

Feb. 19, 1963

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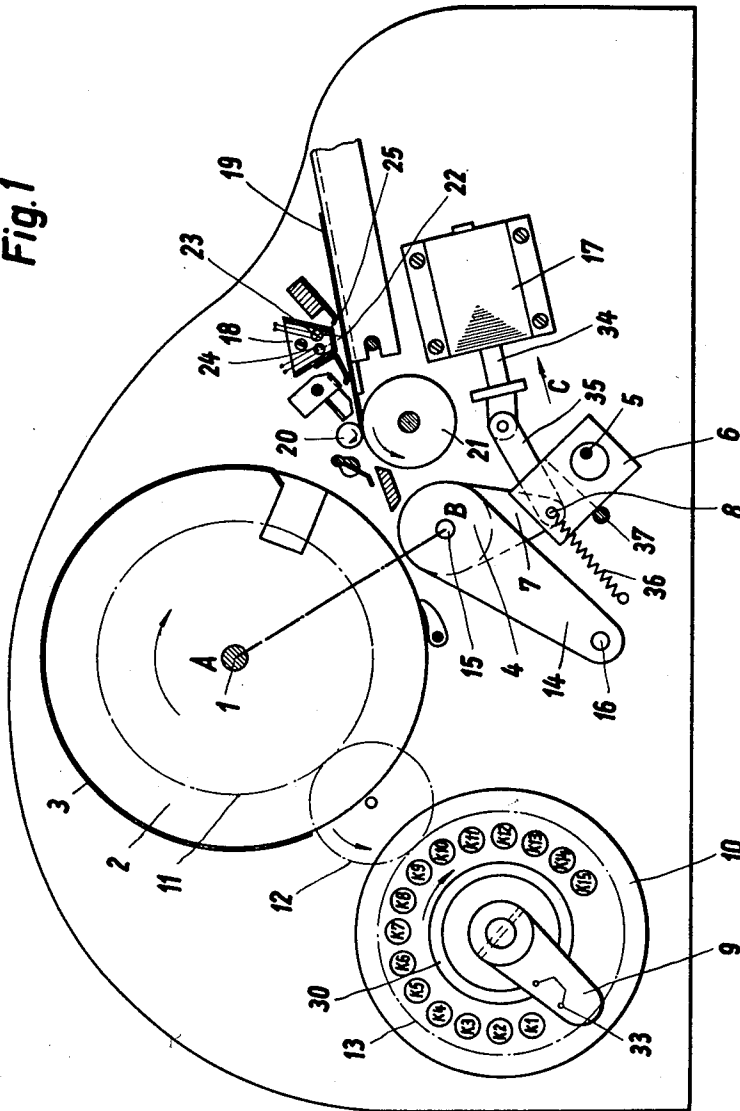
3,077,832

COPY SHEET CONTROLLED SELECTIVE DUPLICATOR

Filed Aug. 1, 1961

5 Sheets-Sheet 1

Fig. 1



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COPY SHEET CONTROLLED SELECTIVE DUPLICATOR

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5 Sheets-Sheet 2

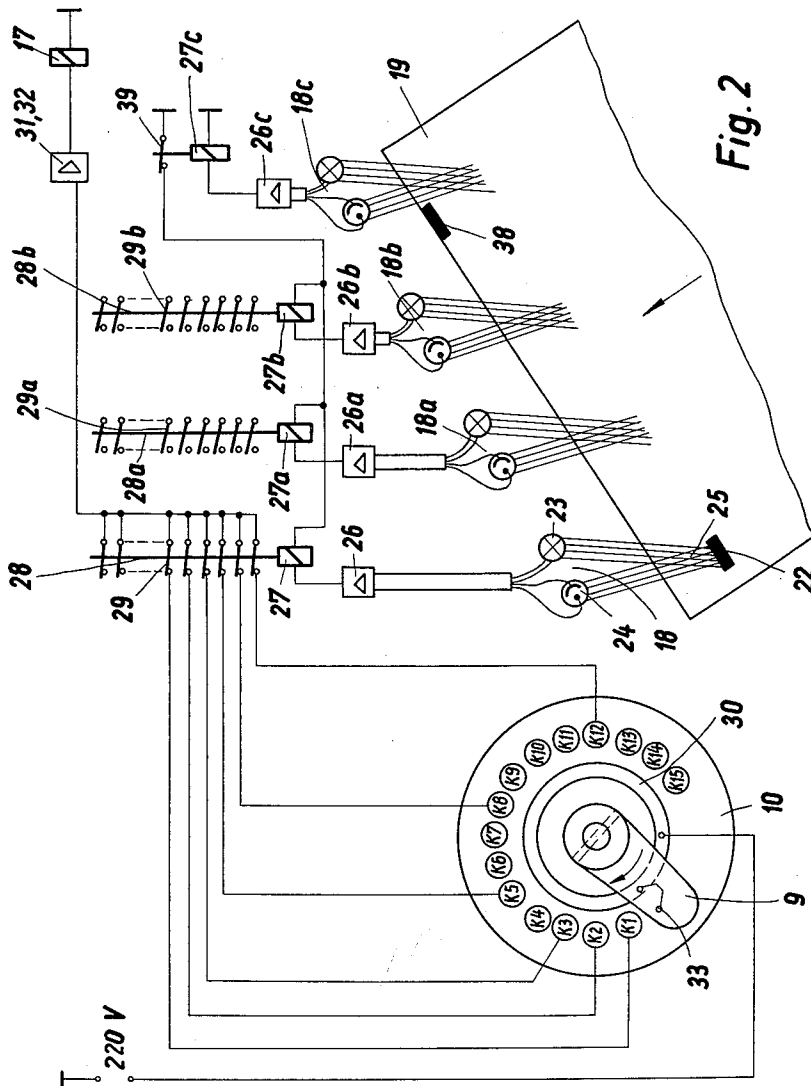


Fig. 2

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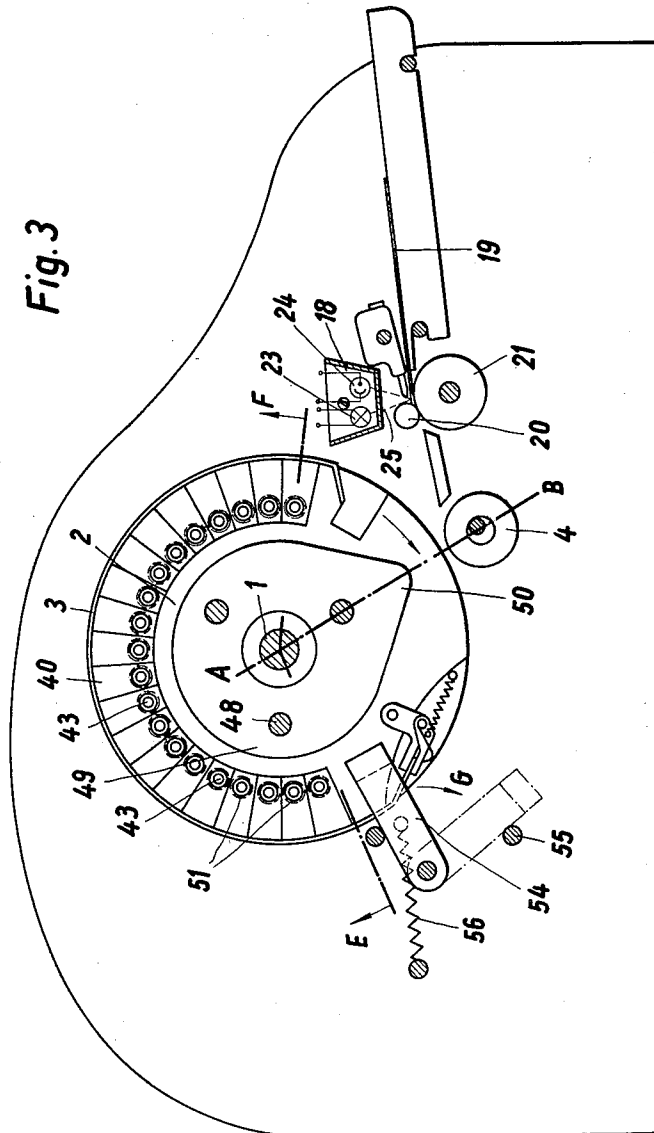
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COPY SHEET CONTROLLED SELECTIVE DUPLICATOR

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5 Sheets-Sheet 3



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COPY SHEET CONTROLLED SELECTIVE DUPLICATOR

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5 Sheets-Sheet 4

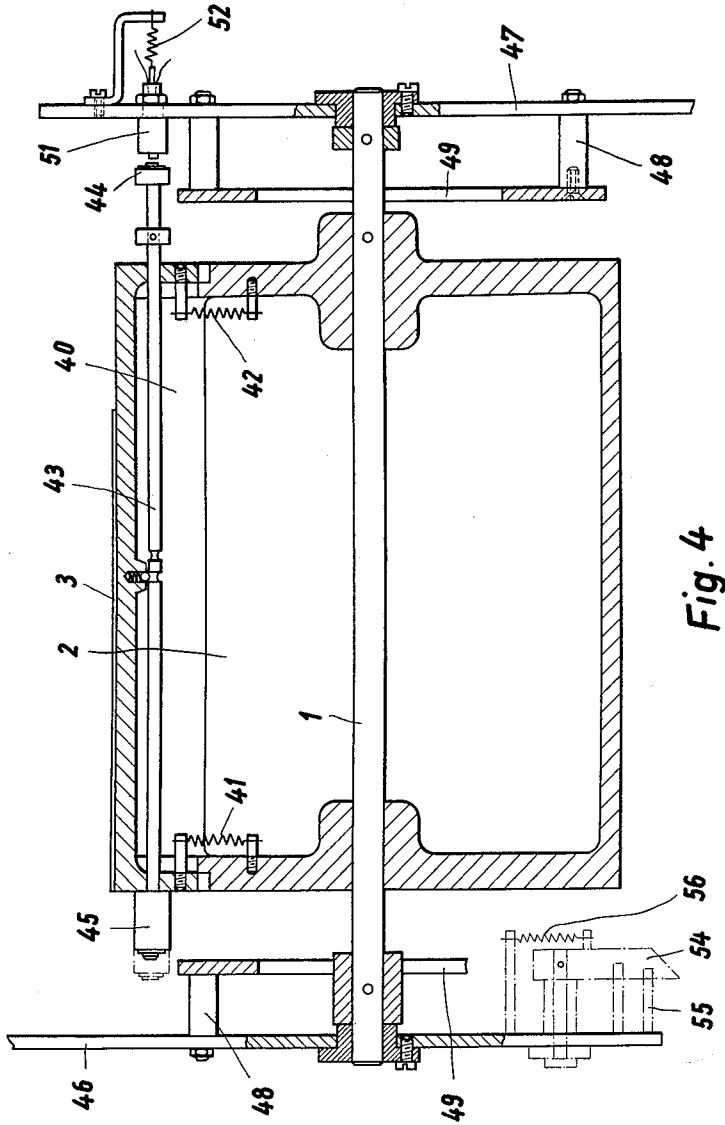


Fig. 4

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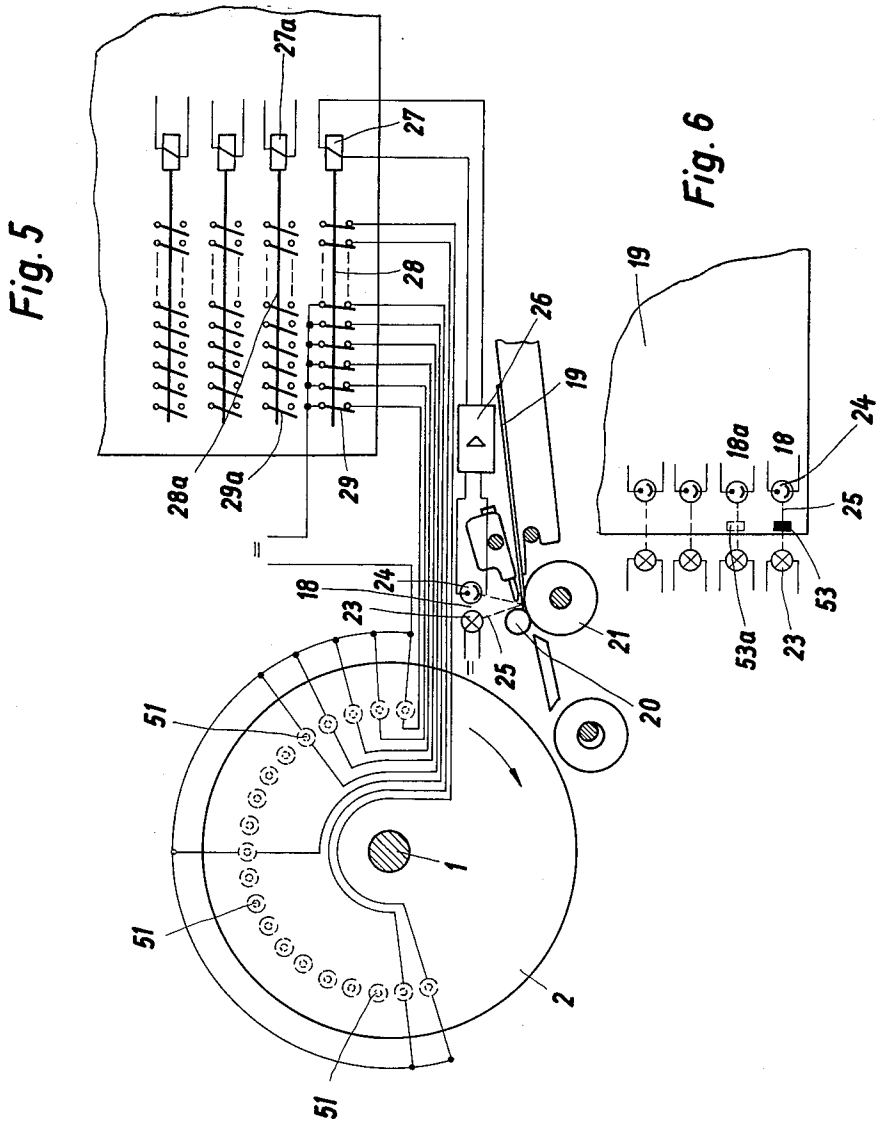
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COPY SHEET CONTROLLED SELECTIVE DUPLICATOR

Filed Aug. 1, 1961

5 Sheets-Sheet 5



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1

2

3,077,832

**COPY SHEET CONTROLLED SELECTIVE
DUPLICATOR**

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20 Claims. (Cl. 101—132.5)

The present invention relates to a copy sheet controlled selective duplicator, and more particularly to a rotary duplicator capable of producing imprints of spaced printing sections of a printing form in adjacent positions on a copy sheet.

Many constructions are known for effecting the selection of desired printing sections of the master sheet, and particularly duplicating arrangements are known in which markings are provided on the printing form adjacent selected printing sections.

It is one object of the present invention to improve selective duplicators of this type, and to provide a selective duplicator which is not controlled by markings on the printing form, but which is controlled by a marking on the copy sheet.

Another object of the invention is to provide a duplicator in which selective printing operations in accordance with a printing program are carried out under control of a marking representing the desired printing program and being provided on the copy sheet.

Another object of the present invention is to determine different printing programs each of which includes different selected printing sections of the printing form, by different control means, and select the control means representing the respective desired printing program by a sensing means responding to a marking on the copy sheet.

Another object of the present invention is to provide copy sheets with single markings, each marking representing a different printing program so that the respective copy sheet is imprinted with a specific program when passing through the printing machine.

With these objects in view, the present invention relates to a duplicator which comprises a printing roller and a pressure roller operable between a position of rest and a printing position forming a printing line; feeding means for feeding copy sheets to the printing line; operating means for operating the roller means to assume the printing position; an electric control device including a plurality of control means correlated to different printing programs, and operatively connected to the operating means for controlling the same; and sensing means for sensing markings on fed copy sheet and operatively connected to the control means to actuate the same.

When the sensing means senses on a copy sheet a marking representing a printing program comprising one or several printing sections of the printing form, the control means correlated with the respective printing program is actuated, and effects operation of the operating means so that the roller means assume the printing position whenever a printing section pertaining to the selected printing program passes through the printing line. The sensing means preferably includes a source of light illuminating the marked portion of the copy sheet, and a photo cell into which light is reflected. The photo cell produces an impulse when a marking is illuminated, and the amplified impulse controls a relay actuating a switching means having a plurality of switches respectively correlated with selected printing sections of a particular printing program. In this manner, different markings on different copy sheets effect actuation of different switching means which represent different printing programs.

In the preferred embodiments of the invention, a plurality of sensing means is provided in adjacent positions for sensing correspondingly arranged single markings on different copy sheets which are intended to be imprinted in accordance with different printing programs composed of different printing sections. In another embodiment of the invention, a single sensing means may be shifted between a plurality of positions for sensing differently placed markings on copy sheets associated with different printing programs.

In one embodiment of the invention, the pressure roller is movable to and from a printing position in which printing sections of the printing form are pressed against a copy sheet, and the actuation of the pressure roller is effected by electro-magnetic means whenever a desired printing section of the printing form approaches the printing line and passes through the same. A rotary contact means rotates in synchronism with a printing roller, and successively engages a plurality of contacts which are selectively connected to the switches of the various switching means which represent different printing programs. When one of the switching means is actuated corresponding to the selected printing program, the electro-magnetic means is energized every time a selected printing section passes through the printing line, since the contact associated with the respective printing section is electrically connected by the rotary contact means to the respective switch of the program representing switching means.

In another embodiment of the invention, the printing roller has a plurality of pressure members respectively associated with the printing sections of the printing form which passes over the pressure members. Each pressure member can be shifted to a projecting printing position in which it forms a printing line with the pressure roller. Such shifting is effected by a set of electro-magnetic means which are respectively associated with the pressure members, and place parts of the associated pressure member in an operative position in which these parts engage cam means by which the pressure members are shifted to the printing position when approaching the printing line and passing through the same.

The electro-magnetic means are selectively connected to the switches of a switching means representing a particular printing program, and when the switching means is actuated in response to a marking on a copy sheet sensed by the sensing means, the circuit of the respective electromagnetic means is closed, and the correlated pressure members are set to be shifted to their printing position when passing through the printing line.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a side view of a rotary duplicator according to one embodiment of the invention, partially in section, and with one lateral wall omitted;

FIG. 2 is a schematic view including a diagram illustrating the electric circuit of the embodiment of FIG. 1;

FIG. 3 is a side view of another embodiment of the present invention, partially in section, and with one lateral wall omitted;

FIG. 4 is an axial sectional view of the printing roller of FIG. 3 and illustrating the actuation of the pressure members;

FIG. 5 is a schematic view including a diagram illustrating the electric circuit of the embodiment of FIGS. 3 and 4; and

FIG. 6 is a fragmentary view illustrating the sensing of a copy sheet.

Referring now to the drawings, and more particularly to FIGS. 1 and 2, a printing roller 2 is mounted on a shaft 1 for rotation in the direction of the arrow, and is driven by a motor, not shown, in a conventional manner. A printing form or master sheet 3 is mounted to extend about the periphery of the printing roller 2, and has adjacent circumferentially arranged and axially extending printing sections. It is desired that selected printing sections of the master sheet are printed during each revolution of the printing roller. Different combinations of printing sections may be considered printing programs.

A pressure roller 4 is mounted on a pair of supporting arms 14 turnable about a shaft 15, and is operated by a pair of toggle levers 6 and 7 to swing with the supporting arms 14 about shaft 16 between a position of rest, and a printing position closely spaced from the printing roller. A printing line is formed in the printing plane A—B when pressure roller 4 is in the printing position.

A spring 36 holds toggle levers 6 and 7 in the position in which the pressure roller is retracted, and a link 35 is connected to the pivot 8 between the toggle levers and operated by the armature 35 of an electro-magnetic means 17. When electro-magnetic means 17 is energized, the toggle levers are straightened, and pressure roller 4 is moved to its printing position.

A copy sheet 19 is supplied over a feeding table, and passes under moistening means to be transported by a pair of feeding rollers 20 and 21 to the printing line between the printing roller 2 and the pressure roller 4. A sensing means 18 is mounted in the region of the feeding table to sense a portion of the copy sheet on which a marking 22 is provided, see FIG. 2. Different copy sheets which are intended to be imprinted in accordance with different printing programs have different markings, such markings being arranged to represent a specific printing program which, for example includes several specific printing sections of the master sheet.

A plurality of sensing means 18, 18a, 18b and 18c is provided, each of which is positioned to sense a different specific marking associated with a particular printing program. Each sensing means includes a source of light 23 which illuminates the marked portion of the copy sheet 19, so that light is reflected and falls into a photo cell 24 which responds when light is reflected to a different extent by marking 22 than by the unmarked surface of the copy sheet.

In this manner, a photo cell responding to a marking 22 produces an impulse which is supplied to an amplifier 26, a plurality of amplifiers 26, 26a, 26b and 26c being respectively connected to the sensing means 18, 18a, 18b and 18c which, in the embodiment of FIGS 1 and 2, are arranged axially aligned to sense axially staggered markings 22 on different copy sheets, with the exception of sensing means 18c which is positioned to sense a special marking 38 provided at the leading edge of the copy sheet 19.

The amplifiers 26, 26a, 26b are respectively connected to relay means 27, 27a, 27b which operate switching means 28, 28a, 28b, each switching means including a plurality of switches 29, 29a, 29b which function as control elements. The other terminals of the relays 27, 27a, 27b are connected to a control switch 39 which is operated by a relay 27c controlled by the amplifier 26c of the sensing means 18c.

It is evident that relays 27, 27a and 27b can only operate the corresponding switching means when control switch 39 is closed, which is the normal position of control switch 39. However, when sensing means 18c senses a special marking 38 on a copy sheet, relay means 27c opens control switch 39, and interrupts the circuit of the relay means 27, 27a, 27b so that the respective switching means cannot be actuated, even if the correlated sensing means senses a marking 22.

Each switching means is associated with a particular printing program including selected printed sections of the master sheet 3. For example, switching means 28 with switches 29 is associated with a printing program including the first, third, fifth, eighth, and twelfth printing section of the master sheet, and the respective switches 29 are connected to stationary contacts K1, K3, K5, K8 and K12 of a contact device which includes a rotary contact means 9 connected by a gear train 13, 12, 11 to shaft 1 of the printing roller so that the contact arm 9 rotates in synchronism with the printing roller. Contact arm 9 has two slide contacts 33 which are interconnected, one of the slide contacts passing successively over the stationary contacts K1 to K15, and the other slide contacts sliding on the slide ring 30 to which a voltage source, not shown, is connected.

The arrangement is such that whenever a printing section passes through the printing line between the printing roller 2 and the pressure roller 4, a corresponding contact K is engaged by slide contact 33, and connected to the source of voltage so as to function as a control element.

Amplifier 31 is connected to all switches 29, 29a, 29b, and electro-magnetic means 17 is connected to ground, so that the circuit is closed when slide contact 33 engages a contact K1 assuming that a switch 29, or 29a or 29b is connected to contact K1.

The duplicator illustrated in FIGS. 1 and 2 operate as follows: FIG. 1 shows the machine in a position of rest. When a copy sheet 19 is placed on the feeding table with its leading edge engaging the feeding rollers 20 and 21, a marking 22 passes under the sensing means and is impinged by the beam of light 25 so that the light is reflected into the photo cell 24 which is positioned to sense a specific marking associated with a particular printing program which is to be printed on copy sheets having this specific marking. The impulse created in the photo cell 24 is amplified by amplifier 26, and the relay means 27 operates the switching means 28 to close all switches 29. Each switch 29 is connected to the contact device 10 and amplifier 31 to the electro-magnetic means 17, but the circuit is interrupted as long as slide contact 33 of the rotary contact arm 9 is not located on one of the stationary contacts which are connected to the switches 29 of the switching means 28 in accordance with the printing program with which sensing means 18 is associated. When the printing roller starts its rotation, control elements K and 29 are operative and slide contact 33 engages first contact K1, so that the circuit of the amplifier 31 is closed through the respective switch 29 and electro-magnetic means 17 is energized to shift counter-pressure roller 4 to its printing position at exactly the moment at which the first printing section passes through the printing line, since the rotary slide contact 33 engages contact K1 at this moment due to the synchronized rotation of contact arm 9 and printing roller 2.

During further rotation of the printing roller and of the rotary contact arm 9, the circuit of the amplifier and the electro-magnetic means 17 is successively closed whenever slide contact 33 engages contacts K3, K5, K8 and K12 and whenever the circuit is closed and the electro-magnetic means 17 is energized, the corresponding printing section passes through the printing line and is imprinted on the copy sheet. Since the copy sheet is at a standstill when undesired printing sections, for example the fourth printing section, pass through the printing line, the selected printing section of the respective printing program are printed adjacent each other on the copy sheet.

Whenever the slide contact is between two contacts, for example between contact K1 and K2, the circuit is interrupted, the electro-magnetic means 17 is de-energized, and the spring 36 acts on the toggle levers 6, 7 to retract the pressure roller to its inoperative position.

The switching means 28, 29 remains actuated during a complete revolution of the printing roller, and also after the revolution is completed. If another copy sheet

would be inserted into the machine in this position, the same printing program, and perhaps an additional printing program according to another marking would be printed on such copy sheet. This is prevented by the marking 38 arranged in the region of the leading edge of the copy sheet 19. When a new copy sheet is placed on the feeding table and moves with its leading edge underneath the sensing means 18c, sensing means 18c senses the marking 38, produces an impulse which is amplified by amplifier 26c so that the relay means 27c opens the control switch 39 so that the previously energized relay 27 is de-energized, and all switches 29 of the previously actuated switching means 28 are opened. When the new copy sheet is further moved toward the feeding rollers 20, 21, the marking 22 corresponding to the new printing program is sensed by the respective sensing means 26, or 26a, or 26b, and the corresponding switching means is actuated to set the machine to a new printing program. It is evident that selected switches 29a of the switching means 28a are connected to contacts K1 to K16 which are selected to correspond to the printing sections which are to be printed in accordance with the program represented by the marking to which the sensing means 18a and the switching means 28a respond.

The clearing marking 38 also effects the clearing of the respective actuated switching means when a copy sheet is erroneously inserted into the machine, and immediately removed without starting of a printing operation. Even if the respective switching means was already actuated by the marking 22 of the erroneously inserted copy sheet, marking 38 of the correct copy sheet, which is inserted after removal of the wrong copy sheet, will be sensed by sensing means 18c so that control switch 39 and the previously closed switches 29 open.

In the embodiment illustrated in FIGS. 3 to 6, the pressure roller 4 cannot be shifted to a printing position. The printing roller 2 has a plurality of pressure members 40 circumferentially arranged and extending in axial direction of the printing roller. A printing form or master sheet is attached to the periphery of the printing roller by suitable holding means, and has printing sections respectively located on the pressure members 40.

As best seen in FIG. 4, each pressure member 40 is mounted for radial movement in slots in the end walls of the printing roller 2, and is urged by springs 41 and 42 to a retracted position. An operating member 23 is axially shiftable in each pressure member 40, and has a normal inoperative position shown in FIG. 4, and an operative position shifted to the left as viewed in FIG. 4. A pair of cams 49 are mounted on the side walls 46 and 47 of the machine by means of bolts 48, and are positioned in such a manner as to be located in the path of rollers 44 and 45 when an operating member 43 is in its operative position, while rollers 44 and 45 ineffectively by-pass cams 49 when the operating means 43 is in the illustrated inoperative position.

Cams 49 have a projecting portion 50 located in the region of the printing plane A—B, so that pressure members 40, whose operating members 43 are shifted to the operative position, and are then engaged by cams 49, 50 pushed outwardly and moved to the printing position in which they form a printing line with the counter-pressure roller 4. When rollers 44 and 45 have passed beyond the printing plane A—B, the rollers move inwardly under the action of springs 41 and 42 so that the respective pressure member 40 is withdrawn to its inoperative position.

When a pressure member is in its printing position when passing through the printing line, it bulges the corresponding printing section of the flexible master sheet 3 outwardly, so that the same is pressed against a copy sheet 19 which is fed by a pair of feeding rollers 20 and 21 to the printing line.

A set of electro-magnetic means 51 is arranged in a circle on side wall 47, and each electro-magnetic means

59 has an armature located opposite the end of one operating means 43 of a pressure member 40. A spring 52 retracts the armature of each electro-magnetic means 51 to an inoperative position, but when any one electro-magnetic means 51 is energized, the armature pushes the respective correlated member 43 to its operative position so that cams 49, 50 become effective to move the respective pressure member to its printing position when the same passes through the printing line.

The energizing of the electro-magnetic means 51 takes place under control of sensing means 18, 18a etc. Each sensing means is positioned in the region of the feeding means to sense differently positioned markings 53, 53a etc. provided on different copy sheets 19. Each sensing means includes a source of light 23, and a photo cell 24, each photo cell being connected to an amplifier 26 which controls a relay means 27, 27a etc., see FIG. 5. Each relay means controls a switching means 28, 28a etc., each switching means having a set of switches 29, 29a etc. FIG. 5 shows the electric connections only for switches 29, and it will be seen that each switch 29 is on one hand connected to a source of voltage, and on the other hand connected to selected electro-magnetic means 51 whose other terminals are connected to the other terminal of the source of voltage, or to mass. The switches 29a are connected to different electro-magnetic means 51 in accordance with a different program and the same is true for the other switching means, the number of switching means corresponding to the number of desired printing programs, each of which is associated with a specific marking on a certain type of copy sheet and includes different printing sections of the printing form.

The duplicator illustrated in FIGS. 3 to 6 operates as follows: When a copy sheet is placed on the feeding table with its leading edge engaging the feeding rollers 20, 21, it is transported, and a marking 53 is illuminated by beam of light 25 and reflects the light into the photo cell 24 to create an impulse passing through amplifier 26 which energizes relay means 27 so that the switching means 28 is actuated, and all switches 29 are closed. Switches 29 are connected, for example, to the first five electro-magnetic means 51 and to three other electro-magnetic means, as shown in FIG. 5. Closing of switches 29 effects energizing of the thus selected electro-magnetic means 51 each of which is correlated with a pressure member 40 and with the printing section of the master sheet lying on the respective pressure member 40. Consequently, certain printing sections are selected by switching means 28, 29 in accordance with the printing program determined by the marking 53 to which the sensing means 18 responded. If another sensing means 18a would have responded to another marking 53a, the switching means 28a would have been actuated, the switches 29a would have been closed, and the printing program would include other printing sections, namely the printing sections whose correlated electro-magnetic means 51 are connected to the switches 29a.

When all the electro-magnetic means corresponding to a certain printing program are energized under control of a marking 53, all members 43 of the respective pressure members 40 are shifted to the operative position in which rollers 44 and 45 are located in the plane of the cams 49.

When the printing roller starts its rotation, the rollers 44 and 45 of members 43 in operative positions successively approach the printing line, and are engaged by the cam projections 50 when approaching the printing line, so that the respective pressure members are pushed outwardly to the printing position thereof when arriving at the printing line, and effect an imprint on the section of the respective copy sheet passing simultaneously through the printing line. Since every pressure member is moved to its printing position only when passing through the printing line, only one pressure member is in the printing position at any time, and only a single printing section of the master sheet is bulged outwardly, which is

desirable since the deformation of the entire master sheet is negligible.

The same program can be maintained in successive revolutions, but if it is desired to clear the machine after a revolution, the clearing cam 54 is placed in the position shown in solid lines in FIG. 3, so that an inclined face thereon successively engages the ends of members 43 and pushes the same back to the inoperative position shown in solid lines in FIG. 4. A spring 56 is connected to the clearing cam 54, and is arranged in such a manner that clearing cam 54 snaps to an inoperative position shown in broken lines in FIG. 3 abutting on a stop 55 when clearing cam 54 is moved out of its operative position.

When the copy sheet continues its movement together with the printing roller, the marking 53 moves away from the sensing means 18, so that relay means 27 is de-energized, and switches 29 open.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of selective duplicators differing from the types described above.

While the invention has been illustrated and described as embodied in selective duplicator controlled by a marking on a copy sheet representing a specific printing program, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured Letters Patent is:

1. A duplicator comprising, in combination, a printing roller means and a pressure roller means operable between a position of rest and printing position forming a printing line; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means for operating said roller means to assume said printing position; a control device including a plurality of control means correlated to different printing programs, respectively, each control means having a plurality of control elements respectively associated with said selected printing sections of said programs and operatively connected to said operating means for controlling the same to operate said roller means to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the control means correlated with the printing program corresponding to the marking sensed by said sensing means.

2. A duplicator, comprising, in combination a printing roller means and a pressure roller means, at least parts of one of said roller means being movable between an inoperative position farther spaced from the other roller means and a printing position in close proximity with said other roller means and defining with the same a printing line; holding means on said printing roller means for holding on the periphery of the same a master sheet having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing pro-

grams respectively including different combinations of selected printing sections of the master sheet; operating means including electro-magnetic means for moving at least said parts of said one roller means to said printing position; an electric control device comprising a plurality of switching means respectively correlated to different printing programs, each switching means including a plurality of switches respectively correlated to different printing sections, said control device being electrically connected to said electro-magnetic means to energize the same whenever one of said switching means is actuated so that the selected printing sections of the respective program pass through the printing line when the respective parts of said one roller means are in said printing position; and sensing means for sensing different markings on fed copy sheets and being connected to said electric control device for actuating the switching means correlated to the printing program represented by the markings sensed by said sensing means so that only printing sections according to a printing program selected by a marking on a copy sheet are pressed against each copy sheet when the same passes through said printing line.

3. A duplicator, comprising, in combination, a printing roller means and a pressure roller means, at least parts of one of said roller means being movable between an inoperative position farther spaced from the other roller means and a printing position in close proximity with said other roller means and defining with the same a printing line; holding means on said printing roller means for holding on the periphery of the same a master sheet having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having marking thereon representing different printing programs respectively including at least one selected printing section of the master sheet; operating means including electro-magnetic means for moving at least said parts of said one roller means to said printing position; an electric control device comprising a plurality of switching means respectively correlated to different printing programs, each switching means including a plurality of mechanically connected switches correlated with different printing sections, said switches moving simultaneously between open and closed positions, said switches being electrically connected to said electro-magnetic means to energize the same only when one of said switching means is actuated; relay means for shifting said switching means and a set of sensing means respectively correlated with different printing programs and different markings, each sensing means being adapted to produce an electrical impulse, and including an amplifier for amplifying said impulse and connected to said relay means to effect actuation of the same and of the respective switching means for actuating said switches in response to a marking sensed by said sensing means so that only printing sections of a printing program selected by a marking on a copy sheet are pressed against each copy sheet when the same passes through said printing line.

4. A duplicator comprising, in combination, a printing roller means including a set of circumferentially disposed pressure members, each pressure member being movable between the retracted position and a radially projecting printing position; holding means on said printing roller for holding on the periphery of the same a master sheet with printing sections of said master sheet located on correlated pressure members; a counter pressure roller means cooperating with pressure members in said printing position to form a printing line; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the master sheet; operating means including a set of electro-magnetic means respectively located in the regions of said pressure members for effecting movement of the same from said inoperative position to said printing position and for holding same in said printing position

while passing through the printing line; an electric control device comprising a set of switching means respectively correlated to different printing programs, each switching means including a plurality of switches respectively correlated to different printing sections and being respectively connected to different electro-magnetic means to energize the same only when one of said switching means is actuated so that the selected printing sections of the respective program pass through said printing line when the respective pressure members are in said printing position; and a set of sensing means for sensing markings on fed copy sheets and respectively correlated with different printing programs and different markings and being respectively connected to said switching means for actuating the same in response to a marking sensed by said sensing means so that only the printing sections according to a printing program selected by a marking on a copy sheet are pressed against the copy sheet when the same passes through said printing line.

5. A duplicator comprising, in combination, a printing roller means including a set of circumferentially disposed pressure members, each pressure member being movable between the retracted position and a radially projecting printing position; holding means on said printing roller for holding on the periphery of the same a master sheet with printing sections of said master sheet located on correlated pressure members; a counter pressure roller means cooperating with pressure members in said printing position to form a printing line; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including selected printing sections of the master sheet; a set of cam follower means respectively mounted on said printing members and being shiftable between an inoperative position and an operative position; stationary cam means having a cam projection in the region of said printing line and being located in the path of said cam follower means in said operative position only for shifting the respective pressure members to said printing position; operating means including a set of stationary electro-magnetic means respectively located axially aligned with said cam follower means and said pressure members for shifting said cam follower means to said operative position so that the pressure members correlated with cam follower means in said operative position move to said printing position before arriving at said printing line and are held in said printing position while passing through said printing line; an electric control device comprising a set of switching means respectively correlated to different printing programs, each switching means including a plurality of switches, said switches being correlated to different printing sections and being respectively connected to different electro-magnetic means to energize the same only when one of said switching means is actuated; and a set of sensing means for sensing markings on fed copy sheets and respectively correlated with different printing programs and different markings and being respectively connected to said switching means for actuating the same in response to a marking sensed by said sensing means so that only the printing sections of a printing program selected by a marking on a copy sheet are pressed against the copy sheet when the same passes through said printing line.

6. A duplicator as set forth in claim 5 wherein each sensing means includes a source of light for illuminating a marked portion of the copy sheets, a photo cell adapted to receive light reflected from said portion and from a marking on said portion to produce an electric impulse in response to a marking, and amplifier means receiving said impulses; each of said switching means including relay means connected to said amplifier means and responding to an impulse from said photo cell to actuate the respective switching means to close said switches and to energize the respective selected electro-magnetic means.

7. A duplicator as set forth in claim 5 and including a

clearing cam located in the path of cam follower means in said operative position and behind the printing line in the direction of rotation of said printing roller means for shifting said cam follower means from said operative position to said inoperative position.

8. A duplicator comprising, in combination, a printing roller means and a pressure roller means, at least one of said roller means being movable between an inoperative position farther spaced from the other roller means and a printing position in close proximity with said other roller means and defining with the same a printing line; holding means on said printing roller means for holding on the periphery of the same a master sheet having circumferentially arranged printing sections; feeding means for feeding through said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the master sheet; operating means including electro-magnetic means for moving said one roller means to said printing position; an electric control device comprising a contact device including a stationary contact means, and a rotary contact means connected to said printing roller for rotation in synchronism with the same, one of said contact means including a set of contacts respectively correlated with said printing sections and being successively engaged by the other contact means during rotation of said printing roller means when the respective printing section passes through said printing line, and a set of switching means respectively correlated to different printing programs, each switching means including a plurality of switches respectively correlated to different printing sections and being respectively connected to contacts of said set of contacts correlated with the same printing sections, said other contact means being electrically connected to said electro-magnetic means for energizing the same only when one of said switching means is actuated and when the respective contact is engaged by said other contact means while the correlated printing section passes through said printing line; and a set of sensing means for sensing markings on fed copy sheets and respectively correlated with different printing programs and different markings and being respectively connected to said switching means for actuating the same in response to a marking sensed by said sensing means so that only the printing sections of a printing program selected by a marking on a copy sheet are pressed against said copy sheet when the same passes through the printing line.

9. A duplicator comprising, in combination, a printing roller means and a pressure roller means, at least one of said roller means being movable between an inoperative position farther spaced from the other roller means and a printing position in close proximity with said other roller means and defining with the same a printing line; holding means on said printing roller means for holding on the periphery of the same a master sheet having circumferentially arranged printing sections; feeding means for feeding through said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the master sheet; operating means including electro-magnetic means for moving said one roller means to said printing position; an electric control device comprising a contact device including a stationary contact means, and a rotary contact means connected to said printing roller for rotation in synchronism with the same, said stationary contact means including a set of contacts respectively correlated with said printing sections and being successively engaged by said rotary contact means during rotation of said printing roller means when the respective printing section passes through said printing line, and a set of switching means respectively correlated to different printing programs, each switching means including a plurality of switches respectively correlated to differ-

ent printing sections and being respectively connected to contacts of said set of contacts correlated with the same printing sections, said rotary contact means being electrically connected to said electro-magnetic means for energizing the same to only when one of said switching means is actuated and when the respective contact is engaged by said rotary contact means while correlated printing section passes through said printing line; and a set of sensing means spaced from each other relative to said feeding means for sensing differently positioned markings on different fed copy sheets and respectively correlated with different printing programs and different markings and being respectively connected to said switching means for actuating the same in response to a marking sensed by said sensing means so that only the printing sections of a printing program selected by a marking on a copy sheet are pressed against said copy sheet when the same passes through the printing line.

10. A duplicator as set forth in claim 9 wherein said rotary contact means includes a rotary arm having two connected slide contacts, one of said slide contacts sliding over said set of contacts, and a slide ring adapted to be connected to a voltage source and being slidably engaged by the other slide contact.

11. A duplicator as set forth in claim 8 wherein each of said switching means includes a relay means for shifting said switches thereof simultaneously between opened and closed positions; and wherein said each sensing means includes a source of light for illuminating a marked portion of the copy sheet and a photo cell receiving light reflected from said portion and a marking thereon, and responding to a marking by creating an impulse, and an amplifier receiving said impulse and connected to the relay means for actuating the respective switching means under control of said impulse.

12. A duplicator comprising, in combination, a printing roller means and a pressure roller means, at least one of said roller means being movable between an inoperative position further spaced from the other roller means and a printing position in close proximity with said other roller means and defining with the same a printing line; holding means on said printing roller means for holding on the periphery of the same a master sheet having circumferentially arranged printing sections; feeding means for feeding through said printing line copy sheets having markings thereon representing different printing programs respectively including at least one printing section of the master sheet; operating means including electro-magnetic means for moving said one roller means to said printing position; an electric control device comprising a contact device including a stationary contact means, and a rotary contact means connected to said printing roller for rotation in synchronism with the same, one of said contact means including a set of contacts respectively correlated with said printing sections and being successively engaged by the other contact means during rotation of said printing roller means when the respective printing section passes through said printing line, and a set of switching means respectively correlated to different printing programs, each switching means including at least one switch, said switches being correlated to different printing sections and being respectively connected to contacts of said set of contacts correlated with the same printing sections, said other contact means being electrically connected to said electro-magnetic means for energizing the same only when one of said switching means is actuated and when the respective contact is engaged by said other contact means while the correlated printing section passes through said printing line; a set of sensing means for sensing markings on fed copy sheets and respectively correlated with different printing programs and different markings; a plurality of relays connected in parallel and respectively controlled by said sensing means and being respectively connected to said switching means for actuating the same

in responsive to a marking sensed by said sensing means, a control switch connected in series with all said relay means and being normally closed so that only the printing sections of a printing program selected by a marking on a copy sheet are pressed against said copy sheet when the same passes through the printing line; and an auxiliary sensing means for sensing an additional marking on a copy sheet and being connected to said control switch for opening the same when sensing the additional marking whereby all said switching means are rendered inoperative when a new copy sheet with said additional marking passes under said sensing means.

13. A duplicator comprising, in combination, a printing roller means and a pressure roller means operable between a position of rest and a printing position forming a printing line; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means including electro-magnetic means for operating said roller means to assume said printing position; an electric control device including a plurality of control means correlated to different printing programs, respectively, each control means including a switching means having a plurality of switches respectively associated with said selected printing sections of said programs and electrically connected to said electromagnetic means of said operating means for controlling the same to operate said roller means to assume said printing position when the printing sections of the respective printing program pass through said printing line; sensing means for sensing markings on fed copy sheet; a plurality of relays connected in parallel and respectively controlled by said sensing means and operatively connected to said control means to actuate the switching means correlated with the printing program corresponding to the marking sensed by said sensing means; a control switch connected in series with all said relay means and being normally closed; and an auxiliary sensing means for sensing an additional marking on a copy sheet and being connected to said control switch for opening the same when sensing the additional marking whereby all said switching means are rendered inoperative when a new copy sheet with said additional marking passes under said sensing means.

14. A duplicator as set forth in claim 12 wherein said sensing means are located in the region of said feeding means to sense an additional marking located at the leading edge of the copy sheet before the same reaches the printing line.

15. A duplicator as set forth in claim 12 wherein said sensing means includes a source of light for illuminating a portion of the copy sheet, and a photo cell positioned to receive light reflected from said portion of said copy sheet, or from a marking thereon, and responding to a marking to produce an impulse.

16. A duplicator comprising, in combination, a printing roller means and a pressure roller means operable between a position of rest and a printing position forming a printing line; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means including electro-magnetic means for operating said roller means to assume said printing position; an electric control device including a plurality of control means correlated to different printing programs, respectively, each control means including a switching means having a plurality of switches respectively associated with

said selected printing sections of said programs and electrically connected to said electro-magnetic means of said operating means for controlling the same to operate said roller means to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the switching means correlated with the printing program corresponding to the marking sensed by said sensing means.

17. A duplicator comprising, in combination, a printing roller means and a pressure roller means, said pressure roller means being operable between a position of rest and a printing position forming a printing line with said printing roller means; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means for operating said pressure roller means to assume said printing position; a control device including a plurality of control means correlated to different printing programs, respectively, each control means having a plurality of control elements respectively associated with said selected printing sections of said programs and operatively connected to said operating means for controlling the same to operate said pressure roller means to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the control means correlated with the printing program corresponding to the marking sensed by said sensing means.

18. A duplicator comprising, in combination, a printing roller means including a plurality of pressure members, and a pressure roller means, said pressure members being operable between a position of rest and a printing position forming a printing line with said pressure roller means; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections respectively located on said pressure members; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means for operating said pressure members to assume said printing position; a control device including a plurality of control means correlated to different printing programs, respectively, each control means having a plurality of control elements respectively associated with said selected printing sections of said programs and operatively connected to said operating means for controlling the same to operate said pressure members to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the control means correlated with the printing program corresponding to the marking sensed by said sensing means.

19. A duplicator comprising, in combination, a print-

ing roller means and a pressure roller means, said pressure roller means being operable between a position of rest and a printing position forming a printing line with said printing roller means; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means including electro-magnetic means for operating said pressure roller means to assume said printing position; an electric control device including a plurality of control means correlated to different printing programs, respectively, each control means including a switching means having a plurality of switches respectively associated with said selected printing sections of said programs and electrically connected to said electro-magnetic means of said operating means for controlling the same to operate said pressure roller means to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the switching means correlated with the printing program corresponding to the marking sensed by said sensing means.

20. A duplicator comprising, in combination, a printing roller means including a plurality of pressure members, and a pressure roller means, said pressure members being operable between a position of rest and a printing position forming a printing line with said pressure roller means; holding means on said printing roller means for holding on the periphery of same a printing form having circumferentially arranged printing sections respectively located on said pressure members; feeding means for feeding to said printing line copy sheets having markings thereon representing different printing programs respectively including different combinations of selected printing sections of the printing form; operating means including electro-magnetic means for operating said pressure members to assume said printing position; an electric control device including a plurality of control means correlated to different printing programs, respectively, each control means having a plurality of switches respectively associated with said selected printing sections of said programs and including a switching means electrically connected to said electro-magnetic means of said operating means for controlling the same to operate said pressure members to assume said printing position when the printing sections of the respective printing program pass through said printing line; and sensing means for sensing markings on fed copy sheets and operatively connected to said control means to actuate the switching means correlated with the printing program corresponding to the marking sensed by said sensing means.

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