Oct. 11, 1938. W. T. GOLLWITZER 2,132,413

PRINTING MACHINE

Filed May 8, 1936 6 Sheets-Sheet 1

Fig. 1.

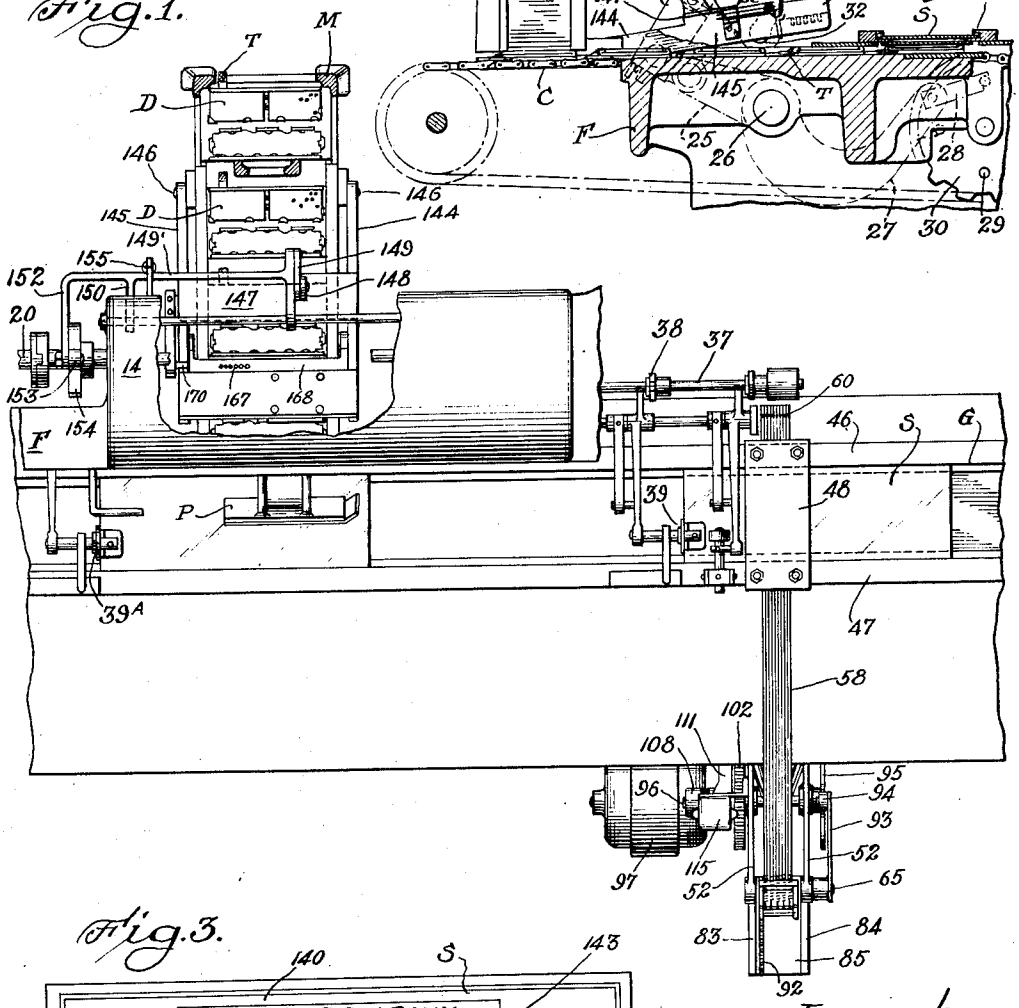


Fig. 2.

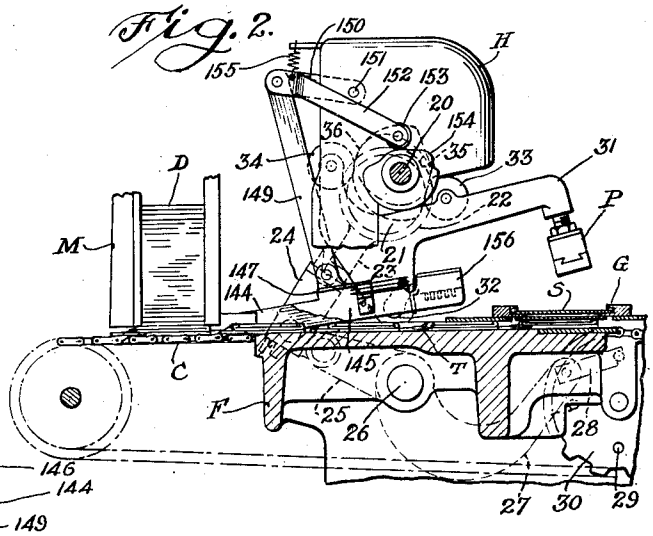
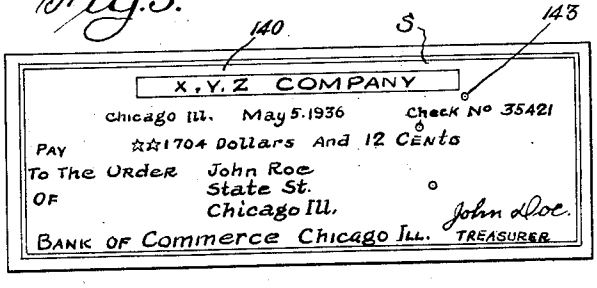


Fig. 3.



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PRINTING MACHINE

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Fig. 4.

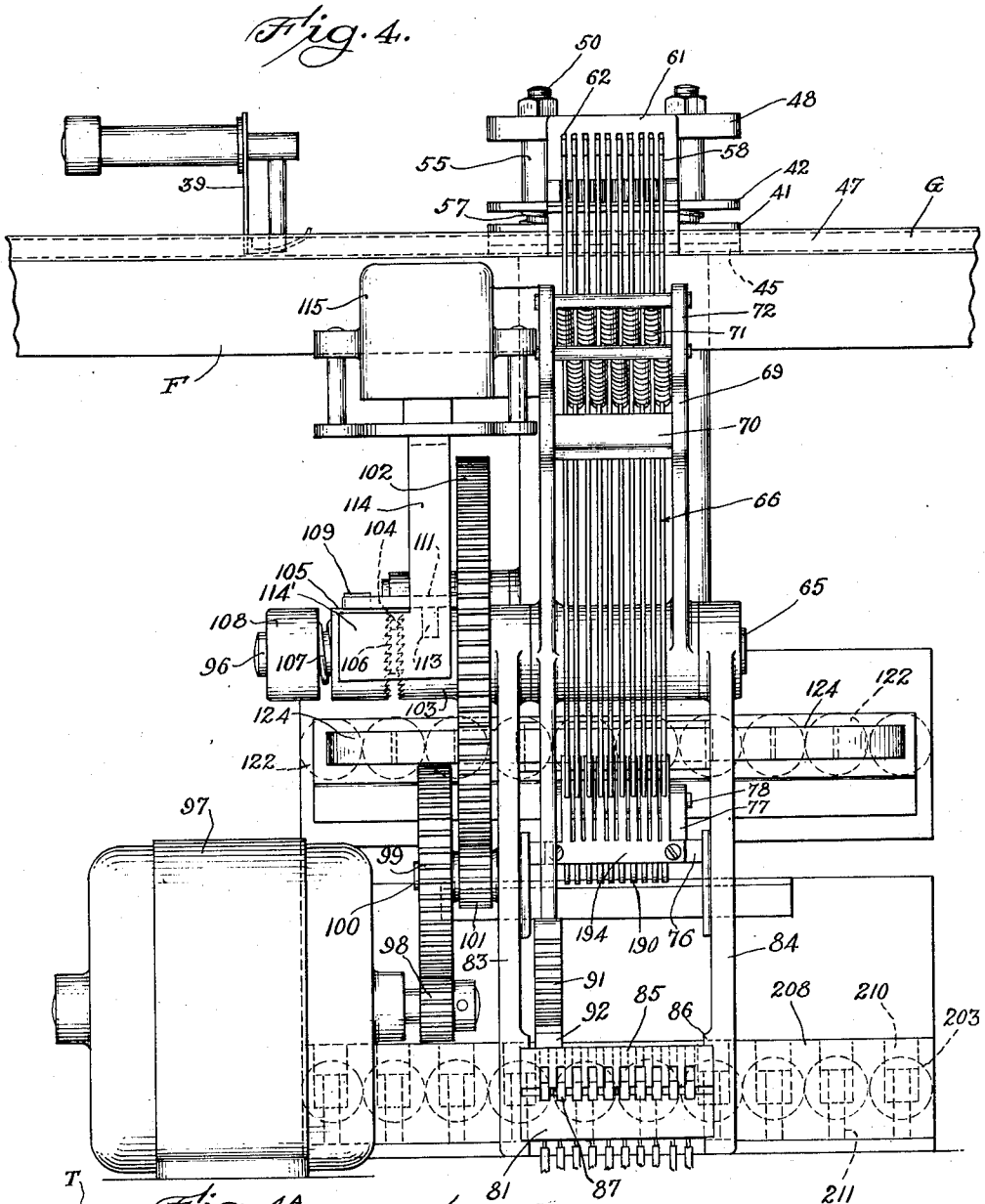


Fig. 4A

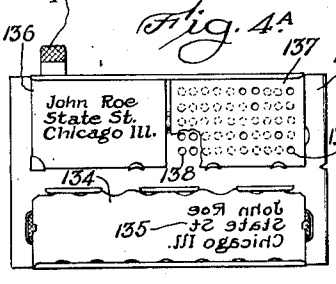
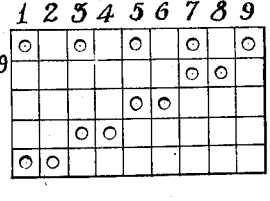


Fig. 4B



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PRINTING MACHINE

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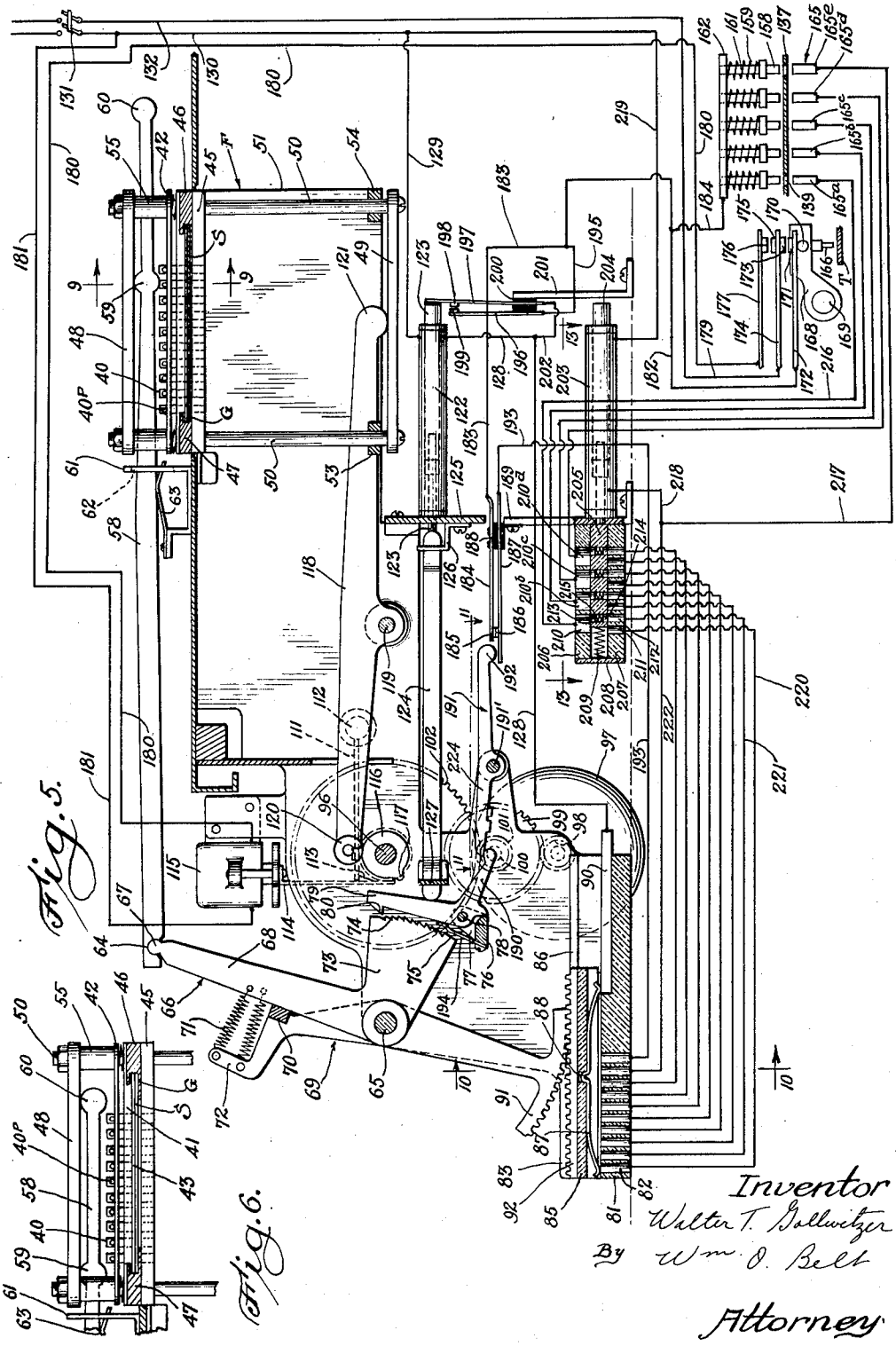


Fig. 5.

Fig. 6.

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PRINTING MACHINE

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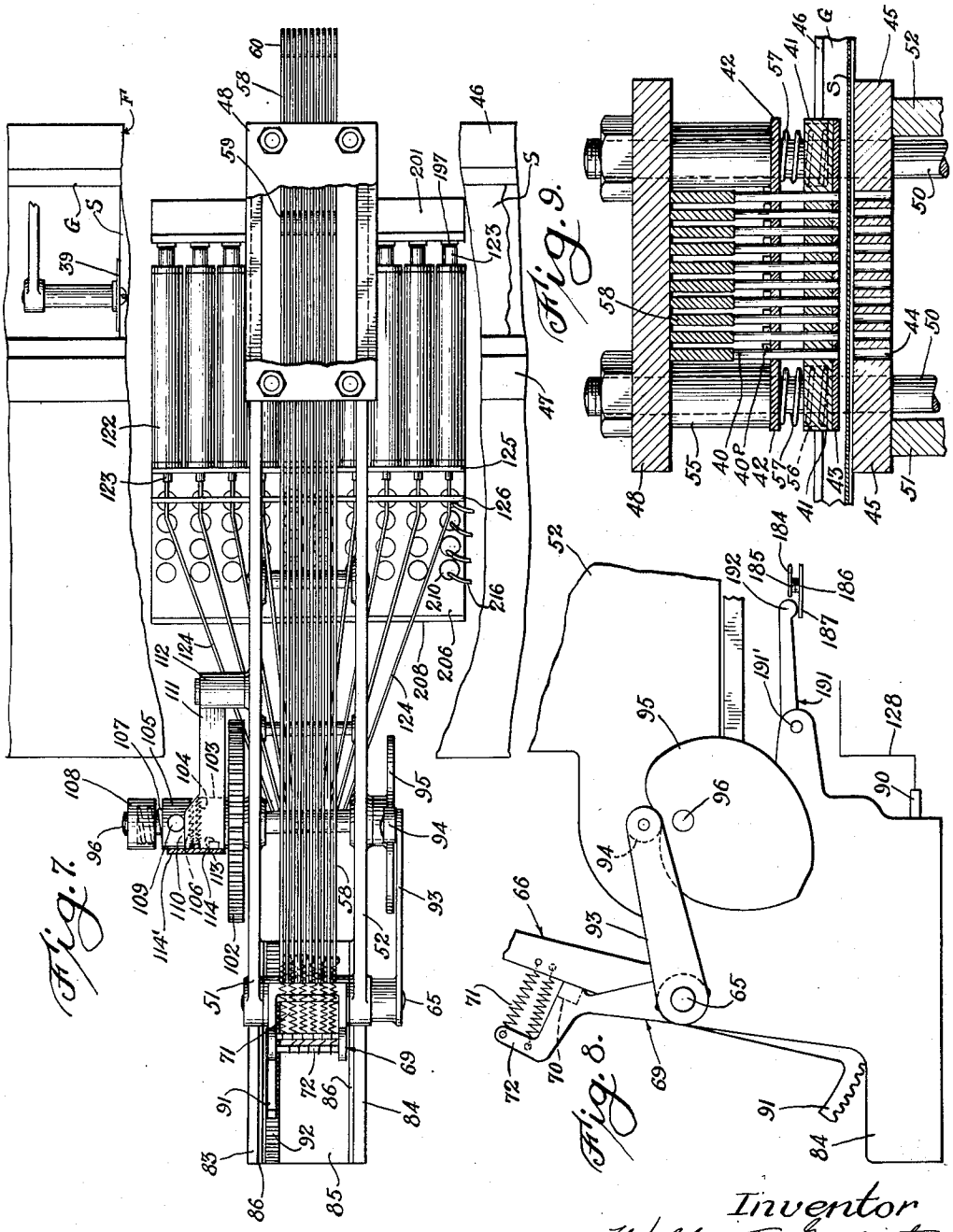


Fig. 7.

Fig. 9.

Fig. 8.

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PRINTING MACHINE

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Fig. 10.

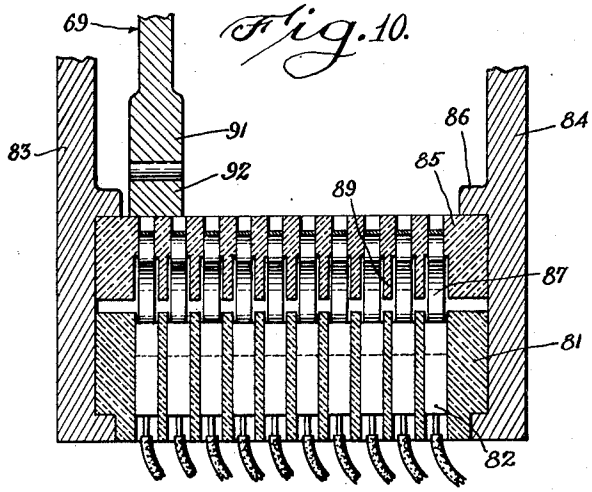


Fig. 11.

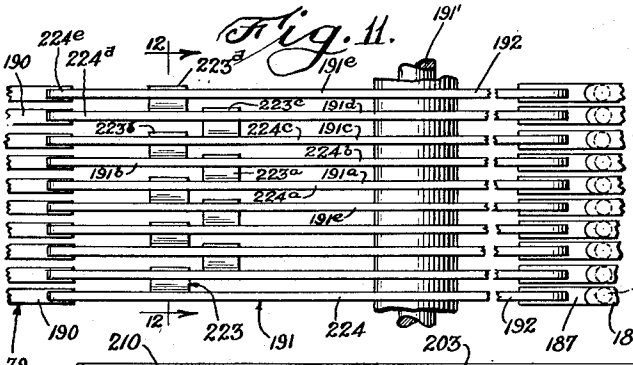


Fig. 12.

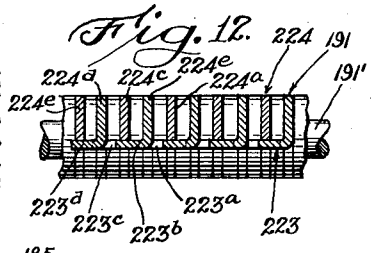
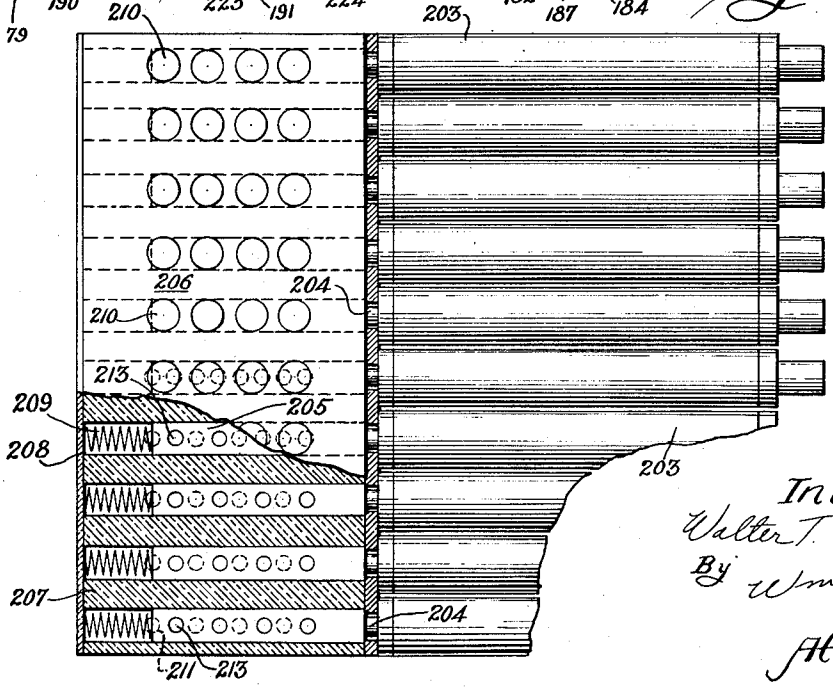


Fig. 13.



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PRINTING MACHINE

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Fig. 14.

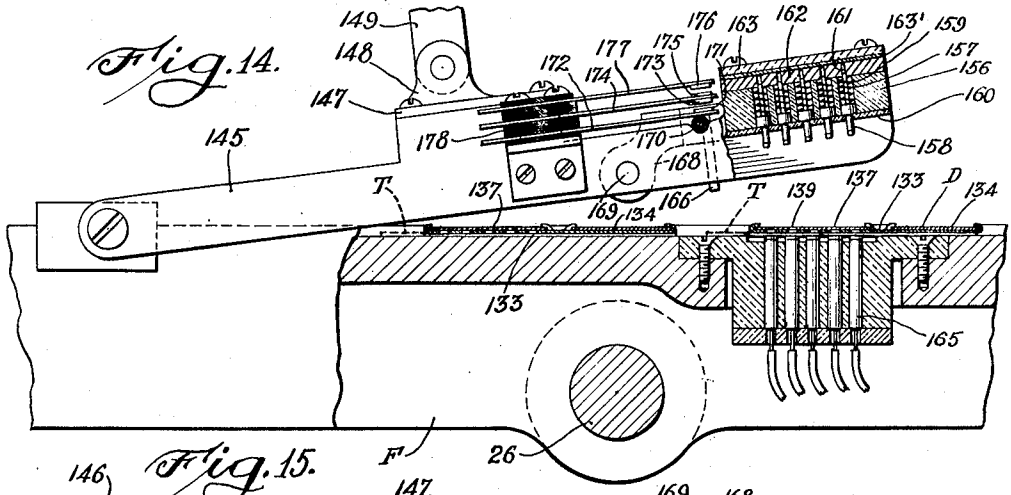


Fig. 15.

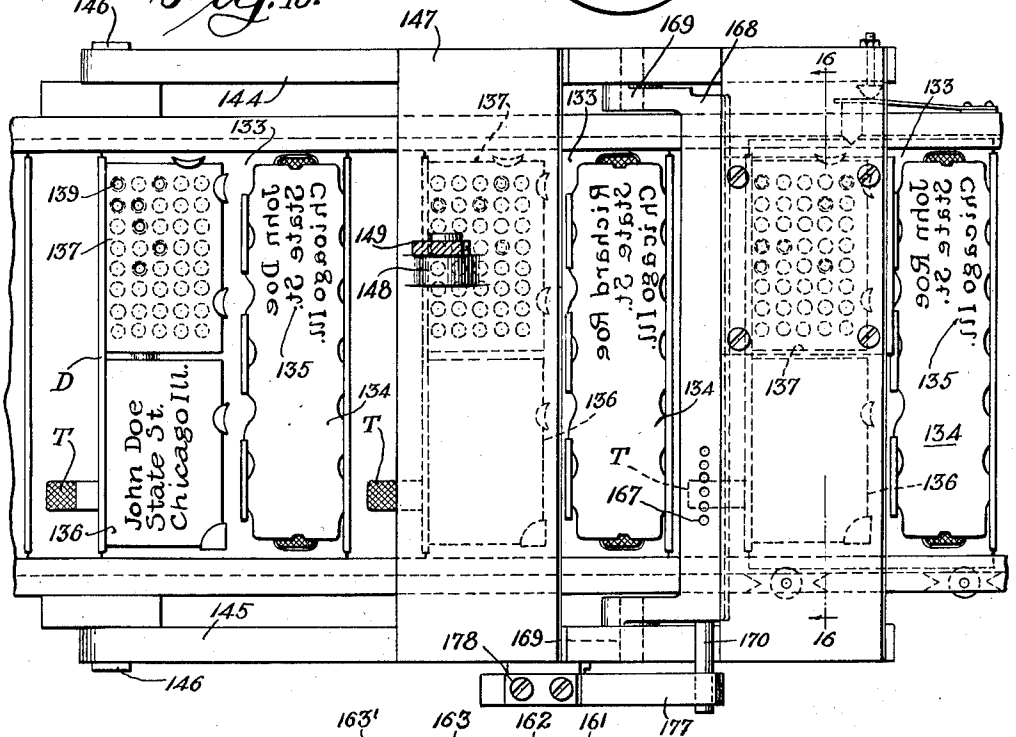
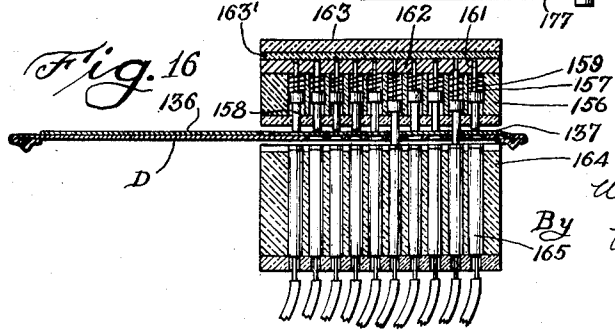


Fig. 16



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Patented Oct. 11, 1938 2,132,413

UNITED STATES PATENT OFFICE

2,132,413

PRINTING MACHINE

Walter T. Gollwitzer, Cleveland, Ohio, assignor, by mesne assignments, to Addressograph-Multigraph Corporation, Cleveland, Ohio, a corporation of Delaware

Application May 8, 1936, Serial No. 78,682

30 Claims. (Cl. 101—58)

This invention relates to printing machines wherein impressions providing records on sheets or the like are made from or under control of devices sequentially fed through the machine, and the primary object is to produce additional records, of different characteristics than the records impressed on the sheets or the like, from or under control of the sequentially fed devices.

Remittances in payment of utility bills, insurance premiums or the like are usually accompanied by the bills or notices of the amounts due or by stubs from such bills, notices or the like. The remittances are usually checked against the accompanying bills or the like and these are then used as memoranda from which the accounts of the remitters are credited or totals of the remittances or other data are compiled. Particularly when the bills, notices, stubs or the like are used as memoranda from which remitters' accounts are credited it is customary to sort these memoranda and arrange them in a sequence corresponding to that in which the accounts to be credited are arranged whereby crediting of the accounts or other information is expedited. Moreover, presented bank checks are distributed to the banks on which they are drawn and are then charged against the accounts of and returned to the drawers thereof, and this entails extensive sorting of the checks. Such sorting of bills, notices, stubs, checks or the like has heretofore been expensive and time-consuming inasmuch as it has been performed manually.

Furthermore, totals of remittances received or amounts of checks returned in a particular period or other data are usually compiled manually from the memoranda accompanying the remittances or from the returned checks, and such compilations have been expensive and time-consuming tasks and difficult to keep free from error because of the manual factor involved.

Hence another important object of my invention is to produce records on bills, notices, stubs, checks or the like from which automatic sorting thereof may be effected or from which calculating or other data compiling operations may be automatically effected.

Record cards and similar control devices such as are used in tabulating and like machines usually bear an impression enabling manual sorting or other handling or use thereof and also perforations or the like for automatically effecting sorting or other handling or use thereof. It is important that the impressions and perforations or the like on a particular record card or similar device relate to the same subject matter so that operations carried out from the impressions upon automatic sorting according to the perforations or the like or operations carried out from the perforations or the like upon manual sorting according to the impressions may be accurately effected.

Therefore, another object of my invention is to make an impression on and to provide perforations or the like in a record card or similar control device or the like from or under control of the same device whereby accurate relationship of the impression and perforations or the like may be assured.

Printing devices having type characters embossed or otherwise provided thereon have been sequentially fed through printing machines and impressions have been made therefrom on bills, notices, checks or the like passed through the machine as separate sheets or as sections of a web, and it has been proposed to sequentially feed devices, such as record cards or other control devices, through suitable printing machines and to make impressions under control of such devices on bills or the like passed through such machines. The impressions made from or under control of devices such as those just described have been records, such as names and addresses and other identifications, numerical accounting data and the like, and the use of such devices to produce such impressions has greatly facilitated the preparation of bills and the like. However, as explained above, such bills and the like are often used in other operations which have heretofore been performed manually. Thus another object of my invention is to produce additional records on bills and the like to enable such other operations to be performed automatically, and an ancillary object is to insure that such additional record provided on a particular bill or the like will be related to the impression or the like made thereon.

Printing and control devices or the like, such as are used repetitiously to provide records, are carefully checked prior to being put into use whereby accuracy of the records produced from or under control thereof is insured, and a further object of my invention is to provide a printing and control device which may be used to produce records from and under control thereof, whereby accuracy of records produced from and under control thereof may be assured by carefully checking the devices prior to use thereof.

Under some conditions it may be desirable to simultaneously make impressions on a bill, sheet

or the like from or under control of a printing and control or similar device and provide an additional record of different character on the sheets or the like, but usually it will be more advantageous to make the impressions and provide the additional records separately. Hence, further objects are to sequentially feed printing and control or similar devices and to successively pass sheets or the like through a printing machine in timed relation with each other, and to make impressions on the sheets or the like from or under control of the printing and control or similar devices and to produce additional records on the sheets or the like from or under control of such devices at selected positions in the path of travel of the sheets or the like through the machine; and to make an impression from or under control of a particular printing and control or similar device on a particular sheet or the like at a selected position in the path of travel of the sheet or the like through the machine and to provide an additional record of different characteristics than the impression on the same sheet from or under control of the same printing and control or similar device as that from which an impression is produced on the sheet at another position in said path of travel.

Some printing and control and similar devices are so arranged that means are included therein for producing every character or the like that may be necessary to produce while others are equipped with means for producing only selected characters. Thus, for example, a printing and control or similar device may be equipped with means to produce all characters of a number including the digits 1 to 9 and 0 whereas other printing and control or similar devices may be equipped only to produce the digits 1 to 9, whereby the necessity of providing a multiplicity of zero-producing means is avoided, and still further objects of my invention are to use printing and control or similar devices equipped only to produce certain selected characters and to automatically produce any other characters that may be necessary or desirable; to enable production of certain characters for which no producing means are included on the printing and control or similar devices; and to suppress production of such characters under predetermined conditions as, for example, where means are provided for producing a ten-place number to enable production of digits or zeros at one side of a selected character in the ten-place number and to suppress the production of digits or zeros at the other side of said selected character.

Further objects are to provide a multiplicity of record producing means at a predetermined position in a printing machine or the like and to selectively render said record producing means operative; to automatically suppress actuation of certain record producing means as other of the record producing means are selectively rendered operative; and to automatically render certain of the record producing means operative when other record producing means associated therewith are not selected for operation or suppressed from operation.

Still further objects are to provide record producing means at a predetermined position in a printing machine or the like and to selectively render the record producing means operative; to operate the devices effecting selection of the record producing means in timed relation with each other whereby selection may be effected by effecting operation of certain devices at selected times; and to impart electrical impulses at predetermined times and thereby effect determined operation of mechanical parts whereby selection of the proper record producing means may be effected.

More detailed objects of the invention are to employ punches for producing records in bills, notices, record cards or the like and to position the punches to impart predetermined characteristics thereto as, for example, to enable the punching of records pertaining to the digits 1 to 9 and 0; to selectively render the punches operative by positioning means for imparting operative movement to the punches in operative position relative to a selected punch; to enable positioning of the means for imparting operative movement to the punches in a neutral position wherein no movement will be imparted to the punches under predetermined conditions; and to so arrange the means imparting movement to the punches that movement will be imparted to a predetermined punch when the movement imparting means is not positioned relative to selected of the associated punches or the movement imparting means is not arranged in a neutral position.

Other and further objects will be brought forth in the following description wherein reference is made to the accompanying drawings in which

Fig. 1 is a top plan view of a printing machine including my novel record producing means;

Fig. 2 is a transverse sectional detail view of the printing machine and showing the printing and control or similar device feeding means and showing means for making impressions directly from printing and control devices;

Fig. 3 shows a typical sheet;

Fig. 4 is a front elevation of my novel record producing means and showing a fragment of the printing machine;

Fig. 4A is an elevation of a typical printing and control device;

Fig. 4B is a chart illustrating the code under which control perforations are provided on the printing and control device shown in Fig. 4A;

Fig. 5 is a vertical sectional view of my novel record producing means and wherein the electrical connections are diagrammatically shown;

Fig. 6 is a fragmentary view of the punching devices as shown in Fig. 5 and wherein part of the selecting means is shown in neutral position;

Fig. 7 is a top plan view of the device as shown in Fig. 4;

Fig. 8 is a fragmentary detail view of a part of the drive of my record producing means;

Fig. 9 is a sectional detail view taken substantially on the line 9—9 on Fig. 5;

Fig. 10 is a vertical sectional view taken substantially on the line 10—10 on Fig. 5;

Fig. 11 is an elevational plan view taken substantially on the line 11—11 on Fig. 5;

Fig. 12 is a transverse sectional detail view taken substantially on the line 12—12 on Fig. 11;

Fig. 13 is a detail plan view taken substantially on the line 13—13 on Fig. 5;

Fig. 14 is a fragmentary side view, partly in elevation and partly in section, of the detecting devices which cooperate with the printing and control or similar devices;

Fig. 15 is a plan view of the detector as shown in Fig. 14; and

Fig. 16 is a detail view taken substantially on the line 16—16 on Fig. 15 and showing the detecting devices in circuit closing position.

In the accompanying drawings I have fragmentally illustrated a printing machine including a frame F having a guideway G on the top thereof through which sheets S or the like are successively passed. The printing machine includes a magazine M in which printing and control or similar devices D are stacked and from which the devices are withdrawn one by one by feed chains C. A step by step movement is imparted from the main drive shaft 20 (Fig. 2) of the printing machine through an eccentric 21 fast on the shaft and surrounded by a band 22 to which a plunger 23 is connected. The plunger 23 is suitably connected in a sleeve 24 carried by an arm 25 fast on the shaft 26 journaled in the frame F and to which an arm 27 is fast. The arm 27 carries a pawl 28 that successively engages spaced pins 29 fast in the sprocket 30 about which the feed chain C is directed. Chains such as C are arranged at opposite sides of a guideway through which the printing and control devices D are fed into printing position below the sheet guideway G and the platen P. The platen is carried by a member 31 pivotally mounted on the frame F at 32 and including arms having follower rollers 33 and 34 thereon which respectively engage conjugated cams 35 and 36 connected to and rotatable with the shaft 22. The eccentric 21 imparts an oscillatory movement to the arm 27 which through the pawl 28 and pins 29 imparts a step by step movement to the feed chains whereby the printing devices move through their guideway with a step by step movement. During at rest intervals in the step by step movement of the printing devices the platen P makes an impression on a sheet S from the printing device D disposed at printing position.

The machine in the present instance also includes a cam shaft 37 (Fig. 1) on which cams such as 38 are provided which operate stop fingers as 39 that engage the leading edges of sheets S moving through the guideway G. The cam shaft is suitably connected to the main drive shaft 20 as through a suitable gear train (not shown) and operates in timed relation with the main drive shaft. The stop finger 39 positions a sheet relative to my novel record producing means while the stop finger 39A positions a sheet relative to the platen P.

The specific form and construction of the machine forms no particular part of my invention and machines typical of that with which my invention may be used and containing features such as those above described are shown in Patent 1,203,717, patented November 7, 1916, Patent 1,955,806, patented April 24, 1934, and Patent 2,041,183, patented May 19, 1936.

My novel record producing apparatus in the present instance consists of a set of punches for producing perforations in sheets of whatever form are passed through the printing machine. I have shown these punches as positioned in a station in the passage of the sheets through the machine immediately preceding the station wherein impressions are made on the sheets by the platen P, but it is to be understood that these punches or other record producing means might be located at any desired position in the machine and if desired more than one such record producing means might be provided.

In the present instance I have provided a punching means capable of producing ten perforations longitudinally of a sheet and also capable of producing perforations in any of ten positions transversely of the sheet to be representative of the digits 1 to 9 and 0. Thus there are ten rows with ten punches in each row. As viewed in Fig. 5, each of the punches 40 at the left hand end of each row are for producing a perforation representative of the digit 9, each of the adjacent punches is for producing a perforation representative of the digit 8, and succeeding punches to the right are each for producing perforations representative of the succeeding digits in descending order. The punch positioned at the right hand end of each row is for producing a perforation representative of 0.

The punches generally indicated by 40 are mounted in a guide plate 41 (Fig. 9) and are passed through a stripper plate 42. Each punch 40 has a protuberance 40p thereon disposed above and engaged with the stripper plate 42. A die plate 43 is mounted on the underside of the guide plate 41 and orients the dies relative to the die openings 44 in the die block 45, each die opening 44 being respectively aligned with a punch 40.

The die block 45 is mounted below the sheet guideway G which consists of two spaced apart strips 46 and 47 that extend longitudinally of the machine, as best illustrated in Fig. 1. The strips 46 and 47 are undercut in the edges thereof disposed toward each other, as best illustrated in Fig. 5, and the edges of the sheet S passed through the guideway G are received in these undercut portions to be properly guided thereby. The die plate 43 and guide plate 41 extend into the sheet guideway G above the path of travel of the sheets S through the guideway.

A punch frame is provided which consists of an upper plate 48 and a lower plate 49 (Fig. 5) and these plates, as best illustrated in Fig. 1, are rectangular in outline. The die block 45, like the guide plate 41 and die plate 43, is rigidly secured to the frame F of the machine. The plate 49 is movably supported well below the die block 45. The frame F includes a pair of side plates 51 and 52 between the lower edges of which rails 53 and 54 extend. The plate 49 is disposed below the rails 53 and 54 and the posts 50, connected to plate 49, pass through these rails, the die block 45, die plate 43, stripper plate 42 and plate 48. Sleeves, such as 55, are disposed about the posts 50 between the lower surface of the plate 48 and the top of the stripper plate 42. Recesses 56 extend into the guide plate 41 about each post 50 and springs 57 are mounted in these recesses and engage the underside of the stripper plate 42 and act through the sleeves 55 to urge the plate 48 and therefore the punch frame into an upper normal position shown in Fig. 5.

In the present instance where ten rows of punches are provided ten punch selectors as 58 are provided one above each row of punches. Each selector 58 includes two enlargements 59 and 60. Each enlargement 59 is sized to neatly fit between the underside of the plate 48 and the top of a punch 40. The enlargement 59 is adapted to be selectively disposed above one of the punches for the digits 1 to 9 while the enlargement 60 is adapted to be positioned above the right hand punch 40 for the digit 0. As best shown in Fig. 6, the enlargements 59 and 60 are spaced apart so that the selectors may be moved into a neutral position wherein neither of the enlargements is above one of the punches. When one or the other of the enlargements 59 or 60 is positioned above the punch 40 and the punch frame is moved downwardly in a manner to be described hereinafter, the engaged punch 40 is forced downwardly through the die plate 43 into

the aligned die opening in the die block 45 whereupon a perforation is made in a sheet S disposed between the die plate 43 and the die block 45.

A plate 61, as best shown in Figs. 4, 5 and 6, is mounted adjacent the punch frame and has ten slots 62 (Fig. 4) therein through which the selectors 58 are passed. A comb spring 63 (Fig. 5) is carried by a bracket on the plate 61 and the teeth thereof respectively bear on the undersides of the selectors 48 to urge the selectors upwardly in the slots 62. A socket 64 (Fig. 5) is provided in the underside of each selector 58 near the forward end thereof.

A shaft 65 is suitably journaled in the side plates 51 and 52 and in the present instance ten register rockers, generally indicated by 66, are rockably mounted thereon. A boss 67 is formed at the free end of each arm 68 of each register rocker 66 and these bosses 67 are respectively seated in the sockets 64 at the ends of the selectors 58. A rocker 69 is fast on the shaft 65 and carries a bridge piece 70. Springs 71 are connected to the arms 68 of the register rockers 66 and to an anchor portion 72 on the rocker 69. The springs 71 urge the arms 68 on the rockers 66 into engagement with the bridge piece 70. Inasmuch as the arms 68 and selectors 58 are mounted in close side by side relation, the springs 71 are arranged in two banks and the springs in the upper bank are connected to alternate arms 68 while the springs 71 in the lower bank are connected to the intermediate arms 68.

Each rocker 66 includes a segment 73 and in the arcuate free edge of each segment as many notches 74 are provided as there are punches in a particular row and in the present instance where there are ten punches, ten notches 74 are provided as well as a dwell 75, the purpose of which will be explained more fully hereinafter. A bar 76 extends between the side plates 51 and 52 and has lugs as 77 thereon which support a rod 78. Pawls as 79 are mounted on the rod 78 and the pawls 79 are respectively aligned with the segments 73 so that the nose 80 of each pawl may be selectively engaged with the notches 74 in the aligned segment 73.

A block 81 of insulating material (Figs. 5 and 10) is carried by the brackets 83 and 84 on the frame F below the shaft 65 and has as many rows of contacts 82 therein as there are rows of punches 40, and there are as many contacts 82 in each row as there are punches 40 in each row and notches on each segment 73. Another block 85 of insulating material is mounted above the block 81 and is urged into engagement with lugs 86 (Fig. 10) on the brackets 83 and 84 by spring contacts 87 which, as illustrated in Fig. 5, include projections 88 mounted in recesses in the block 85. Fingers 89 (Fig. 10) separate the spring contacts 87 one from the other. One end of each spring contact 87 is adapted to successively engage the contacts 82 when moved thereover and the other end of each spring contact rides on a contact strip as 90 mounted in the block 81, there being a contact strip 90 in alignment with each row of contacts 82.

The engagement of the projections 88 on the spring contacts 87 in recesses in the block 85 interconnects these contacts and the block. Thus when the block 85 is moved over the block 81 the spring contacts 87 will be moved over the contacts 82, and such movement is imparted to the block 85 from a gear segment 91 on the rocker 69 that meshes with a rack 92 fast on the top side of the block 85.

An arm 93 (Fig. 8) is fast on the shaft 65 and carries a roller 94 that bears on the peripheral cam 95 fast on the shaft 96 journaled in the plates 51 and 52, as shown in Fig. 4, and upon rotation of the shaft 96 the cam 95 rocks the arm 93 whereupon the rocker 69 is first moved to the left, as viewed in Fig. 5, and then returns to the right back into its normal position shown in Fig. 5. Rotation is imparted to the shaft 96 from the motor 97 (Fig. 4) suitably supported on the frame plate 51 and which has a pinion 98 on the shaft thereof that meshes with a gear 99 fast on a shaft 100 journaled in the bracket 83 and having a pinion 101 thereon meshed with a gear 102 rotatably mounted on the shaft 96. A hub 103 is provided on the gear 102 and has clutch teeth 104 at the free end thereof. A sleeve 105 is slidably but non-rotatably mounted on the shaft 96 and has clutch teeth 106 thereon that are urged toward the clutch teeth 104 for engagement therewith by a spring 107 disposed between the sleeve 105 and a collar 108 fast on the shaft 96. A stud 109 (Fig. 7) extends from the sleeve 105 and is engageable with the cam surface 110 on the arm 111 pivotally mounted, as indicated at 112, on the outer face of the side plate 51, and when the stud 109 engages the cam surface 110 the clutch teeth 106 are held from engagement with the clutch teeth 104. When, however, the lug 113 on the armature 114 of the solenoid 115 engages the underside of the free end of the arm 111 upon upward movement of the arm 114 when the solenoid 115 is energized, the cam surface 110 is retracted from engagement with the stud 109 whereupon the spring 107 forces the clutch teeth 106 into engagement with the clutch teeth 104, and when these clutch teeth are engaged the shaft 96 rotates with the gear 102. However, as long as the cam surface 110 is in engagement with the stud 109 the clutch teeth 104 and 106 are separated.

During the first ninety degrees of movement of the stud 109 with sleeve 105 it engages the extension 114' (Fig. 4) of the armature 114 and so pivots this armature that the lug 113 is disengaged from the arm 111 which thereupon returns to its initial position so that near the end of a revolution the stud 109 will engage the tapered part of the cam surface 110 and effect separation of the clutch teeth 106 and 104 at the end of one revolution. This arrangement therefore provides a one revolution clutch.

Fast on the shaft 96 is a cam 116 (Fig. 5) having a lobe 117 thereon. A rocker 118 is mounted on the rod 119 extended between the side plates 51 and 52. A roller 120 at one end of the rocker 118 rides on the cam 116 and the rounded portion 121 at the other end thereof bears on the plate 49. When the lobe 117 engages the roller 120, the rocker 118 is so pivoted that the rounded end portion 121 thereof forces the plate 49 downwardly whereby the plate 48 is also forced downwardly. If one or the other of the enlargements 59 or 60 is disposed between one of the punches 40 and the plate 48 when said plate is forced downwardly, a perforation is made in the sheet by this punch. The engagement of the plate 49 with the rounded portion 121 and the engagement of the roller 120 with the cam 116 limit upward movement of the punch frame under influence of the springs 57.

The at rest position of the cam 95 is illus-

trated in Fig. 8 and when in this position the engagement of the roller 94 therewith causes the shaft 65 and therefore the rocker 69 and hence the register rockers 66 and the selectors 58 to be positioned as illustrated in Fig. 5. At a predetermined time in the cycle of operation, as will be explained more fully hereinafter, movement is imparted to the cam 95 whereupon the rocker 69 is so moved that the bridge piece 70 moves counterclockwise, as viewed in Figs. 5 and 8, whereupon the register rockers under the influence of the spring 71 move in a similar direction and this causes the selectors 58 to move to the left. This movement also causes the segment 73 of the register rocker 66 to move upwardly and the engagement of the nose 80 of the pawl 79 in one of the teeth 74 or positioning thereof in alignment with the dwell 75 positions the selectors 58 so that one or the other of the two enlargements 59 or 60 is disposed above one of the punches in the row of punches aligned with the particular selector. Thus it is the engagement of the nose 80 of the pawl 79 with one of the notches 74 or alignment thereof with the dwell 75 that determines the position of the enlargements 59 and 60 and the selection or non-selection of one of the punches 40.

The engagement of the noses 80 of the various pawls 79 with the notches 74 is effected by solenoids as 122. These solenoids include plungers 123 which actuate push rods 124. As best shown in Figs. 4 and 7, the solenoids 122 are supported by a plate 125 extended between the side plates 51 and 52. A bracket 126 is secured to this plate 125 and one end of each of the rods 124 is extended through this bracket. The opposite ends of the rods are passed through slots in a bracket 127 extended between the side plates 51 and 52 adjacent the pawls 79. The ends of the rods 124 adjacent the pawls 79 are aligned with the respective pawls behind the bracket 127. The push rods 124 are fanned out, as illustrated in Fig. 7, so that the inner end of each of the rods 124 is aligned with the plunger 123 of one of the solenoids 122 which are mounted in side by side relation, as illustrated in Figs. 4 and 7.

It has been stated that a contact strip 90 is aligned with each row of contacts 82 and each contact strip 90 is respectively connected to one of the solenoids 122. Thus the contact strip 90 aligned with the row of contacts 82 disposed at the right side of Fig. 10 is adapted to be connected to the solenoid operating the pawl 79 engageable with the teeth 74 on the segment 73 of the rocker 66 connected to the selector 58 adapted to cooperate with the row of punches 40 disposed at the right hand side of Fig. 9. This contact strip is illustrated in Fig. 5 and a conductor 128 (Fig. 5) interconnects this contact strip and one end of the winding of the solenoid 122. A conductor 129 interconnects the other end of this solenoid with the line wire 130 leading from the switch 131, the other line wire being indicated by 132.

One form of printing device which may be arranged to provide a printing and control or similar device for use in this machine is disclosed in Patent 2,030,865, patented February 18, 1936, and another form of such a device is disclosed in Patent 1,790,717, patented February 3, 1931, but it is to be understood that my invention is not limited to use with these nor the illustrated device.

The illustrated printing and control device shown in Fig. 4A includes a frame 133 on which a plate 134 is suitably secured. Type characters 135 are embossed on the plate 134 and impressions are made directly therefrom by the platen P onto the sheets S. This printing device also has a card 136 suitably secured thereon bearing an impression from the embossed type characters 135, and this card facilitates handling of the printing device. A control card 137 is also provided on the frame 133 adjacent the identification card 136 and in that part of the frame covered by the card 137 I provide ten rows of openings with five openings in each row. Openings may be provided in the control card 137 in alignment with the openings 138 in the frame therebelow and the location of these openings in the control card determines, in the present instance, the operation of the punches 40, in a manner explained more fully hereafter.

The five openings in each row of openings in the frame 133 may be utilized to produce the digits 1 to 9 by providing openings 139 in the control card 137 in alignment with the openings 138 in accordance with the code illustrated in Fig. 4B. Thus to produce the digit 1 openings 139 are provided in alignment with the uppermost and lowermost openings in any row of openings 138. The control card 139 illustrated in Fig. 4A is adapted to produce the number 37041 and it will be noted that the openings 139 for effecting the production of this number are located in accordance with the code illustrated in Fig. 4B. I have shown ten rows of openings 138, but it is to be understood that a greater or less number may be provided depending upon the number of rows of record producing means provided, and since I have provided ten rows of punches I have provided ten rows of openings in the frame 133.

The particular form of my invention shown herein is adapted for producing an identification number on a check or the like, such as illustrated in Fig. 3. This check bears the usual data and perforations 143 are formed at a suitable place therein. The perforations 143 may be representative of the amount on the check, but in the present instance I have shown these perforations as being an identification number which, in the present instance, is 37041 so that when the checks are returned they may be passed through a suitable device cooperating with the perforations 143 to sort the checks. Stubs of utility bills, insurance premium notices and many other instruments may have perforations, such as the perforations 143, provided therein to enable sorting of such stubs, notices and the like when returned with remittances, and such stubs, notices and the like may also have perforations representative of an amount perforated therein in the device shown in my invention.

Suitably detecting means are provided in the machine for determining the manner in which the punches 40 are to be set up in accordance with perforations provided in the control card 137 on a particular printing and control device D. This detecting device is illustrated in detail in Figs. 14, 15 and 16 and comprises a pair of arms 144 and 145 pivotally mounted, as indicated at 146, on the outer sides of the printing device guideway. A plate 147 extends between the arms 144 and 145 and has a lug 148 on the upper side thereof to which the lower end of a link 149 is connected. The upper end of the link 149 is connected to the outer free end of an arm 150 through a branch arm 149', (Fig. 1) and the arm 150 (Fig. 2) is pivotally mounted at 151 in a housing H that is part of

the frame F. An arm 152 extends from the arm 150 and carries a roller 153 engageable with a peripheral cam 154 fast on the drive shaft 20 of the machine. In a manner explained more fully hereinafter, this cam 154 controls the operation of my record producing means and inasmuch as it is mounted on the main drive shaft of the machine with which my record producing means is associated it is manifest that my record producing means may be operated in timed relation with the machine. A spring 155 urges the roller 153 on the arm 152 into engagement with the cam 154.

At a predetermined time in the operation of the machine, as will be explained more fully hereinafter, a rise on the cam 154 engages the roller 153 whereupon the arms 152 and 150 and link 149 are so moved that the arms 144 and 145 are pivoted downwardly whereupon the detector of my invention is moved into cooperating relation with a printing and control device D in the printing device guideway disposed therebelow.

In the present instance, as I have explained heretofore, the punches 40, constituting my record producing means, are located in a position to produce a record on a sheet S located in a station one station in advance of the printing position station below the platen P. In each operation of the chains C the printing and control devices D are moved ahead one station in their step by step movement. Thus the printing and control device from which an impression is made by the platen P on the sheet S engaged with the stop finger 39 (which sheet is located below the punches 40) is located one station in a step by step movement ahead of printing position below the platen P. I therefore locate the detector controlling the punches to cooperate with the printing and control device located in the station one station ahead of printing position. However, if the record producing means, such as the punches 40, were located in some other position in the path of travel of the sheets S, the detector might be located at some other position although suitable storing means might be provided to hold a record sensed from a printing device until a sheet reached some predetermined station in its movement, and under such conditions the detector of my invention might be located at any desired position along the path of travel of the printing and control devices through the machine.

The detector in the present instance, as stated, is located to cooperate with the printing and control device in the station one station ahead of printing position and comprises a block 156 of insulating material in which ten rows of openings 157 are provided (see Fig. 16) with five openings in each row. The number of rows of openings 157 and the number of openings in each row is determined by the number of rows of record producing means and by the number of openings in each row in the printing and control or similar devices, and it is for this reason that ten rows of openings with five openings in each row are provided. A sensing pin as 158 is mounted in each opening 157 and is urged downwardly by a spring as 159, action of the spring being limited by a plate 160 of insulating material disposed below the block 156 and having openings therein aligned with the openings 157, and these openings in the plate 160 are smaller than the openings 157. Each pin 158 carries a guiding pin 161 that is guided in an aligned opening in the conductor plate 162 suitably secured to the insulating block 156 and electrical connection between this plate and the pins is effected through the springs 159 which surround the contact pins 161 and engage both the pins 158 and plate 162. A plate 163' if insulating material is provided above the contact plate 162 and below the supporting plate 163.

When the block 156 is lowered upon downward movement of the arms 144 and 145 under the action of the cam 154, the pins 158 come into contact with the control card 147 on the printing and control device D disposed in the station one station ahead of printing position. The pins 158 are respectively aligned with the openings 138 in the printing and control device in the aforesaid station. Thus where the control card 137 has openings 139 in alignment with the openings 138, the pins 158 will pass through said aligned openings 139 and 138, but where there are no openings 139 movement of the pins 158 will be arrested by engagement thereof with the card 137.

Another block of insulating material 164 is mounted below the path of travel of the printing and control devices D through the guideway and is so disposed that when the block 156 is in its lower position it is aligned with the block 164. The block 164 has ten rows of contacts 165 therein with five contacts in each row. The contacts 165 are respectively aligned with the openings 138 in the printing and control device disposed in the station one station ahead of printing position and are engageable by those pins 158 which pass through aligned openings 139 and 138. When a pin 158 engages a contact 165 circuit is closed from plate 162 through the spring 159 for the engaged pin 158 and through this pin to the engaged contact 165.

It may be that an additional record is not to be produced from or under control of each printing and control or similar device passing through the machine. This may be accomplished by providing identifying means, such as detachable tabs T, on the printing and control devices D, and when a printing and control device not equipped with such a tab moves into detector station, that is to say, one station ahead of printing position in the present instance, which is not equipped with a tab T, means may be provided which will not be rendered operative, that is to say, means may be provided which will only be rendered operative upon the presence of an identification such as the tab T on a printing and control or similar device in detector position. Such means are utilized in the present instance not only to determine whether or not an additional record is to be produced but also to time operation of my record producing means. Such determining and timing means in the present instance include a pin 166 adapted to be selectively mounted in one of the openings 167 provided in the rocker 168 pivotally mounted at 169 on the arms 144 and 145. The openings 167 are located to be aligned with whole tabs or half tabs T provided on the printing or control device D at detector position, it being contemplated that whole or half tabs T can be mounted on the printing or control device D at any of a plurality of selectable positions. The rocker 168 moves with arms 144 and 145 unless the pin 166 engages a tab T whereupon further movement of the rocker 168 with the arms 144 and 145 is arrested.

A pin 170 of insulating material is provided on the rocker and when movement of the rocker 168

is arrested this pin causes the contact 171 on the leaf 172 to engage the contact 173 on the leaf 174 and then causes the contact 175 on the leaf 174 to engage the contact 176 on the leaf 177. As best shown in Fig. 14, the leaves 172, 174 and 177 are mounted in spaced apart relation in a block of insulating material 178 suitably supported on the outer side of the arm 145. The pin 170 first engages the contacts 171 and 172 and subsequently causes engagement of the contacts 175 and 176, this being effected under control of a two step cam, as will be described.

In Fig. 5 I have shown the electrical connections of the detector and therein it is shown that the leaf 174 is connected by a conductor 179 to the line wire 132. A conductor 180 leads from the leaf 177 to one end of the winding of the solenoid 115 and a conductor 181 interconnects the other end of the winding of the solenoid 115 with the line wire 130. Thus when the contacts 175 and 176 are engaged circuit is closed to the solenoid 115.

A conductor 182 leads from the leaf 172 to a conductor 183. A conductor 182' leads from the conductor 182 to the contact plate 162.

Only one timing switch such as that comprising the contacts 171, 173, 175 and 176 is provided and there is only one conductor plate 162. However, there are as many conductors 183 as there are rows in the detector and record producing means. The illustrated conductor 183 leads to the upper leaf 184 of a switch comprising the contacts 185 and 186, the contact 185 being mounted on the leaf 184 and the contact 186 being mounted on the leaf 187. The leaves 184 and 187 are mounted in a block of insulating material 188 carried by a bracket 189 suitably supported between the frame plates 51 and 52. There are as many switches as that comprising the contacts 185 and 186 as there are pawls 79 and these switches are respectively aligned with the pawls. Each pawl 79 includes an arm 190 (Figs. 5 and 11) and one end of rockers as 191, pivotally mounted on the rod 191' extended between the side plates 51 and 52, engages the arm 190 of one of the pawls, as illustrated in Fig. 11. The other ends 192 of the rockers as 191 respectively engage the lower leaves 187 of switches as those comprising the contacts 185 and 186, which lower leaves 187 extend beyond the upper leaves as 184, as illustrated in Figs. 5 and 11. Upon operation of a pawl 79 under action of a link 124 to cause the nose 80 of the pawl 79 to seat in a notch 74, the end 192, which is normally spaced from the leaf 187 aligned therewith, as illustrated in Fig. 5, engages this leaf and separates the contacts 186 and 185, the purpose of which will be explained more fully hereinafter. A conductor 193 interconnects each leaf 187 with the tenth or last contact in the row of contacts 82 corresponding to the position of the particular leaf 187.

Normally the noses 80 of the pawls 79 are retracted from engagement with the notches 74 by the teeth of a comb spring 194 (Fig. 5) and this comb spring also urges the rods 124 into engagement with the plungers 123.

Conductors as 195 lead from the conductor 182 to leaves as 196 of switches such as that of which the leaf 196 is a part, that is, switches which are respectively aligned with the solenoids 122. These switches include leaves as 197 which are extended to be engaged with the rear ends of the plungers 123 of the solenoids 122. When the solenoids 122 are inoperative the plungers 123 thereof under the action of the spring 194 separate the contacts 198 and 199 respectively mounted on the leaves 197 and 196. The leaves as 196 and 197 are mounted in a block 200 of insulating material carried by a bracket 201 suitably supported by the side plates 51 and 52.

A conductor 202 interconnects the leaf 197 with the conductor 128 which leads to one end of the winding of a solenoid 122 with which the switch comprising the leaves 196 and 197 is aligned.

There are ten punches in each row of punches but only five detectors as 165 but inasmuch as the card 137 may be perforated in accordance with the code illustrated in Fig. 4B, the detectors 165 may be employed to close circuits to effect production of any digit from 1 to 9. The contacts 82 (Fig. 5) are for the purpose of closing circuit to the solenoids 122 to determine positioning of the selectors 58. Circuit to the first nine contacts reading from left to right in Fig. 5 is adapted to be closed from the contacts 165 but inasmuch as there are only five contacts 165 and nine contacts 82 are provided the five contacts 165 must be so connected that they will selectively close a circuit to a selected one of the contacts 82 and the following devices are provided for this purpose. In the present instance where there are ten rows of contacts 82 ten solenoids 203 are provided. These solenoids include plungers 204 for imparting movement to blocks 205 of insulating material that are slidably mounted in pockets provided between the blocks 206 and 207 of insulating material.

A plate 208 of insulating material closes the open end of the pockets in which the blocks 205 are mounted and springs 209 extend between the plate 208 and the adjacent ends of the blocks 205 and urge the blocks 205 to the right as viewed in Fig. 5. When a solenoid 203 is energized the plunger 204 thereof moves the aligned blocks 205 to the left, as viewed in Fig. 5.

By referring to Fig. 4B it will be noted that the odd digits 1, 3, 5 and 7 are represented by two perforations, one of which is always provided in alignment with the uppermost opening in any row of openings 138. The even digits 2, 4, 6 and 8 are represented by a single perforation selectively aligned with one of the openings 138. The odd digit 9 is represented by a single perforation aligned with the uppermost opening in any row of openings 138. It will also be noted that the digit 1 is represented by one opening located as above described and another opening located in alignment with the lowermost opening in any row of openings and that the digit 2 is indicated by a single opening aligned with the lowermost opening in any row of openings 138. Thus whenever a perforation for the digits 1 or 2 is to be produced circuit will be closed to the contact 165*a* (Fig. 5). Likewise when a perforation for the digits 3 or 4 is to be produced circuit will be closed to the contact 165*b*, and circuit will be closed to contact 165*c* to produce perforations for the digits 5 or 6 and to contact 165*d* to produce perforations representative of the digits 7 or 8. Whenever a perforation for any odd digit including 9 is to be produced, circuit is closed to the contact 165*e*.

Thus the contact 165*a* represents the digits 1 and 2, 165*b* represents the digits 3 and 4, 165*c* represents the digits 5 and 6, 165*d* represents the digits 7 and 8, and 165*e* represents any odd digit, but when it alone is energized it represents the digit 9. Since circuit is always closed to the contact 165*a* when perforations for the digits 1 or 2 are to be produced means are provided whereby upon closing of circuit to the contact

165a circuit will be closed to the contacts 82 for 1 or 2.

To this end a contact 210 is provided in the block 206 of insulating material and two contacts 211 and 212 are provided in the block 207 of insulating material in alignment with the contact 210. An opening is provided in the block 205 of insulating material and contacts 213 and 214 are mounted therein and are urged outwardly by an interposed spring 215. The contact 213 always remains in engagement with the contact 210 but the contact 214 is selectively engageable with the contacts 211 and 212.

If a perforation representative of the digit 1 is to be produced, circuit will be closed to contacts 165a and 165e. Contact 165a is connected by a conductor 216 with contact 210. A conductor 217 interconnects contact 165e with a conductor 218 that leads to one end of the winding of the solenoid 203, a conductor 219 interconnecting the other end of this winding with the line wire 130. Therefore whenever circuit is closed to contact 165e solenoid 203 will be energized causing plunger 204 thereof to move to the left, as viewed in Fig. 5, thereby shifting the block 205 so that the contact 214 will be moved from its normal position in engagement with the contact 212 into engagement with the contact 211. Inasmuch as circuit will have been closed to contact 165a by this time circuit will now be closed through conductor 216, contact 210, contact 213, spring 215, contact 214, contact 211, conductor 220 to the first of contacts 82 in the particular row in which the pins 158 closing circuits to the contacts 165a and 165e are located. The timing of the various parts is such that by the time circuit is closed to the first contact 82 the rocker 69 will just have started to move and the contact spring 87 will therefore close a circuit between first contact 82 and the contact strip 90. Thus through conductor 128 circuit will be closed to the solenoid 122 for the particular row and this will so move the plunger 123 thereof that the rod 124 will pivot the pawl 79 and engage the nose 80 in the first notch 74 which will arrest the enlargement 58 in position above the punch in this particular row for punching a perforation for the digit 1.

When the above described circuit from the contact 165a is closed when the solenoid 203 is not energized, as when there is no perforation in alignment with the uppermost opening in the row of openings 138, circuit is closed from contact 165a through conductor 216, contact 210, contact 213, spring 215, contact 214, contact 212, conductor 221 to the second of the contacts 82 in the particular row. Hence circuit will not be closed to the contact strip 90 for this row until the contact spring 87 has moved from engagement with the first of the contacts 82 into engagement with the second of the contacts 82, but when the contact spring 87 engages this second contact circuit is closed to the solenoid 122 whereupon the rod 124 pivots the pawl 79, but during this time the segment 73 will have been moving with the rocker 69, and at the time the pawl 79 is pivoted the nose 80 will seat in the second notch 74. The selector 58 for this row will also have been moving with the rocker 69 and at the time the nose 80 seats in the second notch 74 the enlargement 59 will be above the punch 40 for producing a perforation for the digit 2.

In a manner similar to that just described the contacts 165b, 165c and 165d are respectively connected to the contacts 210b, 210c and 210d and in the manner above described, depending upon whether or not the solenoid 203 is energized, circuit will be closed to the contacts 82 in such a manner that the nose 80 will be seated in a notch 74 for the digit represented under the code of the chart shown in Fig. 4B. If circuit is closed only to the contact 165e, the solenoid 203 is energized without effect but circuit is also closed through the conductor 222 leading from the conductor 217 to the ninth of the contacts 82, and by the time the contact spring 87 moves over this ninth contact the segment 73 will have so moved that the nose 80 will seat in the ninth notch 74 to position the enlargement 59 above the punch 40 at the extreme left. Circuit will be closed through this ninth contact 82 each time a perforation for an odd digit 1, 3, 5 or 7 is to be made, but circuit will be closed through the contact 82 to energize the solenoid 122 for effecting positioning of the enlargement 59 for such an odd digit prior to the time the contact spring 87 engages the ninth contact 82 so that engagement of the contact spring 87 with the ninth contact 82, when circuit is closed thereto when a perforation for an odd digit 1, 3, 5 or 7 is to be made, is without effect.

It will be noted that the code illustrated in Fig. 4B makes no provision for an indication of a zero and thus when a perforation for zero is to be made no perforation 139 is provided in the particular row and under this condition the solenoid 122 for that particular row will not be energized. However, the segment 73 of the rocker 66 for this particular row will continue to move with the rocker 69 in its movement effected by the cam 95, and at the time the rocker 69 reaches the limit of its movement counterclockwise in Fig. 5 the dwell 75 will be aligned with the nose 80 and at this time the enlargement 60 will be above the punch 40 at the extreme right in the particular row which is the punch for producing a perforation for zero so that upon subsequent movement of the rocker 118 and lowering of the punch frame the enlargement 60 will cause this punch 40 at the extreme right (Fig. 9) to be actuated. At this time the enlargement 59 will be beyond all of the other punches 40 so that only this punch 40 at the extreme right will be actuated.

The tenth contact 82 and the tenth notch 74 are located to position the enlargements 59 and 60 of a selector in the position shown in Fig. 6, in which position no punch will be actuated. It will be remembered that the absence of a perforation in the control card 137 will cause a zero to be punched, but under those instances where only a five-digit number is to be punched it is not advantageous to punch zeros to the left of the first digit of the number as would be effected where means are provided, as in the present instance, for punching a ten-digit number. Thus means are provided whereby the absence of a perforation in a particular row will not cause a zero perforation to be made unless it is desired that such a perforation be made. It will be remembered that a selector 58 must make the complete movement of which it is potentially capable in order to effect a zero punching, and by reference to Fig. 6 it will be noted that positioning of the enlargements 59 and 60 so as to prevent making a perforation is attained before a selector 58 has made the complete movement of which it is potentially capable. Thus if there is no perforation in a particular row and no zero perforation

is to be made circuit is closed through the tenth contact 82 to the solenoid 122 for the row so that the nose 80 will seat in the tenth notch 74 and arrest the selector 58 in the position shown in Fig. 6. If, however, a perforation for zero is to be made this circuit from the tenth contact 82 is opened so that at the time the contact spring 87 moves over the tenth contact 82 circuit will not be closed to the solenoid 122 wherefore the selector 58 may complete the movement of which it is potentially capable.

It will be remembered that an arm 190 is provided on each pawl 79 and that when a particular pawl is actuated to seat its nose 80 in one of the notches 74 the end 192 of the rocker 191 separates contacts as 185 and 186. It will also be remembered that the leaf 187 carrying the contact 186 is connected by the conductor 193 with the tenth contact 82 and that the leaf 184 carrying the contact 185 is connected by the conductor 183 with the conductor 182.

When the contacts 171 and 173 are closed circuit is closed from the line wire 132 to the conductor 182. Thus circuit is closed to conductor 183, leaf 184, contact 185, contact 186, leaf 187, conductor 193 to the tenth contact 82. Hence circuit is closed to the tenth contact 82 every time the contacts 171 and 173 are closed. However, the contact 82 to which this circuit is closed is the last in the row of contacts. Hence, if circuit to any other of the preceding contacts 82 in the particular row has been closed, the solenoid 122 for this particular row will have been energized and the pawl 79 therefor will have been pivoted with the result that the contacts 185 and 186 are separated and thus by the time the contact spring 87 reaches the tenth contact circuit to this tenth contact will have been opened.

It will be noted, however, that unless the contacts 185 and 186 are separated circuit will be closed through the tenth contact to the solenoid 182 which will cause the selector 158 to be arrested in the position shown in Fig. 6, and hence it will not be possible to produce a perforation for zero in this particular row. In the present instance where a five-digit number is to be perforated it is desirable that this condition prevail for those punches to the left of the first perforation as the perforations are viewed in Fig. 3, but it may be necessary to make a perforation for zero to the right of the first digit of the number as for example where perforations for a five-digit number as 37041 are to be made. Therefore contacts as 185 and 186 for every row of punches to the right of the first digit for which a perforation is to be made are separated. To this end lugs, generally indicated by 223, (Fig. 11) are provided on the arms 224 of the rockers 191. These lugs 223 are located on the lower side of the arms for when a pawl 79 is pivoted by a rod 124 the arms 224 of the rockers 191 move upwardly. Thus in the present instance where perforations for a five-digit number are to be made the arm 190 of the fifth pawl will pivot the arm 224*a* (Fig. 11) of the rocker 191*a* upwardly whereupon the lug 223*a* on the arm 224*a* will move upwardly, and since the lug 223*a* is below the arm 224*b* of the rocker 191*b* the arm 224*b* will be pivoted upwardly raising its lug 223*b* disposed below the arm 224*c* of the rocker 191*c*, thereby raising the lug 223*c* disposed below the arm 224*d* of the rocker 191*d* thereupon raising the lug 223*d* disposed below the arm 224*d* of the rocker 191*d*. For producing perforations for the number 37041 the rocker 191*a* controls the contacts as 185 and 186 for the row of punches that will produce a perforation for 3, rocker 191*b* controls the contacts for the row for producing perforations for the digit 7, the rocker 191*c* those for the row in which the zero perforation will be produced, etc. It will thus be seen that the rocker 191*e* and those shown therebelow in Fig. 11 will not be moved with the result that the contacts as 185 and 186 aligned with these rockers will not be separated, and hence circuits will be closed to the solenoids controlling the positioning of the selectors for the first five rows of punches from the right in Fig. 9 with the result that these selectors will be positioned as shown in Fig. 6. However, by referring to Fig. 4A it will be noted that there are no perforations in the third row from the left, but inasmuch as the contacts as 185 and 186 controlled by the rocker 191*c* will be separated circuit to the solenoid as 122 for determining the position of the pawl for this row of punches will not be closed and therefore the rocker 66 for this row may make its complete potential movement and hence the enlargement 60 will be positioned above the punch for producing a zero perforation.

Energization of a solenoid as 122 to position the nose 80 in the tenth of the notches 74 when no perforation is to be made of course causes pivoting of this pawl 79 which separates the contacts as 185 and 186, but energization of the solenoid as 122 permits the contacts 198 and 199 to engage inasmuch as the plunger of the solenoid is withdrawn from engagement with the leaf 197. When the contacts 198 and 199 so engage, circuit is closed from line wire 132 through contacts 171 and 173, conductor 182, conductor 195, leaf 196, contact 199, contact 198, leaf 197, conductor 202 to conductor 128 wherefore solenoid 122 is maintained energized inasmuch as the other end of the winding of this solenoid is connected through conductor 129 with line wire 130.

The device is so timed that at the time the rocker 69 completes its counterclockwise movement, as viewed in Fig. 5, the cam 154, Fig. 2, will have elevated the arms 144 and 145 to such an extent that the pin 166, Fig. 5, will have permitted the contacts 176 and 175 and 173 and 171 to have separated, wherefore circuit to energized solenoids 122 is broken and under the action of the spring 194 operated pawls 79 are retracted into the position shown in Fig. 5, and therefore these pawls do not interfere with downward movement of the segment 73 with the rocker 69 which is caused by the cam 95 to move clockwise immediately after its counterclockwise movement is completed.

In operation a stack of printing and control devices D (Fig. 2) is introduced into the magazine M and the machine is set in operation whereupon the chains C move the printing and control devices D along the printing device guideway in a step by step manner. Shortly after a printing and control device reaches detector position a short rise on the cam 154 causes the block 156 (Fig. 14) to be lowered toward the printing and control device in detector position.

Prior to the time the fingers 158 (Figs. 5 and 14) reach the card 137, the pin 166 engages the tab T on the printing and control device at selector position if it is equipped with such a tab. If the printing device is not equipped with a tab my record producing means does not operate in the cycle of operation during which this particular printing and control device remains in de-

tector position. If, however, the printing and control device has a tab T, the pin 166 engages this tab and arrests movement of the rocker 168 and immediately thereafter the pin 170 engages the contacts 171 and 173 whereupon circuit is closed to conductor 182 and through conductor 182' to plate 162. Then the pins 158 move into association with the card 137 on the printing and control device D at detector position.

Assuming that the printing and control device shown in Fig. 4A is in detector position the pins 158 aligned with the uppermost and lowermost openings 138 in the first row of openings on the printing and control device pass through the openings 139 aligned with these two openings 138 and engage the contacts 165*a* and 165*e* in this row which, as will be explained, will cause the punch for perforating a representation of the digit 1 to be selected. In a like manner a pin 158 will pass through a perforation 139 aligned with the next to the lowermost opening 138 in the second row to cause a punch in the second row of punches to be selected for punching a perforation for the digit 4. There are no openings 138 aligned with the opening 139 and hence no contacts 165 for this row will be engaged but a perforation representative of zero will be made for this row. Furthermore pins 158 will pass through openings 139 aligned with the two uppermost openings 138 in the fourth row and pins will pass through the uppermost and next to lowermost openings in the fifth row whereby punches for perforating the digits 7 and 3 in the fourth and fifth rows respectively will be selected. There are no perforations in the remaining rows and consequently no contacts 165 in these rows will be engaged by pins 158 and no punches will be selected inasmuch as no perforations are to be made in these rows as perforations for but a five-digit number are to be made.

First the manner in which a punch is selected for producing a perforation for the digit 1 will be explained in detail. The first rise on cam 154 (Fig. 2) imparted only sufficient movement to the arms 144 and 145 to cause the contacts 171 and 173 (Fig. 5) to be engaged and the pins 158 to engage those contacts 165 aligned with aligned openings in the control card 137 and frame 133, but this movement did not engage the contacts 175 and 176. Upon engagement of pins 158 with contacts 165*a* and 165*e* in the first row of contacts 165 a circuit was set up as follows: From line wire 132 through conductor 179, leaf 174, contact 173, contact 171, leaf 172, conductor 182, conductor 182', plate 162, springs 159 and pins 158 to contacts 165*a* and 165*e*. From contact 165*e* circuit is closed through conductor 217 and conductor 218 through windings of solenoid 203 and conductor 219 to line wire 130 whereupon solenoid 203 is energized and block 205 is shifted to engage contact 214 with contact 211. Circuit is closed through conductor 220 from contact 211 to the first contact 82 in the first row at the extreme left in Fig. 10.

After the pins 158 have engaged the contacts 165 and established the circuits, as just described, a further rise on the cam 154 imparts additional movement to the arms 144 and 145 whereupon the pin 170 engages the contacts 175 and 176, and this rise on the cam keeps the contacts 171 and 173 and 175 and 176 engaged until after the record producing means, the punches 40 in the present instance, have produced a record on the sheet. The closing of contacts 175 and 176 closes circuit from line wire 132 through conductor 179, leaf 174, contact 175, contact 176, leaf 177, conductor 180, winding of solenoid 115 through conductor 181 to line wire 130 whereupon solenoid 115 is energized. Energization of solenoid 115 elevates the armature 114 thereof whereupon the lug 113 elevates the plate 111 to disengage the cam surface 110 from the stud 109, and the spring 107 engages the clutch teeth 106 with the clutch teeth 104 whereupon shaft 96 is set in motion, the motor 97 having been previously set in operation.

As soon as shaft 96 is set in motion cam 95 starts to move rocker 69 counterclockwise, as viewed in Figs. 5 and 8. This movement of rocker 69 is transmitted through gear segment 91 to rack 92 whereupon block 85 and contact spring 87 start to move to the right as viewed in Fig. 5. Inasmuch as the first contact in the first row of contacts 82 is energized, circuit will be closed therefrom through contact spring 87, contact strip 90 aligned with this row of contacts, conductor 128 connected to this contact strip 90 to the winding of the solenoid of the first of the solenoids 122 which thereupon energizes since it is connected to line wire 130 through conductor 129. Energization of this solenoid 122 causes its plunger 123 to move the aligned rod 124 whereupon the nose 80 of the first pawl 79 engages the first notch 74 in the first segment 73 to arrest further movement of the register rocker 66 of which this segment is a part, and this positions the enlargement 59 of the selector 58 connected to this register rocker with the punch 40 in the first row for making the perforation for the digit 1.

Simultaneously with the foregoing and in the manner above described, circuit is closed to the fourth contact 82 in the second row of contacts 82 and at the time in the movement of the plate 85 to the right when the contact spring 87 engages this fourth contact, circuit is closed to the second solenoid 122 whereupon the rod 124 operated thereby causes the nose 80 of the second pawl 79 to seat in the fourth notch 74 in the second segment 73 whereupon the enlargement 59 of the selector 58 connected to the register rocker 66, of which this segment 73 is a part, is disposed above the punch 40 for producing a perforation for the digit 4 in the second row.

Simultaneously with this and in like manner a punch in the fourth row for producing a perforation for the digit 7 is selected and a punch in the fifth row for producing a perforation for the digit 3 is selected. At the time the pawls in the first, second, fourth and fifth rows are pivoted toward the segment 73 aligned therewith the arms 224 thereof move upwardly. The time at which a particular arm 224 moves upwardly depends upon the time in the cycle at which its controlling pawl 79 is operated, and the time in the cycle at which a particular pawl 79 is operated depends upon what digit is to be selected by the selector 58 under control of the particular pawl 79. Thus since the pawl 79 in the first row is to position the first selector 58 to effect perforating of the digit 1, this pawl 79 will be operated first. The pawl 79 for the fifth row will operate next since it is to select a punch for the digit 3. The pawl 79 in the second row will operate next since it is to select a punch for the digit 4 and the last to operate will be the pawl for the fourth row which is to select the digit 7. It will be apparent, however, that one of the pawls will always be operated before the plate 85 has moved any of the spring contacts 87 into alignment with the last contact in any row of contacts 82. Therefore, all pawls for

selecting punches for producing perforations to the right of the first perforation as the perforations are viewed in Fig. 3 will be operated prior to the time any contact spring 87 reaches the last contact in any particular row of contacts 82. Therefore, all contacts as 185 and 186 for as many places as there are digits in the number will be separated so that if a zero is to be perforated in any of these rows the solenoid for that row will be prevented from energization.

It will be noted, however, that none of the arms 224 for the last five rows will be moved upwardly where perforations for the number 37041 are to be made, and hence circuit to the solenoids 122 for these rows remains closed. Thus as the plate 35 moves to the right the contact springs 87 for the last five rows eventually engage the last contact in the rows of contacts 82 for these last five rows and energize the solenoids 122 for these last five rows at such a time in the movement of the rocker 69 that the last notch 74 on the segment 73 for these last rows is in position to be engaged by the noses 80 of the pawls 79 for these rows, with the result that the selectors 58 for these last five rows are locked in the position shown in Fig. 6 so that neither of the enlargements 59 or 60 selects a punch in these five rows.

It will be noted, however, that there is no perforation in the third row but, as explained above, the contacts 185 and 186 for this third row are separated wherefore circuit from the tenth or last contact in the third row of contacts 82 to the third solenoid 122 is open. Thus this solenoid will not be energized and the rocker 66 for the third row will move with the rocker 69 to the extent of its movement in a counterclockwise direction, as viewed in Fig. 5, which will dispose the enlargement 60 above the punch 40 for producing a perforation for zero in the third row.

At the time the rocker 69 reaches the end of its movement in a counterclockwise direction, the lobe 117 on the cam 116 engages the roller 120 and pivots the rocker 118 so that the rounded end 121 thereof moves the plate 49 and therefore the plate 48 downwardly. Those enlargements 59 and 60 which have been previously disposed above punches 40 in the respective rows transmit this downward movement of the plate 48 to the punches aligned therewith whereupon perforations are made in a sheet S which by this time will have been moved into engagement with a stop finger 39 with the side thereof shown in Fig. 3 facing downwardly.

The lobe 117 quickly disengages roller 96 whereupon the springs 57 return the plates 48 and 49 to their original positions and at the time these plates are returning to their initial positions the cam 154 causes the block 156 and the pin 166 to move upwardly and the pin 166 disengages the tab T and permits the contacts 176 and 175 and 173 and 171 to separate whereupon circuits to energize solenoids as 203 and 122 and energize solenoid 115 are broken. The stud 109 will have disengaged the lug 113 from arm 111 and therefore the cam surface 110 will have returned to a position such that the stud 109 will engage therewith and effect separation of the clutch teeth 106 from the clutch teeth 104 at a time when the shaft 96 will have made one complete revolution.

During the time the punches 40 are being selected and operated to produce perforations in the sheet engaged with the stop finger 39, the platen P will be making an impression on the preceding sheet S from the preceding printing and control device D, and at a time subsequent to the movement of the platen P and punches 40 from association with the sheet the stop fingers 39 and 39a are retracted to permit the sheets engagement therewith to move to the next station in the path of travel of the sheets, and the chains C cause the printing and control devices to advance so that a new printing and control device will be disposed in detector position by the time the cam 154 is again rotated sufficiently to engage the first rise thereon with the roller 153 and effect the first lowering of the arms 144 and 145.

The embodiment of the invention as described above is one which is adapted to produce perforations in a check such as that illustrated in Fig. 3 so that when this check is returned the perforations may be utilized to effect automatic sorting of the checks or other operations. I have shown an account number 37041 perforated in the check but it is to be understood that this is but an illustrative use of the invention and furthermore that data other than account numbers could be perforated in sheets if desired, and furthermore account numbers and additional data such as the amount could be perforated in the sheets.

I have shown an arrangement for producing perforations in ten different rows but it is to be understood that perforations could be provided in a greater or less number of rows by merely duplicating or eliminating devices which I have illustrated and described.

It will also be understood that records other than perforations could be produced with an apparatus such as that which I have previously described. Furthermore, it will be apparent that I have provided a record producing means wherein selected of the record producing elements may be rendered inoperative when so desired and wherein means for normally rendering certain of the elements inoperative can be rendered ineffective so as to permit an operation when so desired. Likewise I have provided an arrangement wherein characters may be produced without providing indicating means therefor on the printing and control or similar devices passed through the machine and under control of which the record producing means is operated.

Thus while I have illustrated and described a selected embodiment of my invention and have shown the same in association with a printing machine, it is to be understood that the entire record producing device could be used in association with other machines or elements of my novel record producing means could be used independently or in association with other devices, and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims:

I claim:

1. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices bearing printing characters and control means, means cooperating with the printing characters on said devices to produce impressions on sheets passed into the machine directly from said printing characters so as to provide records on the sheets, and other means indirectly under control of the control means and operative to produce additional records on the sheets of different physical characteristics than the impressions.

2. In a printing machine, means for feeding unitary printing and control devices each bear-

ing printing characters and control means through the machine, means for feeding sheets through the machine, means cooperating with the printing characters on said devices to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets, other means indirectly under control of the control means on each of said devices and operating to produce additional records on the sheets of different physical characteristics than the said impressions, and means for positioning the sheets relative to the means cooperating with the printing characters and relative to said other means while said means are providing records on said sheets.

3. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine, means for feeding sheets through the machine, means cooperating with the printing characters to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets, other means cooperating with the control means on the said devices to produce records on the sheets of different physical characteristics than the impressions, and means for positioning the sheets first in the means cooperating with the control devices and then in the means cooperating with the printing characters while records are being produced thereon.

4. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine, means for feeding sheets through the machine, means cooperating with the printing characters on said devices to produce impressions on the sheets directly from the printing characters so as to provide records, other means indirectly under control of the control means on the devices and operating to produce records on the sheets of different physical characteristics than the impressions, and means for causing all of said means to operate in timed relation whereby records will be produced on a particular sheet by the cooperation of the two record producing means with the same device.

5. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine, means for feeding sheets through the machine, means cooperating with the printing characters on said devices to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets, other means cooperating with the control means on the devices to produce records on the sheets of different physical characteristics than the impressions, means for positioning certain of the sheets relative to the two record producing means while records are being produced on certain other of said sheets and means for causing all of said means to operate in timed relation whereby records will be produced on a particular sheet by the cooperation of the two record producing means with the same device.

6. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine in a step-by-step manner whereby the devices successively come to rest in successive stations, means for feeding sheets through the machine in a step-by-step manner whereby the sheets successively come to rest in successive stations, means positioned at selected ones of the stations wherein the sheets come to rest and cooperating with the printing characters on the devices at selected ones of the stations wherein the devices come to rest to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets and other means cooperating with the control means on the devices to produce additional records on the sheets of different physical characteristics than the impressions.

7. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine in a step-by-step manner whereby the devices successively come to rest in successive stations, means for feeding sheets through the machine in a step-by-step manner whereby the sheets successively come to rest in successive stations, means positioned at one of the stations wherein the sheets come to rest and cooperating with the printing characters on the devices at one of the stations wherein the devices come to rest to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets, and other means positioned at another of the stations wherein the sheets come to rest and cooperating with the control means on the devices at another of the stations wherein the devices come to rest to produce additional records on the sheets of different physical characteristics than the impressions.

8. In a printing machine, means for feeding unitary printing and control devices each bearing printing characters and control means through the machine in a step-by-step manner whereby the devices successively come to rest in successive stations, means for feeding sheets through the machine in a step-by-step manner whereby the sheets successively come to rest in successive stations, means positioned at one of the stations wherein the sheets come to rest and cooperating with the printing characters on the devices at one of the stations wherein the devices come to rest to produce impressions on the sheets directly from the printing characters so as to provide records on the sheets, other means positioned at another of the stations wherein the sheets come to rest and cooperating with the control means on the devices at another of the stations wherein the devices come to rest to produce additional records on the sheets of different physical characteristics than the impressions, and means for operating all of said means in timed relation whereby when the record producing means are positioned in a predetermined relation with each other records will be produced upon a particular sheet by the cooperation of the two record producing means with the same device.

9. In a printing machine through which unitary printing and control devices each bearing printing characters and control means are fed, means for making an impression on a sheet in the machine directly from the printing characters on a device to provide a record on the sheet, and other means indirectly under control of the control means on such device for producing an additional record on the sheet of different physical characteristics than the aforesaid impression.

10. In a printing machine through which unitary printing and control devices each bearing printing characters and control means are fed, means for making an impression directly from the printing characters on each of said devices to provide a record on a sheet in the machine, and other means indirectly under control of the de-

vices for producing an additional record on the sheet of different physical characteristics than the impression made thereon, said other means producing said additional record under control of the control means on the same device as that bearing the printing characters from which said impression was made.

11. In a printing machine through which unitary printing and control devices each bearing printing characters and control means are fed, means for feeding sheets through the machine, means for making impressions on the sheets directly from the printing characters on the devices to provide records on the sheets, other means for producing additional records on the sheets of different physical characteristics than the impressions, and means cooperating with the devices for setting up said other means under control of the control means on the said devices.

12. In a printing machine through which unitary printing and control devices each bearing printing characters and control means are fed, means for making an impression on a sheet directly from the printing characters on one of the devices to provide a record on the sheet, other means for producing an additional record on tht sheet, means cooperating with the devices to set up said other means under control of the control means on the devices, and means for effecting operation of the two record producing means in cooperating relation whereby said other means produces a record on the sheet under control of the control means on the said one of the devices from which an impression is made on the sheet.

13. In a printing machine through which printing and control devices each bearing printing characters and control means are fed, means for making impressions on sheets in the machine directly from the printing characters on the devices to provide records on the sheets, means for perforating records in the sheets, and means for setting up the perforating means under control of the control means on the devices.

14. In a printing machine through which printing and control devices each bearing printing characters and control means are fed, means for making an impression on a sheet directly from the printing characters on one of the devices to provide a record on the sheet, means for perforating a record in the sheet, and means for setting up the perforating means under control of the control means on the device from which an impression was made on the sheet.

15. In a printing machine, means for feeding printing and control devices each bearing printing characters and control means through the machine, means for making impressions directly from the printing characters on the devices on sheets passed through the machine, means for perforating records in the sheet, means for determining from the control means on the devices the data of the records to be perforated in the sheets, and means controlled by the determining means for setting up the perforating means.

16. In a printing machine, means for feeding printing and control devices each bearing printing characters and control means through the machine, means for making impressions directly from the printing characters on the devices on sheets passed through the machine, means for perforating records in the sheet, means for selecting certain of the perforating means in record producing operation, means for determining from the control means on the devices the data to be perforated in the sheets, and means for setting up the selecting means under control of the determining means.

17. In a printing machine, means for feeding printing and control devices each bearing printing characters and control means through the machine, means for making impressions directly from the printing characters on the devices on sheets passed through the machine, means for perforating records in the sheet, means for selecting certain of the perforating means in record producing operation, electrical means under control of the control means on the devices for setting up circuits according to the records to be perforated in the sheets, and selector means under control of said circuits for setting up the selecting means.

18. In a printing machine, means for feeding printing and control devices each bearing printing characters and control means through the machine, means for making impressions directly from the printing characters on the devices on sheets passed through the machine, means for perforating records in the sheet, means for selecting certain of the perforating means in record producing operation, electrical means under control of the control means on the devices for setting up circuits according to the records to be perforated in the sheets, selector means under control of said circuits for setting up the selecting means, and means for closing said electrical circuits and operating said selector means in timed relation with each other.

19. In a machine for producing records under control of printing and control devices each bearing printing characters and control means, means for sensing data pertaining to the records from the control means on the devices, means for producing a record including a plurality of record producing elements, means for selecting said elements for operation, means under control of the sensing means for setting up the element selecting means, and means for producing another record directly from the printing characters on the devices.

20. In a machine for producing records under control of printing and control devices each bearing printing characters and control means, means for setting up electrical circuits according to data represented by the control means on said devices, means for printing an impression directly from printing characters on said devices, means for producing records under control of the control means on the devices and including a plurality of record producing elements, means for selecting said elements for operation, means in said electrical circuits for effecting operation of the element selecting means, and means for closing said circuits at a predetermined time in the cycle of operations.

21. In a machine for producing records under control of printing and control or like devices, means for advancing said printing and control or like devices through the machine in a step by step manner, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, and means under control of said devices during at rest intervals in the step by step movement thereof for arresting movement of said selector in association with selected ones of the elements.

22. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows,

means for moving said selectors along said rows, means under control of said devices for setting up selected electrical circuits according to records found on said devices, and means for closing said electrical circuits in timed relation with the movement of said selectors to thereby position said selectors relative to said elements according to records found on said devices.

23. In a machine for producing records under control of printing and control or like devices, means for advancing said printing and control or like devices through the machine in a step by step manner, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, detecting means cooperating with said devices during at rest intervals thereof, means for arresting movement of said selectors, and electrically operable means in circuit with said detectors for controlling operation of the movement arresting means.

24. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, there being as many moving means as there are rows of elements, means for effecting movement of said moving means, an electrically operated means for each of said moving means, means controlled by said electrically operated means for arresting movement of said moving means, and means for selectively rendering said electrically operated means operative under control of said devices, said last named means including detecting means cooperating with said devices, said detecting means being arranged in rows and there being a smaller number of detecting means than there are elements in each row, and means interposed between said electrically controlled means and said detecting means for selectively connecting said detecting means to said electrically operated means whereby predetermined combinations of said detecting means will effect selection of predetermined ones of said elements.

25. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, a solenoid aligned with each of said moving means, means controlled by said solenoids for arresting movement of said moving means to position said selectors above selected ones of said elements, detecting means for each of said solenoids and cooperating with said devices to sense records thereon, a plurality of sets of contacts, the contacts in each set being connectable to the detecting means for one of said solenoids and to said one solenoid, and means operating in timed relation with the moving means for closing circuits to said solenoids in accordance with records sensed from said devices.

26. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, a solenoid aligned with each of said moving means, means controlled by said solenoids for arresting movement of said moving means to position said selectors above selected ones of said elements, detecting means for each of said solenoids and cooperating with said devices to sense records thereon, a plurality of sets of contacts, the contacts in each set being connectable to the detecting means for one of said solenoids and to said one solenoid, means operating in timed relation with the moving means for closing circuits to said solenoids in accordance with records sensed from said devices, there being a less number of detecting means for each of said solenoids than there are elements in each of said rows, and means under control of said detecting means for selectively closing circuit to said sets of contacts.

27. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, a solenoid aligned with each of said moving means, means controlled by said solenoids for arresting movement of said moving means to position said selectors above selected ones of said elements, a set of detectors for each of said solenoids, a set of contacts for each of said solenoids, there being as many contacts in each set as there are elements in each row and there being a less number of detectors in each set than there are contacts in each set, means controlling electrical connection between said contacts and said detectors, and means under control of said detectors for controlling the electrical connection of said detectors and said contacts.

28. In a machine for producing records under control of printing and control or like devices, a plurality of record producing elements arranged in rows, an element selector for each of said rows, means for moving said selectors along said rows, means for arresting movement of said moving means to position said selectors above selected ones of said elements, a plurality of electrical circuits including means for operating said movement arresting means of said moving means to thereby position said selectors above selected ones of said elements, and means for imparting movement to said moving means and for closing said circuits in timed relation with each other.

29. In a machine for producing records under control of printing and control or like devices, each of said devices having means thereon for controlling the production of predetermined data, a plurality of record producing elements, there being at least one record producing element for which no controlling means is provided on said devices, normally operative means for normally preventing operation of said element for which there is no corresponding control means, and means for rendering said normally operative means inoperative under predetermined conditions whereby said one element will be rendered operative.

30. In a machine for producing records under control of printing and control or like devices, each of said devices having means thereon for controlling the production of predetermined data, a plurality of record producing elements, there being at least one record producing element for which no controlling means is provided on said devices, means for selectively rendering the other of said elements operative under control of the control means on said devices, means for normally preventing operation of the element for which no control means is provided on said devices, and means for rendering said preventing means inoperative upon operation of the means selecting said elements under control of the control means on said devices.

31. In a machine for producing records under

control of printing and control or like devices, each of said devices having means thereon for controlling the production of predetermined data, a plurality of record producing elements, there being at least one record producing element for which no controlling means is provided on said devices, means for selectively rendering the other of said elements operative under control of the control means on said device, means for normally preventing operation of the element for which no control means is provided on said devices, and means for rendering predetermined ones of the preventing means inoperative upon operation of predetermined of the means selectively rendering the other of said elements operative.

32. In a machine for producing records under control of printing and control devices fed through the machine, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for operating the said selecting means, means for controlling the operation of the said operating means including a plurality of detecting elements less than the number of said record-producing elements and under control of said devices, and means interposed between and cooperating with the said controlling means and detecting elements to effect operation of predetermined combinations of said record-producing elements.

33. In a machine for producing records under control of printing and control devices fed through the machine, a plurality of record-producing elements arranged in rows, means for selecting the said record-producing elements for operation, means for operating the said selecting means, means for controlling the operation of the said operating means including a plurality of detecting elements under control of said devices and arranged in rows each containing a number of said detecting elements less than the number of said record-producing elements in a row of the latter, and means interposed between and cooperating with the said controlling means and said detecting means to effect selection of predetermined combinations of said record-producing elements.

34. In a machine for producing records under control of printing and control devices fed through the machine, a plurality of record-producing elements arranged in rows, an element selector for each of said rows, means for moving the said selectors along said rows, means for controlling the operation of the said selector means including detecting elements arranged in rows each containing a number of the said detecting elements less than the number of said record-producing elements in a row of the latter, and means interposed between and cooperating with the said detecting elements and the said controlling means to effect operation of predetermined combinations of said record-producing elements under control of the said control devices.

35. In a machine for producing records under control of printing and control devices fed through the machine and each having openings formed therein constituting a record, a plurality of record-producing elements arranged in rows, means for selecting the said record-producing elements for operation, means for controlling the operation of the said selecting means, a plurality of detecting elements under control of the said openings and arranged in rows each containing a number of the said detecting elements less than the number of the said record-producing elements in a row of the latter, and means including shiftable devices interposed between and cooperating with the said detecting elements and the said selector controlling means to effect selection of predetermined combinations of said record-producing elements.

36. In a machine for producing records under control of printing and control devices fed through the machine and each having openings formed therein constituting a record, a plurality of record-producing elements arranged in rows, means for selecting the said record-producing elements for operation, means for controlling the operation of the said selecting means, a plurality of detecting elements under control of the said openings and arranged in rows each containing a number of the said detecting elements less than the number of the said record-producing elements in a row of the latter, and means including a plurality of shiftable switches interposed between and cooperating with said detecting elements and the said selector-controlling means to effect selection of predetermined combinations of said record-producing elements.

37. In a machine for producing records under control of printing and control devices fed through the machine and each having openings formed therein constituting a record, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for controlling the operation of the said selecting means, sensing means under control of the said openings and including a plurality of contacts less than the number of the said record-producing elements, and means including a plurality of shiftable devices arranged between and cooperating with the said contacts and the said controlling means for effecting operation of predetermined combinations of the said record-producing elements.

38. In a machine for producing records under control of printing and control members fed through the machine, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for controlling the operation of the said selecting means, sensing means under control of the said control members and including a plurality of detecting elements, and a plurality of devices interposed between and cooperating with the said detecting elements and the said selector-controlling means for effecting operation of predetermined combinations of said record-producing elements, each of the said devices including two spaced rows of stationary contacts and a row of shiftable contacts arranged between each two rows of stationary contacts and engageable with the said stationary contacts therein.

39. In a machine for producing records under control of printing and control members fed through the machine, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for controlling the operation of the said selecting means, sensing means under control of the said control members and including a plurality of detecting elements less than the number of the said record-producing elements, and a plurality of devices interposed between and cooperating with the said detecting elements and the said selector-controlling means for effecting operation of predetermined combinations of said record-producing elements, each of said devices including two spaced rows of stationary contacts

and a row of shiftable contacts arranged between each two rows of stationary contacts and engageable with the said stationary contacts therein, each of the said shiftable contacts being normally engaged with a contact in one of the said rows of stationary contacts and being selectively engageable with a plurality of contacts in the other of said rows of stationary contacts.

40. In a machine through which printing and control devices each bearing a record are fed, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for arresting the movement of the said selecting means, sensing means including a plurality of detecting elements less than the number of the said record-producing elements, and means including a plurality of shiftable devices cooperating with the said detecting elements for controlling the operation of the said arresting means.

41. In a machine through which printing and control devices each bearing a record are fed, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for arresting the movement of the said selecting means, sensing means including a plurality of detecting elements less than the number of the said record-producing elements, and means including a plurality of devices cooperating with the said detecting elements and arresting means for controlling the operation of the latter, each of said devices including two spaced rows of stationary contacts and a row of shiftable contacts arranged between and engageable with the said stationary contacts.

42. In a machine through which printing and control devices each bearing a record are fed, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for arresting the movement of the said selecting means, sensing means including a plurality of detecting elements less than the number of the said record-producing elements, and means including a plurality of devices cooperating with the said detecting elements and arresting means for controlling the operation of the latter, each of said devices including two spaced rows of stationary contacts and a row of shiftable contacts arranged between and engageable with the said stationary contacts, each of the said shiftable contacts being normally engaged with a contact in one of the said rows of stationary contacts and being selectively movable into engagement with different contacts in the other row of said rows of said stationary contacts.

43. In a machine for producing records under control of printing and control members fed through the machine, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for arresting the operation of the said selecting means, sensing means under control of the said control members and including a plurality of detecting elements less than the number of said record-producing elements, and a plurality of devices interposed between and cooperating with the said detecting elements and arresting means for controlling operation of the said arresting means, each of said devices including two spaced rows of stationary contacts and a row of shiftable contacts arranged between each of the said two rows of stationary contacts, each of the said shiftable contacts being constantly engaged with a single contact in one of the said stationary rows of contacts and being shiftable into engagement with different contacts in the other of said rows of stationary contacts.

44. In a machine for producing records under control of printing and control members fed through the machine, a plurality of record-producing elements, means for selecting the said record-producing elements for operation, means for arresting the operation of the said selecting means, sensing means under control of the said control members and including a plurality of detecting elements less than the number of said record-producing elements, a plurality of devices interposed between and cooperating with the said detecting elements and arresting means for controlling operation of the said arresting means, each of said devices including two spaced rows of stationary contacts and a row of shiftable contacts arranged between each of the said two rows of stationary contacts, each of the said shiftable contacts being constantly engaged with a single contact in one of the said stationary rows of contacts and being shiftable into engagement with different contacts in the other of said rows of stationary contacts, and means for moving each of the said shiftable rows of contacts.

45. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices bearing printing characters and control means, means cooperating with the printing characters on said devices for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, and other means cooperating with and under the remote control of the control means on said unitary printing and control devices for producing additional records on the sheets of different physical characteristics than said printed impressions.

46. In a printing machine, means for feeding printing and control devices through the machine, each of said devices including a frame provided with control perforations and a card carried by said frame and having control perforations therein adapted to register with the perforations in said frame, each of said devices likewise including a plate bearing printing characters for producing printed impressions, on sheets passed into the machine, directly from said printing characters so as to provide printed records on the sheets, and other means cooperating with and under the direct control of the said control perforations in said devices for producing additional records on the sheets of different physical characteristics than said printed impressions.

47. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices bearing printing characters and control means, means cooperating with the printing characters on said devices for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, and other means under the direct and sole control of the control means on said unitary printing and control devices for producing additional records in the form of perforations in said sheets.

48. In the printing machine, means for feeding unitary printing and control devices through the machine, each of said devices including a frame provided with control perforations and a card carried by said frame and having control perforations therein adapted to register with the per-

forations in said frame, each of said devices likewise including a plate bearing printing characters for providing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, and other means cooperating with and under the direct control of the said control perforations in said devices for producing additional records in the form of perforations in said sheets.

49. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices including a frame and a card carried by said frame and provided with control perforations, each of said devices including a plate bearing printing characters for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, and other means cooperating with and under the direct control of the control perforations in said cards for producing additional records on the sheets of different physical characteristics than said printed impressions.

50. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices including a frame and a card carried by said frame provided with control perforations, each of said devices including a plate bearing printing characters for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, and other means cooperating with and under the direct control of the control perforations in said cards for producing additional records in the form of perforations in said sheets.

51. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices bearing printing characters and control means, means cooperating with the printing characters on said devices for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, other means for producing additional records on the sheets of different physical characteristics than said printed impressions, and means cooperating with and under the direct control of the control means on said unitary printing and control devices for operating the said other record-producing means.

52. In a printing machine, means for feeding printing and control devices through the machine, each of said devices including a frame provided with control perforations and a card carried by said frame and having control perforations therein adapted to register with the perforations in said frame, each of said devices likewise including a plate bearing printing characters for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, other means for producing additional records on the sheets of different physical characteristics than said printed impressions, and means cooperating with and under the direct control of the said control perforations in said devices for operating said other record-producing means.

53. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices bearing printing characters and control means, means cooperating with the printing characters on said devices for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, means for producing additional records, in the form of perforations, in said sheets, and means cooperating with and under the direct control of the control means on said unitary printing and control devices for operating said perforating means.

54. In a printing machine, means for feeding unitary printing and control devices through the machine, each of said devices including a frame and a card carried by said frame and provided with control perforations, each of said devices including a plate bearing printing characters for producing printed impressions on sheets passed into the machine directly from said printing characters so as to provide printed records on the sheets, other means for producing additional records on said sheets of different physical characteristics than said printed impressions, and means cooperating with and under the direct control of the control perforations in said cards for operating said other record-producing means.

55. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the control of the control means on said devices when said devices are in position to have sensing operations performed thereon for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing another record having different physical characteristics than said first named record directly on said sheet.

56. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the direct control of the control means on said devices when said devices are in position to have sensing operations performed thereon for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing another record having different physical characteristics than said first named record directly on said sheet.

57. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the sole control of the control means on said devices when said devices are in position to have sensing operations performed thereon for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing another record having different physical characteristics than said first named record directly on said sheet.

58. In a printing machine, means for feeding a sequence of unitary printing and control devices

each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the control of the control means on said devices when said devices are in position to have sensing operations performed thereon for perforating a record in a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing a record directly on said sheet.

59. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the direct control of the control means on said devices when said devices are in position to have sensing operations performed thereon for perforating a record in a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing a record directly on said sheet.

60. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into position to have sensing and printing operations performed thereon in the machine, means for sensing the control means on said devices, means under the sole control of the control means on said devices when said devices are in position to have sensing operations performed thereon for perforating a record in a sheet fed through the machine, and means cooperating with the printing means on said printing and control devices for printing a record directly on said sheet.

61. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the control of the control means on said devices when said devices are in sensing position for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing another record having different physical characteristics than said first named record directly upon said sheet.

62. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the direct control of the control means on said devices when said devices are in sensing position for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing another record having different physical characteristics than said first named record directly upon said sheet.

63. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the sole control of the control means on said devices when said devices are in sensing position for forming a record upon a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing another record having different physical characteristics than said first named record directly upon said sheet.

64. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the control of the control means on said devices when said devices are in sensing position for perforating a record on a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing a record directly upon said sheet.

65. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the direct control of the control means on said devices when said devices are in sensing position for perforating a record on a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing a record directly upon said sheet.

66. In a printing machine, means for feeding a sequence of unitary printing and control devices each bearing printing means and control means into sensing and printing positions in the machine, means for sensing the control means on said devices, means under the sole control of the control means on said devices when said devices are in sensing position for perforating a record on a sheet fed through the machine, and means cooperating with the printing means on said devices when said devices are in printing position for printing a record directly upon said sheet.

67. In a machine of the character described, means for feeding a sequence of printing and control or like devices through the machine in a step by step manner, means for sensing the control means on said devices during at rest intervals thereof, a plurality of punching devices for punching records in sheets fed through the machine, means for selecting said punching devices, means for operating said selecting means, and means for arresting the operation of the punching device selecting means to select punching devices under control of said sensing means whereby punching devices are selected under control of control means on said printing and control or like devices.

68. In a machine for producing records under control of printing and control or like devices, each of said devices having means thereon for controlling the production of predetermined data, a plurality of record producing elements arranged in a row, a selector including two selector portions, means for selectively positioning one of said portions above predetermined of said record producing elements or the other of said portions above one of said record producing elements or both of said portions out of alignment with said record producing elements, and means responsive to control means on said control devices for operation of said positioning means.

69. In a machine for producing records under control of printing and control or like devices, each of said devices having means thereon for

controlling the production of predetermined data, a plurality of record producing elements for producing records pertaining to the digits 1 to 9 and 0, selector means including a selector portion adapted to be selectively positioned over one of the elements for producing records pertaining to the digits 1 to 9 and another selector portion adapted to be selectively positioned over the element for producing a record pertaining to 0, said portions being spaced apart sufficiently to clear all of said elements when the selector means is moved into a predetermined position, means for positioning said selector means, and means responsive to control means on said control devices for operation of said positioning means.

70. In a machine for producing records under control of printing and control or like devices, each of said devices having means thereon for controlling the production of predetermined data, a plurality of record producing elements for producing records pertaining to the digits 1 to 9 and 0, selector means including a selector portion adapted to be selectively positioned over one of the elements for producing records pertaining to the digits 1 to 9 and another selector portion adapted to be selectively positioned over the element for producing a record pertaining to 0, said portions being spaced apart sufficiently to clear all of said elements when the selector means is moved into a predetermined position, means for positioning said selector means, means responsive to control means on said control devices for operation of said positioning means, and means for causing said selector means to move into said predetermined position in the absence of control means on the device cooperating with the means responsive to the control means.

71. In a machine for producing records under control of printing and control or like devices having control means thereon, means for advancing said printing and control or like devices through the machine in a step by step manner, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, and means responsive to control means on said devices during at rest intervals thereof for operating the means engageable with said positioning means whereby an element is selected in accordance with said control means.

72. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, means for operating the means engageable with said positioning means, and means responsive to control means on said devices for effecting operation of the operating means whereby an element is selected in accordance with said control means.

73. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, and means responsive to control means on said devices for effecting operation of the electrically operated means whereby an element is selected in accordance with said control means.

74. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, switching means controlled by said operating member for selectively closing circuit to said electrically operated means, and means responsive to control means on said devices for selectively closing circuit to said switching means whereby an element is selected in accordance with said control means.

75. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, switching means including a part in circuit with said electrically operated means and a plurality of contacts, means on said operating member for successively establishing circuit between said contacts and said part as said positioning means on said member move past the means engageable therewith, and means responsive to control means on said devices for selectively closing circuit to said contacts whereby an element is selected in accordance with said control means.

76. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to

position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, switching means including a part in circuit with said electrically operated means and a plurality of contacts, means on said operating member for successively establishing circuit between said contacts and said part as said positioning means on said member move past the means engageable therewith, a plurality of control contacts respectively in circuit with the contacts in said switching means, contacts common to two of said control contacts, circuit closing contacts for selectively establishing circuit between the common contacts and one or the other of the control contacts, and means responsive to control means on said devices for selectively closing circuit to said common contacts whereby an element is selected in accordance with said control means.

77. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, switching means including a part in circuit with said electrically operated means and a plurality of contacts, means on said operating member for successively establishing circuit between said contacts and said part as said positioning means on said member move past the means engageable therewith, a plurality of control contacts respectively in circuit with the contacts in said switching means, contacts common to two of said control contacts, circuit closing contacts for selectively establishing circuit between the common contacts and one or the other of the control contacts, means for effecting relative movement between said control contacts and said circuit closing contacts to selectively establish circuit between said control contacts and the common contacts, and means responsive to control means on said devices for selectively closing circuit to said common contacts whereby an element is selected in accordance with said control means.

78. In a machine for producing records under control of printing and control or like devices having control means thereon, a plurality of record producing elements arranged in a row, an element selector for said row, an operating member for said selector, means for effecting movement of said operating member, positioning means on said member located respectively to position said element selector in cooperating relation with a predetermined element, means engageable with said positioning means to arrest movement of the operating member and said selector, electrically operated means for effecting operation of the means engageable with said positioning means, switching means including a part in circuit with said electrically operated means and a plurality of contacts, means on said operating member for successively establishing circuit between said contacts and said part as said positioning means on said member move past the means engageable therewith, a plurality of control contacts respectively in circuit with the contacts in said switching means, contacts common to two of said control contacts, circuit closing contacts for selectively establishing circuit between the common contacts and one or the other of the control contacts, means for effecting relative movement between said control contacts and said circuit closing contacts to selectively establish circuit between said control contacts and the common contacts, and means responsive to control means on said devices for selectively closing circuit to said common contacts whereby an element is selected in accordance with said control means, selected of the means responsive to said control means being operative to effect operation of said relative movement effecting means whereby the connection between said common contacts and said control contacts is under control of said control means.

79. In a device according to claim 74 wherein means are provided for establishing a holding circuit for electrically operated means once circuit thereto is established, and means for interrupting said holding circuit after operation of the selected record producing element.

80. In a device according to claim 77 wherein means are provided for establishing a holding circuit for electrically operated means once circuit thereto is established, and means for interrupting said holding circuit after operation of the selected record producing element.

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