J. G. VINCENT.

ADDING MACHINE.

APPLICATION FILED MAY 14, 1907.

949,338.

Patented Feb. 15, 1910.

3 SHEETS—SHEET 1.

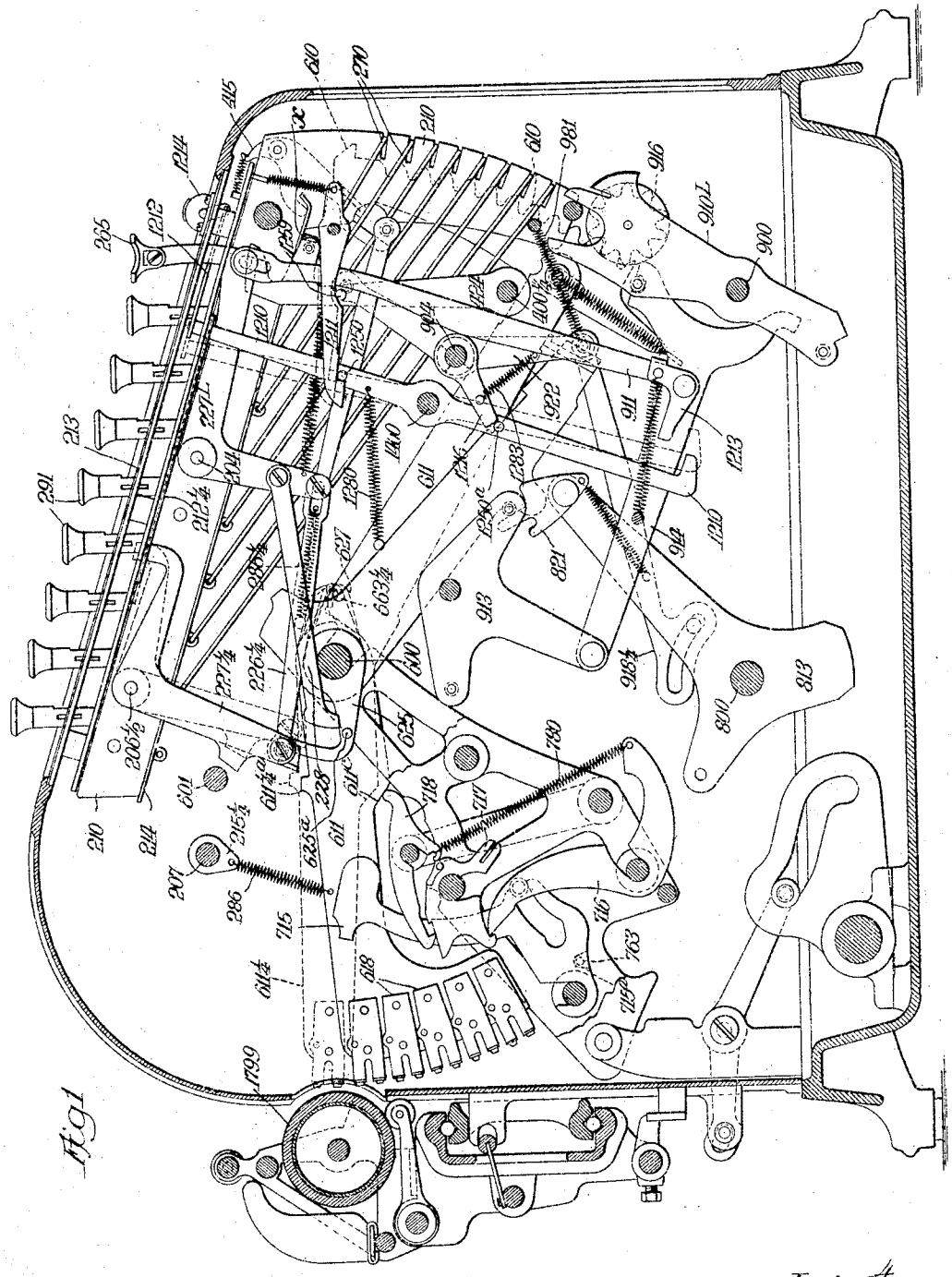

Fig 1

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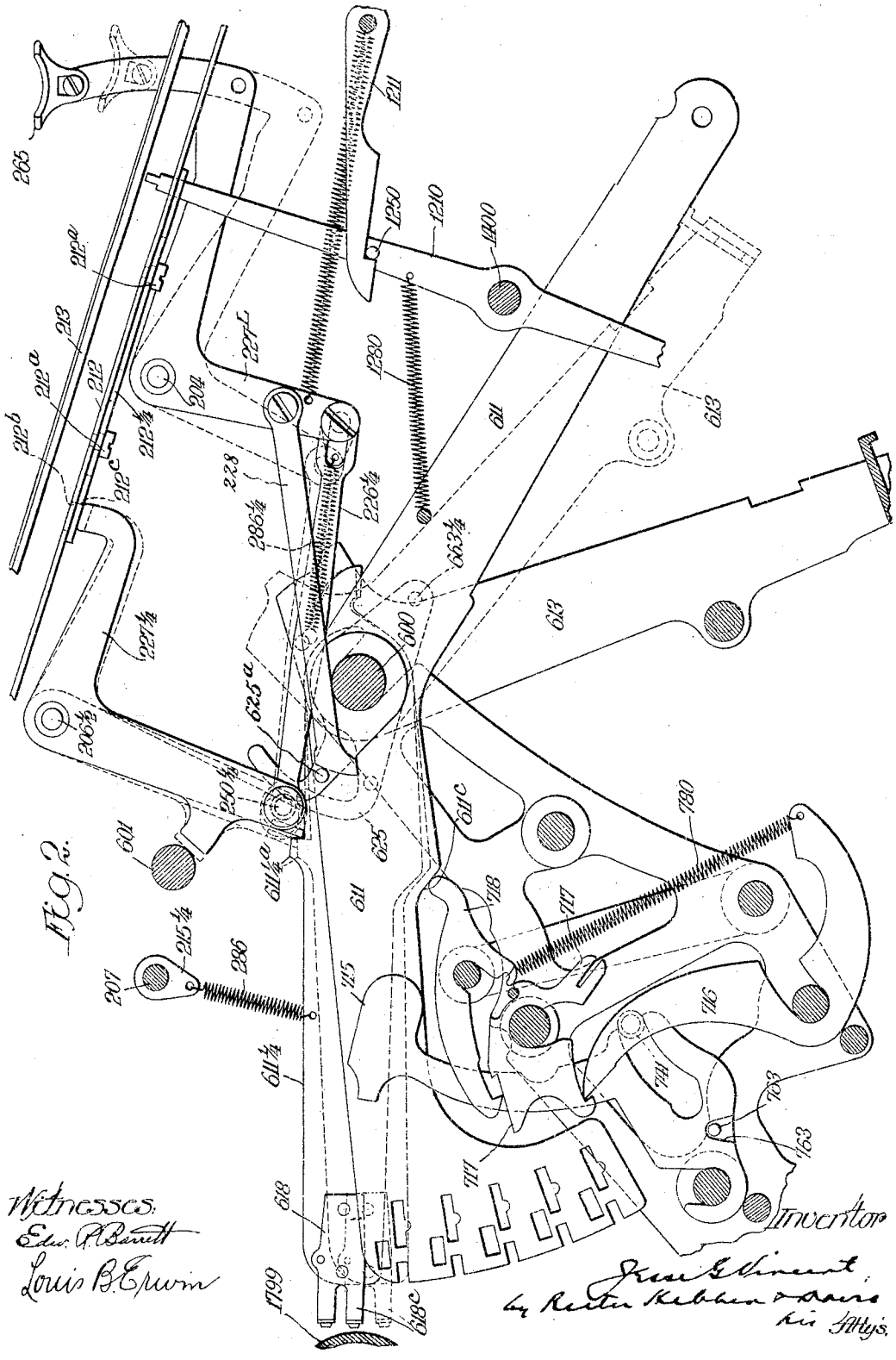

FIG. 2.

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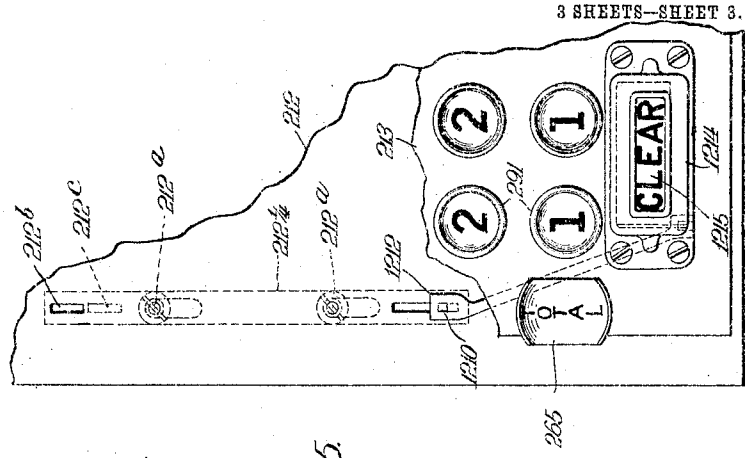
3 SHEETS—SHEET 3.



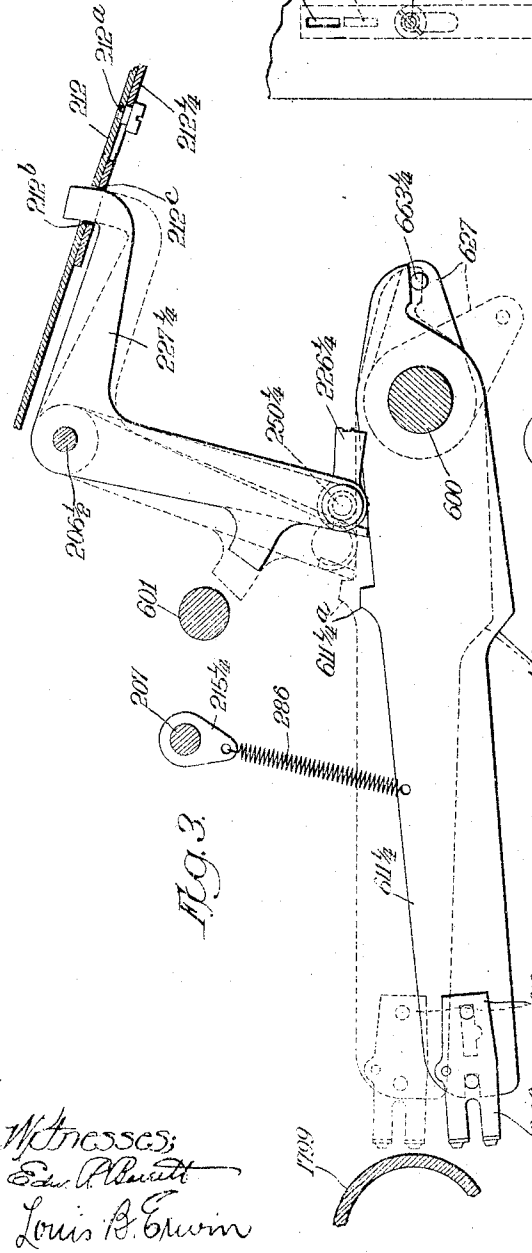


FIG. 3.

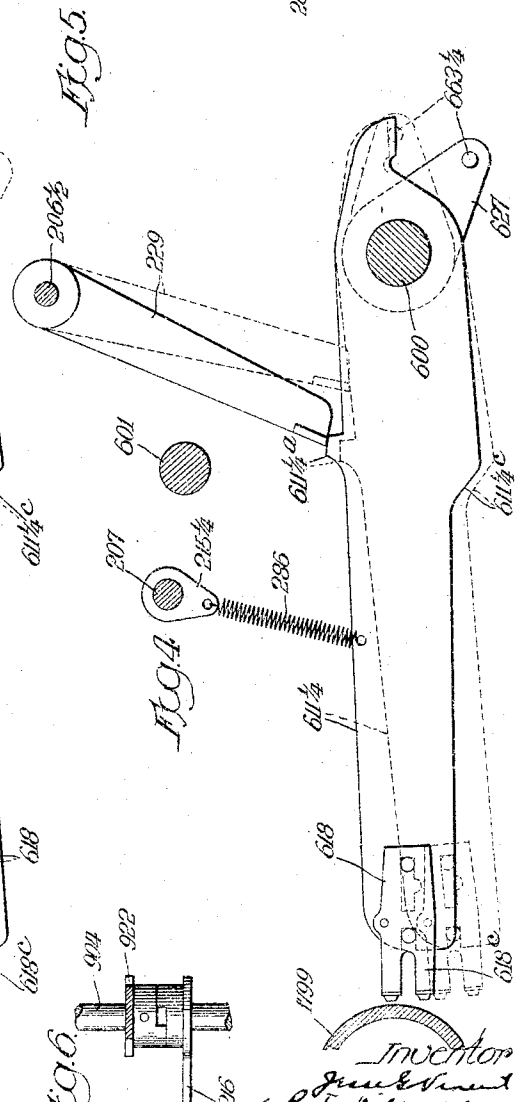


FIG. 4.

FIG. 5.

FIG. 6.

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UNITED STATES PATENT OFFICE.

JESSE G. VINCENT, OF DETROIT, MICHIGAN, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

949,338. Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed May 14, 1907. Serial No. 373,533.

To all whom it may concern:

Be it known that I, JESSE G. VINCENT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

The object of my invention is to provide an improved form of mechanism for automatically printing a character to show whether the machine was in a "clear" condition when a list of items was started, or, in other words, whether or not the adding wheels were set at zero before such list was commenced, at the same time providing for the automatic printing of a different special character to denote a total.

For the sake of affording a clear understanding of my invention, I have chosen to describe and illustrate it in connection with the well-known Burroughs adding machine (see Burroughs patents Nos. 504,963 and 505,078 of September 12, 1893 and Macauley patent No. 823,474 of June 12, 1906), to which my invention may be applied as an improvement or attachment without material alteration of the old parts thereof, but it will be understood that my improvement is not to be limited in its application to this particular type of machine, but that it may be applied and used in connection with machines of the same general type and used for the same general purposes.

In the drawings Figure 1 is a sectional elevation of a Burroughs adding machine with my improvement incorporated therein, the section being taken just inside the left-hand side frame; Fig. 2 a full sized sectional elevation of the various parts of my invention, together with certain parts of the Burroughs adding machine which are most concerned in the operation thereof; Fig. 3 a full sized detail of a lever and its type plate which carries two designating characters, one to show a total or sub-total and the other to show a "clear" condition of the machine, certain controlling devices for said lever also appearing; Fig. 4 a full sized detail of some of the same parts as in Fig. 3, but shown in full lines in a different position from either the position shown in full or dotted lines in said figure; Fig. 5 a full sized plan view of the lower left-hand corner of the Burroughs adding machine keyboard partly broken away to show the details of the operating connections which I use between my attachment and certain parts of the Burroughs machine; and Fig. 6 a detail of a certain operating connection in the Burroughs machine.

Inasmuch as the Burroughs adding machine is well known as to its general construction and mode of operation, only those parts thereof which are more or less directly concerned in the operation of my invention need be described.

Referring first to the visual clear signal device of a Burroughs machine, as shown in Figs. 1, 2 and 5, such signal comprises a signal arm 1210 arranged to rock on a cross-shaft 1400 and under the control of the amount key mechanism and also of the clearing and totalizing mechanism of the machine. The upper end of the signal arm is operatively connected to a link 1212 extending between the keyboard plates 212 and 213 and itself in turn operatively connected with a segmental signal plate 1215, which is arranged to oscillate within a case 1214 on the keyboard and is provided with two distinguished portions, one marked "Clear" and the other provided with a contrasting color such as red, for indicating "non-clear" or danger. The signal arm is drawn rearwardly as to its upper end, *i. e.*, above its pivotal point, by a spring 1280, but is normally restrained by a latch 1211 which engages a pin or stud 1250 on the signal arm. Whenever any one of the number or value keys 291 on the keyboard is depressed the usual bail, of which the part 424 forms a side arm, as seen in Fig. 1, is rocked rearwardly by a depending lip x (Fig. 1) of the key-detent strip or bar 214 in the usual manner, with the result that a pin or stud 1259 on the side arm 424 contacts with and releases the latch 1211 from its described engagement and permits such signal arm to subsequently move from its normal or "clear" position, which is indicated in full lines in Figs. 1 and 2, to the "non-clear" position which is indicated in dotted lines in said figures, such movement being effected by the spring 1280, when the latch 1211 has been displaced and a second interference removed. The latter comprises an arm 1216 pivoted upon the shaft 904, which as usual in a Burroughs machine, has a rocking movement in the operation of the machine through the medium of the arm 922, the

link 918¼ and the rocking arm 813, which is mounted upon the rocking shaft 800 of the machine. Hubs of the arms 1216 and 922 are shouldered as shown in Fig. 6 and indicated in dotted lines in Fig. 1, in such manner as to permit relative movement to a limited extent between the arms against the stress of a spring 1283. In the "clear" condition of the parts of the signal device, the arm 1216 is positioned directly in the path of a stud 1250ª, projecting inwardly from the signal arm below the latter's pivot, and such arm is prevented from rocking to "non-clear" position so long as the arm 1216 is in said position, even though the latch 1211 has been lifted. However, during an operation of the machine, the arm 1216 will move upwardly at the end of the forward stroke of the operating handle and consequent rearward movement of the arm 813 (by reason of the engagement of a stud on the arm 813 with the end of a slot in the link 981¼) and will return to a position in front of the stud 1250ª as the handle starts on its rearward stroke (a spring 981 drawing the arm 922 forward) in case that no amount or item has been set up on the keyboard. If, on the other hand, an item has been set up and the latch 1211 thereby released, the signal arm is permitted to move to "non-clear" position upon displacement of the arm 1216. The latter remains in its upper position resting upon the stud 1250ª against the tension of its spring 1283 until the familiar total key 265 is operated or depressed. This as usual lowers the regular pitman 914 through the medium of the connecting link 911. On the same pivot that connects the link and pitman there is mounted a spring-drawn tappet-piece 1213 which when the pitman lowers is displaced against the stress of its spring by contact with a forwardly projecting foot at the lower end of the signal arm 1210. When the pitman is thrust forward by the usual three-armed lever 913, the tappet-piece drops in front of said foot so that during the subsequent and rearward movement of the pitman the signal arm will be moved or shifted rearwardly below the pivotal point 1400, thereby permitting the arm 1216 to be rocked to its normal position in front of the stud 1250ª and moving the upper part of the signal arm forwardly to its normal position so as to be engaged by the latch 1211.

It will be understood from the above that when the signal arm is in the position shown in solid lines in Figs. 1 and 2, the visual signal plate 1215 indicates "clear" but after an item has been set up and the machine operated the signal arm occupies the position indicated in dotted lines in said figures, at which time the signal plate exhibits its red portion, so as to indicate danger or non-clear, or in other words, that there is an accumulation or an amount in the machine. The signal plate will remain in said "non-clear" position until the clearing mechanism of the machine has been operated and the machine is clear or set at zero position. Clearing of the machine is effected in the usual way by first depressing the total key and then drawing the operating handle forward a full stroke and permitting it to return to normal while the total key is still held down. The taking of a sub-total does not result in changing the signal, for the reason that the total key is released and allowed to rise to its normal position before the operating handle swings rearwardly. The tappet piece 1213 is thus removed from coöperative relation with signal arm before the pitman 914 moves rearwardly. Consequently the taking of a sub-total does not produce any movement of the signal arm 1210 and the red portion of the signal remains in view.

Referring next to the mechanism for automatically printing a star or other designating character opposite a total or sub-total to distinguish it from an ordinary listed item, in the regular Burroughs machine having this star attachment (see Macauley patent) there is a type carrier or bar always in position to print from the star type, but the hammer provided to strike the type plate in the printing operation is arranged to be tripped and allowed to deliver its blow only when the total key is depressed. This hammer is similar to the usual hammers 715 (one of which appears in Fig. 1) coöperating with the series of movable type corresponding to the different denominations on the keyboard, the extra hammer being arranged at the right hand side of such series and hence not brought to view in Fig. 1 but operated in the same manner as such series of hammers so that a description of any one of the latter will be equivalent to describing the extra hammer. As shown in Fig. 2, each hammer is provided with a cam slot adapted to receive an anti-friction roller 741 mounted on the hammer driving lever 716 which lever is impelled by the spring 780 in a rearward direction, tending to throw its hammer 715 rearwardly against its movable type plate. However, this driver is restrained against such movement by its catch 717 until such time as the latter is rocked to release the driver through the medium of the controlling pawl 718. As is well known, and disclosed in said Burroughs and Macauley patents, the controlling pawl of each type-sector bar 611 is raised, during an operation of the machine, from operative relationship with its catch 717, by contact against the inclined edge or cam surface 611ᶜ of its type bar, in case such bar represents or corresponds to a denomination in which no key has been

operated. But in case one of the keys of such denomination has been operated, and the regular type bar 611, in the operation of the machine, is raised a distance corresponding to the value of the key operated, then the controlling pawl 718 is left in position to release its catch 717 in the operation of the machine, and thereby permit the driver 716 to operate its hammer 715. As is also well known, being disclosed in said patents, these catches 717 are provided with projections or lugs extending toward the right or toward the catch of the next lower denomination for the purpose of tripping the hammers corresponding to those denominations in which no keys have been operated, thereby causing a printing of ciphers in those particular rows or denominations. However, there will be no such projection or lug extending over the extra hammer catch which is displaced only through the medium of the total devices. In like manner, the extra hammer provided in the regular Burroughs adding machine to coöperate with the star attachment is controlled in a somewhat similar manner, through the medium of an arm having a cam surface similar to the surface 611^c, which arm is under the control of the totalizing and clearing mechanisms. Normally, this arm is in position to engage the pawl 718 and thereby prevent the operation of the extra hammer, but in the totalizing operation, that is when the total key or button is depressed, the arm is swung away from a position of interference with the pawl 718, with the result that the extra hammer will be caused to operate and deliver its blow against the extra type and thereby print the star or other suitable character in connection with, and as an incident to, the operation of taking a total, either a grand total or a sub-total.

The foregoing is descriptive of the regular Burroughs machine and the particular features described form, *per se*, no part of my invention but are, however, more or less concerned in the operation of the parts or devices herein described and illustrated as an embodiment of my invention.

In the regular Burroughs machine, there is a single character carried by a special type plate, the same being the star, but in order to take advantage of the hammer mechanism provided for such type plate 618, I provide the latter with the additional character herein marked 618^c, for the purpose of designating the clear condition of the machine. This character is preferably the letter "c", although any other suitable designating character may be employed, such character being carried at the lower part and the star at the upper part of the extra type-plate. Furthermore, the extra type-plate which has heretofore been employed in the regular star attachment of a Burroughs machine in a fixed position as regards vertical movement is, according to the present embodiment of my invention, carried at the rearward end of a special type bar 611¼ pivoted loosely upon the main shaft 600 of the machine at the right hand side of the regular type sector bars 611 of the machine and arranged to be moved in a vertical plane so as to present one or the other of its type to the hammer for printing purposes, in this respect somewhat resembling the type bar of the construction shown in said Macauley patent for printing a different character to designate a sub-total from that which designates a grand total. This type bar 611¼ is normally held in its lowermost position, with neither type in printing position, against the tension of a spring 286 secured thereto at its lower end and at its upper end to a plate 215¼ suspended from the cross shaft or rod 207, as indicated in Figs. 3 and 4. When the type bar 611¼ is in its normal position, indicated in full lines in Fig. 3, its cam edge 611¼^c is presented to its hammer controlling pawl 718, so that in an operation of the machine said pawl will be rendered inoperative to disengage the catch 717 from the hammer driver, the same as with hammer drivers of unoperated banks of keys in a regular Burroughs machine. Whenever a total is taken, however, certain restraining devices hereinafter described are removed and the type bar will be raised by its spring 286 to the full line position of Fig. 4 bringing the total type or star into printing position. This upward movement of the type bar is sufficient to remove its cam surface 611¼^c from the path of the tail of the pawl 718 in the ensuing operation of the machine, and consequently its hammer will be actuated for the purpose of striking the extra type plate 618, with the result that the star will be printed to distinguish the total from the individual items. The movement of the type bar is under the control of an arm 627 secured to the rock shaft 600 and provided with a pin or stud 663¼ arranged to contact with the end of the type bar extended forward of the shaft 600. This arm 627 has an oscillating movement during each stroke of the handle or main operating shaft of the machine, but under normal conditions such arm is in the position shown in full lines in Fig. 3, with the stud 663¼ holding the forward end of the type bar in elevated position and the rear or type carrying end correspondingly depressed. However, when the operating handle is pulled to an extreme forward position the shaft 600 is rocked in a clockwise direction through the usual connections carrying the arm 627 to the position indicated by dotted lines in Fig. 3, thereby permitting the spring 286 to elevate the type bar. When the parts of the machine are re-

stored to normal position, the arm 627 will contact with the type bar and restore it to the position shown in full lines in Fig. 3, it being desirable that the type bar remain in this position with both types below the printing line when the machine is normal so as to avoid any possibility of the type blurring the paper when the latter is inserted around the platen. The upward movement of the type bar is limited and the star type brought to the proper printing point by contact of the top of a shoulder or projection $611\frac{1}{4}^{a}$, on said bar against the lower end of a swinging arm 229, as seen in Fig. 4, said arm being secured at its upper end to a rock shaft $206\frac{1}{2}$, which is in turn under the control of the totalizing and clearing mechanism and also under the control of the signal device, with the result that when the totalizing mechanism is operated the arm 229 will be rocked from its normal position, shown in full lines in Fig. 3, to the position shown in full lines in Fig. 4 and a star will be printed automatically and as an incident to the printing of the total. Moreover, the construction and arrangement is such that the arm 229, when permitted by the signal device, may be rocked to the dotted line position shown in Fig. 3, at which time the type bar is permitted to be raised to a higher position than when a total is taken, with the result that the type 618^{c} for designating "clear" condition is brought to the printing point or line, as seen in dotted lines in Fig. 3, this upward movement of the type bar taking place at the first movement of the operating handle or main shaft of the machine and after the pin or stud $663\frac{1}{4}$ has been moved downwardly, as shown in dotted lines in Fig. 3.

The total key 265 is as usual mounted upon the upstanding front end of a bell crank lever 227^{L} secured to a rock shaft $204\frac{1}{2}$ and in the present instance the depending arm of said bell crank has a slot-and-pin connection with the forward end of a link $226\frac{1}{4}$ whose rear end is pivotally connected by a screw-stud $250\frac{1}{4}$ with the lower end of the depending arm of a bell crank $227\frac{1}{4}$ secured to the rock-shaft $206\frac{1}{2}$ from which the said arm 229 depends. The rearward movement of these parts is limited by contact of a projection on the arm $227\frac{1}{4}$ against the shaft 601, but in a regular itemizing operation of the machine no rearward movement at all can take place, the Burroughs machine being provided with a hook 625 secured to the rock-shaft 600 and arranged to engage behind the stud $250\frac{1}{4}$, in such operation of the machine preventing depression of the total key. Thus when said stud is in the position shown in full lines in Fig. 3 as the handle is pulled forward or the main operating shaft rocked forwardly, the hook 625 rises behind the stud to the full line position shown in Fig. 2. As the handle or the main operating shaft of the machine is restored to normal position the hook 625 is likewise restored to its normal position shown in dotted lines in Fig. 2, below the stud $250\frac{1}{4}$. When the arm 229 is occupying the intermediate or "clear" position with the depending arm of the bell crank lever $227\frac{1}{4}$ correspondingly positioned as illustrated in full lines in Figs. 1 and 2 and dotted lines in Fig. 3, the said hook 625 will in an operation of the machine pass up in front of the stud $250\frac{1}{4}$, thus locking said arms against forward movement until the operation of the machine is completed. The upper end of the hook is rounded as shown by the dotted lines in Fig. 2 so that by a camming action against the stud it may insure the proper positioning of parts at the extreme rearward or extreme forward limit of movement as the case may be. A spring $286\frac{1}{4}$ connected at one end with the link $226\frac{1}{4}$ and at the other with the bell crank 227^{L} tends to draw the two together.

An arm 228 pivoted to the total key bell crank lever 227^{L} rests by gravity upon the shaft 600 and is enlarged at its rear end for coöperation with a pin or stud 625^{a} on the hook 625, this arm serving the purpose of locking the total key against depression during an itemizing operation by reason of its engagement with the said stud 625^{a} whenever the hook 625 is out of normal position. When the total key is depressed said stud passes in front of the lower part of the enlarged rear end of said arm and then strikes the under-edge of the latter slightly lifting the same.

As hereinbefore stated, I take advantage of the movements of the signal device for the purpose of controlling the action of my automatic attachment. As seen in Figs. 1, 2 and 5, the controlling connection comprises a sliding bar $212\frac{1}{4}$ adapted to be moved forward and back on the under side of the lower keyboard plate 212, by means of the signal arm 1210, whose upper end is passed through an opening in the forward end of said sliding bar, the latter being held in place by means of two shouldered screws, 212^{a}, engaging slots therein. In the lower keyboard plate 212 I have provided a slot, 212^{b}, Fig. 5, and in the bar $212\frac{1}{4}$ a similar slot 212^{c} shown in dotted lines, Fig. 5. When the machine is in a clear condition, that is, set at zero, these slots 212^{b} and 212^{c} will be out of alinement as shown in Fig. 5, but when an item has been put into the machine and the machine is therefore in a non-clear condition said slots 212^{b} and 212^{c} exactly register. I provide these slots for the proper control of the bell crank $227\frac{1}{4}$, Figs. 1 and 2, whose upper end has the same dimensions as the slots and may pass through them when they are in register or aline-

bar 212¼ is in the "clear" position shown in Fig. 5, also by full lines, Figs. 1 and 2, the slot 212ᵇ is blocked or closed by a portion of the sliding bar 212¼ rearwardly beyond its own slot 212ᶜ, thereby preventing the bell crank 227¼ from rising beyond the position shown in full lines, Figs. 1 and 2. However, when the sliding bar 212¼ is in non-clear position, with the slots 212ᵇ and 212ᶜ alined, the bell crank may enter and pass through said slots taking up the position shown in full lines in Fig. 3.

It will be noted that when the total key 265 is depressed the bell crank 227¼ is rocked to the dotted line position in Fig. 2, the movement being transmitted through the bell crank 227ᴸ and link 226 and limited by the shaft 601. The swinging arm 229 will thus be carried to its rearmost position so that its lower end will stand above the shoulder 611¼ᵃ of the type bar 611¼, as indicated in Fig. 4, with the result that just after the machine has started said type bar rises from the dotted line position in said figure to the full line position, wherein its total type or star is at the printing line. This movement of the special type bar to its upper position as to its rearward end removes the cam surface 611¼ᵉ from its position of interference with the hammer controlling pawl 718, with the result that the hammer is permitted to be tripped and driven against the type plate on the special or extra type bar. Thus a star or other designating character may be printed to the right of the amount representing the total, so that the total may be distinguished from the individual items.

When the machine is in "clear" condition the signal arm 1210 occupies the full line position shown in Figs. 1 and 2, so that the two slots 212ᵇ and 212ᶜ are out of register, with the result that the bell crank arm 227¼ is held to its depressed full line position shown in said figures and the swinging arm 229 takes up an intermediate position, just forward of the shoulder 611¼ᵃ. When so positioned the arm 229 will permit the special type bar to rise to its highest position shown by dotted line in Fig. 3 bringing the type 618ᵉ to the printing line. Thus the character indicating "clear" would be printed every time the machine was operated after the taking of a total, so long as no amount keys were depressed or in other words as an incident to every blank operation of the machine. It is desirable, however, to print this designating character only as an incident to the introduction of the first item into a "cleared" machine and to accomplish this result and the printing thereof at the head of a new list, I have therefore provided a pin 763 on the special type plate hammer and have cut a notch 715ᵃ in the first hammer to the left of this special or for the extra hammer, which is therefore the last hammer to the right, to deliver a blow unless one of the regular hammers is also tripped or operated, Figs. 1 and 2. It will be understood that the hammer provided with the notch is the last regular hammer of the machine on the right, *i. e.*, the units hammer while the special hammer, provided with the pin, is the hammer concerned in the printing of the clear and total designating characters. Thus, in the blank operations of the machine at a time when such machine is clear the special or extra hammer is prevented from operating, even though its catch 717 may have been released, with the result that no printing, either of the star or the "c," takes place. Of course, the printing of an item involves the tripping of the units hammer and as soon as this occurs the special hammer is released. The camming action heretofore mentioned as occurring between the rounded end of the hook 625 and the stud 250¼ has the effect of slightly moving the bell crank 227¼ so as to relieve the plate 212¼ of the frictional engagement of said bell crank when the plate shifts rearwardly after the printing of such item with the special character.

Describing the operation of the machine, and starting with the same in "clear" condition, the parts occupy the relative positions shown in full lines in Figs. 1 and 2, the signal arm 1210 being in its normal or "clear" position and the bell crank 227¼ being in its intermediate position abutting the slide bar 212¼, the slots 212ᵇ and 212ᶜ being out of alinement. The depending arm 229 stands just forward of the shoulder 611¼ on the special type bar, and so, when an item is now set up on the keyboard and the main shaft of the machine operated by hand or otherwise, this special type bar will rise to the position shown in dotted lines in Fig. 3 and about the same time the hook 625 will start on its upward movement and by the action of its rounded end against the stud 250¼ will force the lower arm of the bell crank 227¼ slightly to the rear against the tension of the spring 286¼, thereby causing the forward arm of the ball crank 227¼ to sightly descend, thus relieving the sliding bar 212¼ from the friction incident to pressure of the said bell crank thereagainst. During the still further movement of the main operating shaft of the machine, that is, during the further forward movement of the handle when the machine is manually operated, the regular hammers will be tripped, thereby printing the amount set up on the keyboard, and, as all the regular hammers to the right of an amount or figure must be tripped, as before described, the last regular hammer, which is the one having a notch to coöperate with the pin 763, will be

763 of the special hammer, which having been tripped by reason of the removal of the special type bar from a position of interference with its pawl 718, will deliver its blow, thereby printing a "c" at the right hand of the amount, this being the designating character to show that the machine was "clear" when the item or amount was put into the machine. About the same time that the printing action is taking place, the signal arm 1210 changes its position, coming to rest in the position shown in dotted lines in Figs. 1 and 2 and carrying with it the sliding bar 212¼ and thereby bringing the slots 212ᵉ into register with the slot 212ᵇ. All of this occurs about the end of the forward stroke of the operating handle. The bell crank 227¼ remains in its rearward position during the return stroke of the handle until the hook 625, descending below the stud 250¼ allows the stud and thereby said bell crank to come to the forward position shown in full lines in Fig. 3, this result of course being made possible by the shifting of the signal arm 1210, which has placed the bar 212¼ in such position that its slot 212ᵉ will coincide with slot 212ᵇ, thereby allowing the upper end of the bell crank 227¼ to pass through the slots to the position shown in full lines in Fig. 3. With the return of the handle to normal position, the special type bar is carried to its lowermost position and with the bell crank 227¼ swung forward as above described and with it the arm 229, the special type bar 611¼ will remain in such lowermost position, being so held during subsequent listing operations of the handle by this arm 229. The cam surface 611¼ᶜ will therefore render the special hammer-tripping pawl 718 inefficient during such listing and its special hammer will therefore remain at rest.

In taking a grand total the total key or button 265 is depressed and the swinging arm or detent 229 brought to the position shown in full lines in Fig. 4, so as to stop or limit the upward movement of the special type bar to a position for printing the star, as already described. In taking a sub-total the action is the same during the forward stroke of the operating handle or lever as for taking a grand total, the star being printed, but the total key is released when the handle is at the end of its forward stroke and is permitted to return to its normal or elevated position. At this time, the hook 625 is in the position shown in full lines in Fig. 2, and the stud 250¼ is thereby retained in its rearward position, holding the bell crank 227¼ to the position shown in full lines in said figure. The slot-and-pin connection between the link 226¼ and the bell crank 227ᴸ permits the latter to return to normal

Burroughs machine to lift the total key being so strong as to overpower the spring 286¼. When the total key 265 is thus released at the forward stroke of the operating handle to obtain a sub-total, the signal arm remains in the dotted line position of Fig. 2, thereby allowing the slots 212ᵇ and 212ᵉ to remain in register. As soon as the handle reaches the end of the return stroke and the hook 625 is thereby carried below the stud 250¼, the bell crank 227¼ will therefore again return to the forward position shown in full lines, Fig. 3, its upper end reëntering the slots 212ᵉ and 212ᵇ and the swinging arm or detent 229 being returned to the position shown in full lines in Fig. 3 to retain the special type bar 611¼ in the lowermost position. It follows that when the next item is put into the machine, no "c" will be printed. It is therefore plain that a designating character such as the character "c" will only be printed opposite or at the right hand side of the first item put into the machine, after the latter has been cleared and when the visual signal is exhibiting the word "Clear". If the machine is in a non-clear condition, the signal showing red, and an item is put into the machine there will be no "c" printed opposite it. Neither will the printing of a sub-total result in the following item being printed with the "c".

What is claimed is:

1. In an adding machine, the combination of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars, and bearing a distinguishing character, said special type bar being held with a yielding pressure tending to move it and bring said character opposite the printing line, and means for interfering with the movement of said special type bar when the accumulator is not "clear;" substantially as described.

2. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof, comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars, and bearing a distinguishing character, said special type bar being held with a yielding pressure tending to move it and bring said character opposite the printing line, and a swinging arm arranged to prevent said movement of the type bar when the accumulator is not "clear;" substantially as described.

3. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof com-

prising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars, and bearing a distinguishing character, said special type bar being held with a yielding pressure tending to move it and bring said character opposite the printing line, and a swinging arm in a position of non-interference with said type bar when the machine is "clear" but arranged to interfere with such bar when the accumulator is not "clear;" substantially as described.

4. In an adding machine, the combination of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars, and bearing a distinguishing character, said special type bar being spring pressed toward a position to present said character to the printing line, and means for interfering with the movement of said special type bar when the accumulator is not "clear" substantially as described.

5. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof, comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being spring pressed to bring one or the other of the characters to the printing line, and means for holding said special type bar in inoperative position when the accumulator contains an item or accumulation and for limiting said bar to positions to present one or the other characters to the printing line; substantially as described.

6. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, and a swinging arm under the control of the machine and arranged to coöperate with the special type bar substantially as described.

7. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, a swinging arm under control of the machine and also under manual control and arranged to coöperate with the special type bar and thereby control the same; substantially as described.

8. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being spring pressed to bring one or the other of the characters to the printing line, and a swinging arm under the control of the machine and arranged to coöperate with the special type bar and to hold the same in inoperative position against its tension; substantially as described.

9. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, and a swinging arm arranged in the path of movement of the special type bar and adapted to permit the latter to occupy different relative positions and also to hold it in inoperative position; substantially as described.

10. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing two distinguishing characters, one to indicate a total and the other the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar having a projection on one edge, and a swinging arm arranged in the path of movement of the special type bar and of said projection and adapted to permit such special type bar to occupy different relative positions and also to hold it in inoperative position; substantially as described.

11. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character

"clear" when a list or column of items was begun, means for determining the position of the special type bar according to the condition of the machine, and means under the control of the machine, for restoring said special type bar to normal position at each operation of the machine; substantially as described.

12. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, means for determining the position of the special type bar according to the condition of the machine, and a lever or arm movable at every operation of the machine and arranged to restore the special type bar to normal position after movement from such position; substantially as described.

13. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being pivoted, means for determining the position of the special type bar according to the condition of the machine, and a lever or arm movable at every operation of the machine and having a pin or stud adapted to contact the special type bar and restore it to normal position after movement therefrom; substantially as described.

14. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar or lever pivoted intermediate its length with the type character mounted on its outer end, means for determining the position of the special type bar according to the condition of the machine, and a lever or arm movable at every operation of the machine and arranged to cooperate with the inner end of the special type bar for restoring the latter to an inoperative position after movement therefrom; substantially as described.

15. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being spring pressed toward printing position, means for determining said position and controlling the movement of such bar, and means under the control of the machine in its operation for restoring the special type bar from a printing position to an inoperative position; substantially as described.

16. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being spring pressed toward printing position, means for determining the position of the type bar according to the condition of the machine, and means under the control of the machine in its operation for restoring the special type bar from a printing position to an inoperative position; substantially as described.

17. In an adding machine, the combination, of the accumulator the clearing mechanism and the printing mechanism thereof comprising a series of type bars or carriers located side by side, a special type bar or carrier located at one side of said series of bars and bearing a distinguishing character to indicate the fact that the accumulator was "clear" when a list or column of items was begun, said special type bar being spring pressed toward printing position, means for determining said position and controlling the movement of such bar, and means for restoring the special type bar from a printing position to an inoperative position, comprising a swinging arm arranged in the path of movement of the special type bar and movable to different positions to limit the movement of such bar according to the particular condition of the accumulator; substantially as described.

18. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine and with the hammers of the latter mechanism, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, having a pin and slot connection with one of the outermost hammers of the

regular printing mechanism to prevent action of the special hammer unless the regular hammers are operated; substantially as described.

19. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, a catch normally restraining the special hammer from movement and controlled by the particular position of the special type bar, and means for controlling the position of such type bar according to the particular condition of the adding mechanism, whether "clear" or not; substantially as described.

20. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, a catch normally restraining the special hammer from movement, a trip for such catch and coöperating with the special type bar, and means for controlling the position of such type bar according to the particular condition of the adding mechanism whether "clear" or not: substantially as described.

21. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, a catch normally restraining the special hammer from movement and controlled by the particular position of the special type bar, and means for controlling the position of such type bar according as the adding mechanism is "clear" or not; substantially as described.

22. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, a catch normally restraining the special hammer from movement and controlled by the particular position of the special type bar, and means for controlling the position of such type bar according as the adding mechanism is "clear" or not, said special hammer being under the control of the regular printing mechanism and thereby prevented from acting unless the latter mechanism acts; substantially as described.

23. In an adding machine, the combination, with the clearing mechanism, the adding mechanism and the regular printing mechanism of the machine, of special printing mechanism comprising a movable type bar or carrier bearing a suitable designating character, a special hammer for forcing the type of said bar against the platen, a catch normally restraining the special hammer from movement and controlled by the particular position of the special type bar, means for controlling the position of such type bar according as the adding mechanism is "clear" or not, and an interference between the special hammer and the regular printing mechanism to prevent action of the special hammer until the regular printing mechanism acts; substantially as described.

24. In an adding machine, the combination, with the clear, printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the machine was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, and an operating connection between said arm and the signal device to actuate the arm accordingly as the adding mechanism is "clear" or otherwise; substantially as described.

25. In an adding machine, the combination, with the printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, a bell crank lever operatively connected with said arm and means under the control of the signal device for governing the position of the bell crank lever and consequently of the swinging arm; substantially as described.

26. In an adding machine, the combination, with the clearing printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, a bell crank lever op-

operatively connected with said arm, and a bar controlled by and movable with the signal device for controlling the said lever and arm; substantially as described.

27. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, a bell crank lever operatively connected with said arm and a sliding bar controlled by the signal device and having a slot with which said lever coöperates to determine the position of the latter according to the particular position of the sliding bar; substantially as described.

28. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, a bell crank lever operatively connected with said arm, a fixed plate having a slot, and a bar arranged to slide on the plate and having a slot adapted in one position, to register with the slot in the plate, said bar being under the control of the signal device and the lever, arranged to coöperate with the slots and to pass therethrough to automatically position the arm which coöperates with the special printing mechanism; substantially as described.

29. In an adding machine, the combination with the clearing, printing and adding mechanisms thereof, of a special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, a swinging arm coöperating with the special printing mechanism to determine its operative and inoperative positions, a bell crank lever operatively connected with said arm, a fixed plate having a slot, and a bar arranged to slide on the plate and having a slot adapted, in one position, to register with the slot in the plate, said bar being under the control of the signal device and the lever, having a projection arranged to pass through the slots to automatically position the arm which coöperates with the special printing mechanism; substantially as described.

30. In an adding machine, the combination, with the printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device, and an operating connection between said bar and the special printing mechanism; substantially as described.

31. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a silding bar operatively connected with the signal device, a bell crank whose position is controlled by the bar and an operating connection between the bell crank and the special printing mechanism for controlling the latter; substantially as described.

32. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character or indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device and having a slot, a plate on which the bar slides and provided with a slot, a bell crank having a portion arranged to pass through said slots when in register to automatically position such bell crank, and a connection between the latter and the special printing mechanism for controlling the latter; substantially as described.

33. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device, and having a slot, a bell crank having a projecting arm arranged to pass through said slot when presented, and a connection between the bell crank and

the special printing mechanism for controlling the latter; substantially as described.

34. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device, a lever operatively connected with the special printing mechanism and arranged to be operatively connected with the sliding bar, and means for removing such lever from operative relationship with the sliding bar to permit the latter to be shifted by the signal device; substantially as described.

35. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device, a lever operatively connected with the special printing mechanism and arranged to be operatively connected with the sliding bar, and means for removing such lever from operative relationship with the sliding bar to permit the latter to be shifted by the signal device, comprising an arm arranged to coöperate with the lever and withdraw it from the sliding bar; substantially as described.

36. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism arranged to print a suitable distinguishing character to indicate the fact whether or not the adding mechanism was "clear" when a list or column of items was begun, a visual signal device for indicating whether or not the adding mechanism is "clear," a sliding bar operatively connected with the signal device, a lever operatively connected with the special printing mechanism and arranged to be operatively connected with the sliding bar, and means for removing such lever from operative relationship with the sliding bar to permit the latter to be shifted by the signal device, comprising a curved arm arranged to be oscillated and adapted to contact and withdraw the lever from the sliding bar; substantially as described.

37. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism, and an operating device between the special printing mechanism and the totalizing mechanism and the signal device, the connection between such operating device and the totalizing mechanism being a yielding one; substantially as described.

38. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism having a bell crank rocked whenever a total is taken, a second bell crank connected with the first bell crank and controlled by the signal device, and an operating connection between the second bell crank and the special printing mechanism; substantially as described.

39. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism having a bell crank rocked whenever a total is taken, a second bell crank controlled by the signal and itself arranged to control the special printing mechanism, and a yielding connection between the bell cranks; substantially as described.

40. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism having a bell crank rocked whenever a total is taken, a second bell crank controlled by the signal and itself arranged to control the special printing mechanism, and

a link connecting between the bell cranks and having a yielding connection with one of them; substantially as described.

41. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism having a bell crank rocked whenever a total is taken, a second bell crank controlled by the signal and itself arranged to control the special printing mechanism, and a link connecting between the bell cranks and having a pin and slot connection with one of them; substantially as described.

42. In an adding machine, the combination, with the clearing, printing and adding mechanisms thereof, of special printing mechanism for printing a suitable character to indicate the fact that the adding mechanism was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the adding mechanism is "clear" or not, totalizing mechanism having a bell crank rocked whenever a total is taken, a second bell crank controlled by the signal and itself arranged to control the special printing mechanism, a link connecting between the bell cranks and having a pin and slot connection with one of them, and a spring between the link and the last named bell crank; substantially as described.

JESSE G. VINCENT.

Witnesses:
EDWARD RECTOR,
LOUIS B. ERWIN.