

**May 16, 1933.**

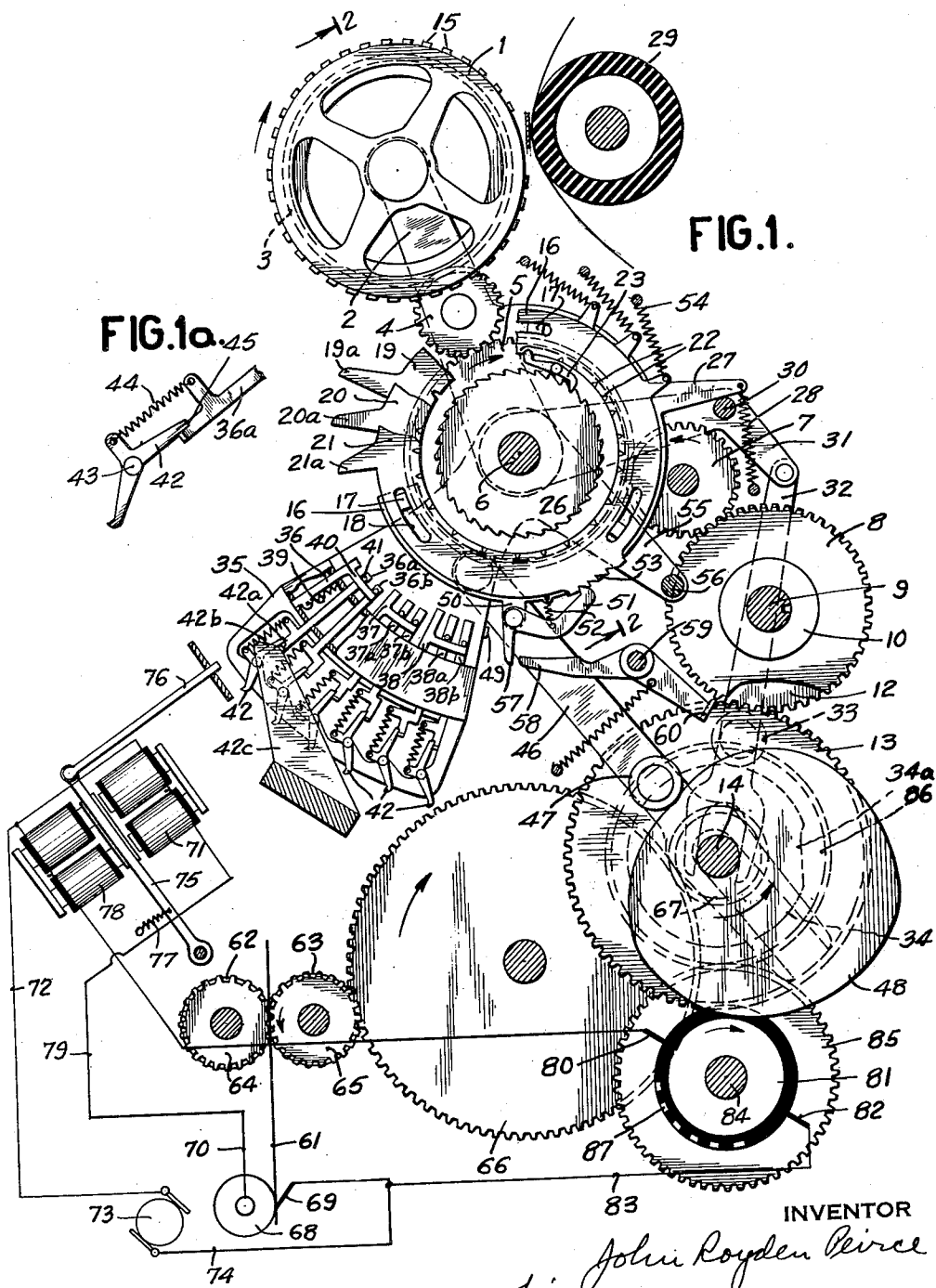
**J. R. PEIRCE**

PRINTING DEVICE

Filed Oct. 29, 1931

**1,909,550**

5 Sheets-Sheet 1



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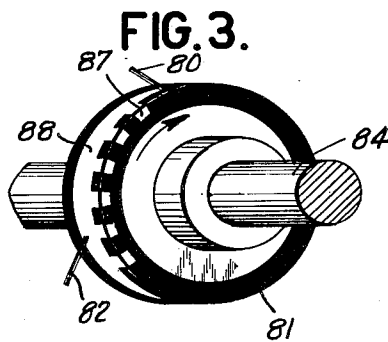
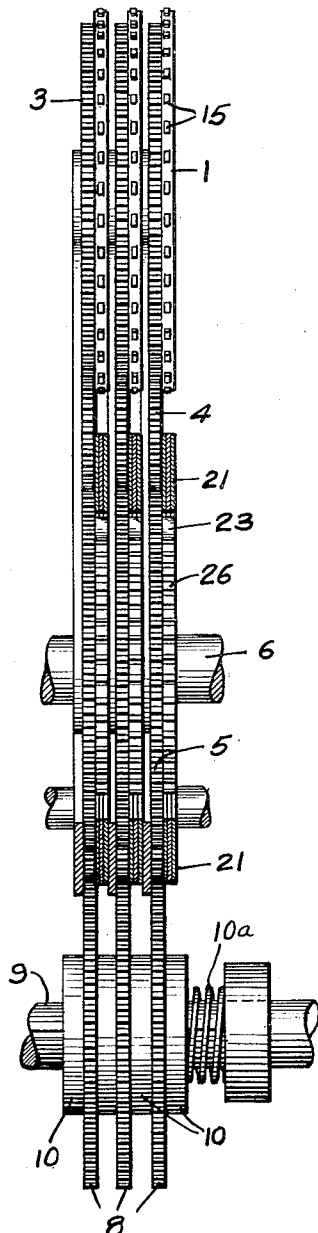
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5 Sheets-Sheet 2

FIG. 2.



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5 Sheets-Sheet 3

FIG.4.

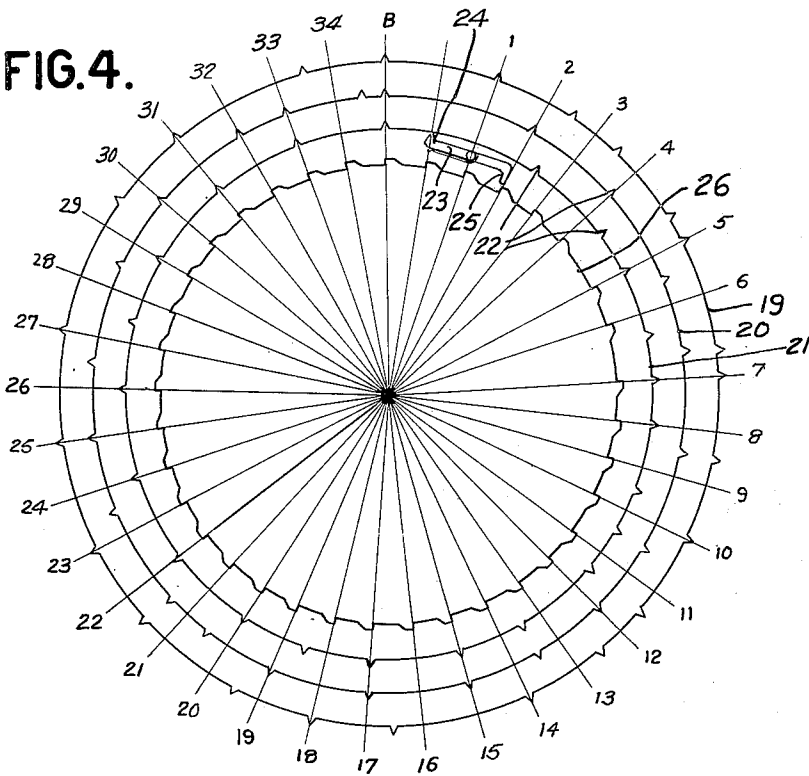
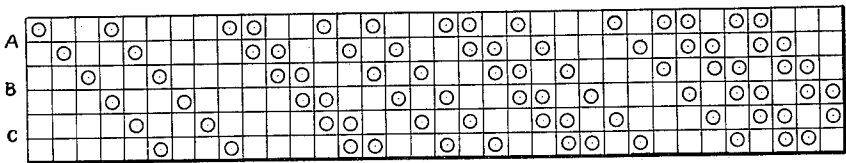


FIG.5.



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5 Sheets-Sheet 4

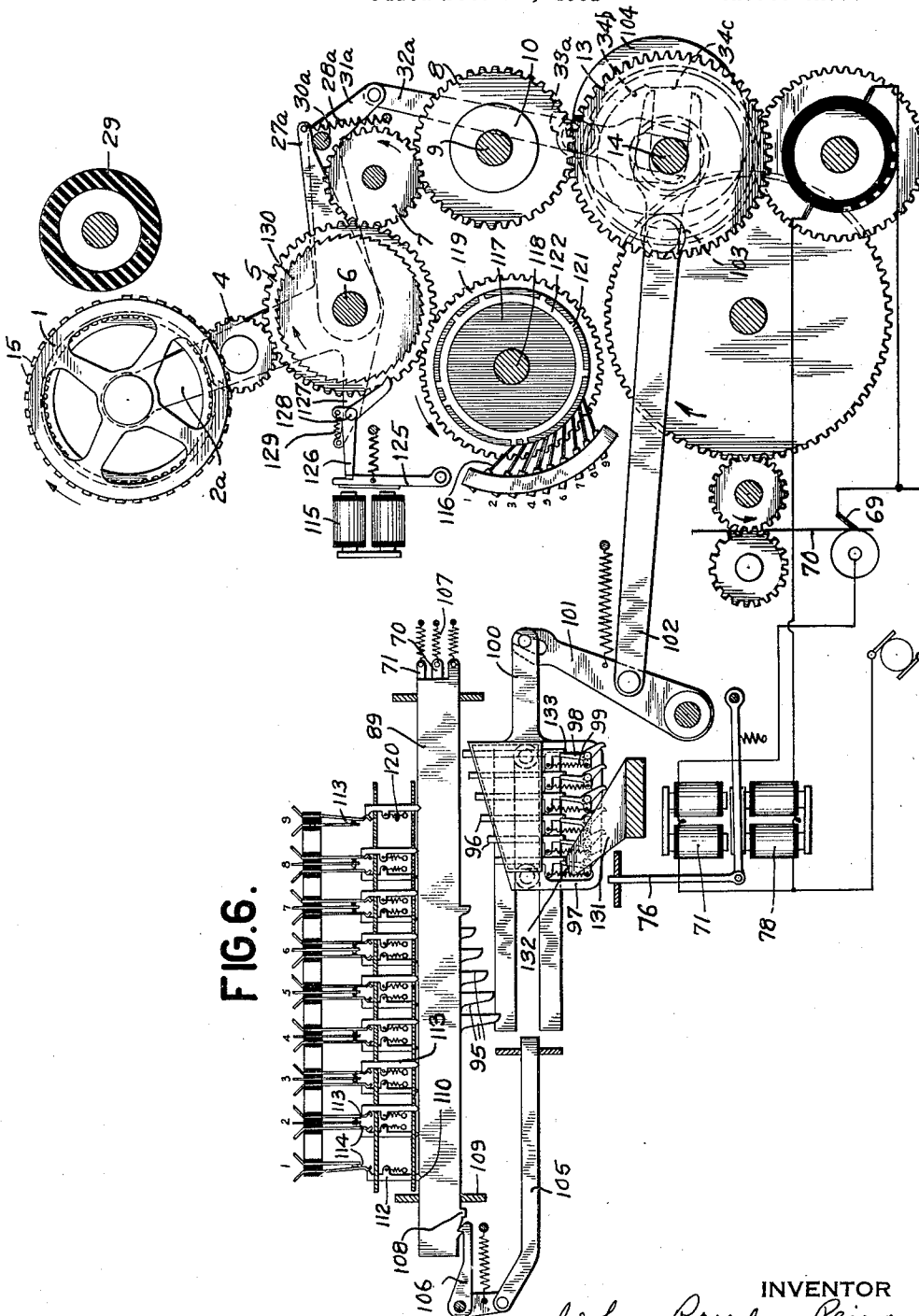


FIG. 6.

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5 Sheets-Sheet 5

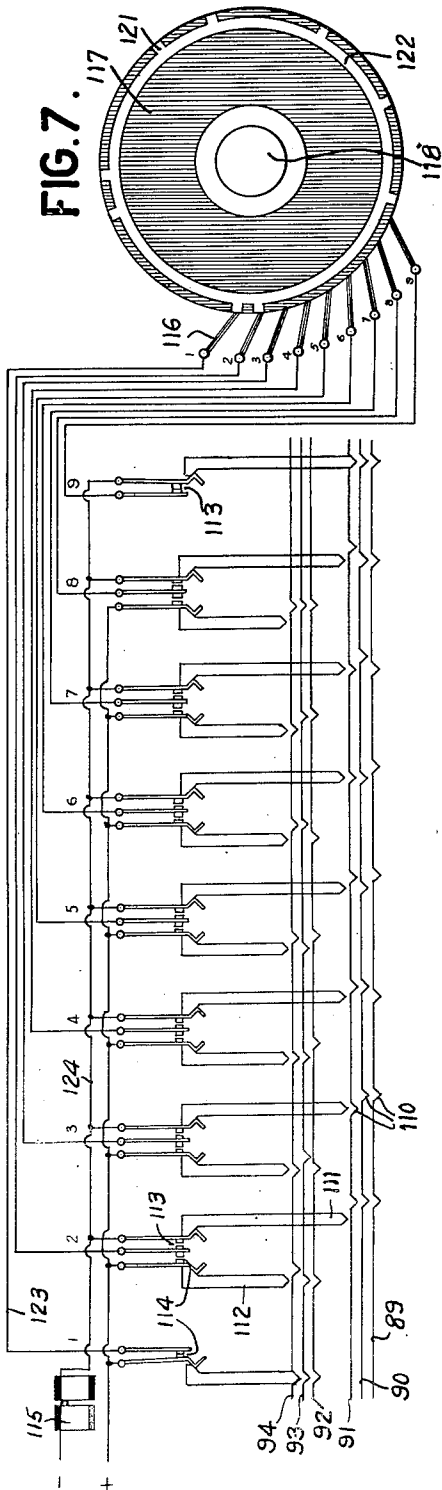


**FIG. 8.**

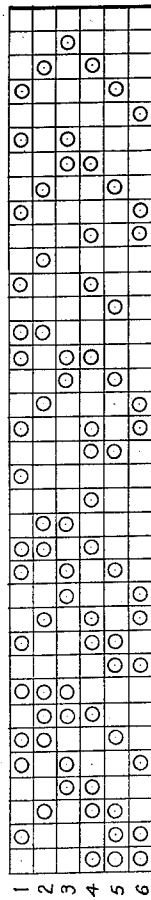
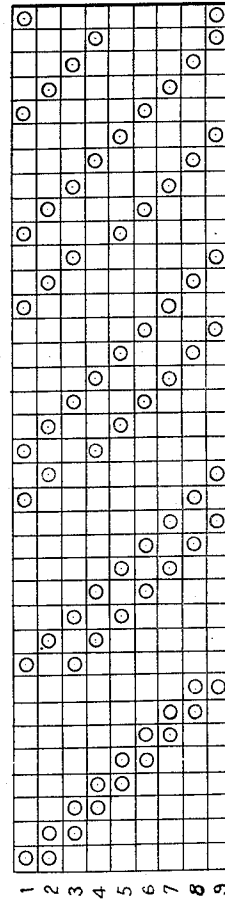


**FIG. 9.**



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## UNITED STATES PATENT OFFICE

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## PRINTING DEVICE

Application filed October 29, 1931. Serial No. 571,782.

This invention relates to printing machines and more particularly to perforated card controlled printing machines.

One of the objects of the invention is to devise a printing machine capable of operating at a very high rate of speed.

Another object is to devise mechanism for controlling the printing from perforated record cards in which the perforations in the card are in combinational arrangement and in which the mechanism is adapted to translate the combinational reading into its ultimate meaning at a high rate of speed.

Another object is to devise a high speed printing mechanism in which it is unnecessary to restore the printing elements to normal position after printing has been effected in one cycle and before printing in the next cycle.

Another object is to devise combinational translating mechanism which need not be restored to normal position before being set for controlling the printing mechanism in the next cycle.

Referring to the drawings:

Fig. 1 is a side elevation showing the important parts of the printing machine.

Fig. 1a is a detail of a part of a controlling device.

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1 on an enlarged scale showing three columns of printing type along with the controlling and operating mechanism associated therewith.

Fig. 3 is an electrical commutator device used in connection with the reading of perforations in the control record cards.

Fig. 4 is a diagrammatic representation of a device for converting combinations of perforations into definite readings and for setting the printing mechanism accordingly.

Fig. 5 is a table indicating the various combinations of perforations used to represent different numerical and alphabetical, etc., characters.

Fig. 6 is a modification of the device shown in Fig. 1 disclosing an electrical controlling device.

Fig. 7 is a wiring diagram of the electrical control device shown in Fig. 6.

Fig. 8 is a table showing a rearrangement of the combinations of perforations to represent the several numerals and letters of the alphabet.

Fig. 9 is a table showing the manner or order in which the combinations of contacts shown in Fig. 7 are analyzed to control the setting of the type carrier.

In carrying out my invention, I employ a plurality of type wheels having the characters to be printed arranged on the periphery thereof in the form of printing type. This type wheel is normally rotating constantly to cause the successive type elements to pass through printing position. The perforated record card is fed under an electric brush which upon sensing a perforation in the card closes an electric circuit which in turn effects the setting of stop devices. These stop devices control setting of several combinational combs. The mechanism which effects the rotation of the type wheel carries a stop pawl which is controlled by the setting of the combs and stops the rotation of the type wheel in a position controlled by the set up of the combs. This brings the particular type on the wheel into stop position in line for printing. This takes place for each column or printing wheel. After all of the printing wheels have been set in position for printing they are then snapped against the platen which carries a sheet of paper to effect printing upon such sheet.

In Fig. 1, the type wheel 1 is shown as rotatably mounted on a carrying arm 2 and is provided with a gear 3 fixed thereto. Gear 3 meshes with a pinion 4 rotatably mounted on the arm 2 and meshing with a gear 5 mounted on a shaft 6. Gear 5 meshes with pinion 7 which in turn meshes with gear 8 carried on a shaft 9. There are as many gears 8 mounted on shaft 9 as there are columns of printing type or wheels 1. Between the several gears 8 are friction washers 10. The washers may be connected to a shaft through a groove 11 so as to be free to move longitudinally on the shaft and constrained to rotate therewith. The gears 8 on the other hand are freely mounted on the shaft 9. Fixed on the shaft 9 is a gear

12 meshing with a gear 13 carried by a driving shaft 14. Shaft 14 causes shaft 9 to rotate continuously thus causing the washers 10 to also rotate continuously. The washers 10 are all pressed against the gears 8 by a spring 10a and tend to turn the latter thus causing the type wheels 1 to rotate. Any of the gears 8 may be locked against rotation to stop the turning of the type wheel 1 to bring any of the type characters or elements 15 to a stop in the printing line.

Integral with the carrying arm 2 is a ring-like member 16 carrying several projecting pins 17 reaching through slots 18 in three combinational combs or rings 19, 20, 21. These combs have notches 22 arranged along their inner periphery and a pawl 23 (Figs. 1 and 4) pivotally mounted on the gear 5 is provided with a tooth 24 reaching across the inner peripheries of the three combs. As the gear 5 rotates the pawl 23 is carried around with the tooth 24 pressing against the inner peripheries of the combs 19, 20, 21. When the pawl reaches a position where three notches 22 in the combs are in alignment the tooth will be pressed into the notches. This will bring the opposite tooth 25 on the pawl into engagement with one of the teeth of a ratchet 26 fixed on the shaft 6 which does not rotate.

This in turn will stop the type wheel and the train of driving gears 4, 5, 7 and 8 so that as the shaft 9 and washers 10 continue to rotate the particular gear 8 will be permitted to slip. The ring 16 is provided with a projection 27 having a spring 28 tending to turn it in a clockwise direction to rock the arm 2, thus moving the type wheel with the type 15 into cooperation with the platen 29. A rod 30 carried between arms 31 mounted on shaft 6 normally holds all of the arms 27 in the position of Fig. 1 thus holding the type wheels away from the platen. A link 32 is provided with a cam follower 33 cooperating with a cam 34 fixed on the drive shaft 14. Once during each cycle of operation a depression 34a in the cam permits the link 32 to drop. The spring 28 will then snap the printing wheel against the platen to effect printing. Also freely mounted on the shaft 6 is a frame 35 carrying several sets of setting stops 36, 36a, 36b, 37, 37a, 37b, 38, 38a, 38b. The stop 36 is provided with a spring 39 tending normally to move it to the right. An arm 40 on the stop 36 cooperates with pins 41 on the stops 36a and 36b to move the latter stops to the right also as viewed in Fig. 1. Stops 36a and 36b cooperate with latches 42 pivoted at 43 to the frame 35. A spring 44 connected between stop 36a and the latch 42 tends to hold the latch in cooperation with a shoulder 45 on the stop 36a. Turning of the latch 42 counterclockwise releases the stop 36a thus permitting the spring 44 to move the stop

to the left. This spring is stronger than spring 39 and so moves the stop 36 to the left also. Stop 36b is similarly constructed and is also adapted when released to move the stop 36 to the left. Stop 36a may thus move to the left carrying stop 36 and leaving stop 36b in its normal position to the right, or the stop 36b may move to the left with stop 36 leaving stop 36a in its normal position to the right. If neither stop 36a nor 36b moves to the left then stop 36 also remains in its position to the right.

The combination combs 19, 20, 21 are provided with projections 19a, 20a, 21a. The projection 19a is adapted to cooperate with any of the stops 36, 36a, 36b. The projection 20a is adapted to cooperate with stops 37, 37a, 37b and the projection 21a is adapted to cooperate with stops 38, 38a, 38b.

The frame 35 is connected to one or more links 46 provided with cam followers 47 co-operating with cams 48 carried by the driving shaft 14. Frame 35 is thus moved clockwise about shaft 6 a distance controlled by the cam 48 and then moves back to its normal position as in Fig. 1. As the frame moves upwardly, if stop 36 is in its outer position, it will engage the projection 19a rocking the comb clockwise around shaft 6. The distance through which stop 36 moves the comb 19 may be designated as 3 steps. If, however, the stop 36b has been released by its latch 42, carrying stop 36 with it, then the stop 36a will engage the projection 19a to rock the comb 19 two steps. If the stop 36a has moved to the left with the stop 36, then the stop 36b will engage projection 19a and rock the comb 19 one step. If both stops 36a and 36b have moved to the left carrying stop 36 with them, then the comb 19 will not be moved at all. In this case, the stop 37 will move into position to engage but not to move the projection 19a.

The projection 20a is similarly controlled by the stops 37, 37a, 37b to set the comb 20. If stops 37a and 37b both move to the left with stop 37 then stop 38 will move into engagement with projection 20a without shifting the latter. Projection 21a is controlled in the same manner by stops 38, 38a, 38b. A special stop 49 is provided to engage projection 21a when the stops 38, 38a, 38b have all moved to the left. It should be noted here that the projections 19a, 20a, 21a are of different lengths which is also true of the sets of stops 36, 37, 38.

Thus, the stop 36 will not interfere with projections 21a, 20a. Nor will the stop 37 interfere with projection 21a. On the other hand, if the stops 36, 36a, 36b have all moved to the left and stop 37 has also moved to the left, the latter stop will still be in position to engage projection 19a without moving the latter. In other words, when the stop 37 moves to the left so as not to effect

a setting of projection 20a, it is still long enough to cooperate with projection 19a.

The ring 16 is provided with a projection 50 on which is pivotally mounted a latching pawl 51 actuated by a spring 52 into cooperation with ratchet teeth 53 provided on each of the combs 19, 20, 21. The pawl 51 prevents turning of the combs under the influence of their springs 54.

Integral with the frame 35 are arms 55 provided with a cross rod 56 adapted to engage a projection 57 on the pawl 51. As the frame 35 reaches the limit of its upward movement the rod 56 engages all of the pawls 51 rocking them out of cooperation with the teeth 53. The reason for this is that one or more of the combs may have been set in a position during the previous cycle, a distance greater than it is to be set during the current cycle and will have been locked in such position by the pawl 51. Thus, the stops 36, 37 or 38 will not on their upward stroke engage the projection on such comb to move the latter, but as the frame 35 approaches the end of its stroke, the rod 56 will move the latches 51 releasing all of the combs so that those that may then be in position beyond the reach of the stops 36a or 37b, for instance, will now be released to be moved by their springs 54 into cooperation with such stops, thus receiving the proper setting for the current cycle of operation.

As the frame 35 now commences to be lowered to its normal position, the rod 56 will release the latches 51 permitting them to engage in teeth 53 to hold all of the combs in their newly set positions. It is, of course, understood that the setting of the several combs under control of the stops 36, 37, 38 is a little beyond the actual operative position and the ratchet teeth 53 will at the same time be slightly beyond the latching position of pawls 51. Thus, as the rod 56 recedes and the pawls move into cooperation with the ratchet teeth 53 the parts will all come to rest in their proper operative positions. As frame 35 is lowered, projections 42a on the stops 36a, etc., will engage a cam edge 42b on a member 42c and will be moved back to normal position and be relatched by latch 42.

The rod 56 is also adapted to engage an arm 58 pivoted at 59 and provided with a projection 60 adapted to cooperate with the teeth of gear 8 to stop their rotation. The stoppage of the gears 8 in this manner takes place just as the combs 19, 20, 21 are being set. This stops the travel of the pawl 23 so that it will not tend to drop into any of the notches 22 until the setting of the combs has been completed. When the setting is complete and the rod 56 begins to return to its normal position, it will release the arm 58 thus releasing all of the gears 8 to permit the parts to again rotate. The pawl 23

then will commence to travel in a clockwise direction until it finds a position in which notches 22 in the three combs are in alignment. At this point, the pawl will drop into the notches at one end and engage the ratchet teeth in wheel 26 at the other end. The engagement of the ratchet teeth 26 causes the stopping of the gear 5 and type wheel 1. After all of the type wheels have been stopped in their several printing positions, then the bar 30 will be dropped to permit the springs 28 to snap the type wheels up against the platen to effect the printing.

The setting of the various stops 36, 37, 38 is effected under control of perforated record cards 61 which are fed one after another by feeding rollers 62, 63 which are driven by pinions 64, 65. These pinions are driven by a gear 66 meshing with a pinion 67 on the driving shaft 14. The cards are fed downwardly between a common contact roller 68 and a sensing brush 69. The roller 68 is electrically connected by a wire 70 to one side of an electromagnet 71. The other side of this magnet is connected by wire 72 to one side of a source 73. The other side of this source is connected by a wire 74 to the sensing brush 69. The armature 75 of the magnet 71 carries a plunger 76 adapted to reach into the path of the several latching members 42. The frame 35 is moved upwardly synchronously with the feeding of the card under the sensing brushes 69.

Each brush 69 cooperates with one column on the record card 61. Each column is divided into six index point positions according to the arrangement of Fig. 5. Perforations in various combinations in any particular column are adapted to represent various values. As each index point position is passing under the sensing brush 69 a corresponding one of the latches 42 will be approaching the plunger 76. If there is a perforation at the particular position in that column on the card the magnet 71 will be energized moving the plunger 76 into the path of the particular latch 42. Thus, as the latch 42 passes the plunger 76, the latch will be rocked out of cooperation with the stop 36a or 36b, etc. As soon as one of the latches 42 has been set the plunger 76 is immediately restored to its normal position out of the way of the next latch 42 so as not to interfere with it. Now if a perforation appears at the next index point position in the column, the plunger 76 will be set again before the corresponding latch 42 reaches it so that such latch may be rocked. In this way, as a given column passes under the sensing brush 69 one or more of the latches 42 will be tripped depending upon the combination of perforations in that column.

The duration of energization of the magnet 71 is equal to the time that it takes for

the perforation to pass under the brush 69. As soon as the brush rides out of the perforation breaking the circuit, the magnet becomes deenergized and a spring 77 will restore the armature and the plunger 76 to normal position. In order to effect very rapid operation of the device an additional electromagnet 78 may be provided on the opposite side of the armature 75. One side of this magnet is connected to wire 72 while the other side is connected through wire 79 to a brush 80 cooperating with a commutator 81. Another brush 82 on this commutator is connected by wire 83 and wire 74 to the other side of the source. The commutator 81 is mounted on a shaft 84 on which is fixed a gear 85 meshing with a gear 86 on the driving shaft 14. The commutator is provided with six contact segments 87 connected to a common contact strip 88. The brush 82 is constantly in contact with the strip 88 and the brush 80 is timed to engage each of the segments 87 just after the brush 69 has ridden out of a perforation in the card to break the circuit through magnet 71. The commutator 81 thus energizes the magnet 78 as soon as magnet 71 becomes deenergized. This will effect a quicker and more positive restoration of the plunger 76 than would otherwise be effected by spring 77 alone. Thus, the plunger 76 after having tripped one of the latches 42 will be restored very rapidly and will thus permit a more rapid operation of the frame 35. While it has been said that the shaft 6 does not rotate, this shaft may be fixed to the arms 31. When these arms rock to cause the type to strike the platen, the ratchets 26 are rocked an equal distance. The pawls 51 carried by rings 16 cause the combs 19, 20, 21 to move a similar distance. Gears 5 are then permitted to turn an equal distance due to their constant tendency to turn and helped by the cooperation of the combs with pawl 23. Thus, when the type wheel moves against the platen, the corresponding movement of gear 5 makes it unnecessary for pinion 4 to roll on gear 5 and change the position of the type wheel.

In Fig. 6, I have shown a modification of the device in which six combs 89, 90, 91, 92, 93, 94 (see also Fig. 7) are employed. These combs are provided with projections 95 of different lengths reaching into the paths of movement of six stops 96 carried by a frame 97. The stops 96 are normally held in their upper position by latches 98, springs 99 being provided to hold the latch in operative position. The frame 97 is connected through an arm or arms 100 to rocking arms 101 which in turn are connected by links 102 having cam followers 103 cooperating with cams 104 on the operating shaft 14. The frame 97 moves to the left synchronously

with the feeding of the card 70 so that as each index point position on the card passes under the sensing brush 69, a corresponding one of the latches 98 will be approaching the plunger 76. Energization of magnet 71 will set the plunger 76 to rock the latch 98, releasing corresponding stop 96 which will be moved downwardly by the spring 99. Each of the stops 96 cooperates with a corresponding one of projections 95. When the frame 97 reaches the end of the stroke to the left those of the stops 96 that are in their upper position will engage their projections 95, moving the combs 89, etc., slightly to the left. At the same time the frame 97 will engage a link 105 rocking the latch 106 out of cooperation with the combs 89, etc.

Whenever a stop 96 has been lowered by reason of the setting of the plunger 76 corresponding to the perforation in the column on the card, a corresponding projection 95 will not be engaged by the plunger 96 so that when the latch 106 is lowered, it will release that particular comb to permit the latter to be moved to the right under the action of its spring 107 until a stop projection 108 engages a stop bar 109.

The frame 97 starts back to its normal position to the right immediately, thus permitting the latch 106 to move back into cooperation with the combs 89, etc. Those combs which have not moved one step to the right will thus be relocked in their normal positions while those that have moved to the right will remain in such position. If any of the combs 89, etc., had moved to the right during the previous cycle they will not be restored until the stops 96 in the current cycle engage the projections 95 to move the combs to the left. Any combs thus restored will be latched in such position when the latch 106 moves upwardly. Combs 89, etc., are provided with notches 110. Three of the combs 89, 90, 91 cooperate with contact operating fingers 111 and the other three combs 92, 93, 94 cooperate with another set of contact operating fingers 112. Wherever three of the notches 110 in the combs 89, 90, 91 are in alignment, corresponding finger 111 will drop into the notches, thus closing contacts 113 and wherever the notches in the three combs 92, 93, 94 are in alignment a corresponding finger 112 will drop into the notches closing contacts 114. In this way, the various sets of contacts 113, 114 will be closed thus establishing a circuit through an electromagnet 115 at a time in the operation of the type wheel 1, depending upon which of the contacts 113, 114 are closed which in turn, of course, depends upon the particular arrangement of the perforations in the column on the record card 70. The contacts 113, 114 are variously connected to several commutator brushes

116. These brushes cooperate with commutator 117 mounted on the shaft 118 on which is also fixed a gear 119 meshing with the gear 5.

5 The fingers 111, 112 are provided with springs 120 tending to lower them into the notches 110. If a finger is in its lowered position in the notches, movement of one of the combs 89, etc., will cam the finger out  
10 of position to permit the corresponding contacts 113, 114 to open. After the combs have been set under control of the reading of the card and the contacts 113, 114 close to correspond to the perforations in a particular column, the rotation of commutator  
15 117 will thereafter close the circuit through electromagnet 115 at a time depending upon which contacts 113, 114 have been closed. The commutator 117 is provided with contact segments 121 which are interconnected  
20 by a conducting ring 122. The segments 121 are located at varying distances apart on the periphery of the commutator. At a particular point in the rotation of the commutator, two of the segments 121 will be  
25 simultaneously engaged by the first and ninth brushes 116. If the setting of the combs has effected closure of the first and ninth set of contacts 113, 114 then when  
30 the first and ninth brushes 116 are in contact with segments 121 a circuit will be closed from the positive side of the line to the first set of contacts 114 then through  
35 wire 123 to the first brush 116 then through the segments 121 and ring 122 to the ninth brush 116, the ninth set of contacts 113, wire 124, magnet 115 and back to the other side of the line.

40 If a different set of contacts 113, 114 is closed then the completion of the circuit through magnet 115 will take place at a different time in the operation of the commutator 117 through different segments 117 and brushes 116. Thus circuits representing  
45 the different characters arranged according to Fig. 8 will take place at different times according to the combination of brushes 116 as indicated by the table in Fig. 9.

50 Here, it will be seen that the first and second of the brushes 116 will be interconnected through the segments 121, and ring 122 and at the next point in the cycle, the second and third of the brushes 116 will be  
55 in position to close the circuit through segments 121 and ring 122 to the magnet 115. The successive points in the cycle at which the several brushes 116 combine to close the circuit through the magnet 115 are shown by  
60 this table of Fig. 9. Thus the circuit through the magnet 115 is closed at a point in the cycle of operation of the machine depending upon the combination in which contacts 113, 114 are closed which in turn depends  
65 upon the reading taken from the control

card 70. The commutator 117 operates synchronously with the type wheel 1 so that as each combination of brushes 116 is interconnected through the segments 121 the corresponding type character 15 will be arriving  
70 at the printing position so that the closure of the circuit through the magnet 115 will stop the type wheel with the particular type character in position to print.

Magnet 115 as shown in Fig. 6 operates  
75 an armature 125 which acts as a latch for a pawl 126 carried by a branch 127 of the arm 2a. The pawl 126 is pivoted on this branched arm at 128 and is actuated by a spring 129 into latching position with  
80 respect to a ratchet wheel 130. The ratchet 130 is fixed with respect to gear 5 so that when the magnet 115 is energized the pawl 126 will be released to stop the ratchet 130 and gear 5, thus stopping the  
85 type wheel 1 for printing. A projection 27a on the carrying arm 2a cooperates with a rod 30a carried by arms 31a which are in turn actuated by links 32a having cam followers 33a cooperating with cams 34b.  
90

When the followers 33a drop into the depressed portion 34c of the cams the spring  
28a will rock the type wheel into printing cooperation with the platen 29. It will be noted that when the gear 5 is stopped gear  
95 119 and commutator 117 also stop. When these parts are later released for operation again, they are thus still in the same relative positions and the type elements 15 will continue to move in synchronism with the segments 121. Thus regardless of the position  
100 at which the type wheel is stopped in any cycle of operation or the position at which the commutator 117 commences to turn the parts will not be brought to a stop  
105 in the next cycle until the proper combination of segments 121 cooperates with the brushes 116, corresponding to the setting of the contacts 113, 114. Whatever the setting  
110 of the contacts 113, 114, the closure of the circuit through the magnet 15 will take place when the corresponding segments 121 cooperate with the proper brushes 116. This  
115 will bring the proper type elements 15 to a stop in position for printing. After the combs 89, etc., have been set under control of the stops 96 the frame 97 will then commence to move back toward the right to the position of Fig. 6. The frame 97 will thus  
120 release the link 105 permitting the latch 106 to cooperate with the combs to hold them in their set positions. A member 131 having a cam edge 132 is in position to be engaged by a projection 133 on each of the stop members  
125 96 as the frame 97 moves toward the right. This will cam the stops 96 that may have been lowered, back to their upper or normal position and the spring 99 will snap the latch 98 into position to hold the stop 96 up.  
130

When a particular set of brushes 116

closes a circuit through segmental contacts 121, magnet 115 is energized, attracting its armature 125 and releasing latch 126. The latch then snaps against the ratchet wheel 130 slightly in advance of the next approaching tooth. When arm 27a rocks to effect printing the arm 127 lifts latch 126 slightly, thus permitting ratchet 130 and gear 5 to follow the swinging movement of the type wheel and the pinion 4 does not roll on gear 5 to shift the position of the type wheel. All of these movements which take place after the brushes close the circuit through the segments 121 permit the segment wheel 117 to turn far enough to break the circuit through the magnet 115 to release armature 125. Thus, when the latch pawl 126 is lifted by the arm 127 the armature 125 will snap into position under the left end of pawl 126. Then when arm 27a is restored to normal position, lowering arm 127 with the pawl 126, the latter, being held up at its left end by armature 125, will be lowered at the point 128. This will remove the right end of the pawl from the ratchet wheel. The parts will now be in the positions of Fig. 6 and the type wheel and the segment wheel 117 will resume their turning.

It will be noted in Fig. 5 that the arrangement of the combinations of perforations to represent the several characters is in step by step progression. In Fig. 8, the same combinations of perforations are employed to represent the various characters but they are scattered as will be seen. This scattering is for the purpose of arranging the time of closure of the circuit through the various combinations of brushes 116 in the progressive order indicated in Fig. 9.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its 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:

1. In a perforated record controlled printing device, a wheel carrying a plurality of printing type elements, a platen associated with said wheel, means for rotating the wheel, means for feeding perforated record cards, means for analyzing the card, a plurality of stops movable synchronously with the feeding of the card, means controlled by the analyzing means for setting said stops and means controlled by the stops for setting the type wheel with respect to the platen.

2. In a printing device, a type wheel,

means for driving said wheel, a plurality of combination combs, a pawl cooperating with said combs, a ratchet adapted to cooperate with the pawl under control of the combs for stopping the type wheel and perforated card control means for setting the combs to control the pawl to determine the position in which the type wheel is stopped.

3. In a printing device, a type carrier movable to different printing positions, means for moving said carrier, a pawl associated with the type carrier also operated by said driving means, a fixed ratchet associated with the pawl and adapted to cooperate therewith to effect setting of the type carrier and a set of combination combs for controlling the cooperation between the pawl and the ratchet.

4. In a printing device, a type carrier movable to various printing positions, means for operating the carrier including a rotatable gear, a stop pawl carried by said gear, a fixed ratchet adapted to cooperate with the pawl to stop the type carrier for printing and a set of combination combs for determining the point of cooperation between the pawl and the ratchet.

5. In a printing device, means for sensing perforations in control cards, a stop member adapted to be set under control of said sensing means, a plurality of combination stops adapted to be set under control of said first named stop, a rotatable type carrier and means controlled by the combination stops for effecting setting of the carrier.

6. In a printing device, means for sensing perforations in control cards, a stop member adapted to be set under control of said sensing means, a set of combination stops adapted to be set under control of said member, a normally movable type carrier and means controlled by the combination stops for stopping the type carrier in position for printing.

7. In a printing device, means for sensing perforations in a control card, a member adapted to be set under control of said sensing means, a set of combination stops movable with respect to said member and adapted to be variously set thereby and a plurality of type elements adapted to be set in printing position under control of said stops.

8. In a printing device, means for sensing perforations in record cards, a set of combination stops movable in one direction and then in a reverse direction to normal position, means controlled by said sensing means to effect variable setting of said stops while the latter are moving in one direction, means for restoring said stops to normal setting during their return stroke and printing means controlled in accordance with the setting of the stops.

9. In a printing device, a type wheel, a

platen associated therewith, means for normally effecting continuous rotation of said wheel in one direction, perforated record controlled means for selectively stopping said wheel in printing position and means operative when the wheel is stopped in printing position to effect cooperation of the wheel with the platen.

10. In a printing device, means for feeding perforated record cards, means for sensing perforations in the cards, a stop member, an electromagnet controlled through said sensing means for effecting energization of said magnet to set said member, a second electromagnet adapted to effect restoration of said member after each setting and printing means controlled by said member.

11. In a printing device, a type carrier, means for controlling setting of said carrier, an electromagnet for effecting setting of said control means, means for feeding record cards, perforation sensing means for sensing successively presented index point positions on the cards for effecting energization of said magnet when a perforation is sensed at one of the index point positions and a second electromagnet adapted to be energized after the sensing of each index point position to restore said control means to normal position.

12. In a printing device, means for analyzing index point positions on a record card, means for feeding a record card with respect to said analyzing means, a set of combination stops movable synchronously with the feeding of the card, a setting member controlled by said analyzing means to effect setting of said stops and a plurality of type elements adapted to be selectively set in printing position under control of said stops.

13. In a printing device, means for sensing perforations in a record card, a plurality of combination combs adapted to be set under control of said sensing means, a plurality of electric contacts adapted to be variously closed under control of said combs, an electromagnet adapted to be energized through circuits controlled in accordance with the setting of said contacts and a type carrier adapted to be differentially set under control of said magnet.

14. In a printing device, means for sensing perforations in record cards, a plurality of circuit closing contacts adapted to be closed in various combinations under control of said sensing means, an electromagnet, a commutator device adapted to close a circuit through said magnet at a time in the cycle of operation of the machine controlled by the setting of said contacts and a type carrier normally movable continuously in one direction and adapted to be stopped in

printing position under control of said magnet.

15. In a printing device, means for feeding perforated record cards, means for sensing successive index point positions on the cards while the latter are in motion, a set of movable stop members, means controlled by said sensing means for variously setting said stop members, a plurality of combination combs adapted to be set under control of said stop members, a plurality of electric contacts adapted to be variously closed under control of said combs and a type carrier differentially set in printing position under control of said contacts.

In testimony whereof I hereto affix my signature.

JOHN ROYDEN PEIRCE.

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