at one end and extends over the channel 16 and the printing table 40, 41 and in spaced relationship thereto. One end of this bracket 48 is either attached to the table 10 or may pass through a slot in the table

10 and may be attached to the channel 16. The remainder of the bracket 48 at its lower side 49 is spaced above and parallel to the channel 16. The bracket 48 is further provided with transverse plates 50, 51 which are spaced apart and serve to support the spindles of two rollers 52, 53.

The plate 50 is provided with two screw-threaded holes in which are screwed tubular bearing members 56 upon which are mounted nuts 57. One of these bearing members 56 supports a spindle 58 for one tubular roller 52, and the other bearing member 56 supports the spindle 58 for one end of the other tubular roller 53. Each of the spindles 58 has a portion which enters one end of the hollow roller and carries a transverse pin 59 the ends of which engage in a longitudinal slot 60 in the end of the roller. The spindles 58 are shouldered at 61 and have portions 62 of reduced diameter which engage the bearing members 56 and 63. The reduced end 62 of each spindle 58 projects from the side of the plate 50 and has fixed to it a head 64 the flange of which is knurled to allow the spindle 58, and consequently the roller associated therewith, to be turned on its axis. Further, operating between the shoulder 61 and a shoulder 65 within the bearing member 56 is a spring 66. The spindles 58 can be withdrawn from the ends of the rollers 52 and 53 by pulling the heads 64.

The other plate 51 is provided with two flanged bearing bushes 67 arranged coaxially with the bearing members 56, and mounted in each of these bearing bushes 67 is a spindle 68, these two spindles having portions 69 which engage in the opposite ends of the rollers 52 and 53. Each portion 69 is provided with a transverse pin 70 the ends of which engage in longitudinal slots 71 in the rollers. The spindles 68 have fixed on their outer ends heads 72 the flanges of which are knurled so that the rollers 52 and 53 can be turned thereby.

The master strip 73 is wound at its ends on these two rollers 52 and 53 and can be caused to travel from one to the other either automatically or by turning the spindle 58 or 68 by hand.

Means may be provided for moving the master sheet by a distance equal to the space between two lines of writing thereon, which lines are arranged parallel to the rollers on which the master is mounted. This action may take place after each copy has been made and before the next copy is made. Such means are shown in Figures 1 and 7, wherein a pulley 87 is shown fixed on the head of the spindle 58 of the roller 52. This pulley is connected by a driving band 88 to a pulley 89 mounted on the end of the rod 74 rotatably mounted in the plates 50 and 51. The rod 74 has fixed on it a ratchet wheel 91 with which cooperates a pawl 92, pivoted at 93 to a lever 94 mounted for oscillation about the axis of the rod 74. The lever 94 is oscillated by a link 95, pivoted at 96 to the oscillating lever 94, and pivoted at 97 to an arm 98 of a bellcrank lever pivoted at 99 to a lug 100 on the bracket 48. The other arm 101 of this bellcrank lever has a slot 102, and engaging in this slot is a pin 103 carried by a link 104 connected at its opposite end by a pin 105 engaging in a lever 106 which projects through a slot 107 in the table 10. The pin 103 can be adjusted along the slot 102 so as to vary the extent of the angular movement applied to the rod 74. The rotation of the rod 74 moves the master sheet, and the roller 53 is driven simultaneously with it so as to prevent slack developing between the

rod 74 and the roller 53. The roller 53 cannot conveniently be used for travelling the master sheet because the diameter of the part of the master on this roller is not a constant amount.

Extending between and having their ends mounted in the plates 50 and 51 are two rods 74, 75, on each of which is provided knurled flanges 76 engaging the upper side of that portion of the master 13 which extends between the rollers.

Opposed to the flanges 76 and engaging the underside of the master sheet are short lengths of rubber tube 77. These members 77 are mounted upon rods 78 which are free to rotate.

The rods 78 at one end are each carried by a lever 79 pivoted at 80 to one side of the plate 50. At the other end of each of the rods 78 the rod passes through a slot 81 in the plate 51 and is attached to one arm 82 of a bellcrank lever pivoted at 83 on the side of the plate 51. The arm 82 of the bellcrank lever is acted upon by a tension spring 84 connected to a pin 85 on the plate 51. Each of the bellcrank levers has a second arm 86. Both the rods 78 therefore are normally spring-loaded in an upward direction. That part of the master sheet which is disposed between the rollers 52 and 53 and immediately above the member 40 is adapted to be pressed downwardly, by means hereinafter described, on to the upper surface of the copy sheet, and when this occurs the rods 78 move downwardly against spring pressure. However, they do not at this time move downwardly sufficiently far for the springs 84 to pass across the dead-centre position. If however it is desired to take out the master sheet and put in a fresh one, the arms 86 of the bellcrank levers can be moved by hand to move the rods 78 to the lower ends of the slots 81. In doing this the springs 84 pass across the dead-centre position so that the rollers 77 on the rods 78 will remain in their lowest position until the lever arms 86 are again operated.

Fixed in the bracket 48 are two pins 108. These pins are spaced apart, and mounted on each is a distance tube 109 and an upper toggle lever 110. The ends of the pins 108 are of reduced diameter and nuts 111 are screwed on to them. A pair of lower toggle levers 112 are pivoted on each of the pins 113 which pass through the lower end of each upper toggle lever 110. The lower end of the lower toggle levers 112 are connected by horizontal pins 114 to a slide 115. The lower part 116 of this slide is of angle section and one side of it slides on the side face of the plate 48. At one end this slide engages the plate 51 and is guided thereby, and at the other end it engages under a guide plate 117 which is fixed to the side of the bracket 48. The toggle mechanism is operated by a push rod 118 mounted on the pins 113 and located between the side of the bracket 48 and the adjacent sides of two of the levers 112. The push rod passes through a slot in the plate 50. The pins 114 have reduced ends upon which are screwed nuts 119. The heads of the nuts 111 and 119 are enlarged, as shown at 120, and the two pairs of nuts are connected by tension springs 121 so that if the push rod 118 is moved in the direction of the arrow shown in Figure 2, the slide 115 is displaced bodily downwardly, and when the push rod 118 is released the springs 121 operate to raise the slide 115.

Fixed in the angle 116 are a plurality of strips 122. These may be made of plastics material and may be held in position by providing them with holes and placing them on pins 123 secured to the angle 116, the strips 122 being secured in position by wing nuts 124 screwing on to the threaded ends of the pins 123. Any number of these strips may be used to build up the necessary width of presser member for the purpose of pressing the master sheet against the copy sheet to reproduce one, two or more lines.

Moistening means for the copy sheets are provided including a hollow cylindrical vessel 125. This is secured to the side of the bracket 48 and passes through an opening in the plate 50. At one end the vessel is provided with a filler opening 126, which can be closed by any suitable means, and at the opposite end the cylindrical vessel passes through an opening in the plate 51 and into a recess 127 in the outer side of the plate 51. The upper portion of the part of the cylindrical vessel 125 which is situated in the recess 127 is cut away, as shown at 128, and the end of the lower portion of the cylindrical vessel is closed by a plate 129 of segmental shape.

Disposed along the bottom of the vessel 125 is a wick 130, and this wick is submerged by the liquid 131 in the vessel. At the end of the vessel 125, which is fixed in the plate 51, the wick is bent upwardly and is secured to the lower portion of an absorbent pad 132, which is placed in the recess 127 in the plate 51. This recess is extended laterally, as shown at 133, and the absorbent pad 132 is similarly extended. The side of the pad is flush with the side of the plate 51.

A cover plate 134 is secured to the plate 51 and covers the end 129 of the vessel 125, and also covers a part of the pad 132. This cover plate at one edge is bent away from the surface of the plate 51, as shown at 135, to form a vertical guide, and a second vertical guide 136 is fixed to the plate 51 in a position spaced away from the guide 135. An exposed portion 133 of the absorbent pad (see Figure 6) is disposed between the guides 135 and 136.

A sliding element operates in the guides 135 and 136. This sliding element consists of a box-like body 137, having laterally-projecting edge portions 138 which slide in the guides 135 and 136, and the box structure further comprises upwardly-projecting spaced sides 139 in which is fixed a pin 140. Further, the face of the box-like structure which slides on the side of the plate 51 is provided with an opening 141 through which is exposed a portion of a moving absorbent pad 142 contained in the box-like body. This moving absorbent pad has a portion which is exposed through the opening 141 and a portion 143 at the bottom which projects through the lower opening of the box-like body 137. This body is automatically moved up and down in the guides 135 and 136, and in its raised position (see Figures 2 and 5) the part of the pad 142 which is exposed through the opening 141 is out of register with the part 133 of the absorbent pad 132, and in this position the lower end 143 of the pad 142 is raised above the plane along which the copy sheet passes as it is moved under the slide 115. When the box-like structure 137 is lowered however the part of the pad 142 which is exposed through the opening 141 comes into contact with the part 133 of the pad 132, and at the same time the lower end surface of the part 143 of the pad 142 comes into light pressure contact with the copy sheet as it is moved into the printing position. The pad 142 engages the upper surface of the copy sheet as it is being moved along by the clip 33, 34, and at the position where the copy sheet is engaged by the

pad 142 the pad is supported upon the soft and resilient strip 45.

The exterior of the vessel 125 serves to guide the master sheet as it leaves the presser and before it passes to the members 76, 77.

The carriage 19 is moved under the slide 115, remains stationary while the slide 115 is moved downwardly to effect the printing, and after the slide is allowed to rise the carriage 19 is moved backwardly to the position shown in Figure 2, and the clip 33, 34 is automatically opened by reason of the fact that the plate 34 comes into contact with the lip 39. The opening of the clip allows the printed copy sheet to be removed and another one to be inserted.

The mechanism for reciprocating the carriage 19 comprises a lever 144, pivoted at 145 to a bracket 146 on the frame 11. This lever is slotted at 147, and engaging in the slot is a pin 148 carried by a fork 149 fixed on a reciprocating rod 150, which slides in a bracket 151 attached to the frame 11. The rod 150 is provided with a flange 152, between which flange and the bracket 151 operates a compression spring 153. The rod 150 is provided with a second fork 154 in which is mounted a roller 155 engaged by a cam 156 on a camshaft 157, which forms the driving shaft of the machine.

Fixed to one of the angle bars 14 is a guide pin 158 upon which can slide a sleeve 159 to which is pivoted at 160 a lever 161. This lever 161 is cranked intermediate its ends, as shown at 162, and the upper end of this lever is provided with an upwardly-projecting stud 163 which engages the bottom plate 23 of the carriage 19. The lever 161 is slotted, as shown at 164, and the lever 144 is connected to the lever 161 by a vertical pin 165 which engages in the slot 164.

As the lever 144 is oscillated by the rod 150 it causes oscillation of the lever 161 and thus moves the carriage 19 forwards and backwards on the channel 16. The stud 163 has a rectilinear reciprocating movement which is permitted by the provision of the pin and slot connection between the levers 144 and 161, or by the provision of the sliding sleeve 159.

Mounted on the frame which supports the table is a plate 166. This is disposed at right angles to the channel 16, and mounted upon its upper side are three brackets 167, 168 and 169. These brackets respectively support bearings 170, 171 and 172. The camshaft 157 is mounted in the bearings 170 and 171, and the bearing 172 supports a driving shaft 173 on which is a pulley 174 by which rotary motion may be imparted to it from the shaft of a power unit. The shafts 157 and 173 are mounted in alignment, and on the shaft 173 is fixed a clutch element 175. Slidably mounted on the end of the camshaft 157 is a clutch element 176. This clutch element is urged towards the clutch element 175 by a spring 177 engaging a collar 178 fixed on the shaft, and engaging the end of the clutch element 176. The clutch element 176 is provided with a longitudinal slot 179 in which engages a radially-projecting pin 180 on the camshaft.

Mounted in the brackets 168 and 169 and parallel with the shafts 157 and 173 is a spindle 181 on which is an oscillating lever 182. The spindle 181 has fixed to it a lever 183 the end of which has an inclined surface 184 and a transverse shoulder 185. The clutch element 176 is provided with a radially-projecting pin 186 which engages the incline 184 when the camshaft is at rest. The driving shaft 173 may be constantly driven. If the operating lever 182 is depressed the lever 183 is raised to bring it clear of the pin 186, thus allowing the spring 177 to move the clutch element 176 into engagement with the clutch element 175. The camshaft is then rotated by the driving shaft. Rotation may continue for as long as is required, and if it is desired to stop the machine at the end of each cycle of operations, the lever 183 is allowed to return to its initial position as soon as rotation of the camshaft has commenced. Just before the end of the rotation the pin 186 engages the incline 184 and the clutch element 176 is then moved axially against the pressure of the spring 177 to disengage the two clutch elements.

Mounted on the camshaft is a check device, which can be seen in Figures 3 and 4. This check device comprises a lug 188 attached to the plate 166, to which lug is pivoted a lever 189 which is acted upon by a compression spring 190. The end of the lever is provided with a laterally-projecting roller 191 which engages in a notch 192 in the periphery of a disc 193 fixed on the camshaft 157 so that the rotation of the camshaft is checked at the end of each revolution.

The camshaft is further provided with the cam 156 which operates the spindle 159. In addition, the camshaft has fixed to it a cam 194 which oscillates the lever 106 which operates the automatic master feed.

In addition the camshaft is provided with a further cam 195 which oscillates a lever 196 which is used to produce the reciprocating motion of the box-like body 137. The lever 196 is connected by a link 197 to a lever 198 on a pin 199 which extends through the bracket 48, and the pin 199 carries a pair of parallel levers 200 which engage the ends of the pin 140. The cam 195 produces the downward movement of the body 137, while the upward movement thereof may be produced by a spring, which is not shown. The levers 200 extend through and are guided by the sides of slots 204 in the plate 51, and the levers 200 are provided with slots 205 which engage the ends of the pin 140.

The camshaft is provided with a further cam 201 which oscillates the lever 202, which engages the end of the push rod 118 so as to produce the downward movement of the slide 115.

The levers 106, 196 and 202 may all be pivoted to the frame at 203, and these levers may all be provided with rollers at their lower ends, which rollers are engaged by the respective cams.

The cams are shaped and disposed on the camshaft so as to produce the necessary movement of the parts in the correct sequence. The cycle of operations is as follows. First the carriage 19 is moved to draw the copy sheet under the slide 115. When the carriage has moved a short distance and the clip 33, 34 has closed on to the copy sheet and drawn it a predetermined distance, the body 137 is moved downwardly until the pad 142 presses lightly on the top of the copy sheet. The downward movement of the body 137 takes place during the first part of the movement of the copy sheet. The carriage then moves to the end of its stroke, so that almost the whole of the upper surface of the copy sheet is moistened. At the completion of the inward stroke of the carriage the body 137 is raised and the slide 115 is lowered to press a portion of the master sheet on to the moistened upper surface of the copy sheet. The slide 115 is then allowed to rise and the carriage commences to move back to its original position. During the return move-

ment of the carriage the lever 106 is moved to cause the ratchet 92 to turn the rod 74 through an angle sufficient to move the master sheet by a distance to bring the next line of writing thereon under the slide 115. When the carriage has returned to its original position the gripper plate 34 is automatically depressed by engagement with the lip 39 and the copy sheet can be removed from the table and a fresh one placed with its leading edge under the plate 33. Each stroke of the movement of the carriage is continuous but there is a pause during which the carriage is stationary while printing is being effected by the downward movement of the slide 115. Movement of the master sheet takes place after the slide 115 has been raised and during the return movement of the carriage. The body 137 of the moistening device is moved downwardly as soon as the leading part of the copy sheet has moved under it, and the moistening device stays down until the copy sheet has reached the printing position, when the body 137 is raised.

What I claim then is:

1. In a duplicating machine of the class described, the combination of a frame, a bar supported by the frame and including a flat printing table, guides on said bar, a carriage having means engaging said guides, said carriage having a bottom plate disposed under the bar, posts on the bottom plate, means on the posts engaging the guides, top plates connecting a plurality of posts at opposite sides of the bar, studs on said top plates, a connecting plate extending across the top of the bar and connecting said studs, a clip plate hinged to the connecting plate and cooperating therewith to form a clip for the copy sheets, spring means for closing said clip automatically when the carriage is moved along the bar away from a feed position, means for opening said clip automatically when the carriage returns to the feed position, means for reciprocating the carriage on said bar into and out of a transfer position in which the copy sheet is between the presser and the printing table, moistening means for the copy sheets including a moistening pad, disposed above the printing table, and means for moving said moistening pad into and out of engagement with a copy sheet during the inward movement of the carriage towards the transfer position, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, said presser being mounted on said bracket, means for moving the presser towards and away from the printing table, and rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table.

2. In a duplicating machine of the class described, the combination of a frame, a feed table on the frame, said feed table having an opening, a bar supported by the frame and including a flat printing table, said bar being disposed in said opening, guides on said bar, a carriage having means engaging said guides, said carriage having a bottom plate disposed under the bar, posts on the bottom plate, means on the posts engaging the guides, top plates connecting a plurality of posts at opposite sides of the bar, studs on said top plates, a connecting plate extending across the top of the bar and connecting said studs, a clip plate hinged to the connecting plate and cooperating therewith to form a clip for the copy sheets, spring means for closing said clip automatically when the carriage is moved along the bar away from a feed position, means for reciprocating the carriage on said bar into and out of a transfer position in which the copy sheet is between the presser and the printing table, means for opening said clip automatically when the carriage returns to the feed position, said means being disposed on the feed table, moistening means for the copy sheets including a moistening pad, disposed above the printing table, and means for moving said moistening pad into and out of engagement with a copy sheet during the inward movement of the carriage towards the transfer position, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, said presser being mounted on said bracket, means for moving the presser towards and away from the printing table, and rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table.

3. In a duplicating machine of the class described, the combination of a frame, a flat printing table mounted on said frame, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, said presser being mounted on said bracket, means for moving the presser towards and away from the printing table, rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table, means for moving copy sheets along the printing table into and out of position beneath the presser, and moistening means for the copy sheets, said moistening means comprising a hollow container for moistening liquid, said container having an opening at one end, a wick in the container, an absorbent pad projecting into said opening and contacting the wick, said bracket having a recess in which the end of the container and the pad are located, guides on said bracket, a slide movable in said guides, said slide being of box-like form and containing an absorbent pad, said slide having an opening in the side nearest the bracket recess through which opening the pad in the slide is exposed, said pad in the slide also being exposed at the end of the slide, means for reciprocating the slide in the guides to move the exposed parts of the pad therein into and out of contact with the pad in the recess and the copy sheets.

4. In a duplicating machine of the class described, the combination of a frame, a feed table on the frame, said feed table having an opening, a flat printing table disposed in said opening, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, said presser being mounted on said bracket, means for moving the presser towards and away from the printing table, rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table, a carriage mounted on and movable along said printing table, said carriage having a clip for receiving the leading end of a copy sheet, means for reciprocating the carriage on said support into and out of a transfer position in which the copy sheet is between the presser and the printing table, moistening means for the copy sheets including a moistening pad, disposed above the printing table, and means

for moving said moistening pad into and out of engagement with a copy sheet during the inward movement of the carriage towards the transfer position, bearings on the frame, a camshaft rotatable in the bearings, a cam on the camshaft, a lever pivoted to said carriage, a guide pin on the frame, a sleeve slidable on said guide pin, said lever having pivotal connections at its ends one to the carriage and the other to the sleeve, a further lever pivoted to means on the frame and having a sliding pivotal connection with the lever connected to the carriage, and a push rod operated by said cam and having a pivotal connection to said further lever.

5. In a duplicating machine of the class described the combination of a frame, a flat printing table mounted on said frame, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, means for moving the presser towards and away from the printing table, rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table, two opposed pairs of guide rollers, the rollers of each pair being adapted to engage opposite sides of a master sheet, one pair being disposed between each of the master-carrying rollers and the presser, means for driving one of said guide rollers for moving the master sheet, a carriage having means for gripping a copy sheet, means for moving the carriage into and out of a transfer position in which the copy sheet is beneath the presser, and moistening means for the copy sheets, including a moistening pad, disposed above the printing table, and means for moving said moistening pad into and out of engagement with a copy sheet during the inward movement of the carriage towards the transfer position.

6. A duplicating machine according to claim 5, wherein one guide roller of each pair is carried by a spring-loaded over dead centre lever permitting each of these rollers to be moved away from its companion roller, said roller remaining in said position until the lever is again operated.

7. In a duplicating machine of the class described the combination of a frame, a feed table on the frame, said feed table having an opening, a flat printing table disposed in said opening, a bracket supported on said frame and extending over said printing table, a presser disposed parallel to but spaced from said table, said presser being mounted on said bracket, means for moving the presser towards and away from the printing table, rollers on the bracket for carrying a flexible master sheet with the portion thereof between the rollers disposed under the presser and over the printing table, a carriage mounted on and movable along said printing table, said carriage having a clip for receiving the leading end of a copy sheet, means for reciprocating the carriage on said support, into and out of a transfer position in which the copy sheet is between the presser and the printing table, moistening means for the copy sheets, said moistening means including a moistening pad disposed above the printing table and movable into and out of moistening position, means for moving the moistening pad into and out of moistening position, during the inward movement of the carriage towards the transfer position, bearings on the frame, a camshaft rotatable in the bearings, cams on the camshaft, means operated by the cams for moving the carriage, the moistening pad and the presser in succession, a bearing on the frame in alignment with the camshaft, a driving shaft in said bearing, clutch elements on the camshaft and on the driving shaft, one of said clutch elements being acted upon by a spring tending to move it into engagement with the other clutch element, and manually-operable means normally retaining said movable clutch element in its disengaged position but movable manually to allow it to engage the other clutch element, said means including an element for returning said movable clutch element to its disengaged position when each revolution of the camshaft is completed.

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