

Feb. 9, 1937.

C. J. HUEBER

2,070,549

PRINTING MACHINE

Filed Feb. 5, 1936

5 Sheets-Sheet 1

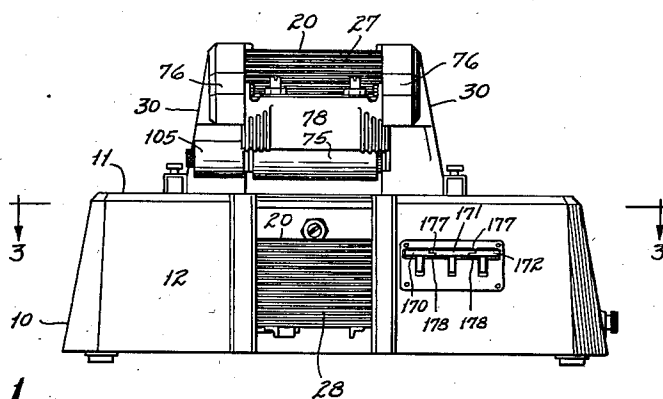


Fig. 1

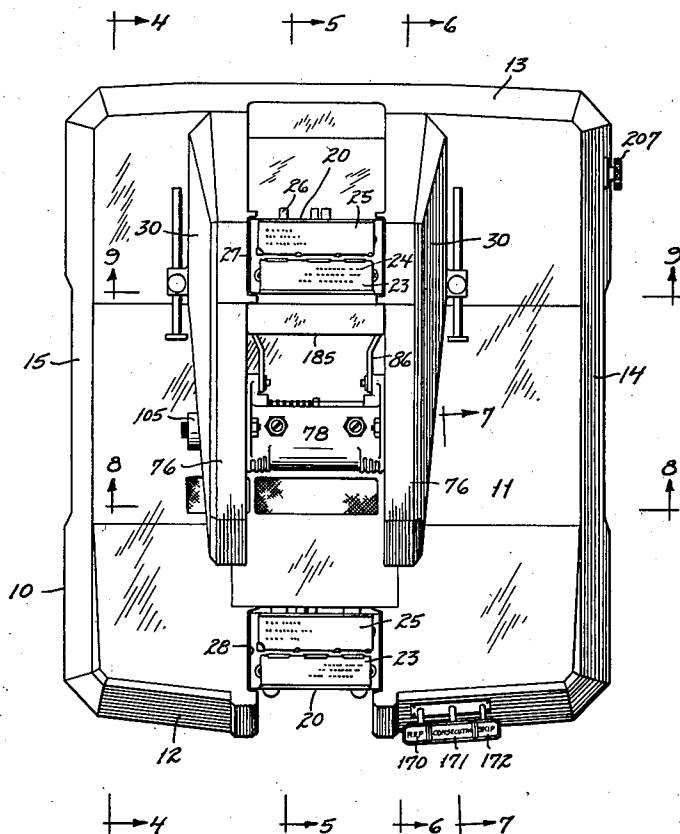


Fig. 2

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5 Sheets-Sheet 2

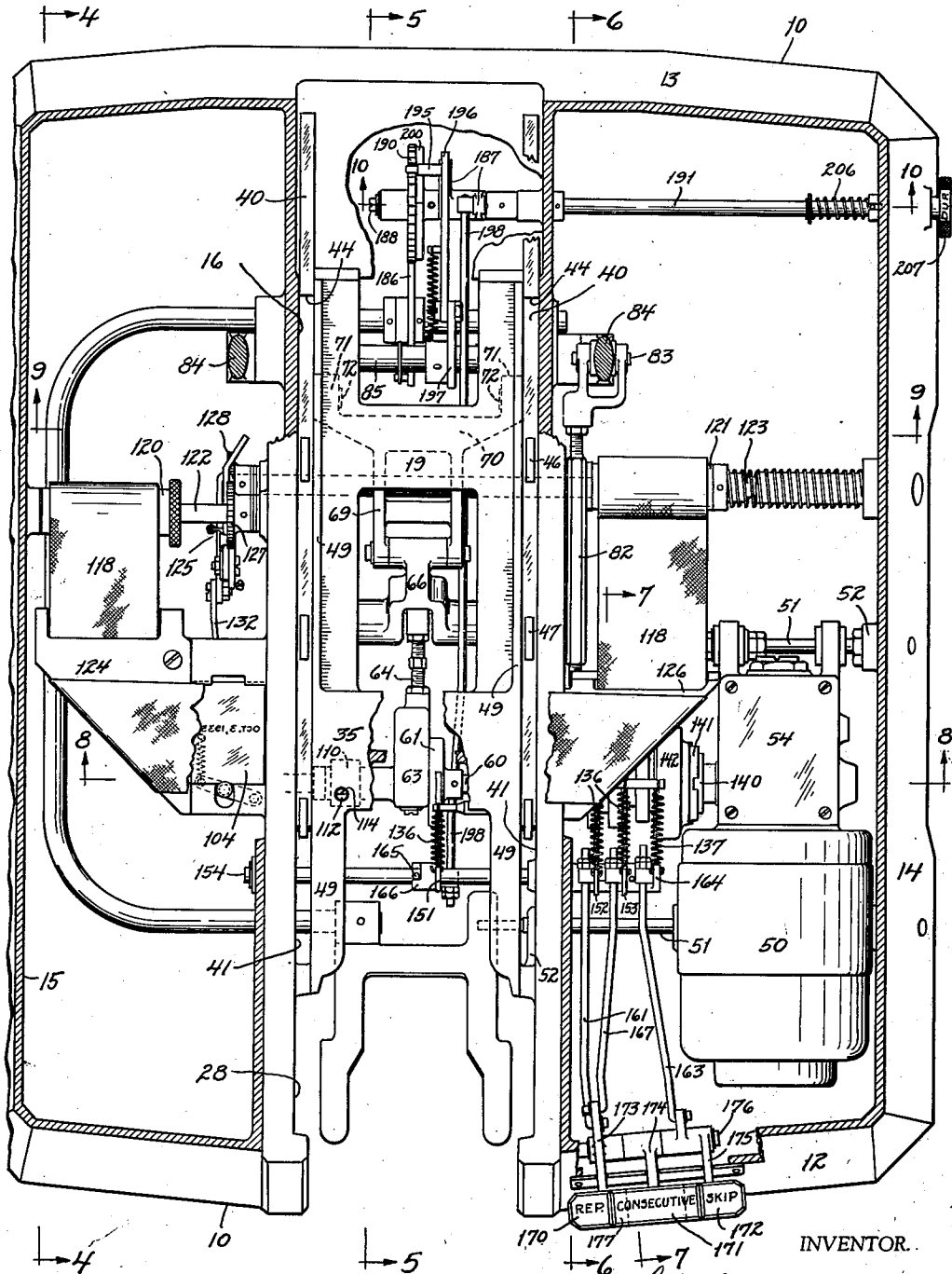


Fig. 3

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5 Sheets-Sheet 3

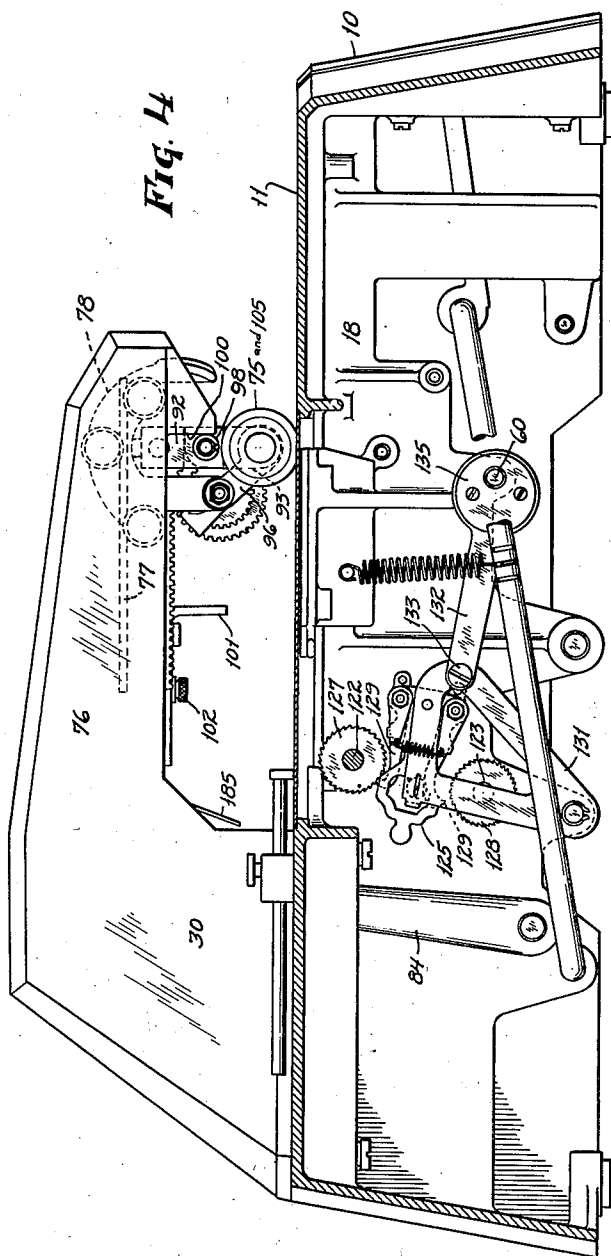


Fig. 14

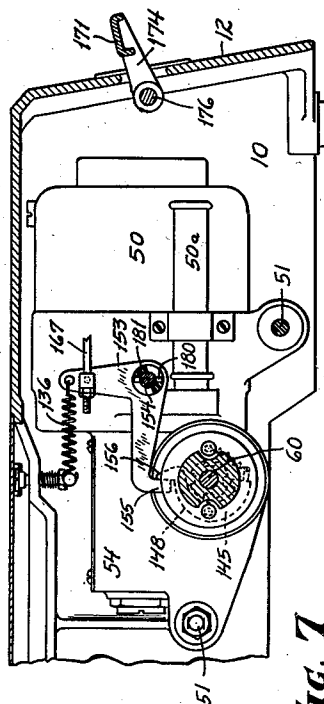


Fig. 7

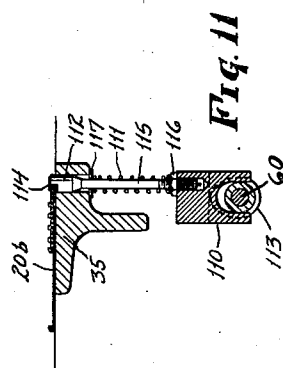


Fig. 11

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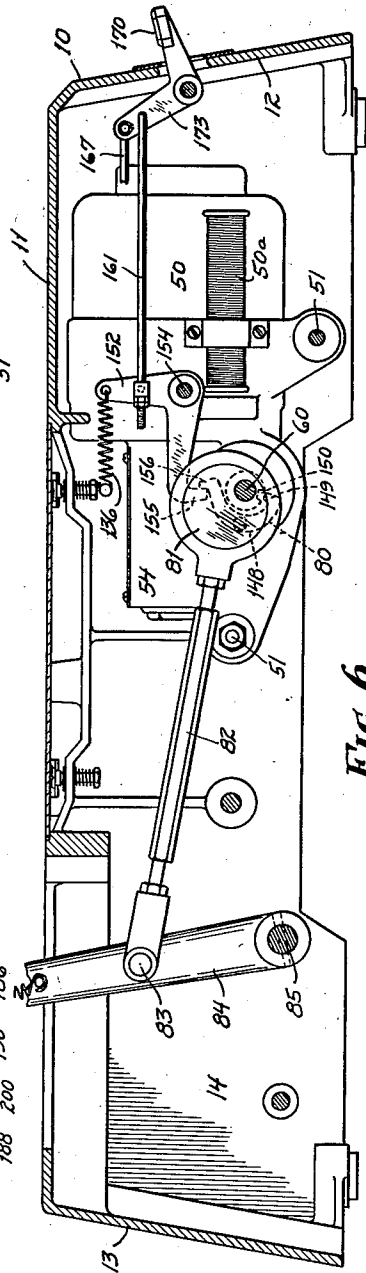
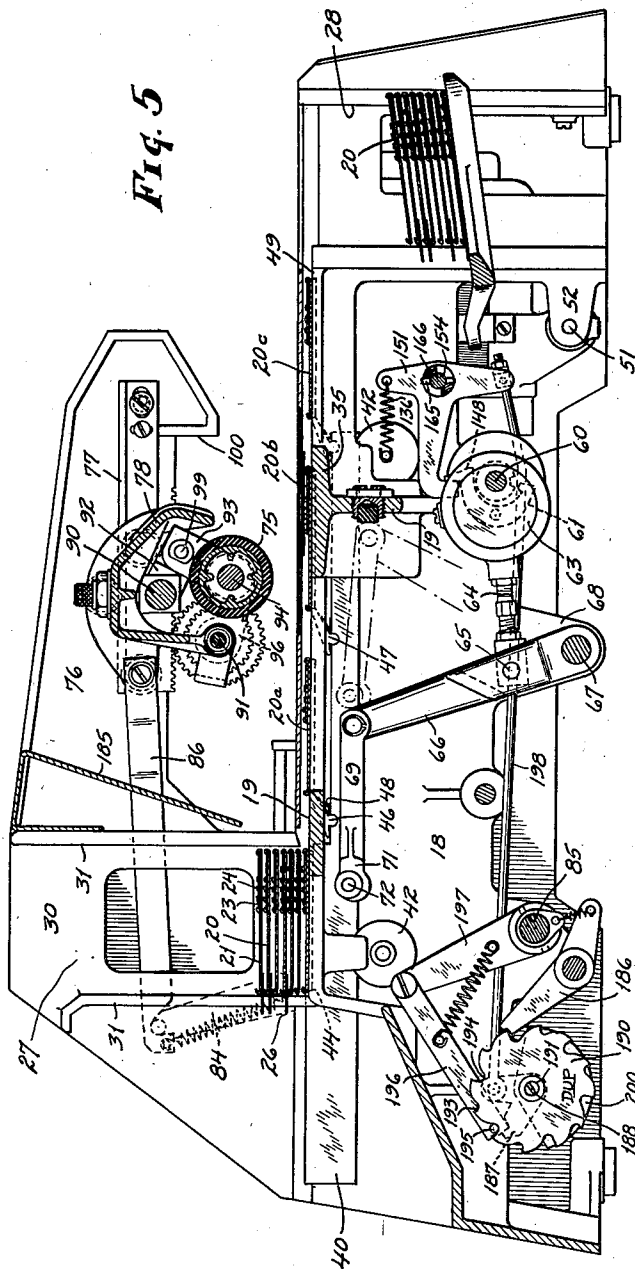
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PRINTING MACHINE

Filed Feb. 5, 1936

5 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,070,549

PRINTING MACHINE

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by mesne assignments, to Addressograph-Multi-
graph Corporation, Cleveland, Ohio, a cor-
poration of Delaware

Application February 5, 1936, Serial No. 62,416

19 Claims. (Cl. 101—56)

This invention relates to a printing machine and specifically to that type of printing machine which is well adapted to make an impression or impressions consecutively from each of a series of printing members, such as, for instance, a machine for printing addresses on envelopes, cards, payroll lists, etc.

Heretofore, many such printing mechanisms have been utilized. These, however, may be classified into two general classes—hand-operated machines and power-operated machines. In the past, the machines of each of these classes have had specific advantages, as distinguished from the machines of the other class.

The hand-operated machines have been comparatively small and have been manufactured to sell at comparatively low cost to the user. This, of course, has provided a machine for general office use where ordinarily the expense of larger machines was unwarranted. On the other hand, the power-operated machines have been comparatively large and more or less cumbersome. Their cost to the user has been great in comparison to the cost of the hand-operated machines. However, these larger and more expensive machines have had advantages over the hand-operated machines. Such as their ability to operate at a much higher rate of speed, thereby greatly increasing the output over that of the hand-operated machines.

The present invention, as distinguished from the two types of machines just mentioned, combines the advantages of both the manually operated machines and the power machines without the disadvantages inherent in either of them.

Many difficulties have been encountered in the attempt to produce an inexpensive, compact, power-operated machine, and such attempts have repeatedly resulted in simply another larger and expensive machine. Several things have been found especially difficult, such as for instance, the provision of duplicators and mechanisms which would enable the operator to skip any printing device as it passed through the printing mechanism. The controls of many such mechanisms have, in the past, resulted in more or less large and cumbersome units. Other difficulties have been encountered in the construction of platen supporting mechanisms, as one of the demands on power printing mechanisms of this type is that it accommodates paper or forms of comparatively large size.

Another difficulty encountered has been the provision of suitable driving mechanism. In series printing machines, such as address print-

ing machines, there is generally provided a printing member feed mechanism, and a platen operating mechanism, together with a suitable inking mechanism such as, for instance, an inking ribbon feeding mechanism. Obviously, it is desirable that these various mechanisms be driven from a single source of power or motor, to enable consecutive single impressions, duplicate impressions from consecutive printing devices, or repeated impressions from the same printing device, as well as to so arrange the drive mechanism as to enable the operator to feed a printing member without making an impression therefrom. This has required, in the past, cumbersome synchronized driving and control mechanisms having the disadvantages above set forth.

A more specific object of the present invention, therefore, is to provide a small, compact and inexpensive power-operated printing machine, adapted for many types of work, and which will overcome the difficulties above mentioned, and at the same time perform the various operations set forth, in such a manner as to be conveniently operated by comparatively unskilled help.

An important feature of the present invention is the provision of a common operating shaft, together with a platen which may be selectively connected or disconnected from the shaft; a printing member feeding mechanism, which likewise may be selectively connected or disconnected from such power shaft; and wherein such feeding and platen mechanism may be operated either independent of each other or in timed relationship to each other.

Other objects of my invention will become more apparent from the following description, reference being had to the accompanying drawings which illustrate a preferred embodiment of the invention. The novel features of the invention will be more fully set forth in the claims.

Referring now to the drawings, Fig. 1 is a front elevation of my improved printing machine; Fig. 2 is a plan view thereof; Fig. 3 is a horizontal section taken substantially along the lines 3—3 of Fig. 1; Figs. 4 and 5, 6 and 7 are vertical longitudinal sections, as indicated by the correspondingly numbered lines on Figs. 2 and 3; Figs. 8 and 9 are vertical transverse sections as indicated by the lines 8—8 and 9—9 respectively on Figs. 2 and 3; Fig. 10 is a sectional detail plan of the section being indicated by the lines 10—10 on Fig. 3; Fig. 11 is a detail section as indicated by the lines 11—11 on Fig. 8.

The machine illustrated in the drawings preferably comprises a hollow rectangular casting or

frame 10, having a substantially flat top 11, and approximately vertical edge walls 12, 13 and 14 and 15. Extending longitudinally of the bed or frame, parallel with its side walls 14 and 15, is a guideway 16 having vertically depending side ribs 18, braced by suitable transverse webs and frame members 19.

The machine illustrated in the drawings is designed to operate with address printing devices of the character illustrated at 20 in Figs. 1, 2, 5, 6, 8, and 9. Such a device is more fully shown and described in many prior patents, issued to my assignee, Addressograph Company, for instance, Patents Nos. 1,929,472 and 1,812,894. Briefly, such a device, designated at 20, in the drawings, comprises a sheet-metal frame member 21, having along its opposite sides, downwardly extending ribs 22, and supporting on its upper face a printing member 23. The printing member preferably comprises a metallic plate bearing embossed printing characters, generally indicated at 24. The frame is also provided with a card 25 arranged to receive data regarding the subject matter carried by the printing plate or other information to be conveyed to the operator. Suitable index tabs 26 are arranged to be removably secured in any of various positions extending from the rearmost edge of the plate as indicated in Fig. 2, and described more in detail in such prior patents as Patent No. 1,807,954, issued to my assignee, Addressograph Company, June 2nd, 1931.

While the particular machine shown in the drawings has been designed to cooperate with a printing device such as above described, it should be understood that the invention is not limited to use with such specific form of printing device, but may be readily adapted for many different forms.

As shown in the drawings, and especially in Figs. 2 and 5, the printing devices 20 are stacked manually or otherwise, one above the other, in a magazine 27 supported by the frame 10, and drop in such magazine by gravity, as the bottommost plate is fed out of the magazine.

As shown in Figs. 1, 2, 5, and 9, the magazine 27 comprises a pair of upwardly extending hollow arms 30, secured in a vertical position on the frame 10 and provided with channel-like members 31, arranged to face each other. The width of the channels and their spacings enable them to freely receive the printing devices, as illustrated in Fig. 2. The upper edges of the channel members 31, however, are preferably inclined outwardly, as shown in Figs. 5 and 9, to facilitate the insertion of the devices. This magazine is directly over the guideway 16, in which operates the feeding mechanism, about to be presently described.

In the guideway 16 between the magazine 27 and the forward front end 12 of the frame 10, is secured an anvil 35, which stands substantially beneath the platen and is adapted to support the printing device during the printing operation. Reciprocally operable in the guideway 16 is a feed slide for transferring the bottommost printing device 20 from the magazine 27 onto the anvil 35. This slide comprises a pair of longitudinally extending bars 40 occupying the guideway 16. These bars are arranged to ride on suitable rollers 42, secured to the frame members 18, as indicated in Figs. 5 and 9. The bars extend beneath respective side ribs 22 of the printing devices, and have shoulders 44 adapted to

engage the ends of such portions of the bottommost printing device in the magazine 27.

When the feed slide is moved from the position shown in Fig. 5 toward the right, these shoulders 44 engage the bottommost printing device and shove it toward the right out of the magazine. Preferably, the machine is designed with a space for one standing printing device between the magazine and the anvil. Simultaneously, with the feeding of a device from the magazine, the standing printing device 20a (Fig. 5) is shoved further to the right onto the anvil by reason of a pair of spring-pressed pawls 46 on the slide engaging the end of such device. These pawls are preferably mounted on the bars 40 by reason of partially circular portions of the pawls engaging correspondingly shaped recesses in the top edges of the bars. Suitable compression springs 48 act to push the front end of the dogs upwardly.

The right-hand movement of the slide bars 40, besides moving the bottommost printing device from the magazine and moving the intermediate printing device onto the anvil, also causes another pair of pawls 47 to engage a printing device 20b on the anvil, and shove it off the anvil into a position indicated by the device 20c, in Fig. 5. This printing device 20c, during the right-hand movement of the feed bars 40, is shoved off of the supporting rib 49 of the guideway 16, whereupon it drops by gravity into a receiving magazine 28.

During the feeding stroke, above described, the printing devices are supported by the longitudinally extending ribs 49 formed on the upper surface of the guideway 16. On the return or left-hand stroke of the feed bars 40, the frictional contact between the printing devices 20 and their supporting ribs 49 retains the devices in the position indicated in Fig. 5.

The reciprocating slide 40 is operated by an electric motor 50, which may have the usual series resistance 50a. As indicated in Figs. 3 and 6, the motor is mounted on suitable rods or bolts 51 carried by suitable frame brackets 52. It will be noted that this motor is entirely within the confines of the walls of the frame 10. The armature shaft 53 of the motor 50 extends substantially parallel with the guideway 16 and extends into a housing 54, formed integral with the motor housing, and is there provided with a worm 55, arranged to mesh with a worm wheel 56. A suitable driving pinion 57 is drivingly secured to the worm wheel and, in turn, meshes with a gear 58, carried by a shaft 59, extending through and rotatably supported by the housing 54. The shaft 59 extends at right angles on the armature shaft 53 and is coupled, as will be hereinafter more fully described, with a power shaft 60, which extends transversely of the machine and is journaled in suitable bearings 36, supported by the depending members 18.

The printing device feed slide 40 is operated from the power shaft 60, under control of a clutch 61, hereinafter to be described more in detail. As shown in Fig. 5, the driving member 63 of the clutch 61 is formed eccentrically to the shaft 16 and is embraced by one end of a connecting rod 64, the other end of which is pivotally connected as at 65 to a lever 66 intermediate the ends thereof. One end of the lever 66 is pivotally mounted on a shaft 67, carried by suitable frame bosses 68. The other end of the lever 66 is connected by a link 69, with a yoke 70, the arms 71 of which are pivotally secured to respective slide bars 40, as indicated at 72 in Figs. 3

and 5. Thus, for each revolution of the clutch member 63 the printing device feed bars 40 move from the position shown in full lines in Fig. 5 to the broken line position and return to the full line position, and as the shaft 60 makes one revolution for each revolution of the clutch member 63, one complete cycle of operation of the feed bars is made for each revolution of the power shaft 60.

I find that while the friction between the printing devices and their supporting rails 49 is sufficient to prevent movement of the devices when their feed bars 40 move on the return stroke, such friction is insufficient to prevent an overthrow of the device at the end of its forward or right-hand movement. Therefore, I provide a mechanism or stop to prevent the overthrow of the printing device in the position indicated at 20b, in Fig. 5.

The stop is best illustrated in Figs. 8 and 11, and as there shown comprises a plunger 112, mounted for vertical reciprocation in the anvil 35. The head of this plunger is provided with a shoulder 114 (Figs. 3 and 11), which, when the plunger is in its uppermost position, (indicated in Fig. 11), is projected into the path of the printing device 20b, and stops its forward movement. As the printing device has practically no sideways movement in the guideway 16, the plunger may be located at one side of the guideway without danger of skewing the printing device.

The plunger 112 is reciprocated into and out of the path of the printing devices by a cam 113, carried by the driving member of the clutch 61. This cam is embraced by a yoke 110, in which the stem 115 of the plunger is slidably mounted. A suitable compression spring 111 coacting with an abutment 116 on the stem of the plunger and with a suitable washer 117 encircling the shaft and bearing against the anvil 35, serves to normally maintain the plunger 112 in its lowermost position, out of the path of the printing devices. The cam 113, being operated by the clutch 61, operates in timed relationship with the printing device feed bars 40. This relationship is such that as the feed bars start forward, the plunger is depressed and remains depressed until the rear edge of the printing device which was in the position indicated by the printing device 20b is beyond or forward of the plunger, whereupon the plunger rises to stop the next succeeding device which is being moved into the printing position.

Immediately after a printing device has been brought to rest in the position indicated by the device 20b on Fig. 5, a roller platen 75 is caused to engage the work which has been placed on the table 11 above the printing device 20b by the operator and, cause an impression to be made.

As illustrated in the drawings, and especially in Figs. 4, 5, and 8, the platen 75 is supported by brackets or arms 76 which extend forwardly from the magazine members 30, respectively, and are spaced from the surface 11 of the frame.

As illustrated, the platen is carried by a carriage 78 which rolls along a guideway 77, carried by the brackets 76, and, consequent upon the platen carriage 78 reaching the forward end of its stroke, (the right-hand end in Fig. 5), the roller platen member 75 moves downwardly from the position indicated in Fig. 5 to the position indicated at Fig. 4, and is retained in such position to apply printing pressure to the work or paper superimposed above the printing device 20b, whereupon the platen, 75, together with its carriage 78, is moved rearwardly toward the left in Fig. 5 a distance sufficient to cause the platen to traverse

the printing plate 23 of such device. Thereupon, the platen roller 75 is raised out of contact with the work, and further rearward movement of the platen carriage is then permitted without effective action by the platen.

The platen illustrated in the drawings is operated from the main drive shaft 60. As indicated in Figs. 5 and 6, I provide the power shaft with a second clutch 80, which is provided with an eccentric driving member 81, adapted to be embraced by a connecting rod 82, which in turn is pivotally connected, as at 83, with an arm 84 pivoted to a rod 85, carried by suitable frame members. The upper end of the arm 84, as shown in Fig. 5, is connected by a link 86, with the platen carriage 78. The arrangement is such that for each complete rotation of the shaft 60, the platen carriage, together with the platen 75, will be moved from the position indicated at Fig. 5 to that indicated in Fig. 4, and returned to the position indicated in Fig. 5.

The specific form of platen mechanism illustrated in the accompanying drawings, forms the subject matter of my co-pending application for Letters Patent, filed February 12, 1936, and assigned Serial No. 63,575 by the Patent Office. Briefly, this platen mechanism comprises, as heretofore mentioned, a carriage 78, which is slidably mounted on guideways or rails 77, supported by the brackets 76, in such a manner that the platen carriage lies therebetween.

Mounted in the carriage 78 are a pair of shafts 90 and 91, which support a toggle mechanism comprising the two pairs of links 92 and 93, the former links being pivotally connected to the shaft 90 and to the links 93, and the latter links being pivotally connected, as illustrated in Fig. 8, to a suitable shaft 94, which rotatably supports the platen 75. A third pair of links 96 are pivotally connected between the platen shaft 94 and the shaft 91 heretofore mentioned. A suitable spring 97 supported by the latter shaft, which is retained stationary relative to the carriage 78, acts to maintain the linkage and the platen in the position shown in Fig. 5. However, when the platen carriage approaches its right-hand limit (Fig. 5) a roller 98, carried by the pivotal connection 99 between the links 92 and 93, engages an abutment 100 formed adjacent the forward edge of the brackets 76 and prevents subsequent movement of the pivot 99, whereupon continued forward movement of the carriage causes the links 92 and 93 to assume the positions shown in Fig. 4, in which positions the links are retained as is obvious from the drawings, by the well-known toggle-locking action.

Following the positioning of the toggle mechanism and platen, as shown in Fig. 4, the platen carriage is drawn toward the rear, causing the platen 75 to be rolled across the printing device 20b. When the platen reaches the end of the printing plate 24 carried by such printing device, the roller 98 is engaged by a stop 101, adjustably supported on one of the bracket members 76, whereupon the continued left-hand movement of the platen carriage causes the toggle to be broken permitting the spring 97 to return the parts to their normal positions, indicated in Fig. 5.

As several lines of printing characters may extend transversely across a printing device, it might sometimes be desirable to print only the first line, or, the first two lines, to the exclusion of the remaining lines. This may be accomplished by adjusting the stop 101 relative to the bracket and securing it in an adjusted position

by a suitable set screw 102. Hence, the point at which the toggle is released may be readily controlled by the operator. After the toggle is released, the platen carriage may readily pass further to the left to complete its stroke by reason of a recessed portion 103 formed in the stop member, as indicated in Fig. 8, and through which the roller 98 passes when the platen is in its raised or normal position.

It is occasionally desirable that supplemental subject matter, common to all printing devices, be impressed on the work simultaneously with the impression made from the printing devices. To this end I provide a manually removable printing member 104, which is arranged to seat in a suitable recess to the left of the printing device 20b, as indicated in Figs. 3 and 8. The platen 75 is likewise provided with a roller extension 105, adapted to engage the work simultaneously with the engagement of the printing device 20b by the platen 75.

In the machine illustrated in the drawings, I have shown the impression as being made through the medium of an inking ribbon 118. As shown in Fig. 3, the ends of this ribbon are secured to ribbon spools 120 and 121, respectively, which are mounted on substantially parallel shafts 122 and 123, respectively. These shafts are journaled in the frame at opposite sides of the guideway 16, and extend in a direction normal thereto. The ribbon 118 passes from one spool, as, for instance, the spool 120 forwardly across a turning plate or bar 124, and thence across the printing device, in the position indicated by the device 20b on Fig. 5, to a similar turning plate or bar 126, and thence to the ribbon spool 121.

The ribbon 118 is preferably permanently attached to one of these spools and removably secured to the other spool, as for instance, in the manner described in my co-pending application, Serial No. 28,508, and filed June 26th, 1935, and assigned to my assignee, Addressograph Company.

The ribbon 118 is periodically fed in one direction until it is completely unwound from one spool. The direction of feeding is then automatically changed and the ribbon rewound on that spool. As shown in Figs. 3 and 4, the shafts 122 and 123 have secured thereto respective ratchets 127 and 128. Between the ratchet wheels is located a suitable ratchet driving mechanism, generally indicated at 125, and which has a pair of ratchet pawls 129 cooperating with respective ratchet wheels and one or the other of them acting at any time. Such driving mechanism may be of the type shown for instance in Patent No. 997,615, granted to the American Multi-graph Company, and in that case, whenever the ribbon becomes entirely unwound from one spool to which it is attached, its resistance causes the shifting of the drive mechanism so as to operate the other spool to wind the ribbon in a reverse direction.

In the embodiment illustrated in the drawings, and especially with reference to Figs. 3, 4, and 9, I have shown the ratchet driving mechanism 125 as operated by a pitman 132 which is pivotally connected as at 133 to one member 131 of the ratchet driving mechanism 125. The other end of the pitman 132 encircles an eccentric 135, which is drivingly secured to the power shaft 60. Hence, for each rotation of the power shaft, the ribbon will be fed one step.

My improved printing machine is arranged to

print consecutively, that is, to make an impression from a printing device, advance the next printing device to printing position, make an impression on it, advance the next printing device to printing position, and so on. Likewise, my machine is arranged to make repeated impressions of the same printing device, or to advance a printing device through the printing position without making an impression therefrom, in other words, to skip a printing device. Manually operable controls are provided to enable the operator to cause the mechanism to perform selectively or operate in any one of the desired manners.

As heretofore mentioned, the printing device feed mechanism and the platen operating mechanism are both operated by the power shaft 60 and under the control of clutches 61 and 80, respectively, and the power shaft 60 is driven from a transmission shaft 59. The transmission shaft and the power shaft are in substantial alignment with each other, and are drivingly connected to operate as a unit by an Oldham coupling 140, one member of which is secured to the shaft 59, and the other member 141 of which is arranged to drive a clutch member 142 in the usual manner. The clutch member 142 has secured thereto suitable friction driving discs, the mates to which are splined to another clutch member 143, thereby forming a friction clutch. The clutch member 143 also comprises the driven member of a single rotation clutch 145, the driving member 146 of which is secured or pinned to the driving shaft 60.

The clutches 61, 80, and 145 each comprise a driven member, which either is pinned to the power shaft 60, as in case of the clutches 61 and 80, or is driven by the friction clutch, as the clutch 145, together with a driving member 63, 81 and 146, which respectively serve to operate the printing device feed mechanism, the platen mechanism and to drive the power shaft 60.

The connection between the driven and driving members of the clutches in each instance comprises a pawl 148, which is pivoted to the driving member of its respective clutch and is provided with a projection 149, which normally maintained out of coacting recess 150, formed in the driven member of its respective clutches by suitable springs 136, which rock respective clutch levers 151, 152 and 153, (Figs. 5, 6, and 7) about their pivot, and cause projections 155 of such levers to engage suitable lugs 156 on their respective clutch pawls 148. When, however, a clutch lever is rocked against the action of its spring 136, its respective pawl moves into engagement with its coacting clutch recess, thereby forming a driving connection between the driven and driving members of such clutch. These various clutch levers operate by suitably manually operable keys about to be described.

To cause the printing mechanism to function to make one impression from each successive printing device on consecutive cycles of operation of the mechanism, the main clutch 145, together with the plate feeding clutch 61 and the platen operating clutch 80 each functions simultaneously to drive, respectively, the power shaft 60, the plate feeding mechanism and the platen operating mechanism.

As illustrated in the drawings, I have provided three control keys 170, 171, and 172, respectively, which are marked "repeat" "consecutive" and "skip" in the order named. These keys are carried by respective bell cranks 173, 175

174 and 175, which are journaled on a common shaft 176, secured to the frame adjacent its forward wall 12, the arrangement being such that the forward, or key-supporting arm of each bell crank projects through a suitable opening in the forward wall of the frame, permitting the key to be conveniently located for use by the operator.

The arrangement of the keys is best illustrated in Figs. 1, 2, and 3, and as there shown it will be noted that the middle key or "consecutive" key 171 is provided with overhanging lips 177 at either side thereof, which are arranged to engage underlying lips 178 of the keys 170 and 172, respectively, so that consequent upon the depression of the key 171, all three keys will be depressed.

When the operator depresses the key 171 and maintains it depressed to cause the machine to make one impression from each of a series of successively advanced printing devices, all three keys are depressed. This causes, first, the clutch operating levers 151, 152 and 153 to be rocked clockwise (Figs. 5, 6, and 7) against the action of the springs 136, whereupon the pawls 148 are drawn into engagement with their respective clutches by suitable springs (not shown) and remain in contact until the key 171 is released by the operator.

The "consecutive" key 171 operates to cause the clutches 60, 80, and 145 to become operative in the following manner: The depression of the "consecutive" key 171 depresses the key 170 as heretofore explained, and causes a link 167 pivotally connected between the key lever 173 and the clutch lever 153, to rock the clutch lever 153 about its pivot, whereupon the main clutch 145 becomes active to clutch the shaft 59 to the power shaft 60. Such depression of the key 170 also causes a link 161, interconnected between the key lever 173 and the clutch lever 152 to rock the last-named lever clockwise about its pivot, thereby rendering the clutch 81 active to cause the platen to transverse the printing device in the position indicated by the device 20b of Fig. 5.

The depression of the key 171 also, as heretofore described, causes the depression of the key 172. This through a link 163, interconnected between a lever 164 and the key lever 175, rocks the lever 164 and the shaft 154 to which the lever is secured. The rocking of the shaft causes a pin 165 (Figs. 3 and 5) to engage a clutch-like formation or jaw 166 formed on the hub of the lever 151, swinging the latter clutch lever in a clockwise direction, thereby rendering the clutch 61 active to cause the feeding of a printing device.

If the lever 171 is retained depressed by the operator, the respective clutches 61, 80, and 145 will continue to function, until the key is released. When the key is released the clutch levers 151, 152, and 153 are returned to their normal positions, as shown in Figs. 5, 6, and 7, by their respective springs 136 and likewise the lever 164 is likewise turned by a similar spring 137 (Fig. 3). Such springs also cause the key levers to return to their normal position consequent upon the release of the keys.

From the foregoing description, it will be seen that the operator may cause an impression to be made of one printing device at a time, by merely releasing the key immediately after its depression, in which instance the clutches will be released for active operation, but their clutch levers

151, 152 and 153 will immediately return to their normal positions and will reengage their respective clutch pawls, thereby disengaging their respective clutches, when the mechanism has completed one completed cycle of operation. This procedure may be repeated as desired.

The depression of the key 170 by the operator, causes repeated impressions to be made from the same printing device, namely, the device in the position indicated at 20b in Fig. 5. The depression of this key causes the main driving clutch 145 and the platen controlling clutch 80 to become active, but does not affect the printing device feed clutch 61. As heretofore mentioned, the depression of the key 170 does not affect the keys 171 or 172, but through the links 161 and 167 renders the main clutch 145 and platen operating clutch 80 active. The depression of the key 170, by the operator, therefore releases for operation only the driving clutch and the platen operating clutch. Hence, the platen will continue to function in repeated cycles without feeding printing devices until the key is released.

The depression of the key 172 causes the mechanism to function to feed the printing devices without making an impression therefrom. For this purpose the key 172 is connected to operate the main clutch 145 and the printing device feeding clutch 61 to the exclusion of the platen clutch 80. The depression of the key 172 operates to cause the printing device feed clutch to become active, as heretofore described. It is to be noted, however, that this is accomplished by rocking the shaft 154, which supports the clutch levers 151, 152 and 153. This movement is communicated to the clutch lever 153, which controls the main clutch.

As illustrated in Fig. 7, the shaft 154 is provided with a pin 180, which is arranged to engage a clutch or jaw formation 181 on the hub of the clutch lever 153, causing such lever to be rocked clockwise, whereupon its clutch 145 becomes active. Thus it will be seen that the depression of the key 172 causes both the main clutch 145 and the printing device feed clutch 61 to become operative. As long as this key is retained depressed, the mechanism will function to progress the printing devices without making impressions therefrom. Each of the links 161, 163, 167, and 198 have lost motion connections with their respective clutch operating levers and hence operation of the levers will not affect the links.

The "skip" key and its associated mechanism is especially advantageous, as it is sometimes desirable that impressions be made from only certain printing devices in the magazine, or vice versa. In such instances, one set of devices, as, for instance, those which are to be skipped, may be provided with tabs 26, (Figs. 1 and 5), having special characteristics, for instance, special colors, or located in special positions on the printing devices.

To enable the selection of specific printing devices by the operator, I provide a mirror 185 (Fig. 5), which is secured to the magazine 27 in such a manner that it will serve to reflect to the operator the image of tabs on the printing device in the position indicated by the device marked 20a of Fig. 5. Thus the operator, in a conveniently seated position before the machine, may readily ascertain whether or not an impression is to be made from the next printing device to be fed, and operate the keys accordingly.

I have so arranged the timing of the various

operations that, in each cycle of operation, the printing devices are first fed and then an impression made from the device in printing position. In other words, the feed takes place before the platen becomes active.

As heretofore mentioned, it is highly desirable in a series printing machine that duplicate impressions may be obtainable from each printing device. I therefore provide a mechanism which may be selectively engaged and, when engaged, will cause two impressions to be made from each successively fed printing device consequent upon the depression of the repeat key 170. Such duplicator mechanism is best illustrated in Figs. 3 and 5, and comprises a mechanism, which, on alternate cycles of operation of the platen, causes the printing device feed clutch 61 to become active for one cycle of operation.

The duplicator mechanism includes a rotor or ratchet 190, rotatably mounted on a suitable shaft 191 carried by the frame 10. The periphery of the duplicator rotor is provided with alternately disposed shallow and deep recesses 193 and 194, arranged to be successively engaged by a pin 195 carried by a lever or pawl 196 pivotally connected to an arm 197 which is drivingly secured to the rock shaft 85, to which the platen operating arms 84, heretofore mentioned, are also secured. Thus, for each movement of the platen, due to the operation of the repeat key 170, the rotor will be advanced from one recess to another. A suitable detent pawl 186 is provided to retain the rotor in its advanced position.

As the pin 195 drops into a deep notch 194 it permits the nose of the pawl 196 to engage a bell crank 187 and rock it about its pivot shaft 191. The bell crank 187 is connected to the clutch lever 151 by a suitable link 198, so that as the bell crank is rocked in a counter-clockwise direction (Fig. 5) the clutch lever 151 is rocked in a clockwise direction, thereby rocking such lever about its pivot shaft 154 and rendering clutch 61 active.

When the duplicator mechanism is rendered active, as will be hereinafter described, and the repeat key depressed, a printing device will be fed whenever the pin 195 enters a deep notch in the rotor 190. However, on the following cycle of operation the pin 195 will engage a shallow notch 193 and the pawl 196 will not drop a distance sufficient to engage the bell crank 187. Thereby, on such cycle of operation, the clutch 61, together with the printing device feed mechanism, will remain inactive and a duplicate impression will be made from the printing device fed on the preceding cycle of operation. The next cycle of operation of the platen, however, a deep notch 194 will be engaged by the pin and the bell crank rocked, causing the clutch 61 to become active and next succeeding printing device advanced to the printing position.

Obviously, the mechanism may be operated to cause triplicate or quadruplicate impressions to be made if desired. This is accomplished by replacing the rotor shown in Fig. 5, with a rotor having two or three shallow notches following each deep notch, thus providing a triplicating or quadruplicating mechanism. For convenience, the rotor 190 is retained in position on the shaft 191 by a set screw 188, hence it may readily be removed to substitute a different rotor.

As heretofore mentioned, the duplicator mechanism is arranged to be rendered active or inactive, as desired by the operator. For this purpose the shaft 191 is rotatably mounted in the

frame 10 and is provided, adjacent the rotor, with a cam 200. Consequent upon the shaft being rotated 180 degrees, this cam contacts the pin 195, raising it out of contact with the rotor, thereby preventing the operation of the bell crank 187, whereupon the spring 136, (Fig. 5) retains the clutch lever 151 in its normal position, and the clutch 61 remains inactive.

As shown in Fig. 5, a clutch-like formation 166 on the hub of the lever 151 permits the operation of this clutch lever by the bell crank in the duplicator mechanism without affecting the position of the other clutch levers. The pin 165 which coacts with this clutch formation provides the driving connection to enable the rocking of the shaft 154 to operate the clutch lever for the purpose heretofore described.

The shaft 191 is turned manually to render the duplicator mechanism active or inactive as desired. The shaft 191 is journaled at its right-hand end in a sleeve 203, having a flange which is provided with a pair of oppositely disposed notches 204, either one of which may engage a pin 205 carried by the frame 10. A suitable compression spring 206, encircling the shaft, serves to maintain the flange of the sleeve 203 in contact with the inner face of the frame member 10. When it is desired to render the duplicator idle, the operator merely grasps a knob 207 secured to the outer end of the sleeve 203, shoves it inwardly and then rotates it 180 degrees, whereupon, when the knob is released, the opposite notch 204 will engage the pin 205. The shaft having been turned 180 degrees, the cam 200 will have been moved into engagement with the duplicator pin 195, thereby rendering the duplicator ineffective.

I claim:

1. In a printing machine, a frame, a magazine extending upwardly from said frame and adapted to receive a plurality of individual printing devices, a guideway extending from beneath said magazine across the frame, means to intermittently feed printing devices one at a time from said magazine along said guideway into a printing position, a pair of arms carried by said magazine spaced above and extending parallel with said guideway, a platen mounted on said arms and adapted to coact with the device in printing position and means to operate said feeding mechanism and said platen.

2. In a printing machine, a frame, a magazine extending upwardly from said frame and adapted to receive a plurality of individual printing devices, a guideway extending from beneath said magazine across the frame, means to intermittently feed printing devices one at a time from said magazine along said guideway into a printing position, a pair of arms carried by said magazine spaced above and extending parallel with said guideway, ways carried by said arms, a roller platen mounted for reciprocation on said ways to coact with the device in printing position and power operated means to operate said feeding mechanism and said platen.

3. In a printing machine, the combination with a hollow substantially rectangular frame having a top wall, together with depending side and end walls extending substantially to the plane of support of the machine, a guideway in the top wall of said frame, a magazine adapted to retain a plurality of printing devices in a stacked relationship one above the other, means to progress printing devices one at a time from the maga-

zine into a printing position, a platen, means to cause said platen to coact with the printing devices when they are in printing position, power mechanism to operate both the feeding means and the platen operating means, said power means including an electric motor carried by said frame within the confines of said walls, and a gear reduction unit interposed between said motor and both of said means.

4. In a printing machine, the combination with a hollow substantially rectangular frame having a top wall, together with depending side and end walls, a guideway in the top wall of said frame and extending substantially from one end wall to the other end wall, a magazine extending upwardly from said top wall and adapted to retain a plurality of printing devices in a stacked relationship above one end of said guideway, a second magazine extending downwardly from said top wall and adapted to receive printing devices from said guideway, means to progress printing devices intermittently and one at a time from the first magazine along said guideway into a printing position between said magazines and thence into the second named magazine, a pair of stationary arms carried by the first-named magazine and extending outwardly parallel with and spaced above said guideway, a roller platen mounted on said arms for movement along said guideway, means to move said platen and cause it to coact with the printing devices when they are in printing position, power mechanism to operate both the feeding means and the platen operating means, said power means including an electric motor carried by said frame within the confines of said walls, and a gear reduction unit interposed between the said motor and both of said means.

5. In a series printing machine, means to feed individual printing devices one at a time to printing position, a platen, means to cause the platen to cooperate with each printing device when such device is in printing position to make an impression therefrom, driving mechanism for said means including a power shaft, a clutch on said shaft adapted to drive the feeding means, a second clutch on said shaft to operate the platen, means to operate said clutches, and means whereby said operating means may cause the clutches to become active and their respective mechanisms to function in repeated cycles of operation or to cause the clutches to be operative for one complete cycle of operation only.

6. In a series printing machine, means to feed individual printing devices one at a time to printing position, a platen, means to cause the platen to cooperate with each printing device to make an impression therefrom, driving mechanism for said means, including a power shaft, a clutch on said shaft adapted to drive the feeding means, a second clutch on said shaft to operate the platen, means to operate said clutches, a motor, a third clutch between the motor and said power shaft, and means whereby said third clutch is rendered operative when the first named clutches are active.

7. In a series printing machine, means to feed individual printing devices one at a time to printing position, a platen, means to cause the platen to cooperate with each printing device when such device is in printing position to make an impression therefrom, an electric motor, a power shaft, three clutches carried by said power shaft, two of said clutches having their driving members connected to the feeding and platen operating

mechanisms respectively and having their driven members connected to said shaft, the other clutch having its driving member connected to said shaft and having its driven member frictionally connected to the motor, and means to control said clutches.

8. In a series printing machine, means to feed individual printing devices one at a time to printing position, a platen, means to cause the platen to cooperate with each printing device when such device is in printing position to make an impression therefrom, an electric motor, a speed reduction unit having a driven shaft connected with said motor and a driving shaft, a power shaft in substantial alignment with said driving shaft, three clutches carried by said power shaft, two of said clutches having their driving members connected to the feeding and platen operating mechanisms respectively and having their driven members connected to said shaft, the other clutch having its driving member connected to said shaft and having its driven member frictionally connected, the driving shaft of said speed reducing mechanism, and manually operable means to control said clutches.

9. In a series printing machine, the combination of power means for feeding printing devices in succession to printing position, power means for printing from said devices while in printing position, a manual key for controlling the feeding means, a second manual key for controlling the printing means, and a third manual key, the operation of which actuates both of the keys heretofore mentioned.

10. A machine according to claim 7, in which the clutch control mechanism comprises three keys, means whereby the operation of one key operates the other two keys, said last-named keys each being arranged to be operated independent of the other keys.

11. A printing machine having means to feed individual printing devices one at a time to printing position, a platen adapted to make an impression from the device in printing position, platen operating means, a driving shaft, a motor, means to selectively couple said motor with the driving shaft, means to selectively couple the driving shaft with the feeding means, means to selectively couple the driving shaft with the platen operating means, manually operable keys to control said coupling means, one of said keys being connected to render the first and second-named coupling means effective, another of said keys being connected to render the first and third-named coupling means effective, and a third key being connected to render all three coupling means effective.

12. A printing machine having means to feed individual printing devices one at a time to printing position, a platen and means to operate the platen to make an impression of the printing device in printing position, a motor, a clutch between the motor and the feeding mechanism, a clutch between the motor and the platen operating means, manually operable members to render respective clutches active independently of each other for continued cycles of operation, and means to cause one of said members to operate the clutch of the other member on predetermined or alternate cycles of operation.

13. In a series printing machine, means to feed printing devices one at a time to a printing position, a platen adapted to make an impression from a printing device when such device is in printing position, a power shaft, a single revolution clutch

- on said shaft adapted to drive the feeding means, a second single revolution clutch on said shaft to operate the platen, a motor, a single revolution clutch between the motor and said shaft, a manually operable key to render the motor and platen clutches active, a second manually operable key to render the motor and feeding clutches active, and a third manually operable key to operate both of the first two named keys.
14. In a series printing machine, means to feed printing devices one at a time to printing position, a platen adapted to make an impression from a printing device in printing position, driving mechanism for said means including a power shaft, a single revolution clutch on said shaft adapted to drive the feeding means, a second single revolution clutch on said shaft to operate the platen, a motor, a single revolution clutch between the motor and the power shaft, a manually operable key to render the motor and platen clutches active, a second manually operable key to render the motor and feeding clutches active and a third manually operable key to operate the first two named keys, and collectively operable means to enable the actuation of the first key to render all three clutches active on alternate rotations of the platen clutch and thereby produce duplicate impressions from each printing device fed.
15. A printing machine having means to feed printing devices one at a time to printing position, a platen adapted to make an impression of a printing device in printing position, a motor, a drive shaft, a clutch between the motor and said drive shaft, a clutch between the drive shaft and the feeding means, a clutch between the drive shaft and the platen, a rock shaft, three levers mounted on said rock shaft and arranged to render respective clutches active consequent upon their movement about the axis of the rock shaft, three manually operable keys, one of said keys being connected to operate the platen clutch lever and the motor clutch lever, another of said keys being connected to operate the motor clutch lever and the feed clutch lever, and the third key being connected to operate the motor clutch and both of the other keys.
16. A printing machine having means to feed printing devices one at a time to printing position, a platen adapted to make an impression of a printing device in printing position, a motor, a drive shaft, a clutch between the motor and said drive shaft, a clutch between the drive shaft and the feeding means, a clutch between the drive shaft and the platen, a rock shaft, three levers mounted on said rock shaft and arranged to render respective clutches active consequent upon their movement about the axis of the rock shaft,

three manually operable keys, one of said keys being connected to operate the platen clutch lever and the motor clutch lever, another of said keys being connected to operate the motor clutch lever and the feed clutch lever, and the third key being connected to operate both of the other keys, a duplicator mechanism adapted to be actuated consequent upon each operation of the platen and a connection between the duplicator mechanism and the feed clutch lever adapted to operate the feed clutch lever on alternate cycles of operation of the platen.

17. In a printing machine, the combination of a hollow frame, made of a top wall and side skirts and having its greatest dimension horizontal, a magazine adapted to receive a plurality of individual printing devices, a guideway in said frame, a platen over said guideway, means to feed printing devices one at a time along said guideway into printing position, means to cause the platen to make an impression from each printing device when it is in the printing position, a motor mounted within said frame adjacent the top wall thereof, a power shaft within the frame, means within the frame connecting said motor with the power shaft including a gear reduction unit, and means within the frame connecting said power shaft with the feeding means and the platen operating means.

18. A printing machine having means to feed individual printing devices one at a time to printing position, a platen adapted to make an impression of a printing device in printing position, a motor, a clutch between the motor and the feeding mechanism, a clutch between the motor and the platen operating means, two manually operable keys one associated with one clutch and the other with the other clutch, to render each respective clutch active independent of the other clutch, a manually operable member to render both clutches operative simultaneously, a duplicator mechanism including a notched disc, means adapted to advance such disc notch-by-notch consequent upon the operation of the platen, and means adapted to be rendered active by predetermined notches to render the first-named clutch active for one cycle of operation of the platen and independent of its respective key.

19. In a series printing machine, the combination of a stationary frame, comprising a pair of arms spaced apart to provide a magazine between them for the storage of a series of printing devices, one above the other, a carriage reciprocable on the arms, a platen carried by the carriage, and means to support a printing device in a position for coaction by the platen.

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