

Dec. 7, 1937.

W. LANG

2,101,435

RECORD CONTROLLED PRINTING MECHANISM

Filed Dec. 28, 1934

3 Sheets-Sheet 1

FIG. 1

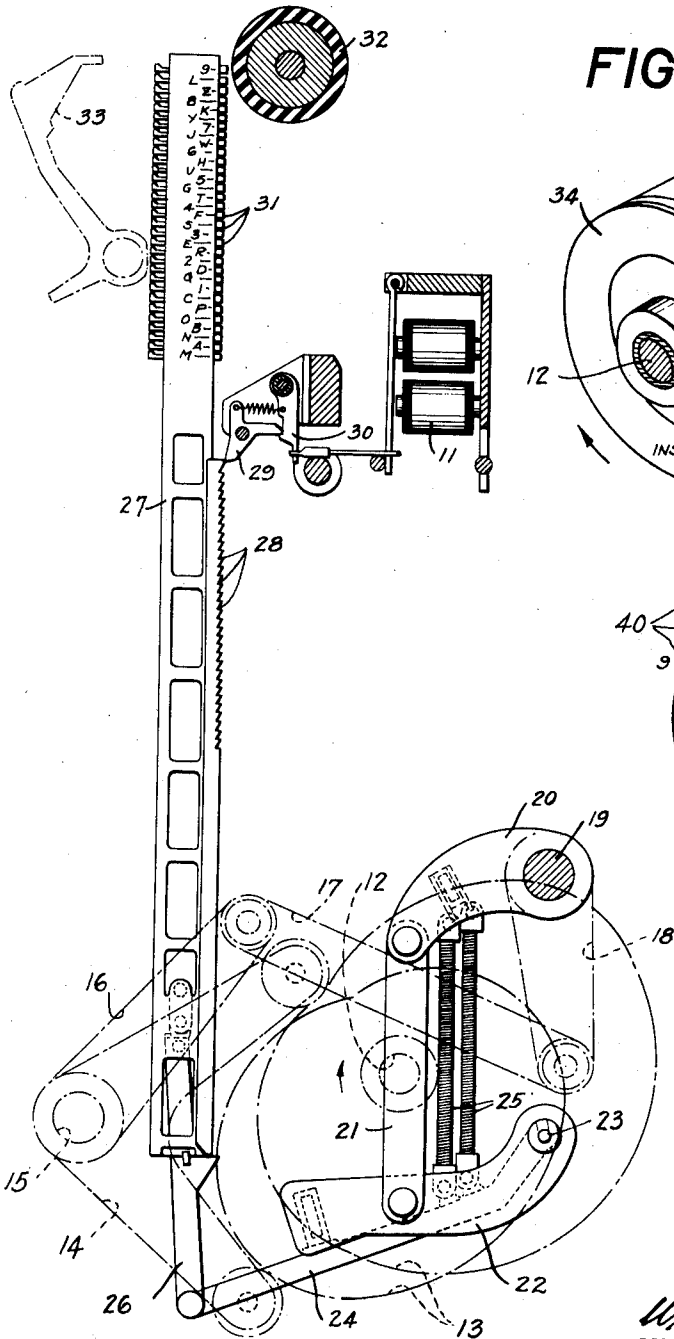


FIG. 2

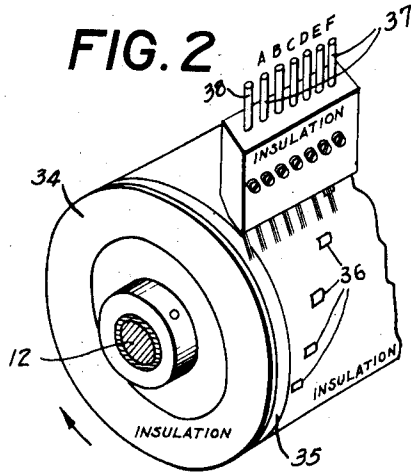


FIG. 3

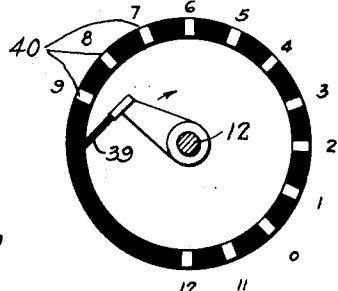
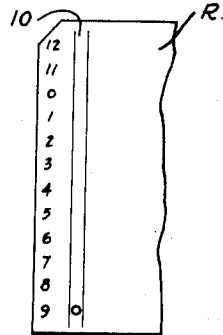


FIG. 4



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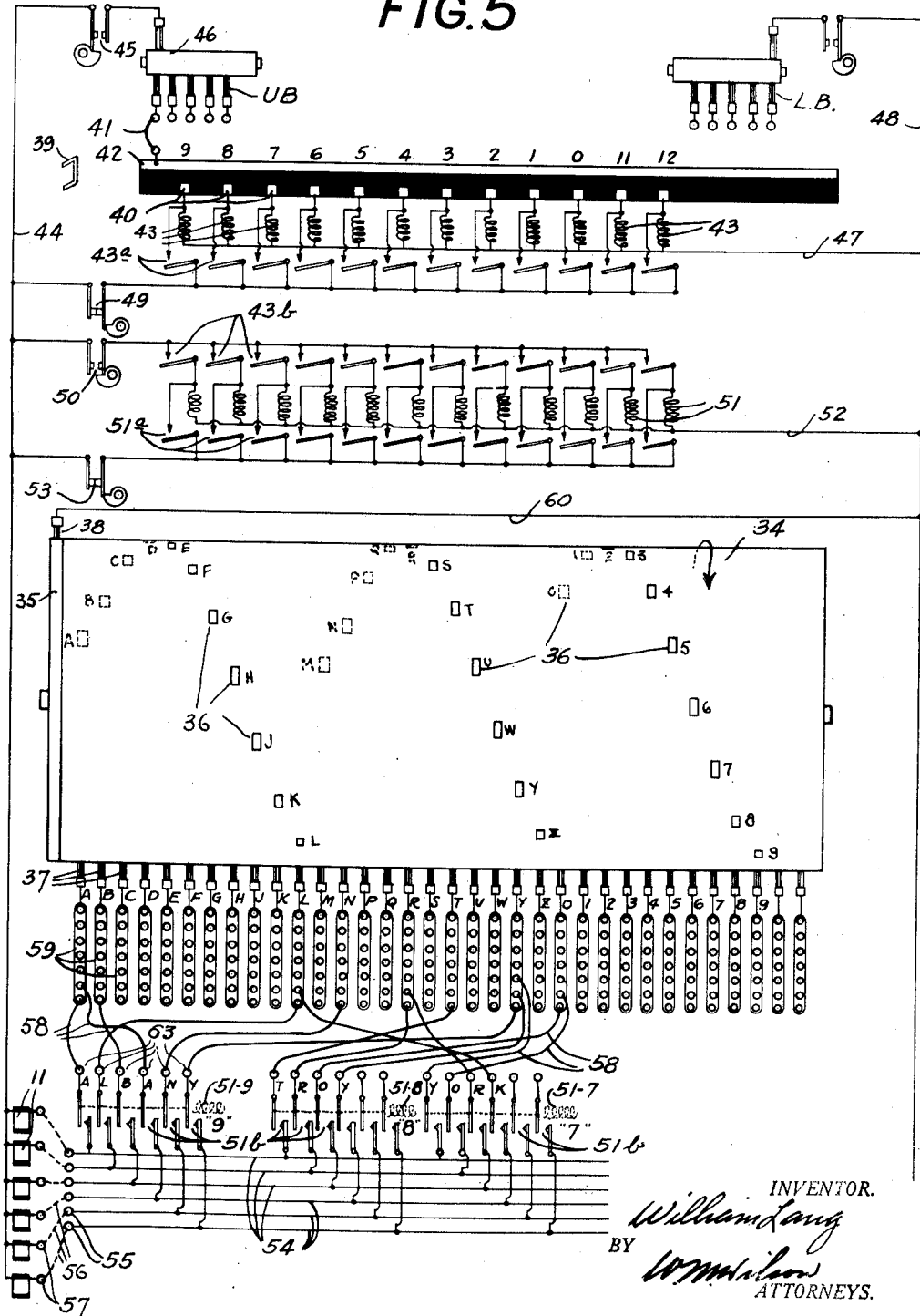
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3 Sheets-Sheet 2

FIG. 5



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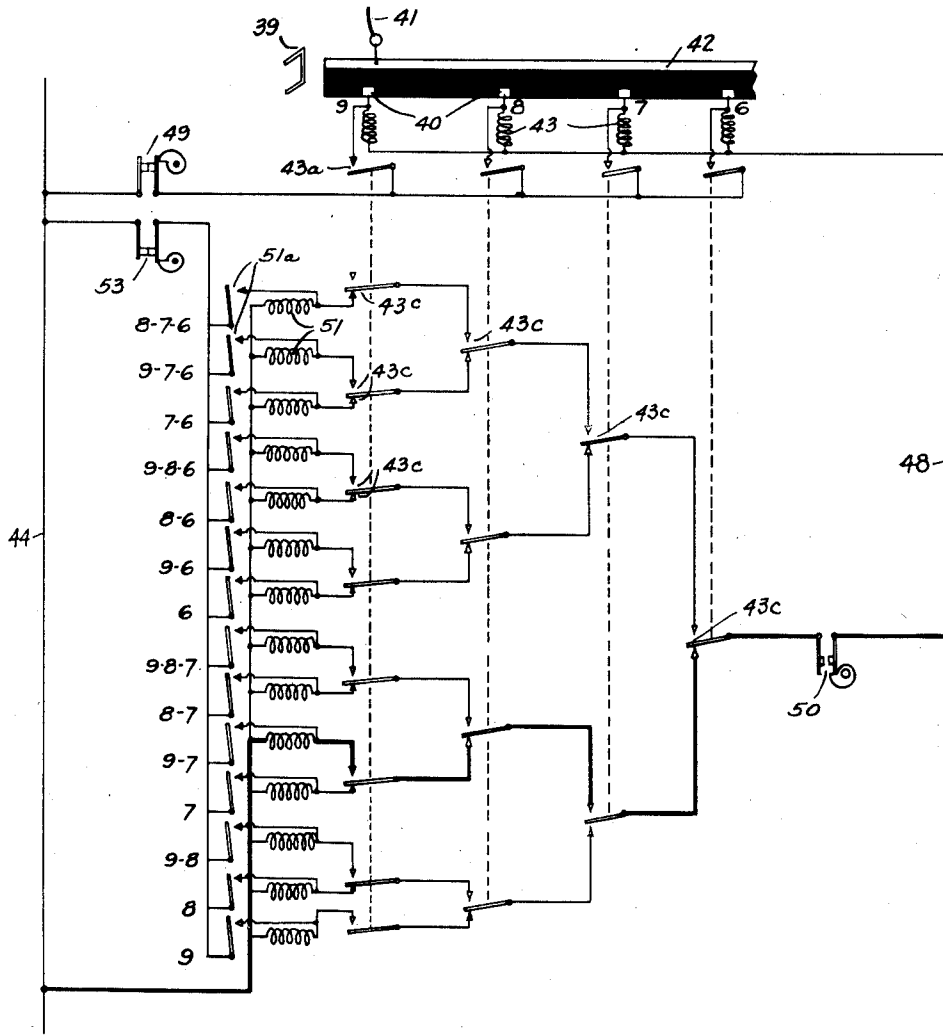
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RECORD CONTROLLED PRINTING MECHANISM

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3 Sheets-Sheet 3

FIG. 6



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RECORD CONTROLLED PRINTING MECHANISM

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Application December 28, 1934, Serial No. 759,488

12 Claims. (Cl. 101—93)

This invention relates to printing mechanism and more particularly to printing mechanism of the record controlled type.

The invention relates particularly to mechanism for decoding and printing in true form alphabetic information which has been entered in perforated record cards in coded or condensed form. Frequently, in the preparation of perforated tabulating cards, alphabetic information, such as names of salesmen, towns, classes of goods, and so on, are indicated by code numbers. These cards, when passed through tabulating machines, are sensed and the coded information is printed on record sheets in code form. This is inconvenient where persons not familiar with the manner of coding attempt to read the printed record. The present invention proposes to retain and increase the advantages of entering data on record cards in code form and to permit printing of the data in decoded or original form. Heretofore, where it has been desired to have alphabetic data printed on the record sheets, it has been necessary to perforate a column of the record card for each letter involved in the designation thus requiring a relatively large number of card columns to be set aside to receive the same. With the present arrangement, perforations in one or more positions of a single card column may be employed to cause the printing of the complete alphabetic designation.

Various other objects and advantages of the invention will be obvious from the following particular description of one form of mechanism embodying the invention or from an inspection of the accompanying drawings; and the invention also constitutes certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the drawings:

Fig. 1 is a view showing the essential elements of the printing mechanism of a tabulating machine.

Fig. 2 is a detail in isometric of a print controlling commutator.

Fig. 3 is a detail of a further commutator.

Fig. 4 is a fragment of a record card.

Fig. 5 is a circuit diagram of the elements pertaining to the present invention.

Fig. 6 is a modification showing an extension of the teachings of the invention.

A machine to which the present invention may be applied may be such as shown in Patent No. 1,926,883, granted September 12, 1933, to J. R. Peirce.

In Fig. 4 is shown a fragment of a record card

R in which a column 10 may be set aside to receive perforations representing alphabetic information. A perforation may be made in any one of the twelve index point positions to represent any one of twelve names of persons, towns, etc. By limiting the number of perforations in column 10 to one, the number of names which may be thus coded is limited to twelve and where a greater number of names is desired to be represented, perforations may be made in two or more positions in the same column.

Record cards having code perforations as in column 10 are placed in the machine and advanced to the usual analyzing brushes which are shown diagrammatically at UB in Fig. 5 where the perforations are analyzed to control relay mechanism which will control the printing by energizing printing magnets 11 (Fig. 1). In this figure, 12 represents the driving shaft of the printing mechanism upon which is mounted a pair of complementary cams 13 which cooperate with rollers on follower arm 14 carried by shaft 15, which shaft also carries an arm 16 connected by a link 17 to an arm 18 secured on shaft 19. Shaft 19 carries arm 20 connected by a link 21 to a bail 22 pivoted at 23. Also pivoted at 23 are arms 24 normally urged upwardly against bail 22 by springs 25. The free end of arm 24 has link connection 26 with the type bar 27 which is suitably mounted for vertical reciprocation. As shaft 12 rotates, the bail 22 is rocked clockwise and arm 24 is urged in the same direction by spring 25, thus elevating the type bar and causing teeth 28 therein to move in succession past the toe of a pawl 29 normally held in the position shown by a latch 30. Energization of printing magnet 11 as the type bar 27 moves upwardly will release pawl 29 so that its toe may engage one of the teeth 28 and interrupt further upward movement of the type bar. The upper end of the bar carries the usual type elements 31 which move through printing position opposite platen 32. After all the type bars are positioned, printing hammers 33, provided for urging the selected type element 31 against the platen, are tripped to effect printing. In Fig. 2 is shown a commutator, generally designated 34, which is provided with a common conducting ring 35 and a plurality of segments 36 which are electrically connected to the ring 35. For each segment 36 there is a commutator brush 37 and there is a segment 36 for each type element 31 on the type bar. The relationship of the parts is such that as the type elements reach the printing position, the corresponding segment 36 will be engaged by its brush 37 and electrical

connection will be formed between brush 37, segment 36, ring 35, to the brush 38 which traverses the ring.

In Fig. 3 is shown a further commutator which is disposed about shaft 12. This commutator comprises a brush 39 carried by the shaft and adapted to cooperate successively with segments 40 which are numbered 9, 8, 7, etc., and the timing is such that the segments are engaged as the correspondingly numbered index point positions of the record card are sensed by the analyzing brushes UB of Fig. 5.

The manner in which the perforations in column 10 of the record card control the printing mechanism will now be set forth with particular reference to Fig. 5 in which a plug connection 41 is made between the brush UB which traverses the column 10 and the common ring 42 of the commutator shown in Fig. 3. Each of the segments 40 is wired to a relay magnet 43. Thus, as the record card passes the brush UB, a circuit will be completed through the magnet 43 corresponding to the position in which the perforation occurs.

Thus, for example, assuming a perforation to be present in the "9" index point position in column 10, at the time this position is at the brush UB the commutator brush 39 will bridge the "9" segment 40 and ring 42. The circuit may then be traced from left side of line 44, through cam contacts 45, closed while the card is being analyzed, contact roller 46, brush UB, plug connection 41, common ring 42, brush 39, "9" segment 40, "9" relay magnet 43, wire 47, to right side of line 48. Magnet 43 will close its contacts 43a to provide a holding circuit traceable from line 44 to cam contacts 49, contacts 43a, relay magnet 43, wire 47, to line 48. In this manner, any one of the magnets 43 may be energized in response to a perforation in a related index point position of the card column. After the card has passed the brushes UB, a pair of cam contacts 50 close, completing the circuit from line 44, through contacts 50, relay contacts 43b (closed in the position corresponding to that of the card perforation previously sensed), a relay magnet 51, wire 52, to line 48. Magnet 51 will close a pair of contacts 51a to provide a holding circuit for the magnet which is traceable from line 44, cam contacts 53, contacts 51a, magnet 51, wire 52, to line 48. Each of the magnets 51 controls a group of contacts 51b shown in the lower part of Fig. 5. One blade of each contact 51b is connected to a plug socket 63 and the other blades are connected to wires 54 which terminate in plug sockets 55 from which plug connections 56 may be made to plug sockets 57 from which wires extend to the printing magnets 11. From sockets 63, plug connections 58 may be made to groups of plug sockets 59 which are electrically connected to the brushes 37 which traverse the segments 36 on commutator 34.

The sockets 63 of each group are connected to sockets 59 corresponding to the letters of a selected word. Thus, the sockets of the first group of contacts 51b are connected in Fig. 5 to the sockets 59 associated with the brushes which traverse the segments 36 corresponding to the letters in the word "ALBANY". As pointed out above, the segments 36 contact with brushes 37 as the corresponding type elements approach printing position. Thus, when the type segment having the letter "A" is at printing position, the segment 36 in the left hand column will be at

its brush 37 and a circuit will be completed (if the first group of contacts 51b are closed) which is traceable from left side of line 48, wire 60, brush 38, ring 35, the first segment 36, brush 37, first socket 59 related to the letter "A", plug connections 58 to the "A" sockets 63 in the word "ALBANY", contacts 51b, wires 54, sockets 55, connections 56, to the two printing magnets 11 in the positions in which the letters "A" are to appear. When the segment 36 corresponding to the letter "L" is at the related brush, a similar circuit will be completed to energize another magnet 11 to interrupt the selected type bar in position to print "L". Similarly, magnets 11 in other positions are energized to interrupt the corresponding type bars in the "B", "N", and "Y" positions to complete the printing of the word "ALBANY".

The word to be printed under control of any group of contacts 51b is determined by the manner in which sockets 63 are connected to sockets 59. Thus, for example, with connections such as made to the second group of contacts 51b, the word "TROY" will be printed and if connections are made as to the third group of contacts 51b, the word "YORK" will be printed.

Briefly summarizing the selecting action, upon sensing the perforation in column 10, a circuit is completed to energize one of the relay magnets 43 which sets up its holding circuit through contacts 43a and closes contacts 43b. After all positions have been sensed, contacts 50 close to cause energization of the magnet 51 corresponding to the position in which the perforation occurred. This magnet sets up a holding circuit through contacts 51a and also closes the related group of contacts 51b. The energization of magnet 51 occurs before the type bar begins its ascent and as it advances circuits are completed to each of the groups of printing magnets 11 associated with the contacts 51b, the circuits being completed at differential times through the commutator segments 36 which have been selected for operation and which correspond to the letters of the word to be printed. As the type bars move upwardly to printing position, the record card is being advanced past the usual lower analyzing brushes LB of the machine which brushes sense other perforations in the record card relating to numerical data and control the entry of this information into suitable accumulating mechanism. While the card is passing the lower brushes, the next following card is moving past the upper brushes and a new setting is made on the relay magnets 43. Thus, if the second card contains a perforation in the "8" position, the "8" magnet 43 will be energized and held through its contacts 43a while the "9" magnet 51 is still energized. After all the type elements have passed printing position, contacts 53 will open to de-energize the "9" magnet 51.

Contacts 50 will then close to energize the "8" magnet 51 through the "8" contacts 43b which are closed at this time. Before magnet 50 again opens contacts 53 will reclose to establish the holding circuit for the "8" magnet 51. After this occurs, the contacts 49 will open momentarily to drop the holding circuit of the "8" relay 43 which will again be in condition to receive a setting from the next following record card.

In Fig. 6 is shown a modification in which a greater number of magnets 51 may be employed and in which the card column may contain one or more perforations. The tracing of a specific example will serve to explain the operation of

the system. Assuming a perforation in the "9" and "7" index point positions of the record card, the "9" and "7" relay magnets 43 will be energized in succession as these two positions are sensed by the brush UB and their contacts 43a will provide holding circuits. Each of the magnets 43 controls the shifting of additional relay contacts 43c which are inter-connected as shown. With relay magnets 43 in the "9" and "7" positions energized, upon the closing of cam contacts 50 a circuit will be completed through the path indicated in heavy lines, energizing the magnet 51 labelled "9-7". Energization of this magnet will shift its group of contacts 51b to effect printing of the particular word for which it may have been plug connected in the same manner as explained in connection with Fig. 5. In Fig. 6, only four of the relays 43 have been shown but it will be understood that the remaining eight positions may also be provided with a corresponding increase in the number of contacts 43c and relay magnets 51 so that the number of possible words which may be printed under control of a single card column is considerably increased.

The numerals placed at the left of magnets 51 in Fig. 6 indicate the combinational arrangement of perforations which will cause energization of the particular magnets 51. Thus the uppermost magnet labelled "8-7-6" will be energized when the "8", "7", and "6" positions of the column are perforated. The next lower magnet will be energized when the "9", "7", "6", positions are perforated and so on.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to two modifications, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated and in their operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is as follows:

1. A printing mechanism for completely printing a word under control of a single perforation in a record card, including means for sensing a perforation, individual type carriers for the different letters of the word and means controlled by said sensing means for effecting printing selection of the different letters of the word at different times during a cycle of operation of the mechanism.

2. In a printing mechanism, the combination of a plurality of type carriers each having similarly located type elements representative of the letters of the alphabet, means for moving said carriers to successively present the elements thereon to a printing position, record sensing means and means controlled thereby in response to the sensing of a single perforation for selecting a differently located type element on each carrier for printing a word.

3. In a printing mechanism, the combination of a plurality of type carriers, each having similarly arranged type elements representative of the letters of the alphabet, means for moving said carriers to successively present the elements thereon to a printing position, a single means for sensing a single column of a record card and means controlled thereby for selecting a differently located type element on each carrier to print a predetermined word.

4. In a printing mechanism, the combination

of more than two type carriers, each having type elements representative of the letters of the alphabet, means for moving said carriers to successively present the elements thereon to a printing position, a single means for sensing a single column of a record card and means controlled thereby to effect differential relative displacement of each of said type carriers to effect alignment in the printing position of type elements representing a word.

5. In a printing mechanism, a plurality of type carriers each having type elements representative of the letters of the alphabet, means for moving said carriers to successively present the elements thereon to a printing position, a positioning magnet for each carrier; for differentially positioning the same, a relay for selecting all of said magnets for operations, contacts operated by said relay, and commutator means cooperating with said relay contacts for completing circuits through each magnet at differential times to print a word.

6. In a machine of the class described, comprising in combination, a plurality of type carriers each having type elements thereon representative of the letters of the alphabet, means for reciprocating said carriers, means for differentially stopping said members at positions wherein a type element on each is presented to a printing line to form any desired word or the like and a common controlling mechanism responsive to a single perforation in a column of a record card for controlling said stopping means.

7. In a machine of the class described, the combination with a record card analyzing means for analyzing the perforations of a record card, a group of type carriers having alphabet type thereon, means controlled by said analyzing means in response to a single perforation for causing the selection of a plurality of type, one from each carrier to form a word and means cooperating with said selecting means for determining the word to be formed.

8. In a machine of the class described, a plurality of type carriers each having alphabet type elements thereon, means for moving said carriers to present said elements to a printing line, means including a commutator for stopping any of said elements on the printing line, settable means for selecting the elements to be stopped and analyzing means correlated with a single column of a record card for controlling the operation of said stopping means to select any element on each of said carriers.

9. In a machine of the class described, means for sensing a single column of a record card for combinational code perforations representing a multi-letter word or the like, a plurality of type carriers each having a group of type elements representing the letters of the alphabet and the digits, and means controlled by said sensing means for selecting from each of said carriers any element corresponding to one of the letters or digits represented by the code perforations sensed.

10. In a machine of the class described, a plurality of type carriers each having alphabet type elements thereon, one for each letter of the alphabet, means for moving said carriers to present said elements to a printing line, means including a commutator for stopping any of said elements on the printing line, settable means for selecting the elements to be stopped and analyzing means correlated with a single column of a

record card and responsive to the presence of a plurality of perforations therein for controlling the operation of said stopping means.

11. A printing mechanism for completely printing a word under control of perforations in a single column of a record card, including means for sensing a plurality of perforations in a card column, individual type carriers for the different letters of the word, each carrier having a type element for each letter of the alphabet and means controlled by said sensing means in response to the presence of more than one perforation for effecting printing selection any of the different

letters of the word at different times during a cycle of operation of the mechanism.

12. In a machine of the class described, the combination with a plurality of type carriers, a controlling element comprising a record card having a column of differentially positioned index points, sensing means for sensing said card column and means controlled by said sensing means in response to perforations in any index points in said card column for controlling said carriers to effect a different relative positioning of said carriers for each different arrangement of perforations in the column.

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