

April 10, 1934.

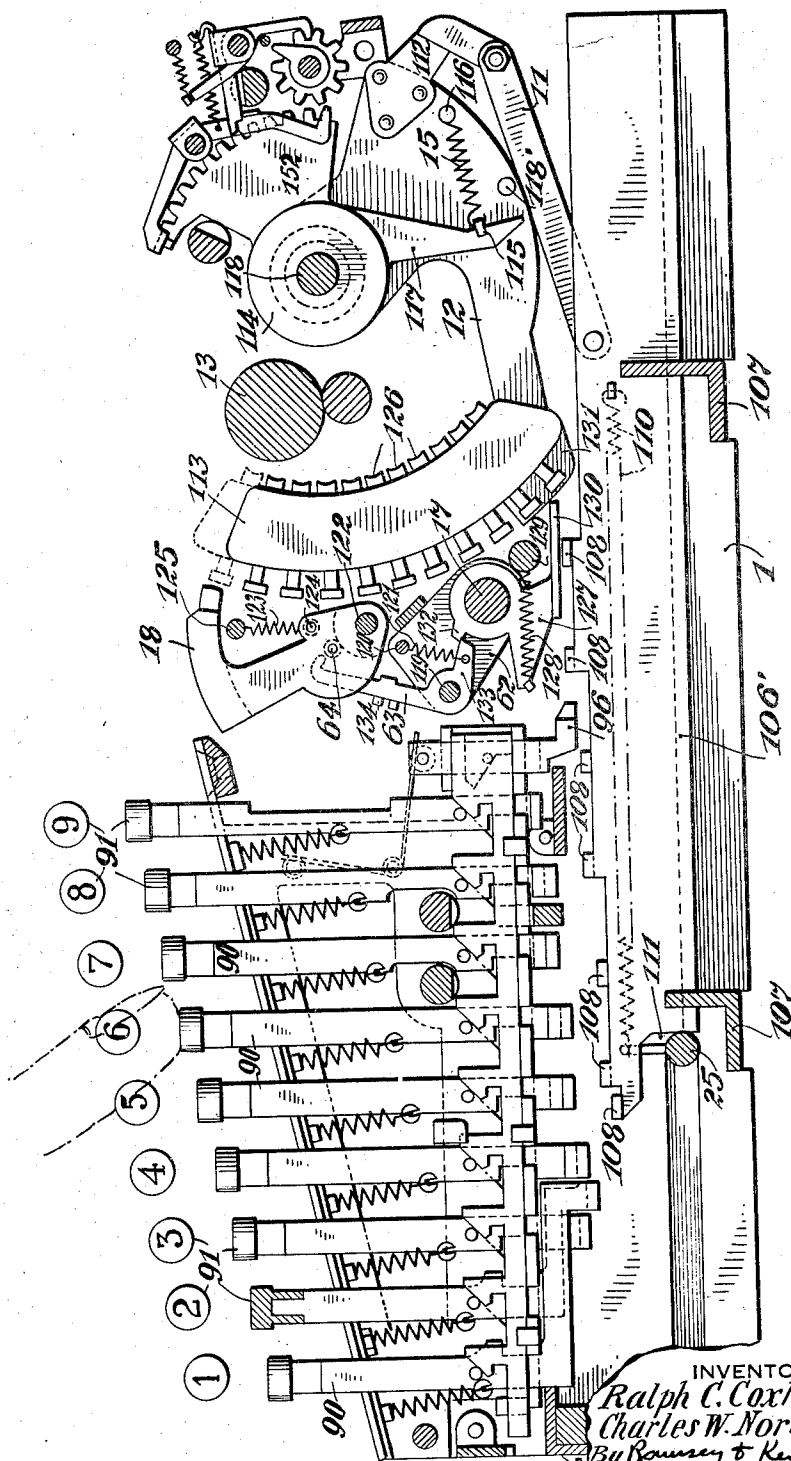
R. C. COXHEAD ET AL

1,954,618

ADDING MACHINE PRINTING MECHANISM

Original Filed Aug. 26, 1926 3 Sheets-Sheet 1

Fig. 1.



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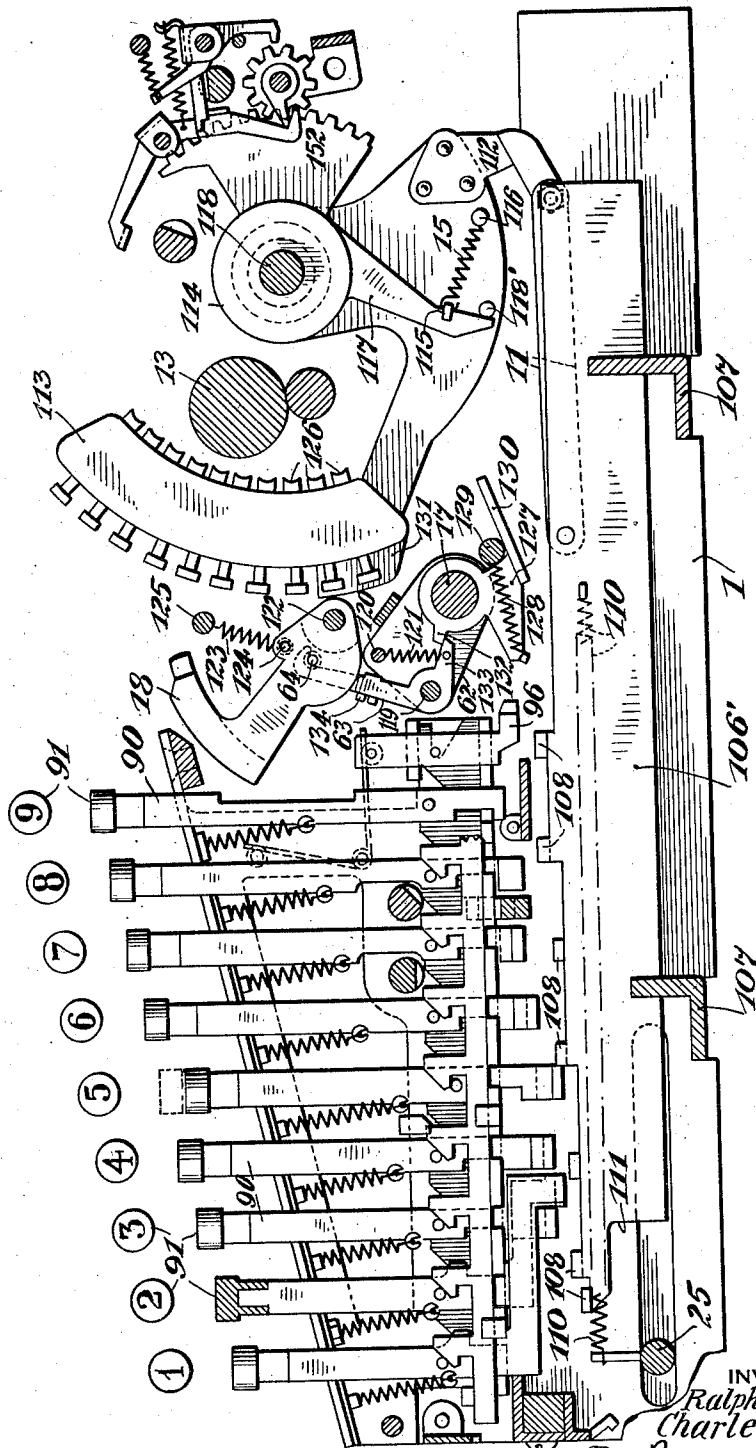
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Fig. 2.



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Fig. 3.

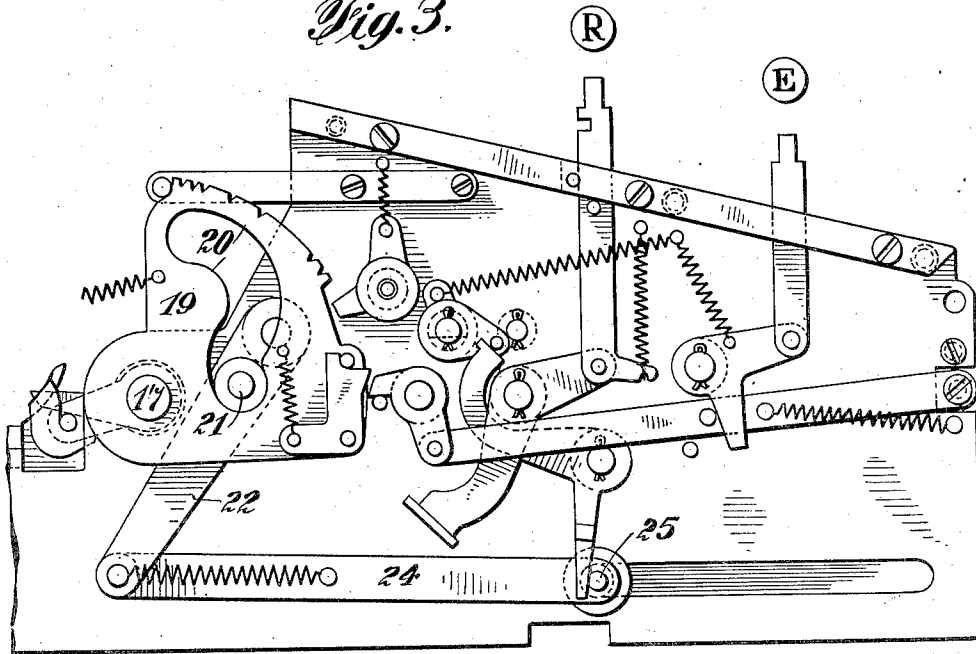


Fig. 4.

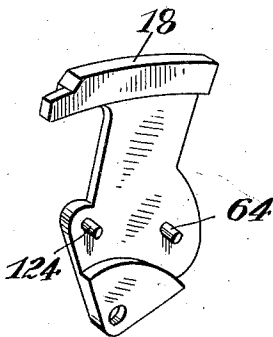


Fig. 5.

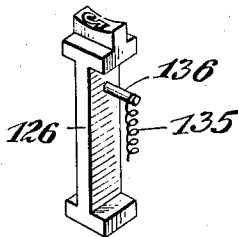
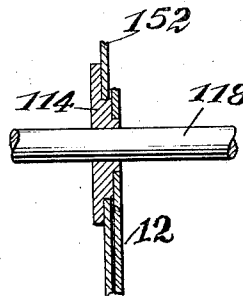


Fig. 6.



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ADDING MACHINE PRINTING MECHANISM

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Original application August 26, 1926, Serial No. 131,797. Divided and this application April 22, 1930, Serial No. 446,294

11 Claims. (Cl. 101—93)

The present invention relates broadly to adding machines and more especially to printing mechanism for an adding machine.

The principal object of the present invention is to provide a printing mechanism adapted more especially for a small compact adding machine of the full keyboard type and wherein type are mounted on type segments and adapted to be driven by hammer impact against a suitable paper carrying platen. Suitable hammer control devices are provided to the operating hammers corresponding to type segments that are moved into position in front of the printing point during normal adding or total taking operations and to print zeros at the right of digital type set at the printing point.

The present case is a division of our prior application Serial No. 131,797, filed August 26, 1926, and, therefore, the disclosure herein has been restricted to substantially the printing mechanism and associated elements.

Referring now to the drawings:—

Fig. 1 is a longitudinal sectional view through substantially the mid portion of the machine with the parts in normal position.

Fig. 2 is a view similar to Fig. 1 with the exception that the parts are shown in a possible position during a forward stroke of the operating handle.

Fig. 3 is a side view of the machine illustrating the operating cam and connecting links for the universal bar 25.

Fig. 4 is a perspective view of one of the printing hammers.

Fig. 5 is a perspective view of a printing type.

Fig. 6 is a section of the shouldered hub joining the type carriers and the actuating totalizer gear sectors.

When an adding key 91 is depressed, the lower portion of the key stem 90 becomes a stop in the path of one of the stops 108 on the actuator bars 106'. These actuator bars are connected by links 11 with type carriers 12.

The type carriers are in the form of mutilated sectors 12 pivoted on rod 118 supported by the main frame. The type sectors are staked to comparatively thick and large diameter stepped hubs 114 as shown in Fig. 6. Each type carrier is provided with a rigidly attached offset arm or lug 112 for attachment of the concentrating link 11 and with a cupped arcuate retaining and guiding cover plate 113 for enclosing the numeral type. Fitted loosely on the stepped portion of the comparatively thick hubs 114 (Figs. 1 and 6) are the gear sectors 152 comprising the totalizer

actuators, which are resiliently connected with the type carrier sectors by springs 15, the ends of which are connected to bent over lugs 115, on the ends 117 of the gear sectors 152 and at the other ends to pins 116 on the type carriers. The arms 117 integral with the gear sectors 152 perform the additional function of limiting the extent of movement of the gear sectors 152 in the direction of the pull of the springs 15 by virtue of interference with pins 118' mounted upon the type sectors 12.

When the main shaft 17 mounted in the main frame 1 is oscillated by the crank handle (not shown), the cam plates 19 carried by this shaft operate to cause the anti-friction rolls mounted on the studs 21 to travel in the cams 20 and oscillate the arms 22 which cause the links 24 to move the universal bar 25 away from the ends 111 of the actuator bars 106' which are mounted for slidable movement in the guide frames 107 which are mounted on the main frame 1. This movement of the universal bar 25 tensions springs 110 tending to move the actuator bars 106' toward the front of the machine until stops 108 on said bars come into contact with the lower ends of depressed keys 90. It is to be understood that the actuator bars 106' beneath a digital row in which no numeral key is depressed are stopped from forward movement by the zero stops 96 coming in contact with the forward stops comprising suitable projections on the actuator slides 106'. The actuator slides however, corresponding to key rows in which no digital key is depressed move forwardly sufficiently to cause the links 11 to rotate the type segments 12 to position the zero types adjacent the printing point and as to rows in which digital stops are depressed, the actuator bars 106' move forward sufficiently before they are stopped to position at the printing point type corresponding to the digital value of the keys depressed.

The printing hammers 18 are pivoted on a stationary shaft 122 mounted in the main frame 1 of the machine. These printing hammers (Fig. 4) are constructed with cutaway side walls to form clearance spaces for pins 64 and 124. Each printing hammer (Fig. 1) is provided with a spring 123 attached to its respective pin 124 and anchored to a stationary rod 125. These springs 123 are normally under slight tension, which tends to place the axes of the shaft 122, the pins 124 and the rod 125 in substantially a straight line with the heads of the printing hammers separated from the heads of the type bars 126 a suf-

ficient amount to provide adequate clearance space when the type segments are operated.

The shaft 17 carries a frame comprising side plates 62 which are loosely mounted on the shaft 17 and are connected thereto by a pin and slot connection, whereby when the shaft 17 is oscillated in a counter-clockwise direction the plates 62 remain stationary for a short portion of the movement and are then carried forward with the movement of the shaft 17. The plates 62 carry a pivot shaft 119 on which hammer actuating hooks 63 are pivoted. The hooks 63 at their upper ends are adapted to engage the pins 64 on the printing hammers and at their lower ends the hooks 63, being of bell crank shape, are provided with extensions 133. Hook actuator plates 127 are loosely mounted on shaft 17 and are formed with lugs 132 adapted to engage extensions 133 on the hooks 63. The hook actuator plates 127 each carry extensions 130 which are normally held in engagement with cams 131 on the type sectors 12 by means of springs 128 anchored at one end of the plates 127 and at the other end to a rod 129 carried by the main frame. Springs 121, of lighter tension than springs 128 are anchored at one end to the hook extensions 133 and at the other end to a rod 120 carried by the plates 62. These springs 121 maintain the extensions 133 on the hooks 63 normally in contact with the lugs 132 on the plates 127. Each hook 63 is provided with a turned over lug 134 extending to the right of the hook and overlying the back of the next adjacent hook to the right.

If a number such as 5000 is introduced into the machine by depressing the "5" key in the 1000ths row on the keyboard and the shaft 17 actuated by the crank (not shown) in a counter-clockwise direction, the 1000th row actuator bar 106' will move forward until the proper lug 108 thereon contacts with the depressed key. This movement is communicated through links 11 to the thousandth row type segment 12 and will position the "5" type thereon opposite the printing point on the platen 13 which is mounted in the machine frame. The platen 13 is associated with proper paper feed mechanism which does not comprise a part of the present specification. The printing point, the head of the type hammers 18, the axis of the platen 13, and the axis of the shaft 118 are substantially in a straight line. As the type segment 113 rises to present a numeral type at the printing point the corresponding extension 130 on the plate 127 drops off the cam 131 on the type sector 12. The spring 128 rotates the plate 127 on the shaft 17, thereby causing the lug 132 to rotate the hook 63 against the tension of spring 121 and cause the upper end of the hook to pass over the pin 64 on the 1000ths printing hammer. The lug 134 on this 1000ths printing hammer hook causes the next adjacent hook 63 to be moved inward and engage its respective hammer pin 64, and lugs 134 on the other hooks to the right operating similarly move inward all of the hammer hooks to the right of the 1000ths row. Since the actuator bars 106' all move forward when the shaft 17 is operated in an adding operation a sufficient distance to position zero type at the printing point, it will be observed that the parts are now in position to print "5000". Hammer hooks 63 to the left of the 1000ths row are not engaged with the pins 64 even though the corresponding type sectors move up to zero position, since the cams 131 are of sufficient length to retain contact with the plates 130 until after the type sectors have been moved into a digital print-

ing position beyond the zero type. This prevents actuation of plates 127 and lugs 134 are effective only on hooks 63 to the left of digital positioned type. As the shaft 17 continues to move in a counter-clockwise direction the plates 62 now move with the shaft, thereby the hook pivot shaft 119 for the hammer hooks 63 will move in a downward direction and since the specified hooks 63 are engaged with certain pins 64, these hammers will be pulled in a counter-clockwise direction, against the tension of springs 121. This movement continues until the hooks 63 which are actuating hammers come into contact with the rod 120 in the frame 62 and the continued movement of the frame 62 causes the rod 120 to bear against the hooks 63 and disengage all of the hooks from the pins 64 with which they were in engagement. As soon as the hammers are freed the springs 123 snap the hammers forward to permit the momentum of the hammer heads to strike the type 126 and overcome the type springs 135 on the pins 136 and drive the type 126 against the printing platen and any paper that may be thereon. It is of course to be understood that suitable ribbon or inking mechanism is provided for the type in order that an imprint is formed when the printing impact is made. The springs 123 being normally stressed on the center line specified act to cause the hammers 18 to rebound from the heads of the type. The return movement of the shaft 17 in a clockwise direction restores all parts to normal position.

The printing of totals and sub-totals is accomplished exactly the same as is the printing of numbers being added into the machine, with the exception that the type sectors during the printing of the total or sub-total are under control of the totalizer mechanism in a manner well understood by those skilled in the art. The totalizer mechanism does not form a part of this specification and while it is illustrated, so that it will be understood by those skilled in the art, it is believed that for the sake of clearness a detailed description of the operation of the totalizer mechanism is unnecessary to a full understanding of the printing mechanism by those skilled in the art.

Having described our invention we claim:

1. In a machine of the character described, the combination of type carriers; spring actuated type hammers; hooks for tensioning said hammer springs; pawls for controlling said hooks so that said hooks are normally disengaged from said hammers, connections from said type carriers for permitting said hooks to engage said hammers, a carrier for said hooks, the construction and arrangement being such that said carrier will cause disengagement of said hooks from said hammers after the hammer springs have been fully tensioned.

2. In a machine of the character described, the combination of type carriers; spring actuated type hammers; hooks for tensioning said hammer springs; pawls for controlling said hooks so that said hooks are normally disengaged from said hammers, an oscillatory shaft journaled in the main frame for supporting said pawls; connections with said type carriers to permit actuation of said pawls to cause said hooks to engage said hammers, a carrier for said hooks and means for causing said hooks to disengage said hammers after the hammer springs have been tensioned.

3. In a machine of the character described, the combination of type carriers; spring actuated type

hammers; hooks for tensioning said hammer springs; pawls for controlling said hooks so that said hooks are normally disengaged from said hammers, a main frame; an oscillatory shaft journaled in the main frame for supporting said pawls; connections with said type carriers for causing engagement of said hooks with said hammers, and a carrier for said hooks actuatable by movement of said pawl supporting shaft.

4. In a machine of the character described, the combination of type carriers; spring actuated type hammers; hooks for tensioning said hammer springs and normally disengaged from said hammers; a main frame; interponent pawls mounted on an oscillatory shaft journaled in the main frame; means to engage said hooks with the hammers by a concomitant movement of said type carriers and interponent pawls, and means for causing said shaft to tension the hammer springs after said concomitant movement.

5. In a machine of the character described, the combination of type carriers; spring actuated hammers; hooks normally disengaged from said hammer and adapted on occasion to engage said hammers; a hook supporting frame; a main frame; interponent pawls mounted on an oscillatory shaft journaled in the main frame; means for causing a plurality of hooks to engage a corresponding plurality of hammers upon concomitant movement of corresponding type carriers and interponent pawls, and means for causing said shaft to move said hook supporting frame.

6. In a machine of the character described, the combination of a plurality of type carriers; a plurality of spring actuated hammers therefor; a plurality of hooks adapted to engage said hammers but normally disengaged therefrom; a shaft for supporting said hooks, a plurality of interponents between said hooks and said type carriers; an interponent supporting shaft; means operating to cause said hooks to engage said hammers after an initial movement of said type carriers, and means for causing said hooks to tension said hammer springs by translational movement of the hook supporting shaft by a rotational movement of the interponent supporting shaft.

7. In a machine of the character described, the combination of a plurality of type carriers; a plurality of spring actuated hammers therefor; a plurality of hooks adapted to engage said hammers but normally disengaged therefrom; a pivoted frame carrying a shaft for supporting said hooks, a plurality of interponents between said hooks and said type carriers; an interponent supporting shaft; means operating to cause said hooks to engage said hammers after an initial movement of said type carriers, and means to cause translational movement of said frame supported shaft by a rotational movement of the interponent supporting shaft after said hooks have engaged hammers.

8. A plurality of type carrying segments mounted upon mutilated sectors carried by a supporting shaft, a platen mounted between said segments and said shaft, type members carried by said segments, a printing hammer for each type segment adapted to drive the type members against the platen at a predetermined printing point on said platen, a key stopped actuator bar connected with each of said mutilated sectors to position at the printing point a type member corresponding to the denominational stopped position of said actuator bar connected with the printing segment.

9. In a machine of the class described, a supporting shaft, a plurality of mutilated sectors mounted on said supporting shaft, a type segment mounted upon each of said mutilated sectors, a row of denominational type carried by each type segment, printing hammers, a main shaft, means tending to operate said printing hammers when said main shaft is operated, and a cam on each of said mutilated sectors adapted to disable the operating mechanism for said printing hammers corresponding to printing segments remaining in zero position of a denominational order higher than the last digit in the number to be printed.

10. In a machine of the class described, the combination of a plurality of type carrying segments, a row of denominational type members mounted on each type segment, a plurality of printing hammers, there being one printing hammer for each type segment, a main shaft, hook arms carried by said main shaft and adapted to operate the printing hammers when the main shaft is actuated, and means to engage said hook arms with said printing hammers corresponding to each printing segment moved to position a digital type at the printing point, and means to engage the hook arms and the printing hammers corresponding to each zero of each denominational segment to the right of the highest denominational order digital type positioned at the printing point.

11. In a machine of the class described, the combination of a platen, a main shaft, a plurality of arcuate type segments movable between said platen and said main shaft, a denominational row of type members on each arcuate type segment, a printing hammer for each type segment mounted opposite said platen to drive said type members against said platen during the printing operation, carrier plates secured to said main shaft to move therewith, printing hammer hooks mounted on said carrier plates, hook controls rotatably mounted on said main shaft, cams movable with said type segments and operating said hook controls whereby a hook engages a printing hammer opposite each type segment which has moved to present the digital type at the printing point.

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