Dec. 4, 1951 R. H. SAMPSON 2,577,092

RECORD CONTROLLED ALPHABETIC PRINTING MACHINE

Filed Dec. 20, 1947 2 SHEETS—SHEET 1

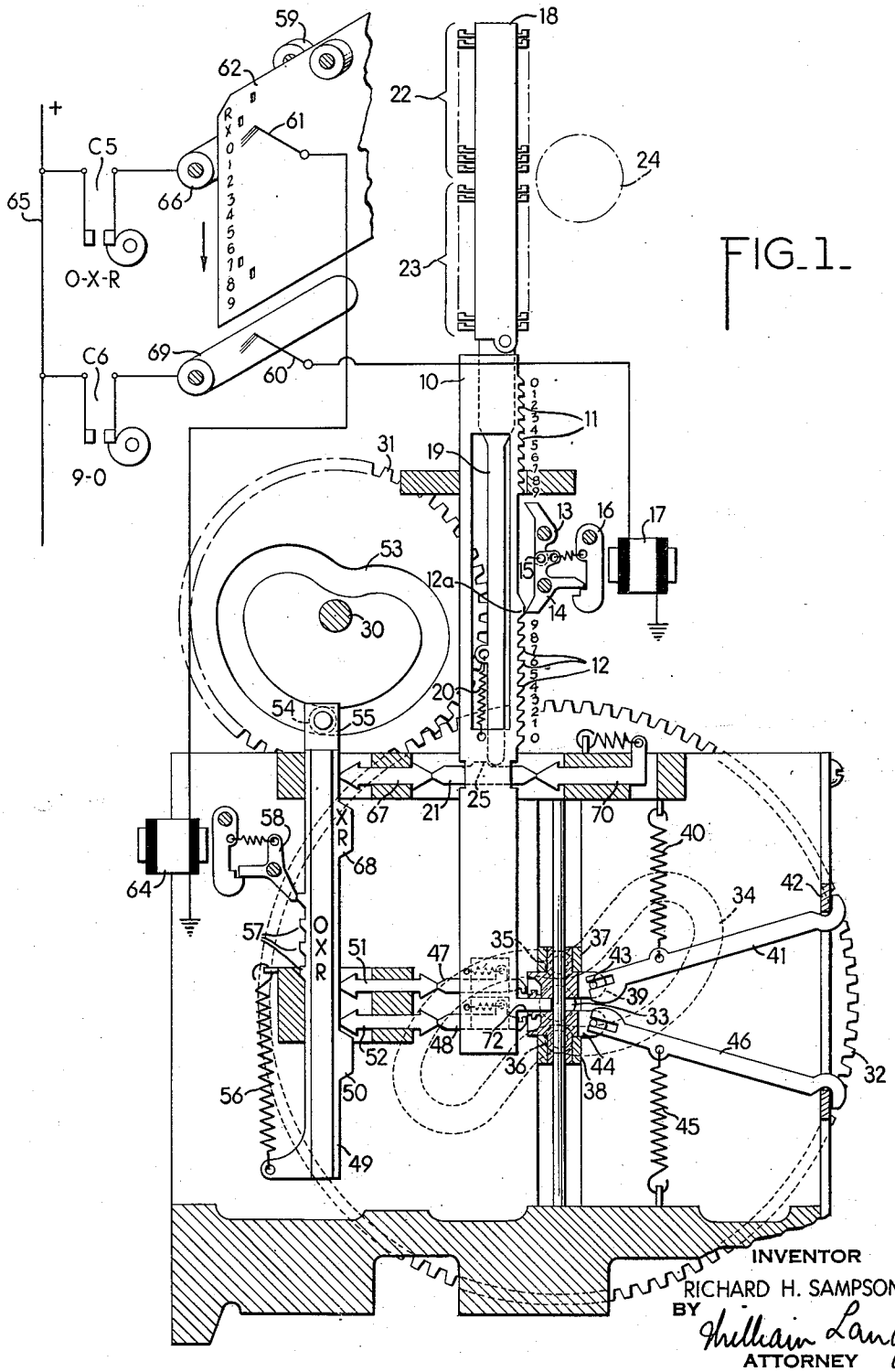

FIG. 1.

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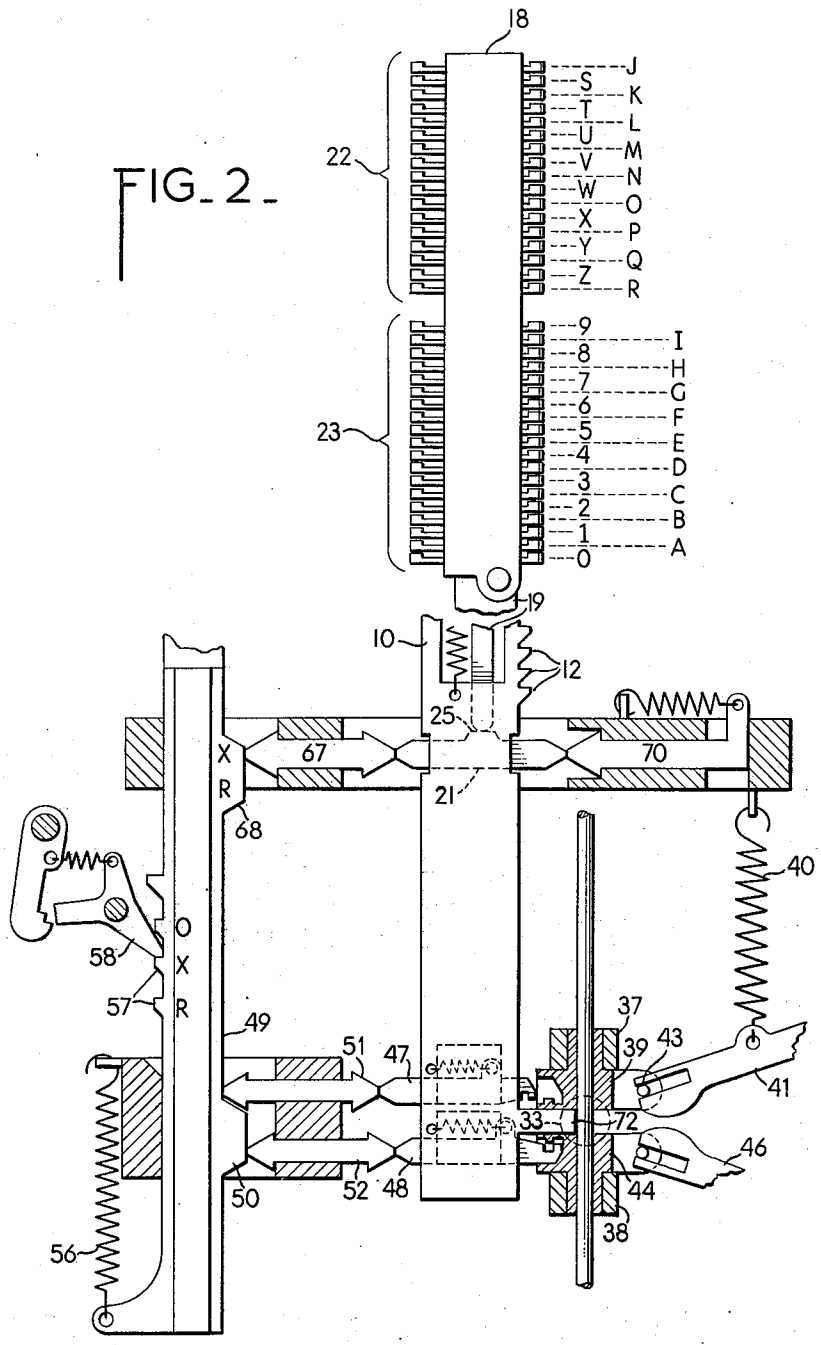
FIG. 2.



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RECORD CONTROLLED ALPHABETIC PRINTING MACHINE

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5 Claims. (Cl. 101—93)

1

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

The principal object of the invention is to provide an improved and simplified mechanism for controlling the positioning of a type carrier for the selection of alphabetic and numeric type elements in response to the sensing of combinational perforations in a column of a record card.

A more specific object of the invention is to provide a type carrier with selective mechanism to either elevate the carrier to raise one set of type elements past a platen or to lower the carrier to cause a second set to pass the platen in the opposite direction. Provision is made to effect an initial displacement of the type on the carrier, so that the direction of movement of the carrier selects one set of type and the displacement effects a further selection of type within the sets.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a diagrammatic view of the printing mechanism showing the essential operating elements thereof.

Fig. 2 is a view of parts in Fig. 1 in an operated position.

In the drawings, 10 represents a carrier mounted for reciprocation and provided with an upper set of stopping teeth 11 and a lower set of stopping teeth 12 which move past the stop pawls 13 and 14, respectively, accordingly as the carrier is lowered or raised. The pawls 13, 14 are articulated at 15 and normally latched in the position shown by engagement of an arm of pawl 14 with armature latch 16 of a magnet 17. In the home position of the parts as in Fig. 1, a restoring tooth 12*a*, which is higher than teeth 12, engages pawl 14 to rock and hold the pawls in their latched positions.

Type head 18 is provided with a stem 19 slidably mounted on the carrier 10 and biased downwardly by a spring 20 against a horizontally slidable stop 21 which is suitably mounted on the carrier. Head 18 is provided with an upper set of type elements 22 and a lower set of type elements 23, normally located above and below the center line, respectively, of platen 24 for the purpose of raising one set of type elements past the platen or to lower the carrier to cause a second set to pass the platen in the opposite direction, thereby increasing the speed of operation of the printing mechanism. The spacing of the type elements is half that of the teeth 11, 12, so that, when pawl 13 engages the 9, 8, 7, 6, etc. teeth 11, the second, fourth, sixth, etc. elements 22 from the bottom will be presented at the printing line opposite platen 24. Likewise, when the pawl 14 engages the 9, 8, 7, 6, etc. teeth 12, the first, third, fifth, etc. elements 23 from the top will be presented at the printing line. Stop 21 has a rise 25 which, when shifted to the right to the position of Fig. 2, will raise the head 18 the distance between adjacent elements 22 to thereby select the alternate elements. Thus, if the carrier is raised with head 18 in its lower position, pawl 14 will select a type element 23 of the group comprising the topmost and alternate elements. If the carrier is raised with head 18 in its upper position, pawl 14 will select a type element 23 of the group comprising the remaining elements 23.

2

In the similar manner, if the carrier is lowered, with head 18 in its lower position, pawl 13 will select a type element 22 of the group comprising the second lowest and alternate elements and, if the carrier is raised with head 18 in its upper position, pawl 13 will select a type element 22 of the group comprising the remaining elements 22.

The manner in which the carrier is reciprocated will now be explained. 30 represents a main or cyclic shaft of the apparatus which makes one revolution for each operation and is driven from any suitable source of power. A gear 31 thereon drives gear 32 on a shaft 33 at a 2 to 1 ratio, so that shaft 33 makes a half revolution for each operation. This shaft has a box cam 34 secured thereto in whose cam groove rollers 35 and 36 ride. These rollers are at the ends of cross bars 37 and 38, respectively, guided for vertical movement so that in a half revolution of cam 34 bar 37 moves up and down again while bar 38 moves down and up again.

Abutting bar 37 and also guided for vertical movement is an actuator 39 urged upwardly through a spring 40 acting on a lever 41 pivoted at 42 and articulated with the actuator 39 at 43. In a similar manner, actuator 44 is urged downwardly against bar 38 through a spring 45 acting on a lever 46. Thus, as the bars reciprocate, the actuators follow under the influence of their springs.

The lower extremity of carrier 10 supports a pair of spring-urged, horizontally slidable interposers 47 and 48 whose right hand ends are hook-shaped for cooperative engagement with actu-

ators 39 and 44, respectively, when the interposers are shifted to the right. Such shifting is effected by a control slide 49 which has a cam surface 50 engageable with intermediate slides 51, 52, so that as the slide is elevated, cam 50 will first shift slide 52 and interposer 48 and then release these and shift slide 51 and interposer 47 and then release the same. This control slide is differentially positionable to stop in one of four positions under control of a record card in the following manner.

Shaft 30 through a box cam 53 and cooperating roller 54 reciprocates a cross bar 55 to allow spring 56 to elevate control slide 49, whereupon teeth 57 designated O, X, R will pass stopping pawl 58.

The shaft 30, through gearing (not illustrated) drives feed rollers represented at 59, which advance a well known form of perforated record card past sensing brushes 60 and 61, which are spaced apart so that the index point positions in a column of card 62 are traversed in the order O, X, R by brush 61 and then 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 by brush 60. While the O, X, R positions of the card column pass brush 61, the carrier 10 remains in its home position of Fig. 1 and the control slide 49 rises to present the O, X and R teeth 57 to pawl 58 as the corresponding card positions are at brush 61. If a hole is encountered in one of these positions, magnet 64 is energized through a circuit from + side of line 65, through cam controlled contacts C5 (closed only during the sensing of the O, X, R positions), contact roller 66, hole in the card, brush 61 and magnet 64 to ground. If the hole were in the X position, slide 49 would have been stopped in the position shown in Fig. 2, where cam 50 shifts slide 52 and interposer 48 to the right, so that the hooked end of the lower interposer 48 reaches under a knob on actuator 44.

If the slide had stopped at its O position. the cam 50 would have effected the same shifting of actuator 52. With slide 49 stopped in its R position, cam 50 shifts and holds interposer 47 to the right in coupling engagement with actuator 39. If no O, X or R hole is present, the slide 50 rises to its extreme position, one step beyond the R stopping position wherein cam 50 also shifts and holds interposer 47. In brief, therefore, an O or X hole in the card will couple the carrier 10 for downward operation and an R hole or absence of any O, X or R hole will couple the carrier for upward operation.

Slide 49 has integral therewith a second cam 68 which through an intermediate slide 67 shifts slide 21 to the right. With slide 49 in its X position (as in Fig. 2) or in its R position, slide 21 is shifted to adjust the type head upwardly with respect to the carrier 10. With the slide 49 in its O or blank positions, the cam 68 is below or above the intermediate slide 67, respectively, so that slide 21 is in its position of Fig. 1 after the O, X and R positions of the card have been sensed.

The four conditions may be tabulated as follows:

O hole in card—Type head normal—Carrier coupled to 44

X hole in card—Type head shifted—Carrier coupled to 44

R hole in card—Type head shifted—Carrier coupled to 39

No hole in card—Type head normal—Carrier coupled to 39

As the 9 hole is now sensed by brush 60, the bars 37 and 38 begin to rise and lower, respectively, with the hooked ends of interposers 47, 48 engaging the knobs on the actuators, so that they will remain held in shifted position as they move away from the intermediate slides 51, 52. An impulse to magnet 17 will thereafter be directed in accordance with the location of the second hole in the card column traceable from + side of line 65, cam controlled contacts C6 (closed during the sensing of the 9 to 0 position by brush 60), contact roller 69, hole in the card, brush 60 and magnet 17 to ground. Incidental release of pawls 13, 14 will interrupt the carrier in the selected position in its upward or downward movement and with type head 18 in normal or shifted position.

Cam 53 returns slide 49 while the carrier is advancing to print selecting position, so that the intermediate slides 51, 52 and 67 are freed for restoration.

When a carrier is interrupted by pawl 13 or 14, its actuator 39 or 44 is also stopped but the bars 37, 38 continue to the full extent of their excursion and shortly thereafter, as is usual, type hammers (not shown) take an impression from the positioned type element on to a record sheet on platen 24.

During the return of the carrier, either up or down, slide 21 engages a spring actuated element 70 which shifts the slide to the left and with it the intermediate slide 67. As bars 37, 38 restore, they will pick up the displaced actuators 39, 44 and these in turn will engage an extension 72 on the carrier to thereby positively restore the same. This action releases interposers 47, 48 which under tension of their springs will return to normal position and, as they reach home position, will engage and return the intermediate slides 51, 52. Thus, at the end of a cycle of operation the parts are returned to the position of Fig. 1 in readiness for a further cycle of operations, during which another record card 62 passes brushes 61, 60.

While there have 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.

What is claimed is:

1. In a printing mechanism in combination, a carrier mounted for reciprocation, a first actuator for elevating the carrier, a second actuator for depressing the carrier, an interposer for connecting the carrier to the first actuator, another interposer for connecting the carrier to the second actuator, a type head mounted on the carrier having a normal position thereon and shiftable to an alternate position, a device for shifting the type head on the carrier, means for sensing a record card and means controlled thereby for selectively operating said interposers, to cause the carrier to be connected to either said first or second actuator, and for selectively operating said shifting device, in accormdance with the location of the perforation sensed, whereby the carrier will be elevated or depressed depending upon which interposer is operated and said movement will be with the head in either normal or

alternate position, depending upon whether or not the shifting device is operated.

2. The invention set forth in claim 1 in which the means controlled by the sensing means comprises a cam element mounted for reciprocation and control means therefor to cause said cam element to take any of a series of positions, said element being configured so as to selectively actuate the interposers and shifting device in a different relative manner for each of said series of positions.

3. The invention set forth in claim 1 in which a second sensing means is provided to sense digit representing perforations in the card, means for moving the actuators to shift the carrier in the selected direction, and means controlled by said second sensing means to selectively interrupt the movement of the carrier at selected points in its travel in accordance with the value of the digit perforation sensed.

4. In a printing mechanism in combination, a carrier mounted for reciprocation, a first actuator for elevating the carrier, a second actuator for depressing the carrier, an interposer for connecting the carrier to the first actuator, another interposer for connecting the carrier to the second actuator, a type head mounted on the carrier having a normal position thereon and shiftable to an alternate position, a device for shifting the type head on the carrier, and means for selectively operating said interposers, to cause the

carrier to be connected to either said first or second actuator, and for selectively operating said shifting device, whereby the carrier will be elevated or depressed depending upon which interposer is operated and said movement will be with the head in either normal or alternate position, depending upon whether or not the shifting device is operated.

5. The invention set forth in claim 1 in which the interposers and shifting device each comprises a slide mounted on the carrier for movement transversely to the direction of travel of the carrier and in which operation of the same is effected by movement in said transverse direction.

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