

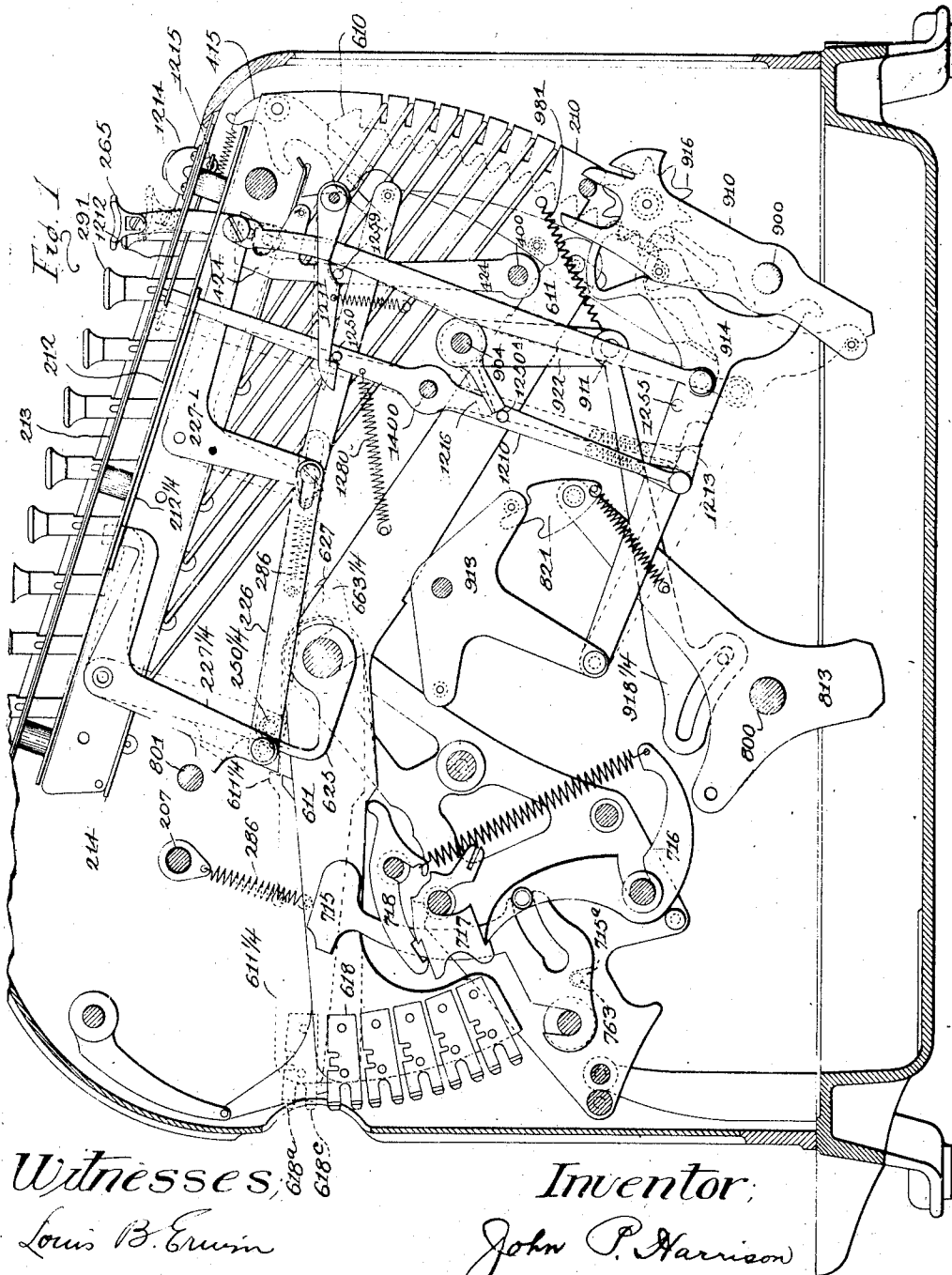
J. P. HARRISON.
 ADDING MACHINE.

APPLICATION FILED MAY 31, 1905.

1,015,227.

Patented Jan. 16, 1912.

3 SHEETS—SHEET 1.



Witnesses,
 Louis B. Erwin
 Edwin H. Smythe

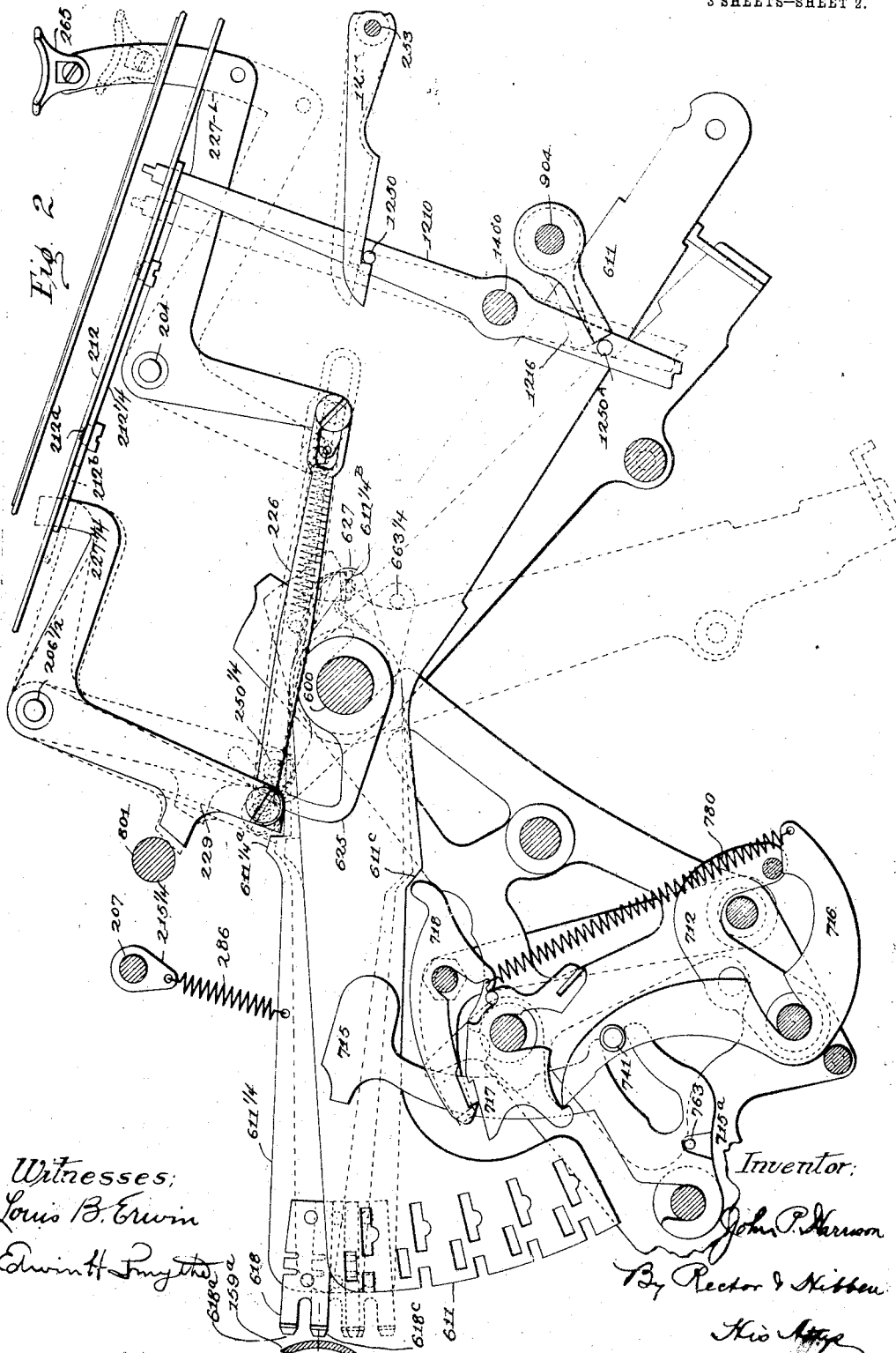
Inventor:
 John P. Harrison
 By Rector & Kibben
 His Attys

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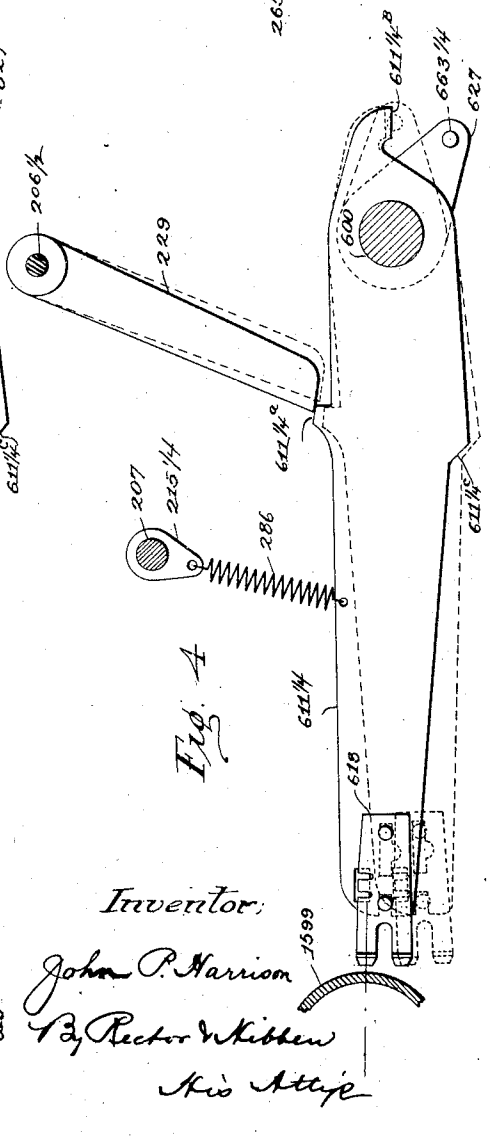
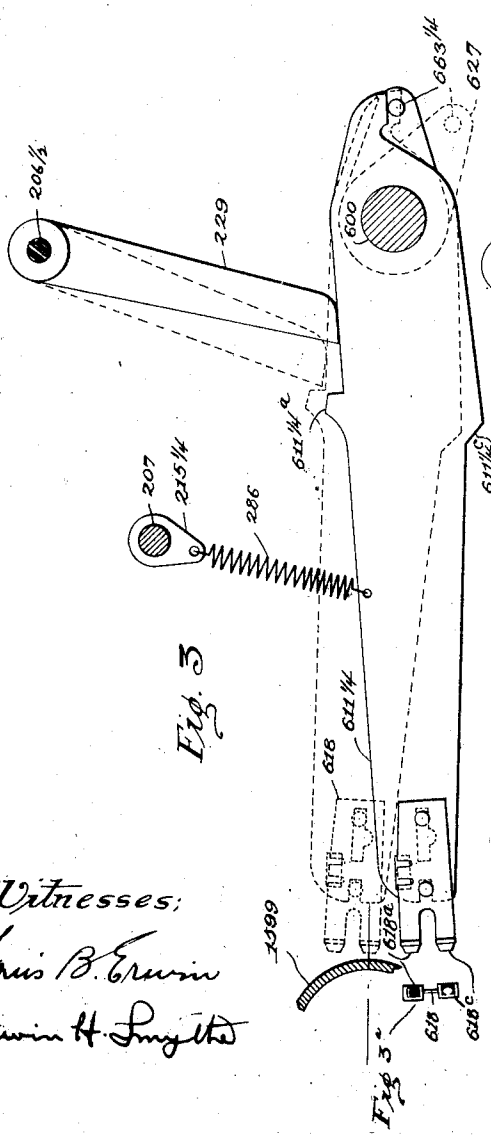
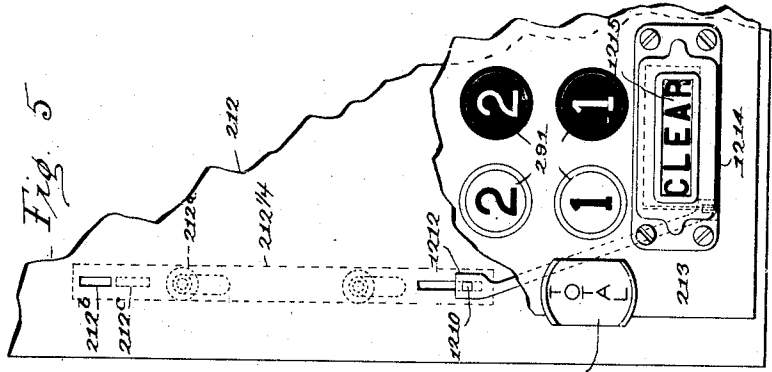


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1,015,227.

Patented Jan. 16, 1912.
 3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

JOHN P. HARRISON, OF LUDLOW, KENTUCKY, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

1,015,227.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed May 31, 1905. Serial No. 263,063.

To all whom it may concern:

Be it known that I, JOHN P. HARRISON, a citizen of the United States, residing at Ludlow, county of Kenton, Kentucky, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

My invention relates to what are commonly designated as adding or calculating machines of the type adapted to add, print and list individual items, and also to print a total or footing of such items at the will of the operator, which type of machine is exemplified by the well known Burroughs adding machine, illustrated and described in the William S. Burroughs Patents Nos. 504,963 and 505,078, issued on September 12th, 1893.

The object of my invention is to provide novel, simple and efficient 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.

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, 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; Fig. 3^a an elevation of the

type end of such type-plate; Fig. 4 a full sized detail 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; and 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 detail of the operating connections which I use between my attachment and certain parts of 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.

My invention relates broadly to means for automatically printing a suitable character for designating the fact that the machine was in "clear" condition when the list was started and the first item printed, such means, in the present instance, being adapted and arranged to cause the printing of such designating character at the time of, and as an incident to, the printing of the first item. Said means are thus operative only when the first item is printed and are rendered inoperative and thereby prevented from printing the designating character so long as an item remains in the machine and also by preference when the machine is given blank operations while in "clear" condition.

According to the present and herein illustrated embodiment of my invention, I take advantage of the clear signal device of the Burroughs machine (see Patent No. 983,009, issued January 31, 1911) for directly controlling said automatic means and rendering the latter inoperative whenever the signal indicates "non-clear" or danger and I further take advantage of portions of the mechanism of the well known star attachment of a Burroughs machine, which is arranged to print a star or other character to designate totals (both grand and sub-totals) as hereinafter described. However, it will be understood that my invention is not to be limited in its broader aspect as set forth in the broader claims herein, to the specific construction shown or to its particular embodiment in connection with the signal device and star attachment or either of them

The said signal device and the star attachment will, therefore, be described to such extent as to afford an understanding of my invention.

Referring first to the clear signal device of a Burroughs machine, as shown in Figs. 1, 2 and 3, such signal comprises a signal arm 1210 arranged to rock on a cross shaft 1400 and under the control of the 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 or connection 1212 extending between the keyboard plates 212 and 213 and itself in turn operatively connected with an oscillating signal 1215, which is arranged to oscillate within the case 1214 on the keyboard and provided with two distinguishable 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 normally held with a yielding pressure toward the rear as to its upper end above its pivotal point 1400 but is restrained by the interference of 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 bail, of which the part 424 forms a side arm, as seen in Fig. 1, is rocked rearwardly by a depending lip of the key-detent strip or bar 214, as in the well known Burroughs machine, 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 caused by the tension of the spring 1280 when the latch 1211 has not only been thus displaced, but a second interference, presently to be described, has been 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 918 $\frac{1}{2}$, and the rocking arm 813, which is mounted upon the rocking shaft 800 of the machine. In the "clear" condition of the parts of the signal device, the arm 1216 is positioned directly in the path of a stud 1250^a, projecting inwardly from the signal arm, 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 a full operation of the machine, the arm 1216 will move upwardly at the end of the forward stroke of the operating handle of the machine and

consequent rearward movement of the arm 813 (by reason of the engagement of a stud on said arm with the end of a slot in the link 918 $\frac{1}{2}$), and will return to a position in front of the stud 1250^a 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 but 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. The arm 1216 remains in its upper position resting upon the stud 1250^a against the tension of its spring 981 until the familiar total key 265 is operated or depressed, and the regular pitman 914 thereby lowered through the medium of the usual connecting link 911 when a stud 1255 on the said pitman is put in a position to cooperate with the bell crank lever 1213 pivoted on the lower end of the signal arm 1210, 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 1250^a and restoring the signal arm to its normal position so as to be engaged by the latch 1211. The bell crank lever 1213 is connected by a spring 1282 with the signal arm 1210, whereby one arm of said bell crank is held normally in line with said signal arm with the other arm of said bell crank lying substantially parallel with the pitman 914. When the latter is lowered by depression of the total key this spring will yield to the pressure of the stud 1255 against the last mentioned arm of said bell crank, but when the pitman moves forward and this stud clears the end of the bell crank the latter is restored to its normal position by the spring. When the signal arm is in the position shown in solid lines in Figs. 1 and 2, the visual signal 1215 indicates "clear" but after an item has been inserted in the machine, the signal arm occupies the position indicated in dotted lines in said figures, at which time the signal 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 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. It will be understood that this clear signal device does not constitute, *per se*, a part of my invention, but that the same is utilized for operating or controlling the parts constituting my invention. 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 stud 1251 is thus removed from coöperative relation with the bell crank 1213 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 823,474, issued June 12, 1906), 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) co-operating 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 so far as its general arrangement is concerned. 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 611^c 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. The extra hammer provided in the regular Burroughs adding machine to coöperate with the star attachment is controlled in a somewhat similar manner, but 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 as *e. g.* in said Macauley patent. Normally, this arm is in position to contact 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, if the machine employs such special key, 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 constituting my invention according to the herein described and illustrated embodiment of my invention. I will now proceed to describe the new parts of my attachment constituting my improvements and, in connection therewith, the regular printing mechanism and some other parts of the regular machine not already referred to.

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, Fig. 3^a, for the purpose of designating the clear condition of the machine. In the present instance, this character is "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 611 $\frac{1}{2}$ 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 611 $\frac{1}{2}$ 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 215 $\frac{1}{2}$ suspended from the cross shaft or rod 207, as indicated in Figs. 3 and 4. When the type bar 611 $\frac{1}{2}$ is in its normal position, indicated in full lines in Fig. 3, its cam edge 611 $\frac{1}{2}$ is presented to its hammer controlling pawl 718, so that in the 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 displayed and the type bar raised by its spring 287 to the full line position, Fig. 4, bringing the total type or star to the printing line. This upward movement of the type bar is sufficient to remove its cam surface 611 $\frac{1}{2}$ 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 also under the control of an arm 627 secured to the rock shaft 600 and provided with a pin or stud 663 $\frac{1}{2}$ arranged to contact 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 an 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 663 $\frac{1}{2}$ holding the forward end of the type bar in elevated position. However, when the handle is pulled to an extreme forward position the shaft 600 is rocked in a clockwise direction to the position indicated in Fig. 4, thereby permitting the spring 286 to elevate the type bar. When the parts of the machine are restored to normal position, the arm 627 will contact 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 pos-

sibility 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 the contact of a shoulder or projection 611 $\frac{1}{2}$ 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 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 $\frac{1}{2}$ 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 $\frac{1}{2}$ secured to a rock shaft 204 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, whose rear end is pivotally connected by a screw-stud 250 $\frac{1}{2}$ with the lower end of a depending arm of a bell crank 227 $\frac{1}{2}$ secured to the rock shaft 226 $\frac{1}{2}$, from which the depending arm 229 depends. The rearward movement of these parts is limited by contact of a projection on the arm 227 $\frac{1}{2}$ against the shaft 801, but in a regular itemizing operation of the machine no rearward movement at all can take place, the construction here shown including the regular hook 625 of a Burroughs machine secured to the rock shaft 600 and arranged to engage behind the stud 250 $\frac{1}{2}$ in such an operation of the machine when said stud is in the position shown in the forward dotted lines in Fig. 2. As the handle is pulled forward or the main operating shaft rocked forwardly, the hook 625 rises to the dotted line position shown in said figure. 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 full lines in Fig. 2 below the stud 250 $\frac{1}{2}$. The upper end of the hook is rounded as shown

by the dotted lines in said figure, so that by a camming action against the stud it may insure the proper positioning of the parts at the extreme rearward or forward limit of movement, as the case may be; also for a purpose hereinafter described. A spring 286 connected at one end with the link 226 and at the other with the bell crank 227 tends to draw the two together.

As hereinbefore stated, I take advantage of the movements of the signal device for the purpose of controlling the action of my automatic attachment, and to this end in the present instance, I provide an operating connection between the signal arm 1210 and the bell crank arm 227. As seen in Figs. 1, 2 and 5, the controlling connection comprises a sliding bar 212^a 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 which is held in place by means of two shouldered screws, 212^b, engaging slots therein. In the lower keyboard plate 212 I have provided a slot, 212^b, Fig. 5, and in the bar 212^a 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 alignment 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 bar 212^a will be slid rearwardly until such slots 212^b and 212^c exactly register. I provide the slots for the proper control of the bell crank 227, Figs. 1 and 2, whose upper end has the same dimensions as the slots and may pass through them when they register with each other. It will be noted however that when the sliding bar 212^a is in the "clear" position shown in Fig. 5, also by full lines, Figs. 1 and 2, the slot 212^b is blocked or closed by a portion of the sliding bar 212^a rearwardly beyond its own slot 212^c, thereby preventing the bell crank 227 from rising beyond the position shown in full lines, Figs. 1 and 2. However, when the sliding bar 212^a is in non-clear position, as indicated in the dotted lines in said figures the slots 212^b and 212^c register, and the bell crank may enter and pass through said slots, taking up the position shown in dotted lines in Figs. 1 and 2. It will be noted that when the total key 265 is depressed the bell crank 227 is rocked to the last dotted line position to the left in Fig. 2, the movement being transmitted through the bell crank 227 and link 226 and limited by the shaft 801. In Fig. 2 the bell crank 227 is shown in two dotted positions, but in the case just referred to where the total key is entirely depressed this bell crank will be in the rearward dotted position with its projection resting

against the shaft 801. The swinging arm 229 will thus be carried to its rearmost position so that its lower end will stand above the shoulder 611^a of the type bar 611^a, 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 611^a from its position of interference with the hammer controlling pawl 718, with the result that its 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 forward full line position shown in Figs. 1 and 2, at which time the two slots 212^b and 212^c are out of register, with the result that the bell crank arm 227 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 611^a as shown in dotted lines in Figs. 3 and 4. When so positioned the arm 229 will permit the special type bar to rise to its highest position shown by dotted lines in Fig. 3, bringing the type 618^a 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, I have provided a pin 763 on the special type plate hammer and have cut a notch 715^a in the first hammer to the left of this special or extra hammer, thereby making it impossible 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, 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.

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 227½ being in its intermediate position abutting the slide bar 212, the slots 212^b and 212^c being out of alinement. The depending arm 229 stands just forward of the shoulder 611½ 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 250½ will force the lower arm of the bell crank 227½ slightly to the rear against the tension of the spring 286, thereby causing the forward arm of the bell crank 227½ to slightly descend, thus relieving the sliding bar 212½ from the friction incident to the pressure of 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 cooperate with the pin 763, will be tripped and allowed to deliver its blow. This action removes the interference to pin 763 and as the special hammer is tripped by reason of the removal of the special type bar from a position of interference with its pawl 718, such special hammer will be allowed to 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 212½ and thereby bringing the slot 212^c into register with the slot 212^b. All of this occurs about the end of the forward stroke of the operating handle (if a handle is employed). The bell crank 227½ remains in its rearward position during the return stroke of the handle until the hook 625, descending below the stud 250½, allows the stud and thereby said bell crank to come to the forward position shown in dotted lines in Fig. 2, this result, of course, being made possible by signal arm 1210, which has placed the bar 212½ in such position that its

slot 212^c will coincide with slot 212^b, thereby allowing the upper end of the bell crank 227½ to pass through the slots to the position shown in dotted lines in Fig. 2. With the return of the handle to normal position, the special type bar is carried to its lowermost position, and the bell crank 227½ carries with it the swinging arm or detent 229 to the position shown in solid lines in Fig. 3. During subsequent listing operations of the machine, the special type bar 611½ will consequently have no movement whatsoever, being held in inoperative position by this arm 229. The cam surface 611½^c will therefore render its controlling pawl 718 inoperative during the listing of all subsequent items, and its special hammer will therefore remain at rest. These parts will remain in this relative arrangement with respect to each other until a total or sub-total is taken. 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, 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 dotted lines in Fig. 2, and the stud 250½ is thereby retained in its rearward position, holding the bell crank 227½ to the position shown in full lines in said figure. The slot and pin connection between the link 226 and in the bell crank 227 permits the latter to return to normal independently of said link and the bell crank 227½, the usual spring employed in the Burroughs machine to lift the total key being sufficiently strong to overpower the spring 286. 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 212^b and 212^c to remain in register. This is due to the fact that the pitman 914 does not maintain its depressed position for the back stroke and hence its pin or stud 1255 does not act against the part 1213 to rock said signal arm. As soon as the handle reaches the end of the return stroke and the hook 625 is thereby carried below the stud 250½, the bell crank 227½ will therefore again return to the forward position shown in dotted lines, Fig. 2, its upper end reëntering the slots 212^b and 212^c 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 6114 in the lowermost position. It follows that when the next item is put into the machine, no "c" will be printed, as the special type bar, by reason of its being detained in its lower position, will interfere with and prevent its pawl 718 from tripping the special hammer. 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". As the signal device gives a visual indication or proof to the operator that the machine is "clear", so my invention affords a printed indication or proof at the beginning of every new column or list of figures that the machine was "clear" when such column was commenced. For the purpose of affording a clear comprehension of the results obtained by a machine equipped with my invention, there is shown below a sample of the work from such a machine.

2.30c

4.20

8.25

10.09

24.84*

3.22

9.80

37.86*

The designating character "c" opposite the first item \$2.30 is the printed proof that the machine was "clear" when this amount was set up on the keyboard and put into the machine, while the star opposite \$24.84 (which, in this example, is a sub-total) indicates that this amount is the total of the several preceding individual items. It will be noted that the \$3.22 which is the first item after the sub-total was taken, has no designating character "c", with the result that if the sheet of paper should be torn off just above the item, removing the sub-total, it would not be possible to mistake this for the first item, as the operator would be informed, by the absence of the designating character, that there was an amount in the machine at the time of the insertion of that item, \$3.22. The machine is thus capable of automatically printing a character in connection with the first item as proof of the fact that the machine was "clear" when such item was put into the machine; in addition to which the machine is capable, as

heretofore, in the regular Burroughs machine, of indicating totals and sub-totals.

I claim:

1. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of mechanism for automatically printing in association with the first item a suitable character to indicate the fact that the machine was "clear" when such item was printed, and means for rendering the latter mechanism inoperative except when the machine is "clear" and the first item is put into the machine.

2. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a special type bar or carrier bearing a distinguishing type character, and means cooperating with said type bar for causing said character to be printed whenever the machine is operated for the printing of the first item put into the machine after "clearing" but preventing printing of such character at all other times; substantially as described.

3. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of special mechanism for automatically printing a suitable character to designate the fact that the machine was "clear" when the first item of a column or list was printed, and means for preventing action of said special mechanism except in conjunction with the printing by the regular printing mechanism of the first item printed after "clearing" of the machine; substantially as described.

4. 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 for automatically printing a suitable character to designate the fact that the machine was "clear" when the first item of a column or list was printed, said special printing mechanism being under the control of the regular printing mechanism; substantially as described.

5. 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 for automatically printing a suitable character to designate the fact that the machine was "clear" when the first item of a column or list was printed, and an interference between said printing mechanisms to prevent action of the special mechanism until the operation of the regular mechanism; substantially as described.

6. 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, and means for restraining action of said hammer except when the first item is printed when the machine is "clear"; substantially as described.

7. 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 and controlled by one of the outermost hammers of the regular printing mechanism and prevented thereby from action except when the regular printing mechanism is operated; substantially as described.

8. In a machine of the character described, the combination with the accumulating item and total printing devices, of a first-item designating type, a hammer for the same, a catch to hold the hammer retracted, and means controlled by the total-printing devices for displacing said catch, with provisions for controlling the hammer action by the item-printing devices.

9. In a machine of the character described, the combination with the accumulating item and total printing devices, of a first-item designating type, a hammer for the same, a catch to hold the hammer retracted, a vibrating member actuated in each totalizing operation, and a catch-controlling member itself controlled by said vibrating member.

10. In a machine of the character described, the combination with the accumulating item and total printing devices, of a first-item designating type, a hammer for the same, a catch to hold the hammer retracted, and means controlled by the total printing devices for displacing said catch, with provisions for interlocking the hammer with the item-printing means.

11. In a machine of the character described, the combination with the accumulating item and total printing devices, of a first-item designating type, a hammer for the same, a catch to hold the hammer retracted, a vibrating member actuated in each totalizing operation, and a catch-controlling member itself controlled by said vibrating member; with provisions for interlocking the hammer with the item-printing means.

12. In a machine of the character described, the combination with the amount types and carriers, means for setting up the types, and means for taking imprints therefrom, of a special type for designating the first item in a list, and means for taking an imprint from said special type; with provisions for interlocking said means with the

means for taking imprints from the amount types; substantially as and for the purpose described.

13. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of means for printing a suitable character when a total is taken to distinguish it from the individual items and for automatically printing another and different character when the machine is "clear" to thereby indicate that fact; substantially as described.

14. In an adding machine, the combination, with the clearing, printing, and adding mechanisms thereof, of means for printing a suitable character when a total is taken to distinguish it from the individual items and for automatically printing another and different character as an incident to the printing of the first item after the machine was "cleared" to indicate the fact that the machine was "clear" when such item was put into the machine; substantially as described.

15. In an adding machine, the combination with clearing mechanism, of means for printing a suitable character as an incident to the operation of clearing the machine to designate a total from the individual items and for printing another suitable distinguishing character as an incident to the operation of printing the first item after "clearing" of the machine to indicate the fact that the machine was clear when that item was put into the machine; substantially as described.

16. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a special type bar or carrier bearing two distinguishing type characters, and means cooperating with said carrier to cause one of said characters to be printed whenever the machine is operated to print a total or "clear" the machine and to cause the other of said characters to be printed whenever the machine is operated to print the first item put into the machine after "clearing;" substantially as described.

17. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a special type bar or carrier bearing two distinguishing type characters, and means cooperating with said carrier to cause one of said characters to be printed with the total and at one side thereof whenever the machine is operated to print a total and to cause the other of said characters to be printed with and at one side of the first item put into the machine after "clearing;" substantially as described.

18. In an adding machine, the combination of 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 machine was "clear" when a list or column of items was begun, and means cooperating with said special type bar to cause said total character to be printed at one side of a total and the other character to be printed at one side of the first item of a column begun after the "clearing" of the machine; substantially as described.

19. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a visual indicator for indicating whether or not the machine is "clear," and means for automatically printing a suitable character to indicate the fact that the machine is "clear;" substantially as described.

20. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a visual indicator for indicating whether or not the machine is clear, and means under the control of the visual indicator for automatically printing a suitable character to indicate the fact that the machine is "clear"; substantially as described.

21. In an adding machine, the combination with the clearing, printing, and adding mechanisms thereof, of a visual indicator for indicating whether or not the machine is "clear", and means under the control of the visual indicator and normally arranged to automatically print a suitable character to indicate the fact that the machine is "clear", but rendered inoperative when said visual signal indicates "non-clear"; substantially as described.

22. 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 machine was "clear" when a list or column of items was begun, a "clear" signal device for visually indicating whether the machine is "clear" or not, and an operating connection between said signal device and said special printing mechanism for controlling the latter; substantially as described.

23. In an adding machine, the combina-

tion with the clearing, printing, and adding mechanisms thereof, of 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 and for printing a suitable character to distinguish the total from the individual items, a "clear" signal device for visually indicating whether the machine is "clear" or not, and an operating connection between the special printing mechanism and the "clear" signal device to control the operation and action of the former; substantially as described.

24. 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 machine was "clear" when a list or column of items was begun and for printing a suitable character to distinguish the total from the individual item, a "clear" signal device for visually indicating whether the machine is "clear" or not, totalizing mechanism, and an operating connection with said special printing mechanism under the control of the signal device and the totalizing mechanism; substantially as described.

25. 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 machine 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 machine is "clear" or not, totalizing mechanism, and an operating connection with said special printing mechanism under the constant and automatic control of the signal device and under the control of the totalizing mechanism at the will of the operator; substantially as described.

JOHN P. HARRISON.

Witnesses:

ALVAN MACAULEY,
H. A. BROWN.