

May 15, 1923.

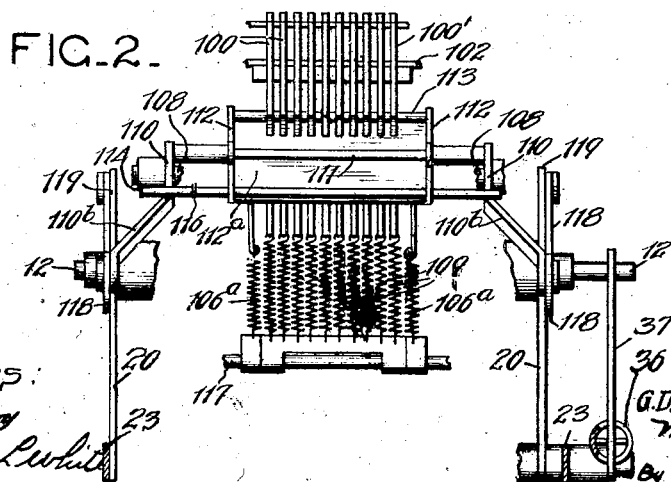
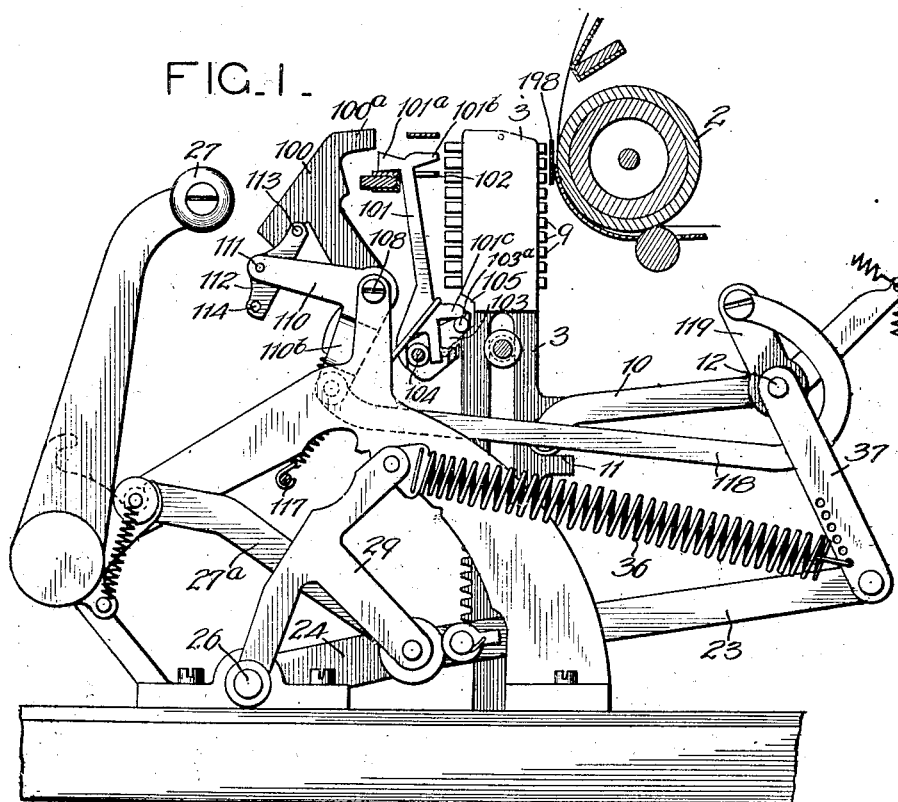
G. D. SUNDSTRAND

1,455,555

ADDING MACHINE

Filed July 24, 1916

3 Sheets-Sheet 1



Witnesses:

W. P. Kilmer

Harry P. L. White

Inventor:

G. D. Sundstrand

Miller

Chundahl

By Parker

May 15, 1923.

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ADDING MACHINE

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3 Sheets-Sheet 2

FIG. 3.

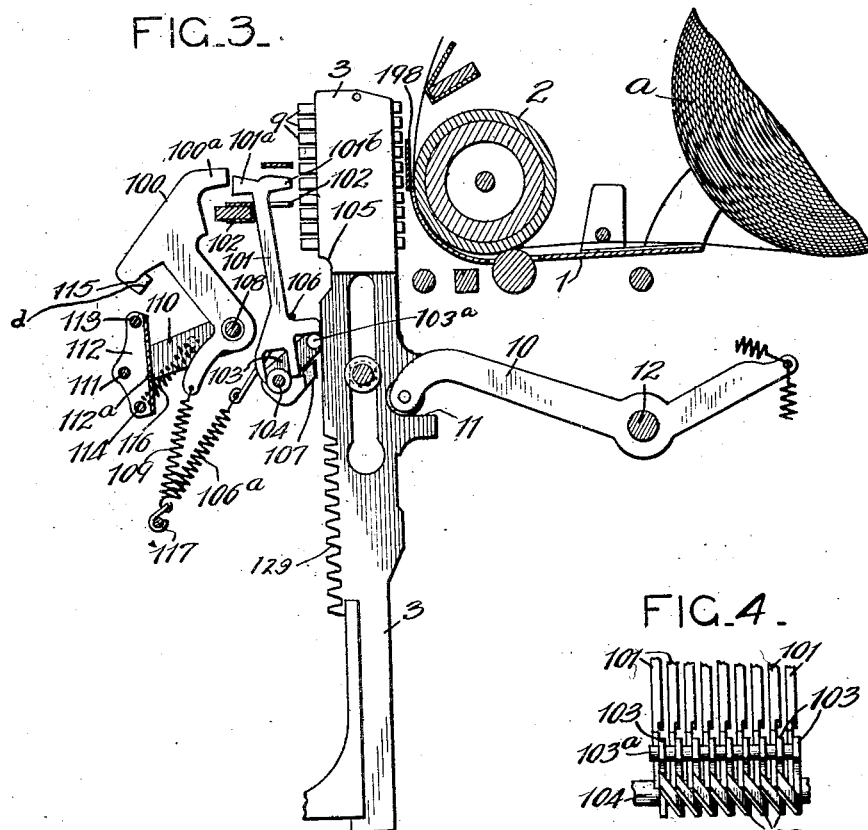


FIG. 4.

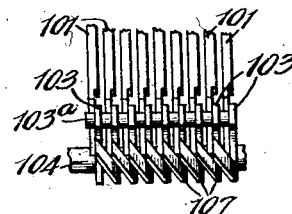
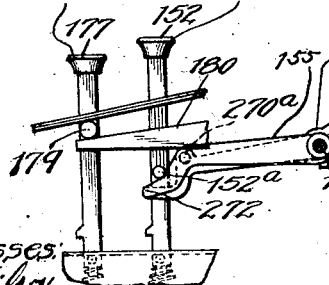
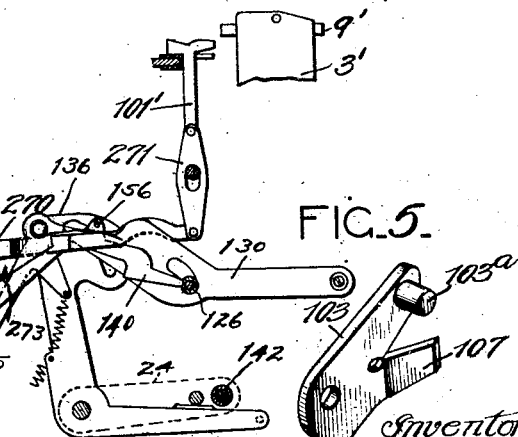


FIG. 6.
TOTAL NON-ADD



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FIG. 5.



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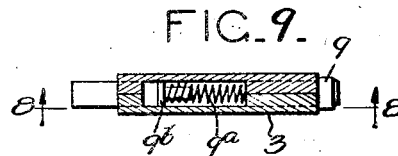
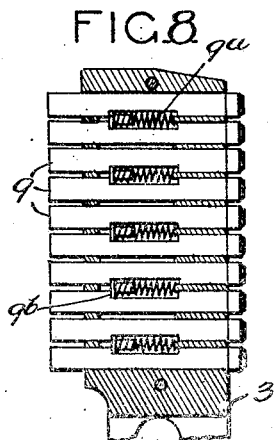
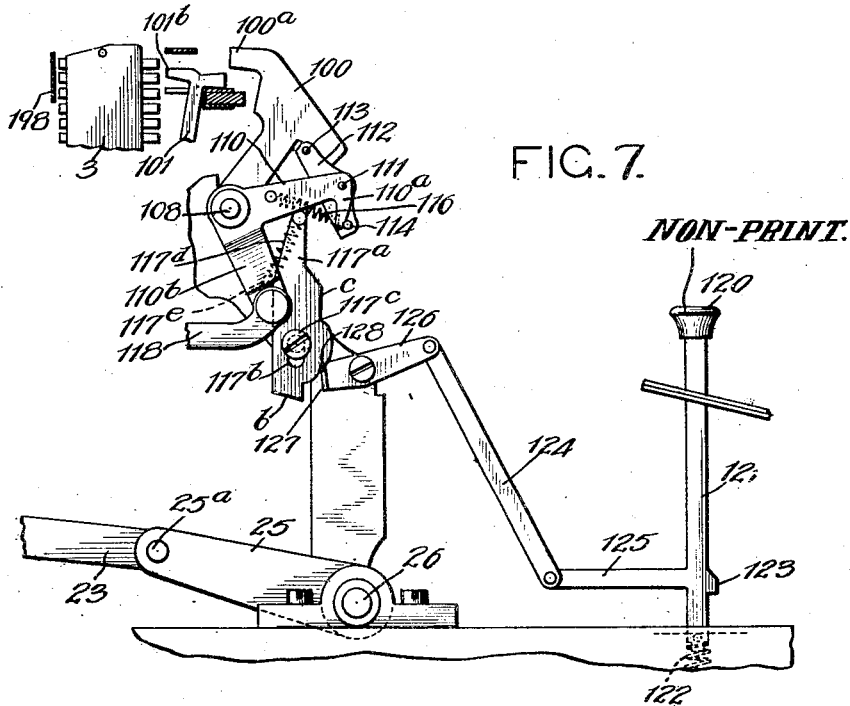
G. D. SUNDSTRAND

1,455,555

ADDING MACHINE

Filed July 24, 1916

3 Sheets-Sheet 3



Witnesses:

W. P. Hilroy

Harry P. L. White

Inventor:
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ATTY.

Patented May 15, 1923.

1,455,555

UNITED STATES PATENT OFFICE.

GUSTAF DAVID SUNDSTRAND, OF ROCKFORD, ILLINOIS, ASSIGNOR TO ROCKFORD MILLING MACHINE COMPANY, OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

ADDING MACHINE.

Application filed July 24, 1916. Serial No. 110,823.

To all whom it may concern:

Be it known that I, GUSTAF DAVID SUNDSTRAND, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Adding Machines, of which the following is a specification.

The present application is a continuation in part of my application Serial No. 682,991, filed March 11, 1912, which has matured in Patent No. 1,329,028 dated January 27, 1920; and also of my application Serial No. 824,610, filed March 14, 1914, which has matured into Patent No. 1,198,487, dated September 19, 1916.

Among the objects of the invention are to insure that the type carriers shall have time to come to rest in printing position before the hammers are released; to permit of cancelling or eliminating any item set up at any time prior to the return stroke of the handle; to provide simple and effective means for determining which of the hammers shall be effective; to provide improved means whereby the printing of ciphers is effected; to provide improved means for disabling the printing mechanism at will; and to provide means for printing a sign to indicate that the machine has been cleared or that a particular item has not been added or any other desired indication.

In the accompanying drawings, Figure 1 is a fragmental side elevation illustrating a printing mechanism embodying the features of my invention. Fig. 2 is a fragmental front elevation. Fig. 3 is a fragmental side elevation showing the position occupied by the parts immediately after an impression has been made upon the paper. Fig. 4 is a fragmental rear view of the devices for raising the bumpers. Fig. 5 is a perspective view of one of said devices. Fig. 6 is a view illustrating a portion of the signal printing means. Fig. 7 is a fragmental elevation taken from the side opposite to that shown in Fig. 1, and illustrating particularly the means for preventing effective operation of the hammers. Fig. 8 is a fragmental sectional view of one of the type bars, the view being taken in the plane of dotted line 8—8 of Fig. 9. Fig. 9 is a transverse sectional view of one of the type bars.

The sheet or tape on which the items and

totals are to be printed may be supported in any ordinary or suitable way. Herein, I have shown a roll *a* of paper supported upon a carriage 1 which may, if desired, be mounted upon the framework of the machine in the usual way for sliding movement in order that a plurality of columns may be printed upon a sheet. Rotatably positioned on the carriage 1 is a cylindrical platen 2.

The printing is effected by means of vertically reciprocatory type carriers or bars 3, one such carrier being provided for each numerical order. The machine herein illustrated is adapted to register and print up to 999,999,999, hence nine carriers 3 are employed. Said carriers are arranged side by side, and are guided in any suitable way for vertical movement.

Each carrier 3 is provided at its upper end with ten types 9 adapted to print from naught to nine, respectively. The top type is adapted to print "0", the next to the top "1", and so on. As shown in Figs. 8 and 9, between every two adjacent types is placed a spring 9^a which acts through a member 9^b to restore the types to normal position after each actuation.

The means, for vertically moving each type-carrier 3 into and out of printing position need not be illustrated or described in detail, since it may be of any suitable character, as, for example, that fully disclosed in said Patent No. 1,198,487. The portion herein shown of said means comprises an arm 10 carrying a roller that lies in a notch 11 in the carrier. The arm 10 is loosely mounted on a fixed shaft 12 and is yieldingly connected to two levers 20 (Fig. 2) pivoted on the ends of the shaft 12. These levers are connected through two links 23 (Figs. 1, 2 and 7) to two crank arms 24 and 25 fixed on the main rock shaft 26. The shaft 26 is arranged to be rocked by means of a handle or crank 27 which is connected through a link 27^a to the arm 24.

The carriers 3 are normally in position to print ciphers. When the operator pulls the handle forward, such of the type-carriers 3 as are at liberty to rise move up into position to print other digits.

The means for returning the handle to its normal or initial position consists of a spring 36 which is connected at one end to a bracket 29 that swings on the axis of the shaft 26. The other end of the spring

36 is connected, for convenience, to a link or bar 37 (Figs. 1 and 2) pivoted on one end of the shaft 12, said link being connected to swing with the lever 20. The bracket 29 is connected to the handle 27 by means of the link 27^a. The spring 36 is stretched during the forward stroke of the handle.

The means for limiting the extent to which the type-carriers 3 may rise, and thus to determine which numerals shall be brought to the printing position, may be of any suitable character, as, for example, that fully disclosed in said Patent No. 1,198,487.

The means for driving the types 9 into contact with the inking ribbon 198 comprises a series of hammers 100, one for each carrier 3, and a series of devices 101 (hereinafter termed bumpers) for transmitting the blows of the hammers to the types. All of the hammers are actuated whenever the handle is drawn forward. The bumpers are normally in such position as to be out of the range of the hammers. When an amount is to be printed, the bumpers corresponding to the carriers 3 which are to do the printing are moved into the range of action of the respective hammers.

The upper portions of the bumpers 101 are guided in a slotted guide plate 102. The lower ends of the bumpers are forked to fit over a rod 104. For each bumper there is an arm 103 which is pivoted on the rod 104. On each arm 103 is a stud 103^a that underlies a lug 101^c on the adjacent bumper. Each type-carrier 3 has a notch 105 in its forward edge for the reception of the free end of the adjacent arm 103. When the carrier 3 is down (as in Fig. 1), the free end of the arm 103 lies in the notch 105, and the bumper is below the path of oscillation of the head 100^a of the hammer. When, however, the carrier 3 is raised, the lower end wall of the notch 105 cams the arm 103 up into the position shown in Fig. 3, thereby raising the bumper so that the head 101^a is in the path of the hammer head 100^a, and so that the point 101^b is in proper position to strike a type 9. After each blow of the hammers, the bumpers are restored by a bar 106 lying behind the bumpers and drawn forward by two springs 106^a (Figs. 2 and 3).

As hereinbefore stated, the carriers 3 are initially in position to print ciphers, and consequently when a cipher is to be printed there is no upward movement of the carrier 3 carrying that cipher which may be utilized in raising the bumper. Other means is therefore provided for raising the bumpers which are to cause the printing of ciphers. This means consists of a lug 107 (Figs. 4 and 5) on each arm 103 (except the arm farthest to the right) arranged to underlie the arm 103 which is next to the right. When any arm 103 is raised, the lug 107

on that arm raises the arm 103 next to the right if the last mentioned arm is not raised by its carrier 3. Gravity, assisted by the springs 106^a restores the bumpers 101 to their initial (lower) position after each operation.

The hammers 100 and 100' are pivoted on a rod 108, and are actuated by individual springs 109 anchored to a stationary rod 117. The means for drawing the hammers forward to place the springs 109 under increased tension, and for releasing the hammers, comprises two arms 110 (Figs. 1, 2 and 7) pivoted on the rod 108. A rod 111 is carried by the arms 110. Pivoted on the rod 111 are two levers 112 which are rigidly connected together by a web or plate 112^a (Fig. 2). A cross-rod 113 carried by the levers 112 is adapted to engage hooks 115 on the hammers 100. A spring 116 connected to a rod 114 carried by the levers 112 normally holds the rod 113 in engagement with the hooks 115. The spring 116 normally holds one end of the rod 114 against a lug 110^a (Fig. 7) on the adjacent arm 110. The parts 112, 113 and 114 constitute a latch device which serves to restrain the hammers. In the present embodiment the hammer-restraining means is a universal device acting upon all of the hammers, but it will be understood that other forms of latch devices may be used and that the invention is not limited to the use of a universal latch device. At the beginning of the up-stroke of the arms 110 the levers 112 are rocked to carry the rod 113 away from the hooks 115, whereupon the springs 109 impel the hammers against any bumpers that may have been raised. The means for thus rocking the levers 112 comprises a lever 117^a (Fig. 7) having an elongated opening 117^b through which a pivot screw 117^c extends. A spring 117^a normally holds the lever 117^a against a stop pin 117^e, with the upper end wall of the opening 117^b resting upon the screw 117^c. The arm or part 25 fixed upon the shaft 26 has a pin 25^a, which, when the handle 27 is drawn forward, is carried against the surface *b* upon the lower arm of the lever 117^a, thus raising said lever against the tension of the spring 117^a. As soon as the pin 25^a has passed the lever 117^a, the latter drops back to normal position. When the arm 25 begins to swing back, the pin 25^a tilts the lever 117^a, thus swinging the upper arm *c* of said lever against the rod 114, thereby tilting the levers 112 and disengaging the rod 113 from the hooks 115. The springs 109 then throw the hammers against the bumpers that have been raised. In the continuing upward movement of the arms 110, the rod 113 comes in contact with the surfaces *d* of the hooks 115. As soon as the rod has passed said surfaces, it is moved into the hooks by the spring 116.

The arms 110 are oscillated by means of links 118 connected to arms 110^b which are rigid with said arms, said links being pivoted to arms 119, the latter being rigidly connected to the arms 20.

It will be noted that the printing is done during the return stroke of the handle 27, rather than during the forward stroke. The type-carriers 3 have therefore had ample time to complete their destined upward movement and come to rest before the hammers are released. The accuracy of type alinement hence is not interfered with by any rebounding of the type carriers.

When it is not desired to print an amount, the printing mechanism may be disabled by means comprising a non-print key 120 (Fig. 7). The stem 121 of this key is guided for vertical reciprocation, the key being normally held elevated by a spring 122. Downward movement of the key is limited by a stop lug 123. A link 124 is pivoted at one end to an arm 125 rigid with the stem 121, and is pivoted at its other end to a lever 126. Said lever has a lug 127 arranged to engage a shoulder 128 on the lever 117^a. When the non-print key 120 is depressed, the lever 126 lifts the lever 117^a beyond the range of action of the pin 25^a, thus permitting the rod 113 to remain in engagement with the hooks 115, and thereby preventing the hammers from striking the bumpers.

The ribbon 198 may be supported and moved in any suitable manner, and the platen 2 rotated by any preferred means.

As set forth in my prior application, Serial No. 824,610 (Patent No. 1,198,487), the adding mechanism comprises a series of adding pinions (not herein shown) mounted upon a shaft 126 (Fig. 6), and means is provided for moving said pinions into mesh with the racks 129 (Fig. 3) just before the latter commence their downward movement after the printing operation. It sometimes is desirable to print an item without adding it to the amount already accumulated. This may be accomplished by depressing a non-add key 152 acting through a pin 152^a upon the forward end of a lever 155. This lever is pivoted upon the shaft 145 and its rear end underlies a pin 156 carried by a pivoted hook 140. Normally this hook 140 tends to engage a stud 142 on the crank arm 24 as the handle completes its forward stroke, and on the return stroke the hook operates through the lever 136 and associated parts to move the pinions into mesh with the racks 129. When, however, the hook is moved out of the path of travel of the stud 142 by the depression of the non-add key 152, the adding mechanism is disabled. Thus the disabling mechanism is operable after the completion of the forward stroke but before the return stroke of the operating member.

It will accordingly be evident that since both the printing disabling means and the adding disabling means are operable after the completion of the forward stroke of the operating handle, the operator if he discovers at any time after pulling the handle and before releasing the same that he has made an error in setting up an item, may correct the error by depressing the non-print key 120 and the non-add key 152 before releasing the handle.

If desired, means may be provided for printing a distinguishing character in connection with certain imprints, as, for example, in connection with a total, or an item which is printed but not added to the previous items. Herein is shown a special signal-printing bar 3' (Fig. 6) which has no movement and which carries but one type 9'. The bumper 101' for transmitting the blow of the signal-printing hammer 100' (Fig. 2) to the type 9' is raised and lowered by means of a lever 270 pivoted at 145. The rear end of the lever 270 is connected to the bumper 101' by a link 271. The forward end of the lever 270 has a lug 272 that underlies a pin 152^a on the stem of the non-add key 152. On the forward portion of the lever 270 is a pin 270^a that lies beneath the clearing lever 180. The lever 180 underlies a pin 179 on the stem of the "Total" or "Clear" key 177. A spring 273 tends to move the lever 270 to lower the bumper 101'. It will be seen that whenever the non-add key 152 or the total key 177 is depressed, the bumper 101' will be raised into operative position, thus printing the distinguishing character opposite each non-added item and each total. As shown in Fig. 2, the hammer 100' is located to the right of the hammers 100, and the means for rendering this hammer 100' effective, including the bumper 101' and the keys 177 and 152 are therefore also located at the right hand side of the machine which is the side at which the handle 27 is located. This handle, being pivoted somewhat forwardly of the key 177 is thus arranged so that as it is swung into its forward position it is located near the total key 177. Accordingly it is possible for the operator after he has completed the forward stroke of the handle to actuate the total key with the same hand as is used to swing the handle. Thus the operation of taking a total is accomplished with great facility. By means fully disclosed in said Patent No. 1,198,487 the items may be printed in one color and the totals in another color.

In a machine that prints upon the return oscillation of the main shaft as in the machine herein shown, the governor that controls the operation of the type bars may be made much smaller and lighter than where the hammers are released during the

forward stroke, and consequently the machine may be made smaller and lighter than would otherwise be possible.

While the present embodiment of my invention has been described in considerable detail, I would have it understood that the invention is not limited to the particular construction and arrangement shown.

I claim as my invention:

1. A printing mechanism having, in combination, a plurality of vertically movable type-carriers arranged side by side, each carrier having a plurality of types, the carriers being in position to print ciphers when in their normal position, a hammer for each carrier, an energy-transmitting member arranged to be raised into the zone of action of each hammer by the rising of the respective type-carriers, and means associated with each energy-transmitting member for raising all of the members located at one side of a given member.

2. A printing mechanism having, in combination, a plurality of carriers each having a plurality of types, a hammer for each carrier, energy-transmitting members between the hammers and the carriers, arms actuated in the movement of the carriers for moving said members into operative position, and a projection on each arm underlying the next adjacent arm for moving into operative position all of the members located at one side of a given member.

3. A printing mechanism having, in combination, a plurality of type-carriers arranged side by side, an arm adjacent to each carrier, an energy-transmitting member connected to each arm, each of said arms being movable by its respective carrier, a projection on each arm for moving an adjacent arm, and means for imparting energy to said members.

4. A printing mechanism having, in combination, a type-carrier, a hammer, said carrier having a shoulder, an arm pivoted near the carrier and arranged to rest on said shoulder when the carrier is in its lowermost position, and an energy-transmitting member connected to said arm so as to be lifted into the zone of action of the hammer when the arm is raised by the rising of said shoulder.

5. A printing mechanism having, in combination, a vertically movable type-carrier, a hammer pivoted in front of the carrier, an arm pivoted between the carrier and the hammer, said carrier having a notch in which the end of the arm is arranged to rest, and an energy-transmitting member pivoted to said arm so as to be raised into the zone of action of the hammer when the arm is moved through the rising of the carrier.

6. A printing mechanism having, in combination, a plurality of type-carriers arranged side by side, a hammer for each car-

rier, an arm adjacent to each carrier, an energy-transmitting member for each carrier, each of said arms being engaged by its respective carrier, and a projection on each arm for moving an adjacent arm.

7. A printing mechanism having, in combination, a plurality of carriers, each having a plurality of types, a hammer for each carrier, energy-transmitting members between the hammers and the carriers, means actuated in the movement of the carriers for moving said members into operative position, and means associated with the last mentioned means for moving into operative position all of the members located at one side of a given member.

8. A printing mechanism having, in combination, a carrier having a plurality of types, an arm pivoted near said carrier and arranged to be pivotally moved by the movement of said carrier into operative position, a member pivoted to said arm, and a hammer arranged to strike said member when said arm is pivotally moved, said member transmitting the blow of the hammer to one of said types.

9. A printing mechanism having, in combination, a carrier carrying a plurality of types, a hammer, and a member arranged to be moved into the range of action of the hammer by the movement of said carrier into operative position, said member being arranged to transmit the blow of the hammer to one of said types.

10. A printing mechanism having, in combination, a type-carrier, a hammer, and a member swingably mounted between the hammer and said carrier and arranged to be moved into and out of the range of action of the hammer to be driven by the hammer into contact with the type.

11. A printing mechanism having, in combination, a type, a hammer, a member between the hammer and said type and arranged to be driven by the hammer into contact with the type, and means for moving the member into and out of position to be struck by the hammer.

12. A printing mechanism having, in combination, a bar carrying a plurality of types, a hammer, and a member normally held in position out of the range of action of the hammer and arranged to be moved by the bar into the range of action of the hammer, said member being arranged to transmit the blow of the hammer to one of said types.

13. A printing mechanism having, in combination, a reciprocatory bar having a plurality of types, a hammer, a pivoted arm arranged to be engaged and moved by said bar, and a member connected to said arm and arranged to be struck by a hammer when said arm is moved by the bar, said member transmitting the blow of the hammer to one of said types.

14. A printing mechanism having, in combination, a plurality of pivoted hammers, spring means acting upon said hammers, each hammer having a hook thereon, an arm pivoted on the axis of the hammers, a lever pivoted to said arm, an element carried by the lever for engaging said hooks, means for swinging said arm, and means for swinging the lever to disengage said element from said hooks.

15. A printing mechanism having, in combination, a pivoted hammer having a hook thereon, a spring for impelling said hammer, an arm pivoted on the axis of the hammer, a lever pivoted to said arm, an element carried by the lever for engaging said hook, means for swinging said arm, means for swinging the lever to disengage said element from said hook, and means including a key for disabling the lever-swinging means.

16. A printing mechanism having, in combination, a pivoted hammer, a spring for impelling said hammer, an arm pivoted on the axis of the hammer, a lever pivoted to said arm, an element carried by the lever for controlling the hammer, means for swinging said arm, means for swinging the lever to release the hammer, and means including a key for disabling the lever-swinging means.

17. A printing mechanism having, in combination, a hammer, an element controlling the hammer, a lever carrying said element, a second lever for swinging the first lever, means for pivotally moving the second lever, and means including a key to prevent pivotal movement of the second lever.

18. A printing mechanism having, in combination, a hammer, an element controlling the hammer, a lever carrying said element, a second lever for swinging the first lever, an oscillatory arm arranged to engage and swing the second lever, and means for removing the second lever from the range of action of said arm.

19. A printing mechanism having, in combination, a hammer, an element controlling the hammer, a lever carrying said element, a second lever for swinging the first lever, the second lever being mounted for pivotal and translatable movement, an oscillatory arm arranged to engage and swing the second lever, and means for bodily moving the second lever out of the range of action of said arm.

20. A signal-printing mechanism comprising a type, a hammer, a member arranged to be interposed between the type and the hammer, and means including a key for moving said member into and out of the range of action of the hammer.

21. A printing mechanism having, in combination, a type carrier, means including a pivoted lever for moving the type carrier into and out of desired printing position, means for striking the type including a

spring-actuated member, means for holding said member in inoperative position, and means actuated by the lever in its return stroke for releasing the striking means.

22. A printing mechanism having, in combination, a type carrier, means including a pivoted handle for moving the type carrier into desired printing position, a spring for returning the handle and type carrier to initial position, a spring-actuated pivoted hammer for actuating the type, means for cocking the hammer during the forward stroke of the handle and means actuated in the return stroke of the handle for releasing the hammer.

23. A printing mechanism having, in combination, a type carrier, means for striking the type including a spring-actuated striking member and an energy-transmitting member, means for moving said energy-transmitting member into the range of action of said striking member, means for holding said striking member in inoperative position, and means for releasing the striking member.

24. A printing mechanism having, in combination, a plurality of pivoted hammers, means for actuating each of said hammers including a spring, a rock shaft, means actuated by the rocking of said shaft to tension said springs, and means actuated in the return of said shaft to its initial position for releasing said hammers when the springs are under tension.

25. In a recording mechanism, in combination, an operating handle, a spring for swinging the handle to starting position, a member arranged to move in one direction when the handle is pulled forward and in the opposite direction when the handle is returned to starting position, hammers, a hammer-controlling part arranged for pivotal and translational movement, and a spring to hold said part in normal position, said member moving said part aside against the tension of the last mentioned spring when the handle is pulled forward, and said member causing said part to move to release the hammers when the handle is moved toward its starting position.

26. A printing mechanism having, in combination, type carriers moving to and from recording position, hammers for driving the type on said carriers to print, spring means for impelling said hammers, a rock shaft, means operable by the rock shaft to place said spring means under tension, automatic mechanism for moving said type carriers to and holding them in recording position while said shaft is moved in one direction, and mechanism controlled by said rock shaft during the initial portion of its movement to its initial starting point after said type carriers have been positioned, for releasing said hammers for actuation by said impelling means to drive the type to print.

27. In an adding machine, the combination of type-carriers, spring actuated hammers for driving the type on said type-carriers to print, a rock shaft, means operatively connected with the rock shaft to tension the hammer springs, mechanism for positioning said type-carriers for printing as an incident to the rocking of said shaft in one direction, and mechanism for operating said hammers to drive the type controlled by said rock shaft and arranged to operate during the initial movement of said rock shaft toward its starting point after said type-carriers have been positioned.
28. In an adding and recording machine, type-carriers movable to and from recording position, hammers for driving the type on said type-carriers to print, spring actuators for said hammers, a rock shaft, automatic mechanism for moving said type-carriers to and holding them in recording position while said rock shaft is moving in one direction, means operable independently of the movement of the type bars to tension the spring actuators, and mechanism, controlled by said rock shaft during the initial portion of its movement to its starting point after said type-carriers have been positioned, for operating said actuators to drive the type to print.
29. A printing mechanism comprising, in combination, a rock shaft, a reciprocatory type-bar, a hammer pivoted between its ends and provided with a controlling spring, a pivoted member operatively associated with said rock shaft so as to be movable thereby, a rocker member mounted upon said pivoted member and adapted to operatively engage said hammer whereby in the movement of the pivoted member the hammer will be placed under the tension of its spring, and means adapted in the movements of the rock shaft to actuate said rocker member whereby to release said hammer for operation by its spring.
30. A printing mechanism having, in combination, a rock shaft, a reciprocatory type-bar, a spring-controlled hammer, means adapted to place and hold said hammer under the tension of its spring including a pivoted member operatively associated with said rock shaft, and an oscillatory member mounted upon said pivoted member, and a member swingable in the movement of the rock shaft in one direction into engagement with said oscillatory member whereby to effect the release of said hammer.
31. A printing mechanism having, in combination, a rock shaft, a reciprocatory type-bar, a spring-controlled hammer, means adapted to place and hold said hammer under the tension of its spring including a pivoted member operatively associated with said rock shaft and an oscillatory member mounted upon said pivoted member, and a member swingable in the movement of the rock shaft in one direction into engagement with said oscillatory member whereby to effect the release of said hammer, said oscillatory member having a controlling spring, and said pivoted member having a stop for limiting the movement of said oscillatory member in one direction.
32. A printing mechanism having, in combination, a rock shaft, a reciprocatory type-bar, a spring-controlled hammer, means adapted to place and hold said hammer under the tension of its spring including an oscillatory member, and a pivoted member operatively associated with said rock shaft and carrying said oscillatory member, and a lever operatively associated with said rock shaft whereby in the movements of the rock shaft to actuate said oscillatory member for releasing said hammer.
33. A printing mechanism comprising, in combination, a reciprocatory type-bar, means for driving the type of said bar to print including a striker, a pivoted member, means movable with said type-bar to establish an operative association between said pivoted member and said striker, spring means for actuating said pivoted member, means for holding said pivoted member against movement by said spring means, and means for releasing said pivoted member to the action of its spring means after the type-bar and its associated member have been moved into printing position.
34. A printing mechanism comprising, in combination, a rock shaft, a reciprocatory type-bar having a plurality of types, a type striking member, a pivoted member, means operable in the movement of the type-bar to establish operative association between said pivoted member and said striking member, whereby the operation of said pivoted member shall cause the type to print, spring means for actuating said pivoted member, means for holding said pivoted member under the tension of its spring means, and means operatively associated with said rock shaft adapted to actuate said holding means whereby to release said pivoted member at a predetermined point in the movement of said rock shaft.
35. A printing mechanism comprising, in combination, a rock shaft, a reciprocatory type-bar having a plurality of types, a pivoted member, a member movable with the type-bar into operative association with said pivoted member whereby the operation of said pivoted member shall cause a type to print, spring means for actuating said pivoted member, means for holding said pivoted member against movement by said spring means, comprising an oscillatory member, and means for actuating said oscillatory member to release said pivoted

member including a pivoted part operatively associated with said rock shaft so as to be swung thereby in the movements of the shaft and adapted to operatively engage said oscillatory member to effect the release of said pivoted member.

36. A printing mechanism comprising, in combination, a rock shaft, a reciprocatory type-bar having a plurality of types, a pivoted member, a member movable with the type-bar into operative association with said pivoted member whereby the operation of said pivoted member shall cause a type to print, spring means for actuating said pivoted member, means for holding said pivoted member against movement by said spring means, and means controlled by said rock shaft in its movements to release said pivoted member at a predetermined time.

37. A printing mechanism comprising, in combination, a rock shaft, a reciprocatory bar carrying a plurality of types, means for driving said types to print including a pivoted member, spring means for actuating said member, means for holding said member against movement by its spring means said means including an oscillatory member and a part carrying said oscillatory member, and means for actuating said oscillatory member whereby to release said pivoted member for movement by its spring means, the last mentioned means comprising a pivoted lever and an arm swingable in the rotation of said rock shaft into engagement with said lever whereby to cause the lever to swing said pivoted part and thereby said oscillatory member.

38. In an adding machine or the like, the combination of a plurality of reciprocatory type-bars, means for operating said bars into and out of printing position including a lever, an arm mounted to swing on a horizontal axis, a link connecting said arm and said lever, a member swingable with the arm but extending beyond it so as to have a greater range of movement, a coiled contractile spring connecting said member and said lever, a handle mounted on a horizontal axis parallel with the first mentioned axis, and a connection between said handle and said pivoted member whereby in the swinging movements of the handle the reciprocation of said link is effected.

39. In an adding machine, the combination of a printing mechanism including a part to be reciprocated, a lever operatively connected with said part, means for swinging said lever including a handle mounted to swing on a horizontal axis, an arm mounted to swing on an axis parallel with the first mentioned axis, a connection between said arm and said handle, a connection between said arm and said lever, a member operatively connected with and disposed between the handle and the arm, and spring means con-

nected with said member and adapted to restore the parts to their initial position after each operation of the handle.

40. A printing mechanism comprising, in combination, a reciprocatory bar carrying a plurality of types; key-controlled means for positioning said type bar with a selected type in position to print; means for driving said selected type to print including a pivoted member, spring means for actuating said member, an oscillatory member adapted to operatively engage said pivoted member, a pivoted part carrying said oscillatory member and operable to place said spring means under tension, a device operable to swing said oscillatory member whereby to release said pivoted member, and means operatively associated with said pivoted member and controlled by the type bar in its movement to carry a selected type into printing position, adapted to render operative the pivoted member when the latter is released whereby to effect a printing of the selected type.

41. A printing mechanism comprising, in combination, a reciprocatory bar carrying a plurality of types; a rock shaft; means for positioning said type bar with a selected type in position to print as said rock shaft moves in one direction; means for driving said selected type to print including a pivoted member, spring means for actuating said member, means for holding said pivoted member under the tension of the spring means and means operable after said rock shaft has completed its movement in the direction to position said type bar whereby to actuate said holding means so as to cause it to release said pivoted member; and means operatively associated with said pivoted member and controlled by the type bar in its movement, adapted to render operative the pivoted member when the latter is released whereby to effect a printing of the selected type.

42. A recording mechanism having, in combination, a movable type carrier, a hammer for driving the type on said carrier to print, a spring tending to actuate the hammer, a member arranged to restrain the hammer, a lever, one arm of which is arranged to move said member, a spring for pivotally moving said lever in one direction, a rock shaft, automatic mechanism for raising the type carrier to and holding it in recording position while said rock shaft is moving in one direction, and a part secured to said rock shaft and arranged to engage the other arm of said lever during the initial portion of the return movement of the rock shaft to swing said lever against the tension of its spring and thus cause said member to release the hammer.

43. A printing mechanism for adding machines having, in combination, a rock shaft, a type carrier, means operable as the rock

shaft moves in one direction to move said carrier into printing position, a hammer, a spring actuator for the hammer, a latch device operatively connected with the rock shaft movable as the rock shaft moves in the direction to actuate the type carrier into printing position and adapted to hold said hammer against actuation by its spring, and a member arranged for actuation in the return movement of the rock shaft, said device being carried in its said movement into the path of movement of said member so as to be disengaged thereby from the hammer in such return movement of the rock shaft.

44. In a printing mechanism, a movable type bar, a type-striking member, spring means for actuating said member, means including a reciprocatory operating member operable independently of the movement of the type bar as said operating member moves in one direction to place said striking member under the tension of said spring means, and means operable as said operating member moves in the opposite direction and independently of any movement of the type bar, to effect the release of said striking member.

45. In an adding machine, the combination of a printing mechanism and means for disabling the printing mechanism at will, said printing mechanism comprising a reciprocatory operating member, and means operable subsequent to the completion of the movement of said operating member in one direction and in its movement in the opposite direction toward its initial position, to effect the operation of the printing mechanism; whereby said disabling means is operable after the printing mechanism has been set in motion by the initial full stroke of the operating member.

46. In an adding machine, the combination of printing mechanism, printing disabling means, addition disabling means, and operating means including a reciprocatory operating member, and means operable during the return stroke only of the operating member to effect the operation of said printing mechanism, said disabling mechanisms being operable after the completion of the

forward stroke of said operating member and before the return stroke thereof.

47. In an adding machine, the combination of printing mechanism and printing disabling mechanism, said printing mechanism including a type bar, a type striking member, spring means for actuating said striking member, means for placing and holding said striking member under the tension of said spring means including a reciprocatory operating member, and means operable upon said holding means during the return stroke of the operating member to effect the release of said striking member when the printing mechanism is not disabled by said disabling mechanism.

48. A signal printing mechanism comprising a type, a hammer normally inoperative to drive the type to print, operating mechanism including a handle, a key, means operable by the depression of said key to render said hammer effective, said key being located in proximity to the free end of the handle when the latter is at one end of its stroke, whereby said key may be operated by a digit of the hand holding the handle.

49. A printing mechanism for adding machines having, in combination, a rock shaft, a type carrier, means operable as the rock shaft moves in one direction to move said carrier into printing position, a hammer, a spring actuator for the hammer, a latch device movable as the rock shaft moves in the direction to actuate the type carrier into printing position and adapted to hold the said hammer against actuation by its spring, a spring controlled member arranged for actuation in the return movement of the rock shaft, said device being carried in its said movement into the path of movement of said member so as to be disengaged thereby from the hammer in such return movement of the rock shaft, and a key-controlled device for moving said member against the action of its spring into an inoperative position and thus prevent printing.

In testimony whereof, I have hereunto set my hand.

GUSTAF DAVID SUNDSTRAND.