Sept. 16, 1924. 1,508,532

W. P. QUENTELL

PRINTING MECHANISM

Filed May 21, 1923 2 Sheets-Sheet 1

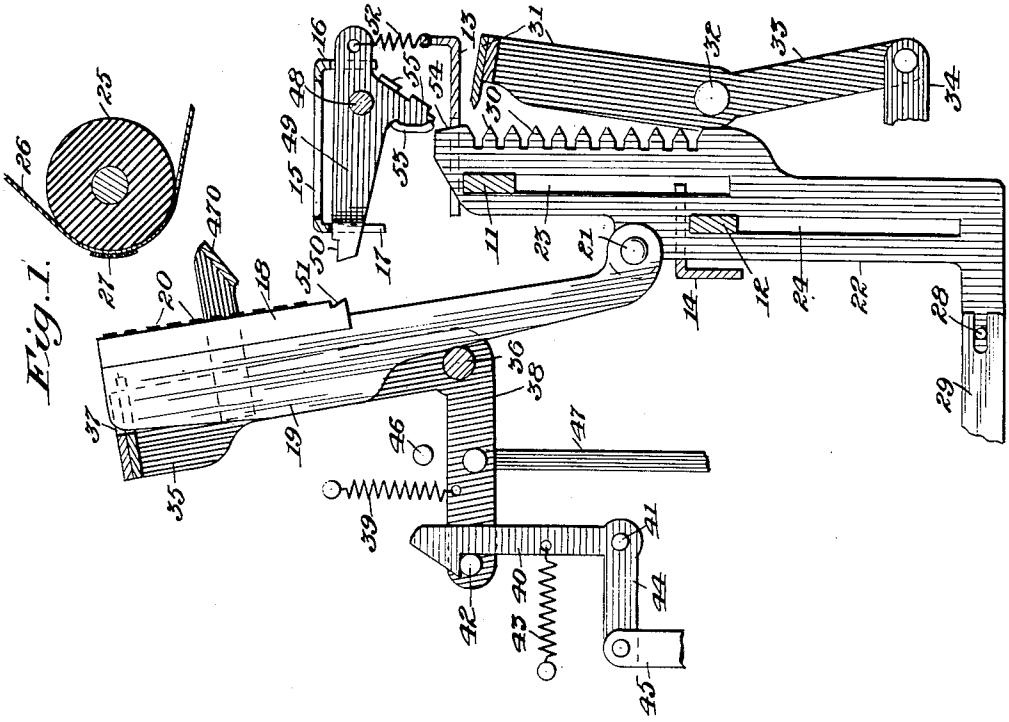

Fig. 1.

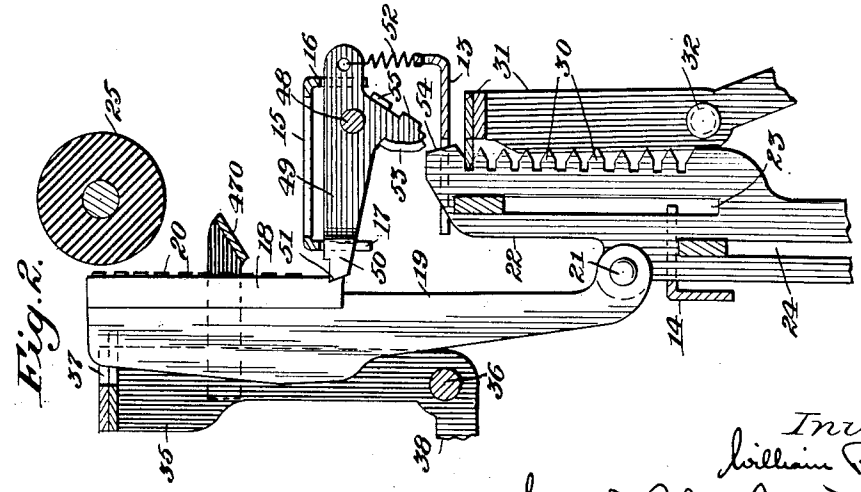

Fig. 2.

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Fig. 3.

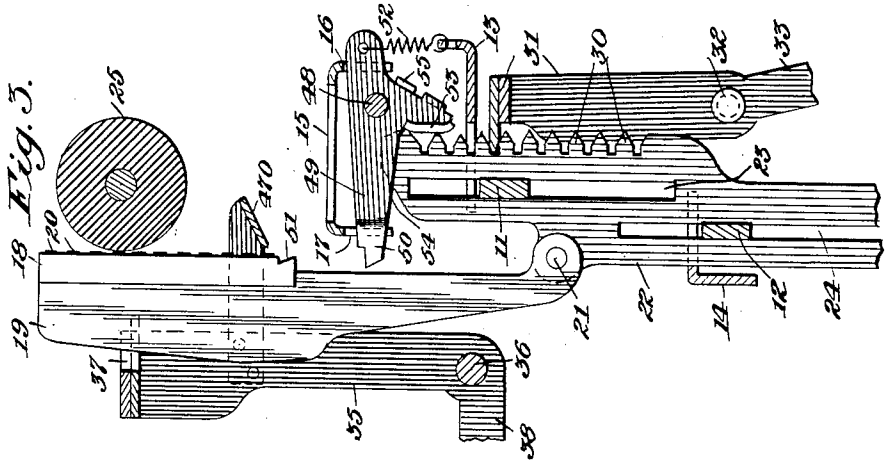
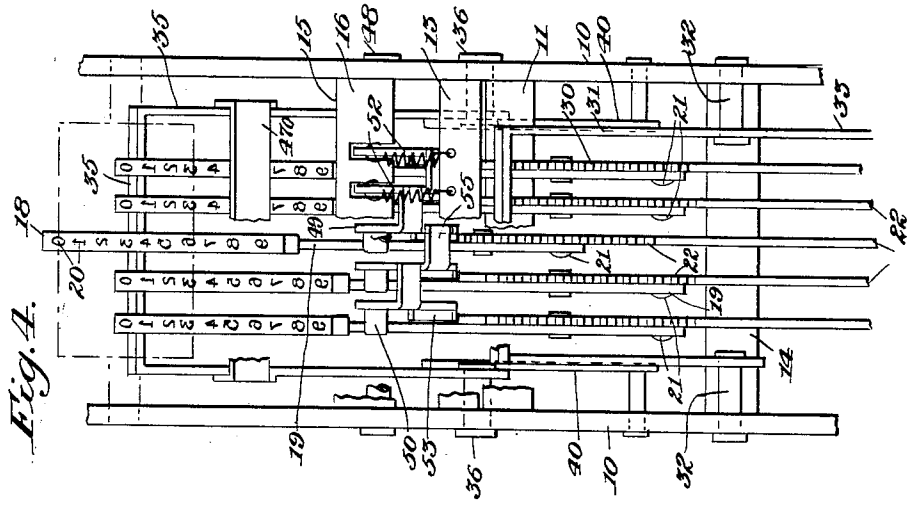


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PRINTING MECHANISM.

Application filed May 21, 1923. Serial No. 640,433.

To all whom it may concern:

Be it known that I, WILLIAM P. QUENTELL, a citizen of the United States, residing at New York, county of New York, State of New York, have invented a certain new and useful Improvement in Printing Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to mechanism for printing or recording numbers and adapted for use either as a separate machine or as a constituent part of a numbering machine, recording register, adding machine, or other device in which mechanism of this character is employed.

The invention has for its object the provision of simple, compact and efficient mechanism for printing amounts comprising any number of digits (within the capacity of the machine) wherein the necessary zeros at the right of a significant digit will be automatically printed, the printing of unnecessary zeros at the left of the significant digit of the highest order being, however, prevented.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of one form or embodiment thereof illustrated in the accompanying drawings. It will be understood, however, that the particular mechanism described and shown has been chosen for illustrative purposes merely, and that the invention, as defined by the claims hereunto appended, may be otherwise practised without departure from its spirit and scope.

In said drawings:

Fig. 1 is a simplified, somewhat diagrammatic, sectional view, with the associated parts omitted or broken away, of a printing mechanism constructed and arranged in accordance with the invention.

Figs. 2 and 3 are similar views of certain of the parts shown in Fig. 1, said parts being shown in different positions.

Fig. 4 is a rear elevation with certain of the parts omitted or broken away in order to illustrate the construction more clearly.

The parts of the printing mechanism herein shown are mounted in a frame composed of side plates 10 (see Fig. 4) and certain transverse members, hereinafter referred to, connecting said side plates. Said mechanism comprises a series of printing members for printing respectively the digits of different orders making up the complete number to be printed, said printing members cooperating with a platen, herein shown as a roller 25 (Figs. 1 to 3) for supporting a paper record strip 26 (Fig. 1) between which and the printing members is interposed an inking ribbon 27. Each of the printing members comprises a swinging arm 19 to which is secured a type bar 18 having on its face a longitudinal series of types 20 adapted respectively to print the several digits from "0" to "9". The printing members are swung toward the platen by means hereinafter described to effect the printing impression and are independently moved or adjusted longitudinally to bring the several types 20 into printing position. To the latter end, each of the arms 19 is pivoted at 21 to a vertically movable printing-member carrier or slide 22. The carriers 22 are spaced from one another by combs 13 and 14 comprising frame members extending across between the side plates 10 and having slots in which said carrier slides are received. Said slides are formed with vertical slots 23 and 24 through which pass transverse frame members 11 and 12 whereby said slides are guided for vertical movement. The carrier slides 22 may be independently adjusted vertically by any suitable means and as shown in Fig. 1 are provided at their lower ends with pins 28 which are engaged by the rearward ends of operating or adjusting arms 29. Said carrier slides are formed on their rear edges with beveled teeth 30 which are engaged by the beveled edge of a positioning bail 31 pivoted at 32 to the side plates 10 and having an extended arm 33 to which is connected an operating link 34. The positioning bail 31, by engagement with the spaces between the teeth 30, serves to center the printing members with the desired types in proper alinement and to lock the same in adjusted position during the printing impression. The printing members, as shown in Figs. 1 and 2, and at the ends of the series in Fig. 4, are normally so positioned as to print zeros and are raised out of their normal positions into successively higher positions in order to adjust them to print figures of successively greater value.

In order to effect the printing impression, the printing members are swung on their pivots 21 toward the platen 25 by means of a bail 35 pivoted at 36 to the side plates 10 and engaging all of the arms 19, said bail having a slotted or comb portion 37 to receive said arms and hold the same in properly spaced relationship. The bail 35 is formed with a forwardly extending, angularly disposed arm 38 (Fig. 1) connected by a spring 39 with the frame of the machine, whereby said bail tends normally to impel the printing members toward the platen. Said bail is normally locked against such movement by means of a latch 40 pivoted at 41 to the adjacent side plate 10 and engaging a stud 42 on the arm 38, said latch being normally held in engagement with said stud by means of a spring 43 and having an arm 44 to which is connected an operating link 45 whereby said latch may be released to permit the spring 39 to throw the bail 35 and printing members toward the platen. Before the printing members strike the platen, the movement of the bail 35 is arrested by engagement of the arm 38 thereof with a stud 46 on one of the side plates 10, so that said printing members are thrown by momentum against the platen and effect the printing impression by a percussive action. Connected with the arm 38 of the bail 35 is a link 47 by which said bail may be re-set and the stud 42 re-engaged by the latch 40. Said bail 35 preferably carries an auxiliary bail 470 extending across the printing members at the rear side of the series for the purpose of returning to normal position such of the printing members as may not rebound from the platen or fall by gravity into their normal positions, as shown in Fig. 1, when the bail 35 is re-set by the link 47.

Pivotally mounted on a rod 48 extending between the side plates 10 is a series of tumblers 49 corresponding in number to the printing members and held in spaced position on said rod 48 by means of combs or slotted flanges 16 and 17 on a transverse frame member 15 which is located immediately above the printing-member carrier slides 22 and is cut away to permit said slides to pass therethrough when said slides are raised. Each of the tumblers 49 is formed with a laterally offset forward end 50 which, when the corresponding printing member is adjusted to print zero and is thrown toward the platen by the bail 35, engages a notch 51 in the lower end of the type bar 18 of said printing member, as shown in Fig. 2, thereby arresting the movement of the latter and preventing the same from striking the platen. The end 50 and notch 51 are preferably beveled or undercut, as shown, so as to insure their proper interengagement when the tumbler is struck by the type bar and preventing said tumbler from being inadvertently pushed down by said type bar. The tumblers 49 are normally held in the position shown in Fig. 1, to cause the operation last described, by means of springs 52 connecting the rear ends of said tumblers with the frame member 13, said springs holding the forward ends 50 of said tumblers in engagement with the upper ends of the slots in the comb 17. Each of the tumblers 49 is formed with a laterally extending lip 53 constituting a cam portion adapted, when the corresponding carrier 22 is raised, to be engaged by a cam surface 54 on the upper end of said carrier in such a manner as to turn said tumbler into the inoperative position shown in Fig. 3, in which position the forward end 50 of said tumbler is depressed below the path of movement of the type bar 18. Each of the tumblers 49, with the exception of that corresponding to the printing member of highest order, is formed with a laterally turned lip 55 which overlaps the next adjacent tumbler of higher order so that when any tumbler, except that of lowest order, is moved by its carrier 22 from the operative position shown in Figs. 1 and 2 into the inoperative position shown in Fig. 3, all of the tumblers of lower order than the one so moved will be rendered inoperative likewise. To facilitate the manufacture and assembling of the parts and permit a compact construction, the lips 55 on successive tumblers are staggered with respect to one another, as shown in Fig. 4.

It will now be seen that when all of the printing members are in normal position, so as to print zeros, and the bail 35 is released by the latch 40 so as to throw said printing members toward the platen, movement of said printing members toward the platen will be arrested by the engagement of said members with their respective tumblers 49, so that no printing will occur. If, however, one of the carriers 22 be operated to adjust the corresponding printing member to print a figure greater than zero, such movement of the carrier 22 will cause the corresponding tumbler 49 to be moved into its inoperative position, as shown in Fig. 3, carrying with it all of the tumblers of lower order, so that, when the bail 35 is operated, the type bar which has been adjusted to print a significant figure will strike the platen, as will also all of the type bars of lower order, thereby printing the significant figure together with the appropriate zeros at the right thereof. Thus, for example, in Figs. 3 and 4 the hundreds printing member has been moved upwardly four spaces to adjust the same to print the numeral "3", thereby adjusting the mechanism as a whole to print the number "300." The corresponding tumbler 49 has been moved into inoperative po-

sition by engagement of its cam portion 53 by the cam surface 54 on the corresponding carrier 22, and the lips 55 of the tumblers of lower order, each of which overlaps the adjacent tumbler of higher order, have caused the tumblers corresponding to the tens and units printing members also to be moved into inoperative position so that when the bail 35 is operated the hundreds, tens, and units type bars will all be caused to strike the platen. Since the tens and units type bars are in their normal position, zeros will be printed in the tens and units places following the significant figure "3" which is printed in the hundreds place. The tumblers 49 corresponding to the printing members of higher order than that adjusted to print a significant figure will, however, remain in their normal or operative positions, so that said printing members of higher order will be arrested before they strike the platen, and no zeros will be printed to the left of the highest significant figure.

The arms 29 for adjusting the printing member carriers 22, the link 34 for operating the positioning bail 31, the link 45 for releasing the latch 40, and the link 47 for re-setting the printing member operating bail 35, may be connected with any suitable parts, such as keys or levers, for adjusting, operating, and controlling the printing mechanism. The invention, however, is herein shown as embodied in a printing mechanism suitable for use as a part of a recording adding machine of well-known type such, for example, as that shown in Letters Patent No. 1,286,769, granted to me December 3, 1918. Such a machine comprises a series of adding wheels and a series of adding wheel actuators, which actuators are positioned by suitable keys to turn the several adding wheels amounts depending upon the keys operated, said adding wheels being carried by a frame movable to bring the same into operative engagement with their actuators after the latter have been set, and said actuators being thereafter returned to normal position to advance the adding wheels. When employed as a part of such a machine, the arms 29 for adjusting the several printing member carriers 22 may form a part of or be connected with the several adding wheel actuators so as to cause the printing members to be set or adjusted in accordance with the setting or adjustment of the respective adding wheel actuators. Also the links 34 and 45 for operating the positioning bail 31 and for releasing the latch 40 may be so connected with the mechanism for operating the adding wheel frame that the printing members and their carriers will be locked in adjusted position and said printing members operated to print when the adding wheels are moved into engagement with their actuators. Further, the link 47 for re-setting the bail 35 may be so connected with a suitable part of the main actuating mechanism of the machine as to cause said bail to be re-set at a suitable point in the cycle of operations of the machine. These connections are not shown, as it will be obvious that their precise nature will depend upon the particular type of adding mechanism with which the printing mechanism is used. They will, however, be readily understood, by those skilled in the art, without further explanation in detail.

Having thus described my invention, I claim:

1. In a number printing mechanism, in combination, a series of printing members independently adjustable to print different figures, a common actuator for moving all of said members in the direction to effect the printing impression, means for arresting the effective printing movement of said members, and means for positioning said last named means to permit said members to print.

2. In a number printing mechanism, in combination, a series of printing members independently adjustable to print different figures, a common actuator for moving all of said members in the direction to effect the printing impression, and means controlled by the adjustment of said members for arresting the effective printing movement thereof.

3. In a number printing mechanism, in combination, a series of printing members independently movable in one direction to adjust the same to print different figures, a common actuator for moving all of said members in another direction to effect the printing impression, means for arresting the effective movement of said members in said last named direction, and means for positioning said last named means to permit said members to print.

4. In a number printing mechanism, in combination, a series of printing members independently movable in one direction to adjust the same to print different figures, a common actuator for moving all of said members in another direction to effect the printing impression, and means controlled by the movement of said members in said first named direction for arresting the effective movement thereof in said last named direction.

5. In a number printing mechanism, in combination, a series of printing members independently movable in one direction from their normal positions to adjust the same to print different figures, a common actuator for moving all of said members in another direction to effect the printing impression, and devices co-operating with said members

respectively to arrest the effective movement thereof in said last named direction, said devices being rendered inoperative by movement of their respective printing members out of normal position in said first named direction.

6. In a number printing mechanism, in combination, a series of printing members independently movable in one direction from a zero position to adjust the same to print figures greater than zero, a common actuator for moving all of said printing members in another direction to effect the printing impression, and means controlled by said members respectively and rendered inoperative by movement thereof in said first named direction out of zero position for arresting the effective movement of the several members in said last named direction.

7. In a number printing mechanism, in combination, a series of printing members of different orders independently adjustable to print different figures, a common actuator for moving all of said members to effect the printing impression, devices co-operating with said members respectively for arresting the effective printing movement thereof, means for rendering said devices severally inoperative to permit their respective members to print, and means associated with and connecting said devices whereby each is rendered inoperative when the next adjacent device of higher order is rendered inoperative.

8. In a number printing mechanism, in combination, a series of printing members independently movable in one direction from their normal positions to adjust the same to print different figures, a common actuator for moving all of said members in another direction to effect the printing impression, devices co-operating with said members respectively to arrest the effective movement thereof in said last named direction, said devices being rendered inoperative by movement of their respective printing members out of normal position in said first named direction, and means associated with and connecting said devices whereby each is rendered inoperative when the next adjacent device of higher order is rendered inoperative.

9. In a number printing mechanism, in combination, a series of printing members of different orders independently adjustable from a zero position into positions to print figures greater than zero, a common actuator for moving all of said members to effect the printing impression and means for preventing the effective printing movement of said members when the latter are in zero position, said mechanism including means, rendered operative by the adjustment of a printing member to print a figure greater than zero, for rendering said arresting means inoperative with respect to the printing members of lower order than that so adjusted.

10. In a number printing mechanism, in combination, a series of printing members of different orders independently movable in one direction from a zero position to adjust the same to print figures greater than zero, a common actuator for moving all of said members in another direction to effect the printing impression, devices co-operating with said members respectively for arresting the effective movement thereof in said last named direction when said members are in zero position, means for rendering said devices severally inoperative when their respective printing members are moved in said first named direction out of zero position, and means associated with and connecting said devices whereby each is rendered inoperative when the next adjacent device of higher order is rendered inoperative.

11. In a number printing mechanism, in combination, a series of printing members of different orders independently adjustable to print different figures, a common actuator for moving all of said members to effect the printing operation, and a series of tumblers co-operating with said members respectively to arrest the effective movement thereof in said last named direction, said tumblers being severally movable into inoperative positions to permit the respective members to print and having overlapping portions whereby each is moved into inoperative position when the next adjacent tumbler of higher order is so moved.

12. In a number printing mechanism, in combination, a series of printing members, carriers for said printing members respectively, said carriers being independently movable to adjust said members from a zero position into positions to print figures greater than zero, a common actuator for moving all of said members to effect the printing impression, and tumblers co-operating with said printing members respectively for arresting the effective printing movement thereof, said tumblers being operated by said carriers respectively and moved thereby into inoperative positions when said carriers are operated to move said printing members out of zero position, and said tumblers having overlapping portions whereby each is moved into inoperative position when the next adjacent tumbler of higher order is so moved.

13. In a number printing mechanism, in combination, a platen, a series of type bars each carrying a series of figure types, arms on which said type bars are mounted, sliding carriers on which said arms are pivoted, said carriers being longitudinally movable to bring any of the types on the corresponding bar into operative position opposite said platen, a bail for impelling said arms

toward said platen to cause said types to strike the same, and tumblers co-operating with said type bars respectively to prevent the same from striking said platen, said tumblers being engaged and moved into inoperative positions by said carriers respectively when the latter are moved to adjust said type bars to print numbers greater than zero, and said tumblers having overlapping portions whereby each is moved into inoperative position when the next adjacent tumbler of higher order is so moved.

14. In a number printing mechanism, in combination, a platen, a series of printing members independently movable across said platen to adjust the same to print different figures, means for throwing said members by momentum against said platen, and means for arresting the movement of said members before they strike said platen, said last named means being movable into an inoperative position to permit said members to strike said platen.

15. In a number printing mechanism, in combination, a platen, a series of printing members of different orders, a series of carriers therefor independently movable to adjust said printing members from a zero position into positions to print figures greater than zero, means for throwing said members by momentum toward said platen, devices co-operating with said members respectively for arresting the same before they strike said platen, said devices being engaged by the respective carriers when the latter are moved to adjust the corresponding printing members to print figures greater than zero and moved thereby into inoperative positions to permit their respective printing members to strike said platen, and means associated with and connecting said devices whereby each is moved into inoperative position when the next adjacent device of higher order is so moved.

16. In a number printing mechanism, in combination, a platen, a series of printing members of different orders, carriers for said members movable to adjust the same to print different figures, a bail for throwing said printing members toward said platen, a spring for operating said bail, a latch for holding said bail against operation, means for releasing said latch, a stop for arresting the movement of said bail to cause the same to throw said printing members toward said platen by momentum, and a series of tumblers co-operating with said printing members respectively to arrest the movement thereof before they strike said platen, said tumblers being movable by the respective carriers into inoperative positions to permit the respective printing members to strike said platen, and said tumblers having overlapping portions whereby each is moved into inoperative position when the next adjacent tumbler of higher order is so moved.

In testimony whereof I affix my signature.

WILLIAM P. QUENTELL.