

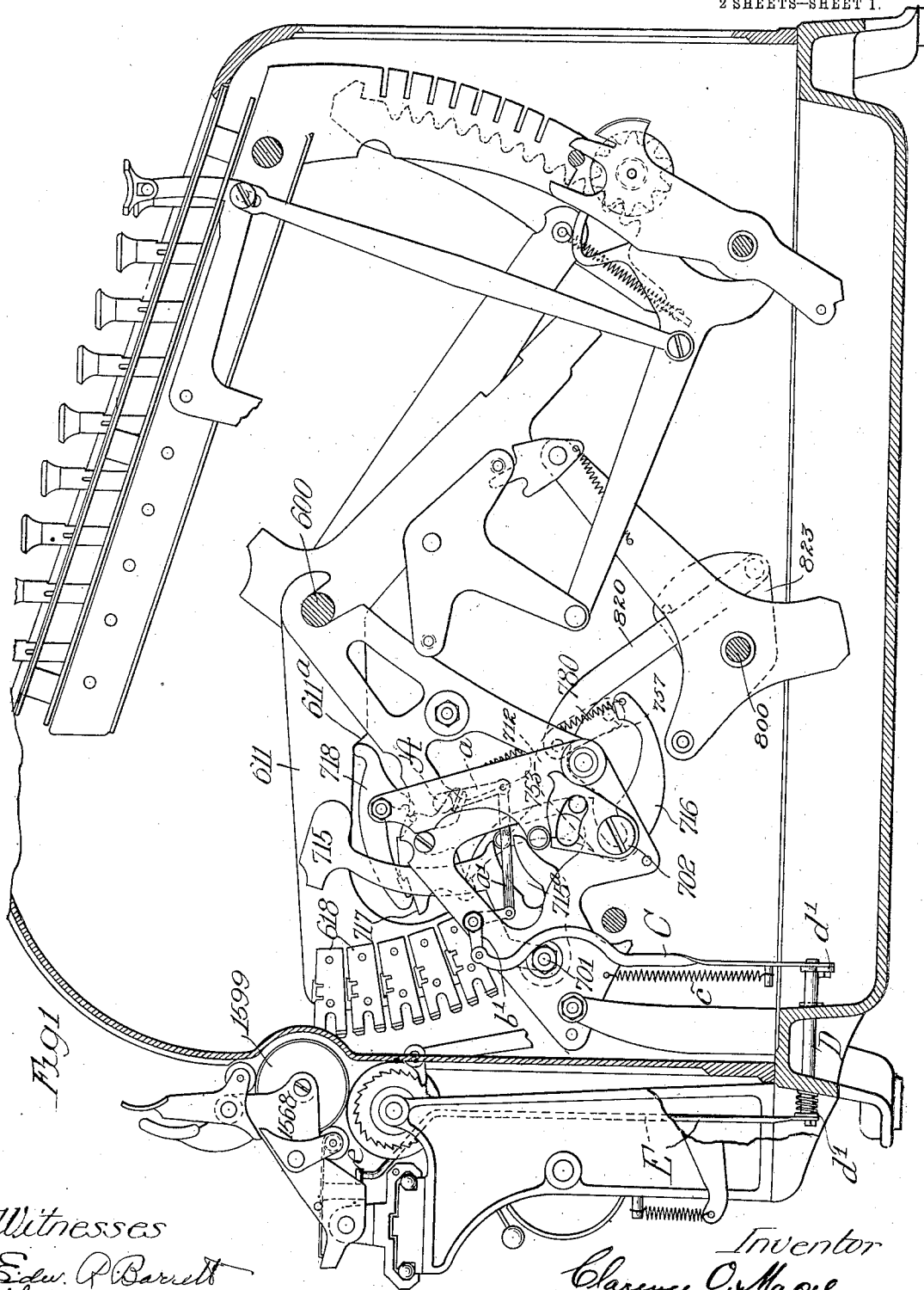
C. O. MAPEL.
ADDING MACHINE.

APPLICATION FILED NOV. 23, 1905. RENEWED NOV. 15, 1909.

1,013,192.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 1.



Witnesses
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His Attys.

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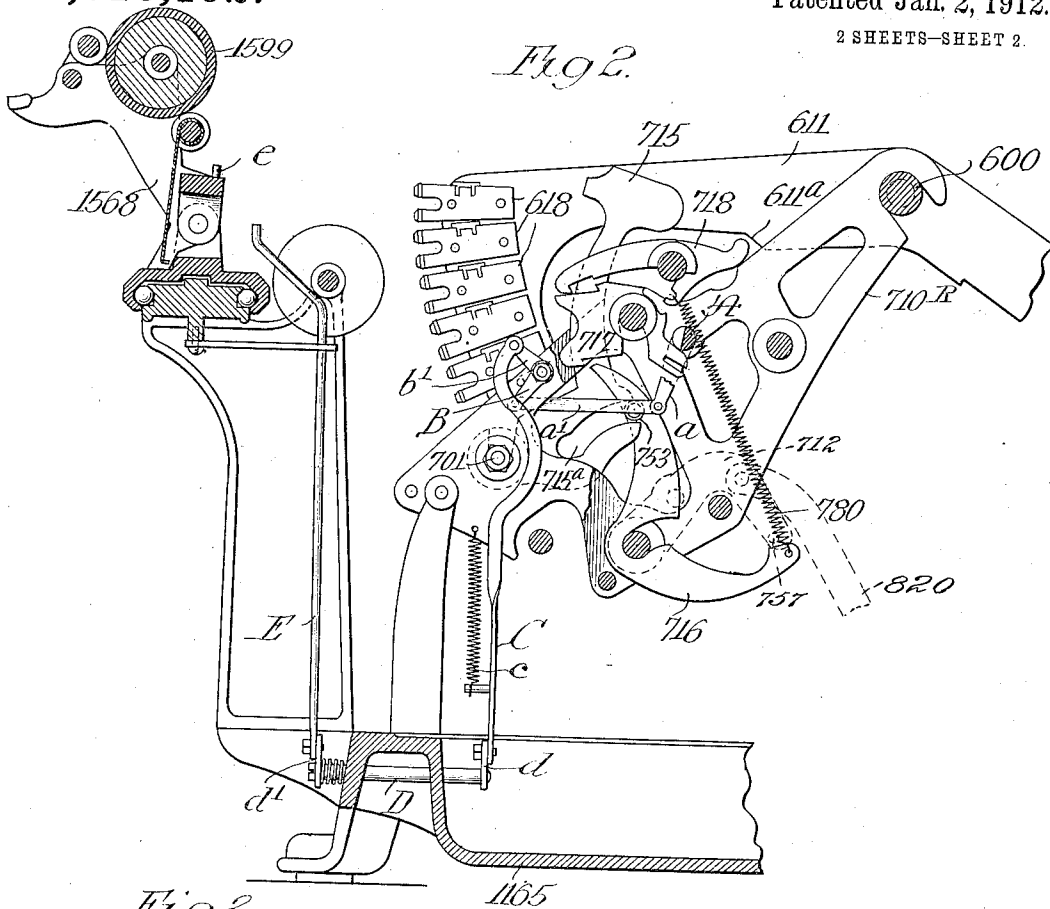


Fig. 3.

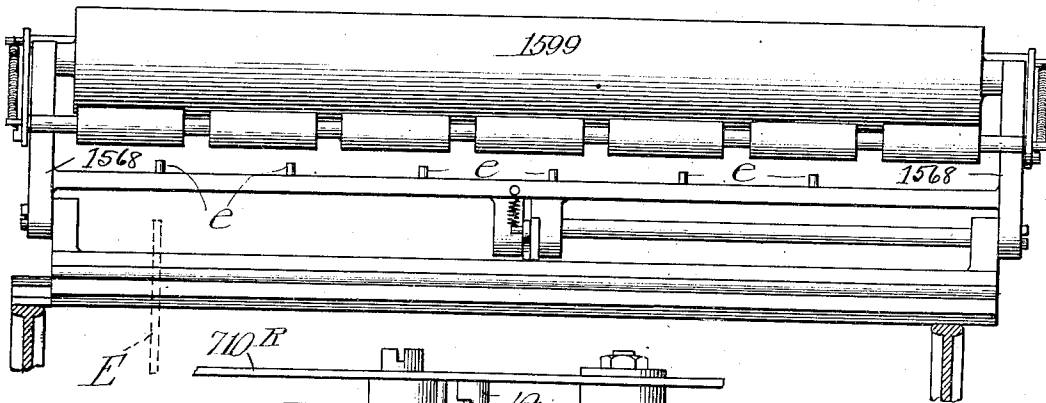
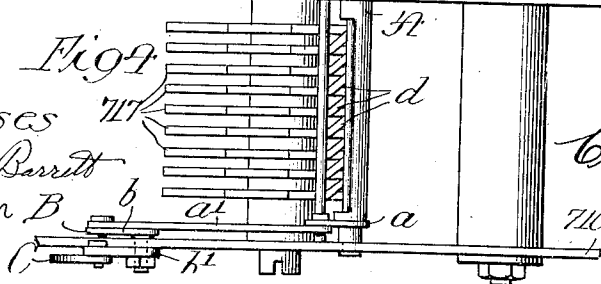


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

CLARENCE O. MAPEL, OF CHICAGO, ILLINOIS, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

1,013,192.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed November 23, 1905, Serial No. 288,714. Renewed November 15, 1909. Serial No. 528,146.

To all whom it may concern:

Be it known that I, CLARENCE O. MAPEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

My invention relates to adding machines of that type or class adapted to print, list and accumulate individual items and to print the total or footing of such lists at the will of the operator and the same has more particular relation to the printing mechanism of an adding machine.

15 The object of my invention is to control the operation of the printing mechanism by the paper support or platen and to render such printing mechanism operative only when the paper support is in a position to receive the impression from the printing mechanism, such mechanism being rendered inoperative when the paper support is swung back to a non-printing position. The purpose of this control of the printing mechanism is to relieve or protect the type plates and prevent them from being damaged or broken off from their supports or sectors by the force of the blows of the hammers imparted to such type plates at a time when the paper support is swung back and not in position to receive the impression from such type plates. It frequently happens that for one reason or another, particularly when the machine is being cleared for a fresh operation, adding machine operators throw back the paper support and leave it in such non-printing position during an operation or operations of the machine, with the result that nothing remains to receive the type impression so that the blow of the hammers upon the type plates is liable to knock such plates off their sectors or to damage the same. To overcome this difficulty, I provide means which is dependent upon the position of the paper support for controlling the action of the printing mechanism, such mechanism being rendered inoperative when the machine is thrown back, but left operative when the paper support is in printing position, so that while the machine may be operated as before, to clear the machine or for any other reason, the printing mechanism is enabled to

operate and the hammers enabled to deliver their blows only when the paper support is in position to receive the force of the impact and thereby relieve the type plates from the full force of the blows.

In the present instance, I have shown my invention as applied to and incorporated in the well known Burroughs adding machine, made in substantial accordance with Burroughs' Patents Nos. 504,963 and 505,078, issued on September 12, 1893, although as will be understood, my invention may be applied to adding machines of other styles and makes and constructed and operating in the same general way to accomplish the same general purposes.

Moreover, my invention may partake of other embodiments, although the present and illustrated and hereinafter described construction is preferred and found satisfactory in practical use.

In the drawings, Figure 1 is an elevation of the left-hand side of a Burroughs adding machine showing those portions only thereof as are more or less directly concerned with a description and understanding of my invention; Fig. 2 a somewhat similar view of the machine, but with the paper support or platen thrown back in non-printing position; Fig. 3 a plan view of the paper carriage or support and a portion of the machine proper; and Fig. 4 a detail view of a portion of the printing mechanism illustrating the means for controlling the latches.

Inasmuch as the Burroughs adding machine is well known and also described in detail in the Burroughs patent aforesaid as to general features of construction and mode of operation, only those portions of the machine which are more or less directly concerned with the operation of my attachments or improvements need be described or illustrated.

The Burroughs machine, as herein illustrated is provided with a series of type levers or sectors supported or hung upon the main cross shaft and corresponding in number to the number of denominations represented by the different rows or banks of keys on the keyboard. These sectors are provided at their rearward ends with the series of type plates which, in the present instance, are five in number; each bear-

ing two type so as to present the nine digits and the cipher. As is well known, these type are mounted upon their sectors in such manner as to have a slight reciprocating or longitudinal movement independent of such sectors but to move or oscillate in unison therewith, with the result that after the sectors have oscillated upwardly as to their rearward ends distances corresponding to the values represented by the particular keys operated, the particular type plates representing those values are presented to the printing line of the paper support or platen 1599 of the machine and such type plates are impressed upon the paper support (or rather the paper carried thereby) by the blows of the hammers 715. The control of the degree of oscillation of the sectors 611 at their forward ends by operating connections under the control of the keys is well known and described in said Burroughs patent so that detail description thereof is unnecessary here.

The printing mechanism of the Burroughs machine herein shown comprises a series of hammers 715 corresponding in number to the number of sectors 611 and mounted to oscillate on a cross shaft 701. These hammers are arranged to be operated or driven by a series of similar drivers 716 mounted upon the cross shaft 702, to which end each driver is provided with a laterally projecting stud 753 adapted to be received by the slot 715^a in its corresponding hammer, with the result that when the driver 716 which in the operation of the machine is placed under tension of the spring 780, one for each driver, and after such drivers have been tripped in a manner hereinafter explained, the hammers are caused to move rearwardly to deliver their blows upon the particular type plates which happen to be presented to them, according to the particular elevation of the operated sectors 611. Each driver 716 is associated with a latch 717 and each latch is in turn under the control of its pawl 718. As is well known, the pawls 718 have no effect upon their latches in case the sectors 611 have not been elevated, owing to the contact of the tails of such pawls upon the inclined shoulder 611^a of such sectors, but in case any one or more of the sectors are elevated the interference to the tails of those pawls 718 corresponding to such operated sectors is removed, with the result that in the usual forward swinging of the entire series of pawls 718 those particular pawls, that is the pawls corresponding to the operated sectors, will engage their respective latches 717 and rock the same in a clockwise direction, Figs. 1 and 2, and thereby release their drivers and operate the hammers. The drivers and consequently the hammers are normally held retracted by a bail such as shown in

the above-mentioned Burroughs Patent 505,078, said bail comprising side arms 712 and a connecting rod 757 overlying the forwardly projecting arms of the drivers. This bail is connected through the medium of a link 820 with a crank plate 823 secured to the rock-shaft 800. The latter is oscillated in the usual manner in each operation of the machine. At the outset of an operation the bail above described is lifted and the hammer drivers and hammers thus relieved from the restraint normally imposed by said bail. Hence when latches are thereafter tripped the hammers pertaining to them can be projected against the type by the springs 780 with a percussive effect. It will of course be understood that the above described bail serves the purpose of retracting the hammer drivers and hammers as an operation of the machine is brought to a close. As is well understood, the transfer of hammer action for cipher printing is accomplished by means of the series of tails *d* on the latches 717, as indicated in Fig. 4 and as described in the Burroughs patents aforesaid.

Ordinarily the printing mechanism would operate, that is the hammers would deliver their blows upon the type plates, when an item was being put into the machine or a total being taken, regardless of whether the paper support or platen was in printing position or not, but in order to bring such printing mechanism under the control of the paper support so that the position of the latter shall determine whether the printing action occurs or not, I provide mechanism for interfering with the usual operation of the latches causing the same to be automatically tripped or released from their drivers at the instant when the paper support is raised or tilted back, as shown in Fig. 2. With the latches thus disabled it will be seen that the hammers will be permitted to fall or move rearwardly as the bail 712—757 rises and there can be no percussive action such as essential to a printing impression. Under the present construction, the means which I have provided to accomplish the desired results normally tends to render the printing mechanism inoperative by tripping such latches and the same is operated by the act of restoring the paper support to its printing position, with the result that immediately upon tilting back the paper support said means instantly renders the printing mechanism inoperative.

Referring more particularly to Fig. 2, I provide at a point adjacent the tails of the latches 717 a transverse rock shaft A which may be conveniently described as half-round, inasmuch as one half thereof has been cut away, or one side thereof has been at least reduced. The ends of this rock shaft are suitably journaled in the side plates 710^a

and 710^L of the frame of the printing mechanism. When the reduced side of this rock shaft is presented toward the tail of the latches 717, such rock shaft has no effect upon such latches, but when such shaft is rocked so as to present its full side or diameter to such latches all of the latches will be rocked downwardly as to their forward ends, while their rearward ends will be rocked upwardly to thereby release these latches from engagement with the drivers 716, as shown in Fig. 2, at which time no hammer action can take place. For the purpose of placing this rock shaft under the control of the paper support I provide suitable operating connections which, in the present instance, comprise a crank arm *a* connected with the rock shaft A which is in turn connected by the link *a*¹ with the bell crank B. This bell crank is itself connected by rock shaft *b* and arm *b*¹ (Fig. 4) to the upper end of a substantially vertical rod or link C, whose lower end is pivotally connected to a crank arm *d* on the inner end of a rock shaft D which projects through and has its bearings in the base 1165 of the machine. The outer end of the rock shaft D is provided with a crank arm *d*¹ which is operatively connected to an upwardly extending rod or finger E, whose upper end is so bent or disposed as to lie in the path of movement of any one of a series of pins *e* arranged and spaced upon the frame 1568, in which the platen 1599 is journaled, Figs. 2 and 3. These pins *e* are spaced on such platen frame or paper support according to the different columnar positions to which the paper carriage is shifted, while the upper end of the operating rod E is in position to be contacted and depressed by any one of such pins at any columnar position of the paper carriage. The said operating connections are held in the position indicated in Fig. 2 with a yielding pressure by means of a spring *c* connected with the link C, as indicated in Figs. 1 and 2.

When the paper support or platen is in printing position, as indicated in Fig. 2, one of the series of pins *e* causes a depression of the operating rod E and a consequent partial rocking of the controlling shaft A, with the result that at this time the reduced side of such shaft is presented toward the tails of the latches 717 without any contact or interference therewith, so that such latches and in fact the entire printing mechanism operates in the usual manner. When, however, the platen is tilted back as shown in Fig. 2, the downward pressure of one of the pins *e* is removed from the tilting rod E, whereupon, owing to the tension of the spring *c*, the operating connections are restored to their normal condition, whereupon the controlling shaft A is partially rocked so as to prevent its full side to the tails of

the latches 717 and to partially oscillate such latches, sufficiently for the purpose of disengaging the same from the hammer drivers 716. If the machine is now operated for the taking of a total or for inserting an item into the machine, neither the drivers nor the hammers will be held under tension, inasmuch as the latches which constitute the trigger devices for the drivers, have been disabled so that in the operation of the machine the hammers will move slowly in a rearward direction following the restoring bail while their sectors are moving upwardly, but such hammers will simply come to rest at the end of the forward stroke of the operating handle or forward movement of the main operating shaft, without delivering any blows upon the type plates. Thus, according to the present embodiment of my invention, neither the drivers nor the hammers are put under that tension to which they are subjected in the ordinary operation of the printing mechanism, inasmuch as the drivers and hammers move rearwardly as the pawls 718 move forwardly so that the driver springs 780 cannot be stretched as in the usual operations of the machine. Immediately upon restoring the platen to printing position the operating rod E is depressed and the interference to the latches 717 caused by the rock shaft A is removed by partially rocking such shaft to present the reduced side thereof to such latches.

The action of the printing mechanism is thus under the control of the paper carrier or platen, whose position determines whether the printing mechanism shall operate or not. By these means the danger of knocking the type plates off the sectors or injuring the connections between these parts is prevented, inasmuch as no blow can be delivered by a hammer so long as the paper support is not in printing position.

Although I have herein shown and described pins *e* as the part of the paper support which actuates or controls the means for tripping the latches, yet it will be understood that a longitudinal plate may be substituted for the pins to act with the same effect and it will also be understood that it is within the scope and meaning of my invention to utilize any part or portion of the paper support for the purpose of controlling said means. Furthermore, it will be understood that I employ the term "paper support" in its broad sense to include not only the ordinary paper support on a laterally movable paper carriage, but also a paper support adapted merely to swing and not to move laterally or longitudinally.

While early release of hammers and elimination thereby of percussive action has been described as useful in preventing injurious effect of hammer action when the platen is out of printing position, yet it is

to be understood that such control of the hammers can be availed of in other connections where a non-printing action of hammers is desired.

5 I claim:

1. In an adding machine, the combination, with the printing mechanism and with a paper support movable to and from a position for receiving printing impact of said
10 mechanism, of means for preventing printing action when the paper support is out of position for receiving the impression impact.

2. In an adding machine, the combination, with the printing mechanism and with a paper support movable to and from a position for receiving printing impact of said
15 mechanism, of means under the control of the paper support for preventing printing action when the paper support is out of position to receive an impression from the
20 printing mechanism.

3. In an adding machine, the combination, with the printing mechanism and with a movable paper support, of means tending
25 to prevent printing action but rendered inoperative when the paper support is in position to receive an impression from the printing mechanism.

4. In an adding machine, the combination, with the printing mechanism and with a movable paper support, of means spring
30 pressed to an operative position to prevent printing action but rendered inoperative when the paper support is in position to receive an impression from the printing
35 mechanism.

5. In an adding machine, the combination with the printing mechanism and with a paper support arranged to swing to and
40 from a position for receiving printing impact of said mechanism, of means governed by such support to prevent printing action when the support is swung out of printing
45 position.

6. In an adding machine, the combination with the printing mechanism and with a paper support arranged to swing, of means
50 controlled by the swinging movements of the paper support and controlling the printing action.

7. In an adding machine, the combination, with the printing mechanism and with a paper support arranged to swing, of means
55 normally tending to prevent printing action and rendered inoperative to permit printing action when the paper support is in printing position.

8. In an adding machine, the combination with the printing mechanism and with a paper support arranged to swing, of means
60 normally tending to prevent printing action and having an operating member arranged in the path of movement of the paper support and actuated thereby when the support

is in printing position whereby said means are rendered inoperative.

9. In an adding machine, the combination, with the printing mechanism having hammers for causing the impression, and
70 with a paper support for controlling the hammer action movable to and from a position for receiving the impression impact, with provisions for automatically preventing impression action of hammers when the
75 paper support is out of position to receive the impression impact.

10. In an adding machine, the combination, with the printing mechanism having hammers for causing the impression, and
80 with a paper support, of means normally tending to prevent hammer action and arranged to be rendered inoperative by the paper support when in printing position to permit the printing mechanism to op-
85 erate.

11. In an adding machine, the combination, with the printing mechanism having hammers for causing the impression, and
90 with a paper support arranged to swing to and from position for receiving the impression impact, of means governed by the swinging of the paper support for controlling the hammer action.

12. In an adding machine, the combination, with the printing mechanism having hammers for causing the impression, and
95 with a paper support arranged to swing, of means under the control of the paper support for preventing hammer action when the paper support is swung back from the position at which it receives the impression.
100

13. In an adding machine, the combination, with the printing mechanism having movable type and hammers for striking said
105 type, and with a paper support arranged to swing, of means for controlling the hammer action and arranged to prevent the striking of the type when the paper support is not in printing position.
110

14. In an adding machine, the combination, with the printing mechanism having movable type and hammers for striking said
115 type, and with a paper support arranged to swing, of means under the control of the paper support for tripping the hammers upon the initial movement of the printing mechanism to permit the hammers to move throughout the movement of the printing mechanism without striking the type.
120

15. In an adding machine, the combination with the printing mechanism having movable type, hammers for striking said
125 type and trigger devices controlling the hammers, of means under the control of the paper support for tripping the trigger devices upon the initial movement of the printing mechanism to prevent hammer action.

16. In an adding machine, the combina- 130

tion, with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, and trigger devices controlling the drivers, and with a paper support arranged to swing, of means controlled by the paper support and adapted to render the trigger devices inoperative when the paper support is not in printing position.

17. In an adding machine, the combination, with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, and trigger devices controlling the drivers, and with a paper support arranged to swing, of means normally tending to render the trigger devices inactive, but arranged to be rendered inoperative when the paper support is in printing position.

18. In an adding machine, the combination, with the movable paper support and with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, latches normally restraining said drivers from movement, trips for the latches, and means controlled by the paper support and normally tending to trip said latches but rendered inoperative when the paper support is in printing position.

19. In an adding machine, the combination, with the movable paper support and with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, latches normally restraining said drivers from movement, trips for the latches, a movable member arranged to be actuated to trip said latches to prevent hammer action, and an arm connected with said member and arranged to be operated by the paper support.

20. In an adding machine, the combination, with the movable paper support and with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, latches normally restraining said drivers from movement, trips for the latches, a movable member spring pressed toward a position to trip said latches to prevent hammer action, and an arm connected with said member and contacted by the paper support when in printing position to operate such member and render it inoperative.

21. In an adding machine, the combination, with the movable paper support, and with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, latches normally restraining said drivers from movement, trips for the latches, a movable member spring pressed toward a position to trip said latches to prevent hammer action, and an arm connected with said member and held in the path of movement of the paper sup-

port by said spring pressure but arranged to be moved by such support when in printing position to thereby render said member inoperative and permit of the normal operation of the printing mechanism.

22. In an adding machine, the combination, with the movable paper support and with the printing mechanism having movable type, hammers for striking said type, drivers for such hammers, latches normally restraining said drivers from movement, trips for the latches, a rock shaft having portions to contact and thereby trip said latches to prevent hammer action, and an arm operatively connected with said shaft and projecting in the path of the paper support but actuated by the latter to rock the shaft to an inoperative position to which it is held so long as the paper support remains in printing position.

23. In an adding machine, the combination, with the paper support and with printing mechanism including the hammers and their trigger devices, of means under the control of the paper support for releasing said trigger devices when the paper support is moved from printing position comprising a member arranged to be moved to release the trigger devices, and an operating connection between said member and the paper support, including a movable rod or finger arranged in the path of the paper support and adapted to be moved thereby when the paper support is in printing position to remove said member to an inoperative position.

24. In an adding machine, the combination, with the paper support and with printing mechanism including the hammers and their trigger devices, of means under the control of the paper support for releasing said trigger devices when the paper support is moved from printing position comprising a member arranged to be moved to release the trigger devices, and an operating connection between said member and the paper support including a movable rod or finger projecting adjacent the paper support, the latter having a series of pins corresponding with different columnar positions of the support and arranged to control and move said finger to thereby remove said member to an inoperative position.

25. In an adding machine, the combination, with the paper support and with printing mechanism including the hammers and their trigger devices, of means under the control of the paper support for releasing said trigger devices when the paper support is moved from printing position comprising a member arranged to be moved to release the trigger devices, and an operating connection between said member and the paper support, including a substantially vertical finger longitudinally movable, said

paper support having a projecting portion in which path of movement said finger is projected.

26. In an adding machine, the combination, with the paper support and with printing mechanism including the hammers and their trigger devices, of means under the control of the paper support for releasing said trigger devices when the paper support is moved from printing position, comprising a rock shaft reduced on one side and arranged adjacent said trigger devices to release the latter when such shaft is rocked to present its full side thereto, a movable finger arranged in the path of swinging movement of the paper support, and operating connections between said finger and the rock shaft.

27. In a machine of the character described, the combination of percussive printing means and means for effecting at will a gradual movement of such printing means.

28. In a machine of the character described, the combination of a spring-actu-

ated printing hammer, means for retracting the same, means for holding the hammer retracted, tripping devices timed to release the latter means for producing a percussive hammer action, and means for anticipating at will the operation of said tripping device and producing gradual movement of the hammer following up its retracting means to the elimination of percussive action.

29. In a machine of the character described, the combination of hammer levers, springs applied thereto, an oscillating bail for retracting said levers, latches for restraining the levers, pawls for tripping the latches, an oscillating carrier for the pawls, and means for tripping the latches independently and in advance of the pawls to cause the levers to follow the bail and eliminate percussive action.

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