

April 2, 1963

W. RITZERFELD ETAL
AUTOMATIC SELECTIVE DUPLICATOR

3,083,638

Filed Aug. 1, 1961

7 Sheets-Sheet 1

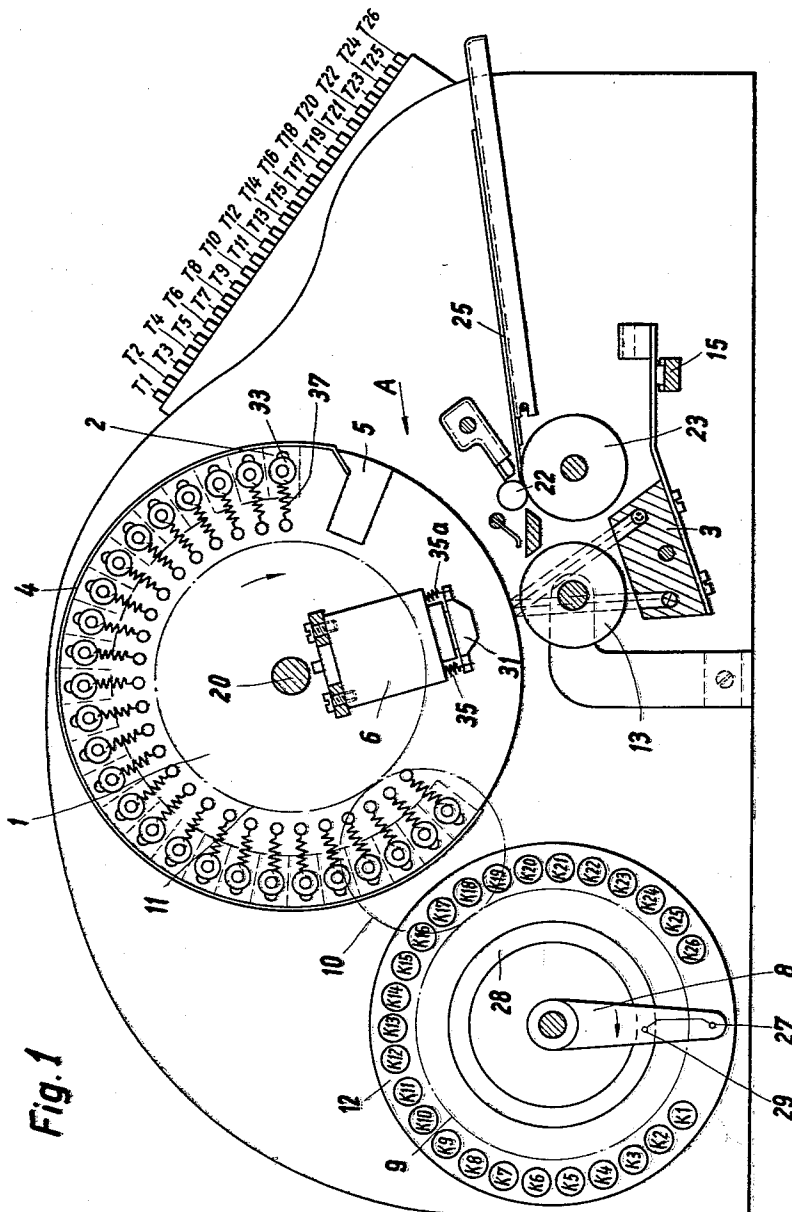


Fig. 1

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7 Sheets-Sheet 2

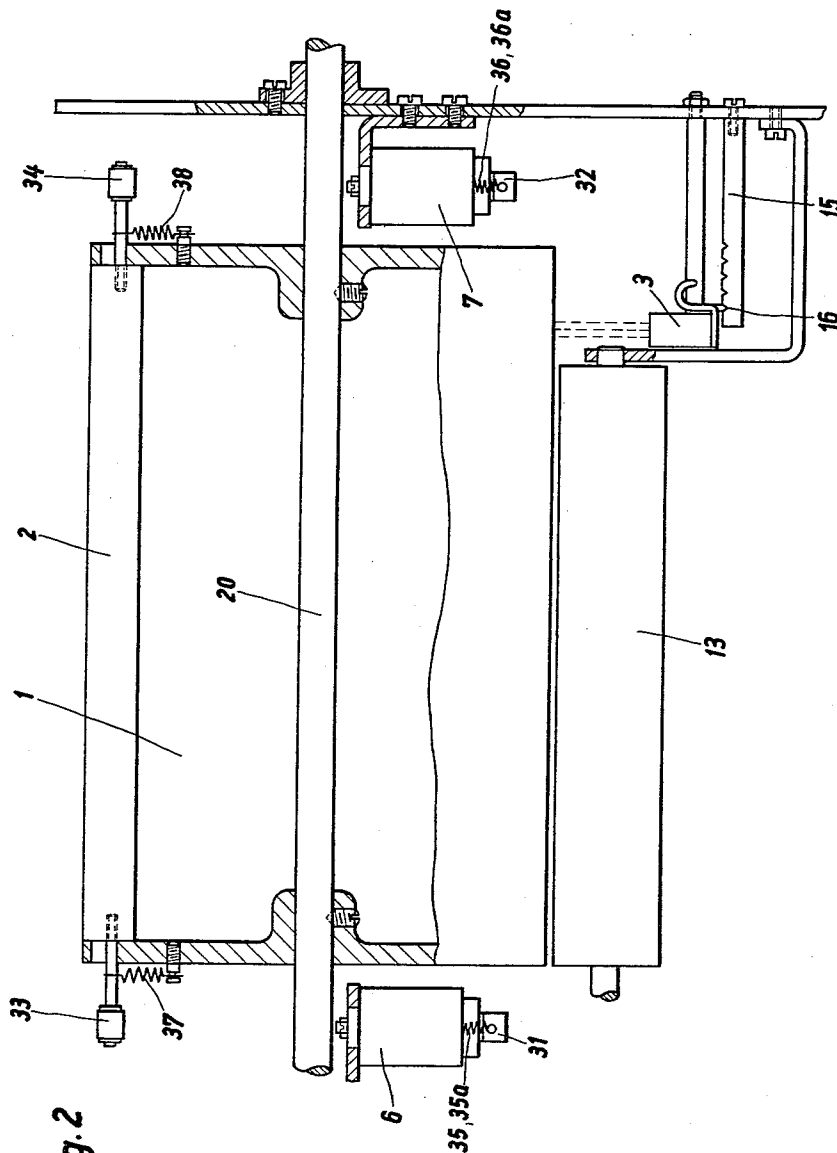


Fig. 2

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7 Sheets-Sheet 3

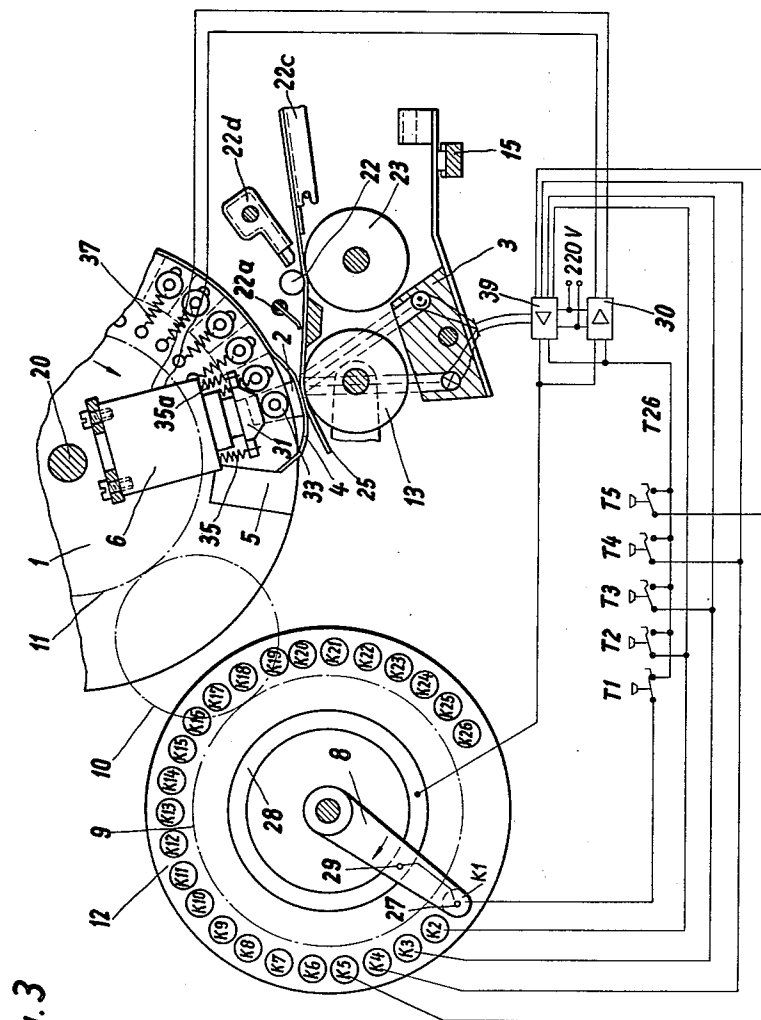


Fig. 3

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7 Sheets-Sheet 4

Fig. 4

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AUTOMATIC SELECTIVE DUPLICATOR

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7 Sheets-Sheet 5

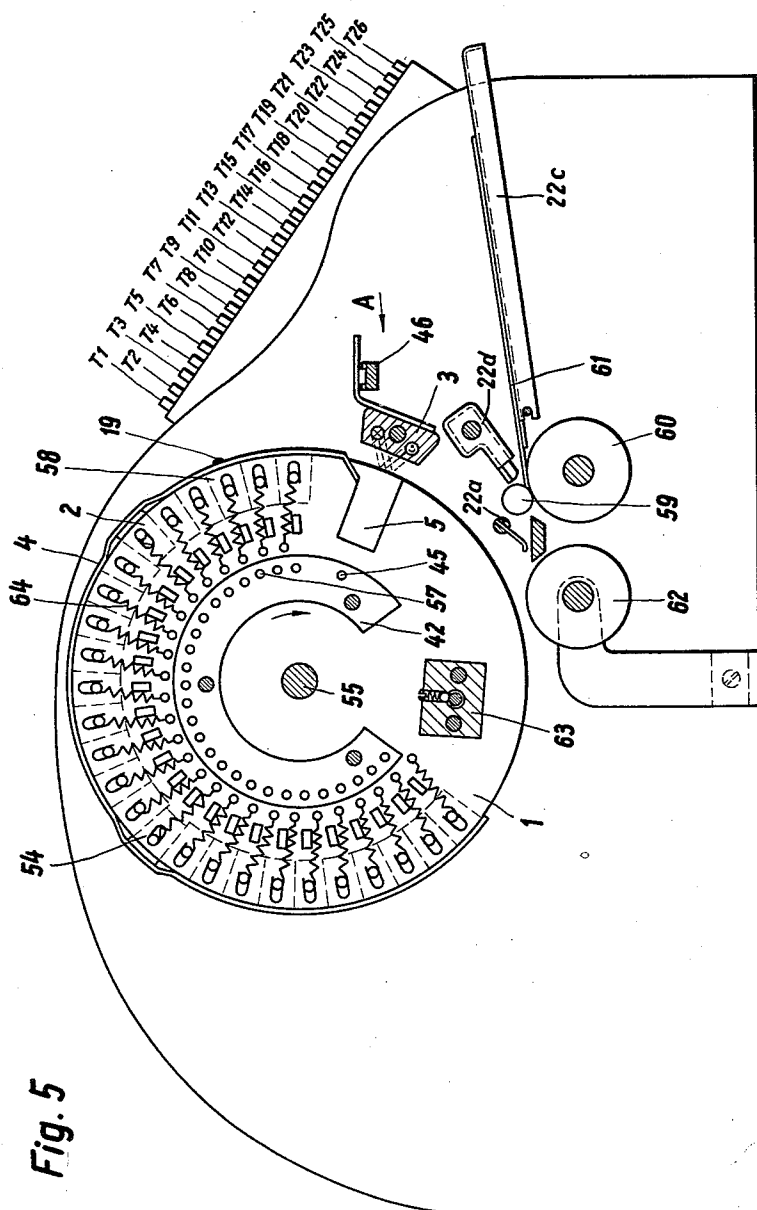


Fig. 5

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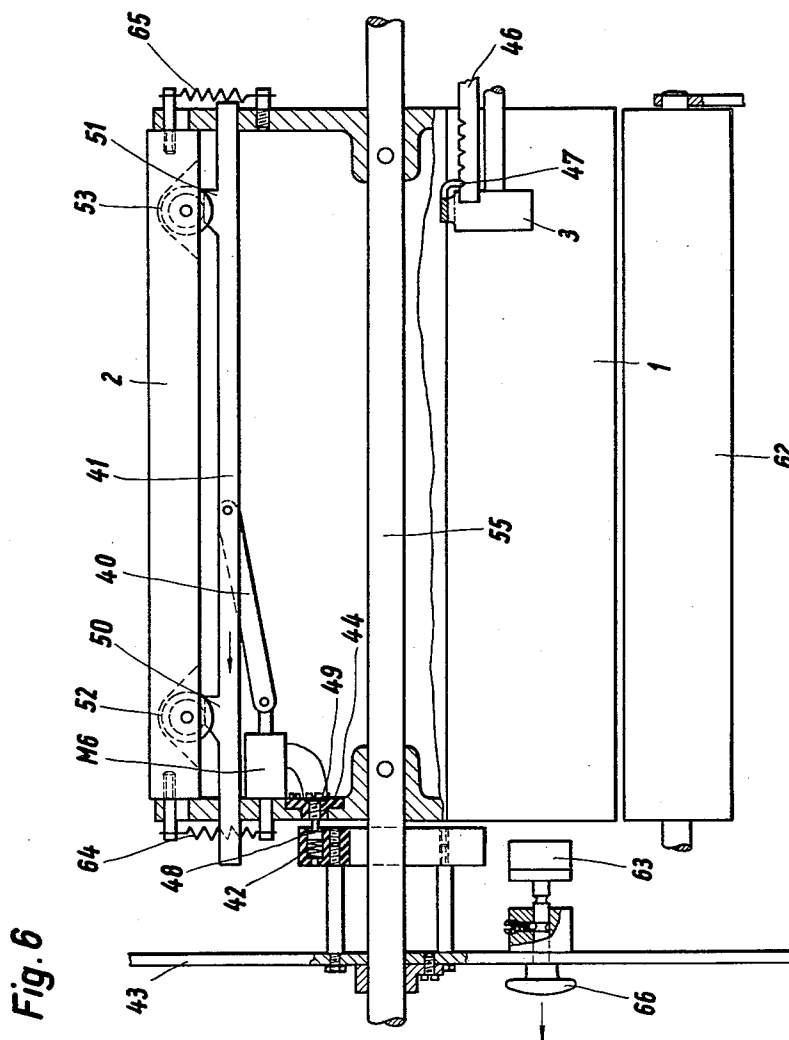
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AUTOMATIC SELECTIVE DUPLICATOR

3,083,638

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7 Sheets-Sheet 6



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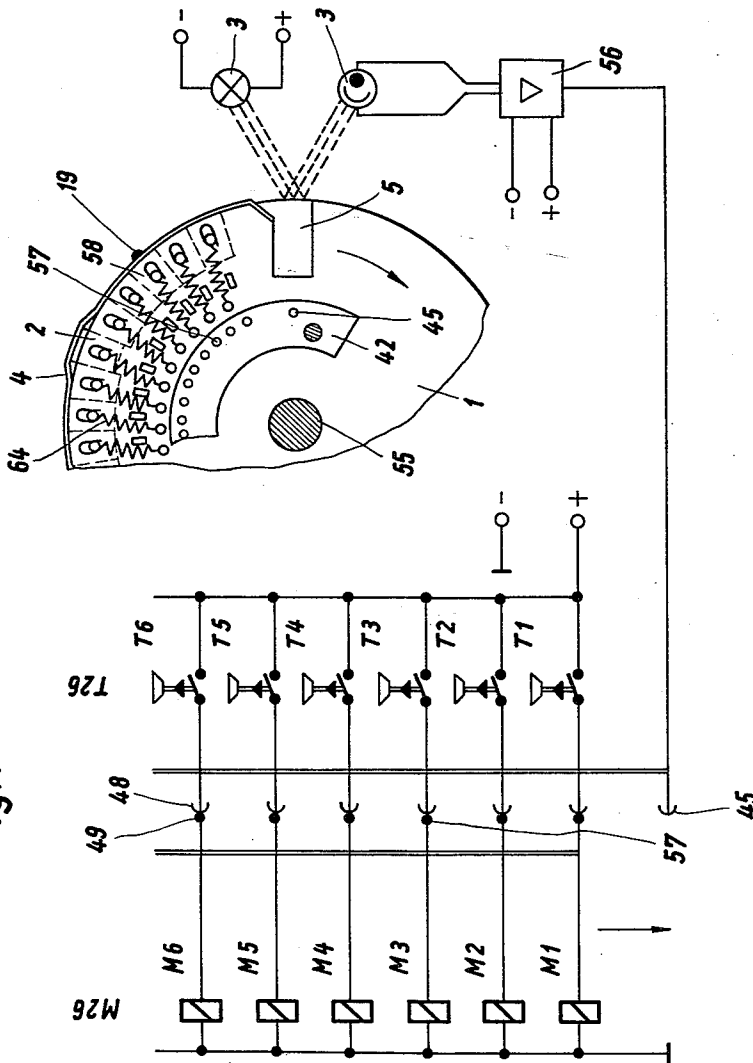
W. RITZERFELD ETAL
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7 Sheets-Sheet 7

Fig. 7



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3,083,638

AUTOMATIC SELECTIVE DUPLICATOR

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Filed Aug. 1, 1961, Ser. No. 128,489

Claims priority, application Germany Aug. 10, 1960

15 Claims. (Cl. 101—132.5)

The present invention relates to an automatic selective duplicator, and more particularly to a rotary duplicator in which selected sections or lines of a master sheet are printed in adjacent positions on a copy sheet.

It is one object of the present invention to provide a duplicator of this type in which printing sections of the master sheet can be selected either by operation of selector keys, or by providing markings correlated to selected printing sections, and sensed by sensing means.

Another object of the invention is to provide a duplicator in which the printing of selected printing sections of the master sheet is controlled by rotary contact means, and effected by electro-magnetic means.

Another object of the present invention is to provide the rotary duplicator in which sections of the master sheet are selected for printing before the printing operation, while other sections of the master sheet are automatically printed under the control of sensing means responding to markings.

With these objects in view, one embodiment of the invention comprises a printing roller including a set of pressure members which are movable between retracted positions and radially projecting printing positions, and press corresponding printing sections of the master sheet outwardly when located in their printing positions; a counter-pressure roller cooperating with pressure members in the advanced printing position to form a printing line in which selected printing sections of the master sheet are pressed against the copy sheet; operating means including electro-magnetic means for moving selected printing members to the printing position; a contact device including stationary contact means, and rotary contact means connected to the printing roller for rotation in synchronism with the same; and selector means electrically connected with the contact device and with the electro-magnetic means for effecting energizing of the electro-magnetic means in such a manner that the pressure member correlated with selected printing sections are moved to the printing position thereof before reaching the printing line, are held in such position while passing through the printing line, and are then retracted so that selected printing sections are printed on the copy sheet in the printing line.

In one embodiment of the invention, electro-magnetic means are provided at the printing line, and are energized under control of the contact device which has a set of contacts respectively correlated with the printing sections of the master sheet, and which become operative when the respective correlated printing section of the master sheet passes through the printing line.

A set of selector keys is provided and connected to the contacts of the set, so that by actuation of one or several of the selector keys, the timed energizing of the electro-magnetic means, and thereby the shifting of the selected pressure member to its printing position when passing through the printing line can be effected.

Markings are also provided on other selected sections of the master sheet, and are preferably sensed by sensing means responding to such markings and electrically connected to the electro-magnetic means to energize the same automatically when sensing of a marking indicates that a selected printing section passes through the printing line during rotation of the printing roller.

In another embodiment of the invention, each pressure member is independently operated by an electro-magnetic means, so that a set of electro-magnetic means is provided on the printing roller. The contact device includes again a set of contacts which are respectively connected to the electro-magnetic means and to selector keys, so that by operation of selected selector keys, the respective electro-magnetic means can be energized to move the respective pressure members to the printing position before rotation of the printing roller starts. Wherever a pressure member was set to its printing position, a respective printing section is pressed against the copy sheet when passing through the printing line.

In addition thereto, sensing means are provided for sensing markings indicating other selected sections of the printing form, such sensing means responding to the markings to effect through the contact device energizing of the respective electro-magnetic means when the respective selected printing portion approaches the printing line so that it is in the printing position when passing through the printing line, whereupon the electro-magnetic means is de-energized, and the respective pressure member is retracted.

In both embodiments of the invention, the sensing means are shiftable to sense different sets of markings during consecutive revolutions of the printing roller. This arrangement may be modified by providing a set of printing means respectively cooperating with sets of markings on the printing form, and being selectively, or automatically, connectable into a circuit so that during consecutive revolutions, successive axially staggered sensing means are actuated.

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, partly in section, of a rotary duplicator according to one embodiment of the present invention, with one lateral wall omitted;

FIG. 2 is a view in the direction of the arrow A in FIG. 1, partially in section, the conventional clamping device, transporting device, moistening device, and feeding means being omitted for the sake of clarity;

FIG. 3 is a schematic side view including a diagram illustrating the electric circuit of the selector arrangement of the embodiment of FIG. 1;

FIG. 4 is a master sheet provided with columns of markings;

FIG. 5 is a side view, partly in section, illustrating another embodiment of the invention with one side wall omitted;

FIG. 6 is a fragmentary view in the direction of the arrow A in FIG. 5, partially in section, and with the conventional clamping device, transporting device, moistening device, and feeding means omitted for the sake of clarity; and

FIG. 7 is a schematic view including a diagram illustrating the electric circuit of the selector arrangement of the embodiment of FIG. 5.

Referring now to the drawings, and more particularly to FIGS. 1 to 4, a printing roller 1 is secured to a drive shaft 20 and is driven by a motor, not shown, to rotate in clockwise direction. A holding means 5 holds a master sheet on the periphery of printing roller 1. Printing members 2 are arranged about the periphery of the printing roller 1, and extend in axial direction corresponding to circumferentially arranged printing sections of the master sheet 4.

The master sheet 4 is shown in FIG. 4 to have a main portion in which the text is written in according to the printing sections and lines, and another portion provided with four columns 17 in which markings are selectively placed aligned with selected sections of the master sheet 4. Different sections may be identified and selected by sets of markings in the four columns.

As best seen in FIG. 2, each pressure member 2 is provided with two projecting shaft portions which are guided in radial slots of the end walls of the printing roller 1 so that the pressure members 2 are movable between a retracted position in which they form a continuous cylindrical surface on the printing roller to a radially projecting printing position in which the respective pressure member 2 bulges the corresponding printing section of the master sheet 4 outwardly, as best seen in FIG. 3. Printing members in the printing position form a printing line with a counter pressure roller 13, so that a copy sheet 25 receives an imprint from the printing section on the master sheet which is bulged by an advanced printing member 2.

Copy sheet 25 is transported by a pair of transporting rollers 22 and 23, and are held immovable by spring means 22a when printing sections of the master sheet lying on retracted pressure members pass through the printing line. Moistening means 22b moisten the copy sheets while the same pass over the feeding table 22c.

The shafts of each printing member 2 are provided with rollers 33 which pass the armatures 31 and 32 of a pair of electro-magnetic means 6 and 7 located in the region of the printing line. Springs 35, 35a and 36, 36a normally retract the armatures of electro-magnetic means 6 and 7, but when the electro-magnetic means 6 and 7 are energized, the armatures are advanced, and the camming heads 31 and 32 are moved to an advanced position in which they engage rollers 33 and 34 so that the same ride up the laterally inclined faces of the heads 31 and 32 until they arrive at the flat center portion of the same where the respective printing member is held in the advanced printing position. During further turning movement of printing roller 1, their respective rollers 33, 34 roll down the inclined lateral faces of the heads 31 and 32 at the other side of the printing line while the respective printing member 2 is retracted by the springs 37 and 38.

A contact device is provided and includes a rotary contact means shown to be in an arm 8 which is connected by gears 9, 10 and 11 to shaft 20 of the printing roller to rotate in synchronism with the same. Contact arm 8 has a pair of connected contacts 27 and 29 which respectively slide over a set of stationary contacts K1 to K26 and over a slide ring 28. As best seen in FIG. 3, each stationary contact K1 to K26 is connected to selector keys T1 to T26. The slide ring 28 is connected to a pair of amplifiers 39 and 30, which are also connected to each other as best seen in FIG. 3. Amplifier 39 is connected to the sensing means 3 which include a source of light for illuminating one of the columns of markings on the master sheet, so that light reflected from the surface of the master sheet or from markings thereon, respectively impinges a photo cell in the sensing means 3 which produces electric impulse passing through amplifier 39.

As best seen in FIG. 2 the counter-pressure roller 13 does not extend the full axial length of the printing roller 1, so that the sensing means 3 can be arranged to sense the portion of the master sheet which carries the four columns of markings. A support 15 extends in axial direction, and is provided with axially spaced carriage recesses 16 into which a springly member of sensing means 3 projects, so that sensing means 3 can be shifted between a plurality of axially spaced positions in which sensing means 3 respectively cooperates with the four columns of markings in the marked portion of the master sheet 4. Such shifting of the sensing means is carried

out by manual operation after each revolution of the printing roller, if selection of different printing section by the sensing means is desired. However it is also possible to automatically shift the sensing means 3 by stepping mechanism actuated after each revolution of the printing roller 1. The embodiment shown in FIGS. 1 to 3 operates in the following manner: It is assumed that the first printing section or line of the master sheet is to be selected for printing in addition to the fourth line of the master sheet, which is provided with a marking 19 in the first column, as shown in FIG. 4. Key T1 is depressed, so that an electric connection is established between amplifier 30, and contact K1. When the machine is started to perform a single revolution, the printing roller 1 rotates in the direction of the arrow together with the master sheet 4. The rotary contact arm 8 is driven through gears 9, 10, 11, to rotate in synchronism with the printing roller.

The feeding means 22, 23 transport a copy sheet 25 toward the printing plane passing through the axis of printing roller 1 and counter-pressure roller 13. When the contact 27 of the rotary contact arm 8 engages stationary contact K1, the first printing section of the master sheet reaches the printing plane. The circuit is closed through the closed contact of selector key T1, contacts K1, and 27, 29, 8 and the amplifier 30 energizes the electro-magnetic means 6 and 7 so that the armatures with the camming heads 31 and 32 are advanced in the path of movement of the rollers 33, 34 of the first printing member 2, and move the same to the advanced printing position so that the first printing section of the master sheet is bulged when passing through the printing plane, and forms a printing line with the counter-pressure roller 13, effecting an imprint of the first printing section on the copy sheet 25 which was moistened by the moistening means 22b. When contact 27 leaves contact K1, the circuit of the electro-magnetic means is interrupted, and electro-magnetic means 6 and 7 are de-energized, so that springs 35 and 36 retract the armature of the electro-magnetic means, and springs 37, 38 retract the first printing member to its retracted inoperative position. The contact K2 cannot effect energizing of the electro-magnetic means, since the contact of selector key T2 is not closed. The electro-magnetic means are also not energized when the third printing section passes through the printing plane. When the fourth printing section of the master sheet approaches the printing plane, the sensing means 3 senses marking 19, and produces an impulse which passes through amplifier 39, and effects energizing of the electro-magnetic means over contact K4 so that the fourth printing member is moved to its printing position, and places the corresponding fourth printing section of the master sheet in the printing line so that the text thereon is imprinted on the copy sheet. Since the copy sheet has not moved during the turning movement of printing roller 1, the imprint of the fourth printing section is located adjacent the imprint of the first printing section.

Since no other key was depressed, and since no other marking is provided in the first column, the printing roller 1 completes its first revolution, without producing any further imprints.

Before the next following revolution of the printing roller, it is possible to actuate other selector keys to select printing sections for printing. In any event, markings are provided in the second column of the master sheet corresponding to the seventh, tenth, fifteenth, sixteenth, twenty-second and twenty-fifth printing section, and since the sensing means is shifted in axial direction to be located opposite the second column of markings on the master sheet 4, these markings will be sensed during the second revolution of the printing roller and effect energizing of the electromagnetic means when the respective printing section is passed through the printing lines, where-

5

by imprints of such selected printing sections are produced on another copy sheet.

In the above described embodiment, electro-magnetic means are provided in the region of the printing line, and successively cooperate with all printing members. In the embodiment of the invention illustrated in FIGS. 5 to 7, each printing member 2 is provided with an electro-magnetic means M1 to M26, of which electro-magnetic means M6 is best seen in FIG. 6. Each printing member 2 has a pair of projecting shafts guided in radial slots of the end walls of the printing roller 1, and is urged by springs 64 and 65 to a retracted position. Each printing member has a pair of inner recesses in which cam follower rolls 52 and 53 are turnably mounted. An elongated cam member 41 having two cams 50 and 51 is mounted in the end wall of the printing roller 1 for axial movement between an inoperative position in which cams 50 and 51 are displaced relative to the rolls 52 and 53, and the operative position illustrated in FIG. 6 in which the rolls are engaged by the cams 50 and 51 while the respective printing member 2 is pressed to its projecting printing position. When cams 50 and 51 are displaced relative to rolls 52 and 53, springs 64 and 65 retract the respective pressure member.

Each cam member 41 is connected by link 40 to the correlated electro-magnetic means M1 to M26, the electro-magnetic means M6 being shown in FIG. 6. When electro-magnetic means M6 is energized, link 40 is pulled to the left as viewed in FIG. 6, together with cam 41, 50, 51 and assumes its operative position in which the respective printing member 2 is in its printing position.

When electro-magnetic means M6 is de-energized, the printing member remains temporarily in its printing position, but during the further turning movement of the printing roller, the end of cam member 41 passes a clearing cam 63 and is pushed back to the right as viewed in FIG. 6 to its inoperative position, so that the respective printing member returns to its inoperative retracted position under the action of springs 64 and 65.

Clearing cam 63 may be rendered inoperative if the same printing sections are to be printed during successive revolutions of the printing roller 1. In this event, handle 66 is manually shifted to the left as indicated by an arrow, until a catch arrests the catch recess in a retracted position of the clearing cam 63 in which the end of cam member 41 is axially spaced from the clearing cam 63, and cannot be pushed back by the same.

A sensing means 3 is again provided near the end of the printing roller 1 to cooperate with several columns of markings on the master sheet 4 shown in FIG. 4. A support 45 supports the sensing means 3 for axial movement, and catch recesses 47 define positions of the sensing means in which the same cooperates with different columns of markings on the master sheet 4.

A set of contacts 49 is arranged in a circle and mounted on one end wall of the printing roller 1, each contact 49 being connected to a corresponding electro-magnetic means M1 to M26. A set of stationary contacts 48 is mounted in a circle on a stationary contact means 48 which is secured to side wall 43 of the machine. During rotation of printing roller 1, contacts 49 successively slide over and engage contacts 48. This is schematically indicated in FIG. 7, which shows contacts 49 connected to the electro-magnetic means M1 to M26, respectively, and the fixed contacts 48 respectively connected to selector keys T1 to T26. An additional fixed contact 45 is also provided in the circle of stationary contacts 48. As best seen in FIG. 5, the additional contact 45 is located in the region of the sensing means 3.

Sensing means 3 include a source of light illuminating a column of markings on the master sheet, and a photo cell which receives the reflected light and responds to light variations produced due to the different reflecting properties of the markings and of the surface of the mas-

6

ter sheet. Electrical impulses created in the photo cell are amplified in an amplifier 56 which is connected to the additional contact 45 and during rotation of the printing roller 1, contacts 49 successively slide over contact 45, but the respective electro-magnetic means can only be energized, if the photocell of the sensing means 3 produces an impulse at the moment of engagement between the respective contact 49, and the stationary contact 45. The duplicator illustrated in FIGS. 5 to 7 operates in the following manner: If the selector key T6 is actuated, the respective selector contact is closed, and the circuit is closed through contacts 48, 49 so that the electro-magnetic M6 is energized as long as key T6 is depressed. The energized magnet shifts the cam 41 so that the printing member 2 on which the printing section 6 is located is shifted to its printing position by cams 50, 51 acting on rolls 52, 53. When the key is released, its contact opens, and the electro-magnetic means M6 is de-energized, however, printing member 2 remains in its projecting printing position in which the corresponding sixth printing section of the master sheet 4 is bulged outwardly. Key T16 is also actuated, so that printing member 54, associated with the sixteenth printing section of the master sheet is shifted to projecting printing position, raising the corresponding printing section of the master sheet as best seen in FIG. 5. The keys select desired printing sections while the machine is at a standstill.

The first column of the master sheet has a marking 19 in its fourth column. When the machine is started, the printing roller 1 turns with shaft 55 and with the set of contacts 49 in the direction of the arrow in FIGS. 5 and 7. When marking 19 in the fourth line of the master sheet 4 passes the sensing means, an impulse is created which is amplified by amplifier 56. Since at this moment, contact 57 of the revolving set of contacts 49 engages the fixed contact 45 which is connected to amplifier 56, shown in FIG. 7, electro-magnetic means M3 is energized, and shift the respective cam 41 to effect outward movement of the respective printing member 2 to its printing position. Sensing means 3 is positioned spaced a short angular distance from the printing plane defined by the axis of printing roller 1 and counter-pressure roller 62, and the corresponding third printing section of the master sheet is pushed by the respective pressure member to a position in which it forms a printing line with the counter-pressure roller, and effects an imprint on a copy sheet supplied to the counter-pressure roller. When the respective printing member has passed through the printing line, its cam 41 is engaged by clearing cam 63 which is located spaced a short angular distance behind the printing line, so that cam 41 is shifted to its inoperative position, and the respective printing member 2 is retracted by springs 64 and 65 to its inoperative retracted position.

The sixth and sixteenth printing sections also effect imprints of the respective printing sections on the copy sheet, and since the copy sheet does not move while intermediate sections of the master sheet pass through the printing plane, the three imprints of the three selected sections are produced in adjacent positions on the copy sheet. When contact 57 separates from the fixed contact 54 associated with the sensing means, the circuit of the respective electro-magnetic means M3 is interrupted, so that the clearing cam 63 can push the respective cam 41 to its inoperative position permitting the respective printing member 2 to return to its retracted position.

After the first revolution, the sensing means may be shifted in axial direction to a second position cooperating with a second column of markings in which another set of markings is provided to select other printing sections for automatic prints. Of course, selected keys may again be operated to select additional printing sections for printing. If the set of selector keys is omitted, all printing operations are carried out only under control of the markings and sensing means, and in this event, it is ad-

vantageous to arrange the sensing means very near the printing plane so that the printing members 2 are moved to the projecting printing position.

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 duplicators differing from the types described above.

While the invention has been illustrated and described as embodied in a rotary duplicator provided with a set of printing members operated by electro-magnetic means under the control of a rotary contact device rotating in synchronism with the printing roller, 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 by Letters Patent is:

1. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially projecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; operating means including electro-magnetic means for moving selected printing members to said printing position whereby printing sections of the master sheet are pressed against the copy sheet at said printing line; a contact device including stationary contact means, and rotary contact means connected to said printing roller and rotating in synchronism with the same, at least one of said contact means including a set of contacts respectively correlated with said pressure members and printing sections; and selector means including sensing means for sensing markings correlated with selected printing sections of said master sheet and electrically connected with said contacts of said contact device and to said electro-magnetic means so that selected printing sections are printed in the printing line.

2. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially projecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; operating means including electro-magnetic means for moving selected printing members to said printing position whereby printing sections of the master sheet are pressed against the copy sheet at said printing line; a contact device including stationary contact means, and rotary contact means connected to said printing roller and rotating in synchronism with the same, at least one of said contact means including a set of contacts respectively correlated with said pressure members and printing sections; and selector means including a set of selector keys respectively connected with said con-

tacts and correlated with said printing sections, said selector means being connected to said electro-magnetic means for effecting energizing of electro-magnetic means selected by operation of said selector keys so that selected printing sections are printed in the printing line, said selector means including sensing means for sensing markings correlated to selected printing sections of said master sheet and electrically connected with said contacts of said contact device, and to said electro-magnetic means for effecting energizing of electro-magnetic means selected so that printing sections selected by markings are printed in the printing line.

3. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially projecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; stationary electro-magnetic means located in the region of the printing line and being successively passed by said pressure members, said electro-magnetic means holding, when energized, a printing member passing through the printing line in said printing position; a contact device including stationary contact means, and rotary contact means connected to said printing roller and rotating in synchronism with the same, one of said contact means including a set of contacts respectively correlated with said pressure members and printing sections, and the other contact means being connected with said electro-magnetic means, said selector means including sensing means for sensing markings on the master sheet correlated with selected printing sections, said sensing means being electrically connected with said contacts and said electro-magnetic means for effecting energizing of electro-magnetic means selected by markings.

4. A duplicator as set forth in claim 3 wherein said sensing means includes a source of light for illuminating markings on the master sheet, and a photo cell positioned so that the reflected light falls into said photo cell.

5. A rotary duplicator as set forth in claim 3 and including a support extending in axial direction of said counter-pressure roller and supporting said sensing means for movement between a plurality of positions located, respectively opposite different columns of markings on the master sheet so that during consecutive revolutions of said printing roller, differently marked printing sections can be selected for printing by shifting said sensing means to said positions thereof.

6. A duplicator as set forth in claim 3 wherein each pressure member has a pair of rolls at the ends thereof axially projecting from said printing roller; wherein said electro-magnetic means include a pair of electro-magnets having armatures located in the path of movement of said rolls and engaging the same when said electro-magnets are energized; and spring means for retracting said armatures, when said electro-magnets are de-energized; and other spring means for retracting said pressure members when the same have passed said armatures.

7. A duplicator as set forth in claim 6 wherein each of said armatures has a camming head having a flat central portion cooperating with the roll of the pressure member which is located in the printing line, and an inclined lateral portion located in the region of the roll of an adjacent pressure member for guiding the last-mentioned roll onto said flat portion during turning movement of said printing roller.

8. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially pro-

jecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; a set of electro-magnetic means mounted on said printing roller and respectively located in the regions of correlated pressure members, each electro-magnetic means being operatively connected to respective correlated pressure member for moving the same between said retracted and printing positions and for holding the correlated pressure member in said printing position while the same passes through the printing line; a contact device including a stationary contact means having a plurality of contacts, and a rotary contact means having a plurality of contacts connected to said printing roller for rotation therewith, each of said last-mentioned contacts being electrically connected to one of said electro-magnetic means and correlated with the respective pressure member; and selector means including a set of selector keys respectively connected to said stationary contacts so that upon actuations of selected keys, corresponding electro-magnetic means are energized to move the correlated pressure members to said printing position, said selector means including sensing means for sensing markings correlated with selected printing sections of said master sheet, an additional stationary contact in the region of said rotary contact means and being successively engaged by said contacts of said rotary contact means when the pressure members correlated with the respective contacts of said rotary contact means pass through the printing line whereby energizing of the respective electro-magnetic means is effected.

9. A duplicator as set forth in claim 8 wherein said sensing means includes a source of light for illuminating markings on the master sheet, and a photo cell receiving light reflected from said markings and being electrically connected to said additional stationary contact.

10. A duplicator as set forth in claim 8 and including a support extending in axial direction of said printing roller and supporting said sensing means for movement between a plurality of positions located respectively opposite different columns of markings on said master sheet so that during consecutive revolutions of said printing roller differently marked printing sections are selected for printing by shifting said sensing means to said positions thereof.

11. A duplicator as set forth in claim 8 wherein each pressure member includes cam follower means and a spring urging said pressure member to said retracted position; a cam cooperating with said cam follower means and mounted on said printing roller adjacent each pressure member and being movable between an inoperative position permitting retraction of the respective pressure member and an operative position holding the respective pressure member in said printing position, each cam being connected to one of said electro-magnetic means, respectively and shifted by the same to the operative position when the respective electro-magnetic means is energized.

12. A duplicator as set forth in claim 11 and including a clearing cam having a retracted position and an operative position located in the path of movement of said cams in said operative position for engaging said cams and shifting the same to said inoperative position after the respective pressure member has passed the printing line.

13. A duplicator as set forth in claim 12 wherein said

sensing means and said clearing cam are located at opposite sides of the printing line closely adjacent to same.

14. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially projecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; a set of electro-magnetic means respectively located in the regions of correlated pressure members, each electro-magnetic means being operatively connected to respective correlated pressure member for moving the same between said retracted and printing positions; a contact device including a stationary contact means having a plurality of contacts, and a rotary contact means, one of said contact means having a plurality of contacts, each of said contacts being electrically connected to one of said electro-magnetic means and correlated with the respective pressure member; and selector means including a set of selector keys respectively connected to said stationary contacts so that upon actuations of selected keys, corresponding electro-magnetic means are energized to move the correlated pressure members to said printing position, said selector means including sensing means for sensing markings correlated with selected printing sections of said master sheet, an additional stationary contact in the region of said rotary contact means and being successively engaged by said contacts of said rotary contact means when the pressure members correlated with the respective contact of said rotary contact means pass through the printing line whereby energizing of the respective electro-magnetic means is effected.

15. A rotary duplicator comprising, in combination, a rotary printing roller including a set of circumferentially disposed pressure members, each pressure member being movable between a retracted position and a radially projecting printing position; holding means on said printing roller for holding a flexible master sheet on the periphery of said printing roller with printing sections of said master sheet located on correlated pressure members; a rotary counter-pressure roller cooperating with pressure members in said advanced printing position to form a printing line; feeding means for feeding copy sheets to the printing line; operating means including electro-magnetic means for moving selected printing members to said printing position whereby printing sections of the master sheet are pressed against the copy sheet at said printing line; a contact device including stationary contact means, and rotary contact means connected to said printing roller and rotating in synchronism with the same; and selector means including sensing means for sensing markings correlated with printing sections of the master sheet and electrically connected with said contact device and to said electro-magnetic means for effecting energizing of said electro-magnetic means so that selected printing sections are printed in the printing line.

References Cited in the file of this patent

UNITED STATES PATENTS

1,916,964	Carroll	July 4, 1933
2,446,851	Ruderfer	Aug. 10, 1948
2,891,648	Kleinschmidt	June 23, 1959
2,980,014	Bousch	Apr. 18, 1961