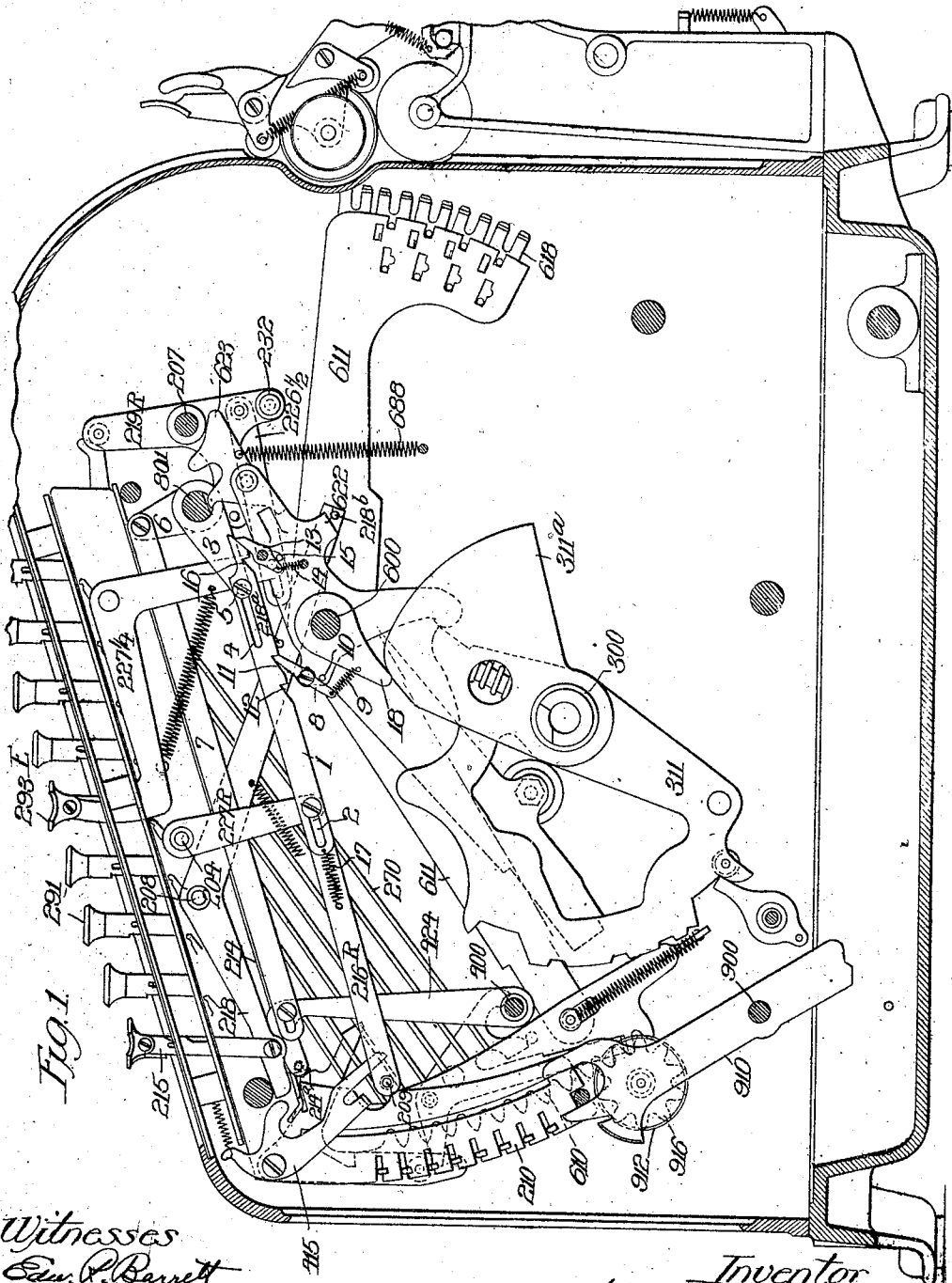


H. C. PETERS.
 ADDING MACHINE.
 APPLICATION FILED APR. 29, 1905.

1,050,039.

Patented Jan. 7, 1913.

4 SHEETS—SHEET 1.



Witnesses
 Edw. P. Barrett
 Atty

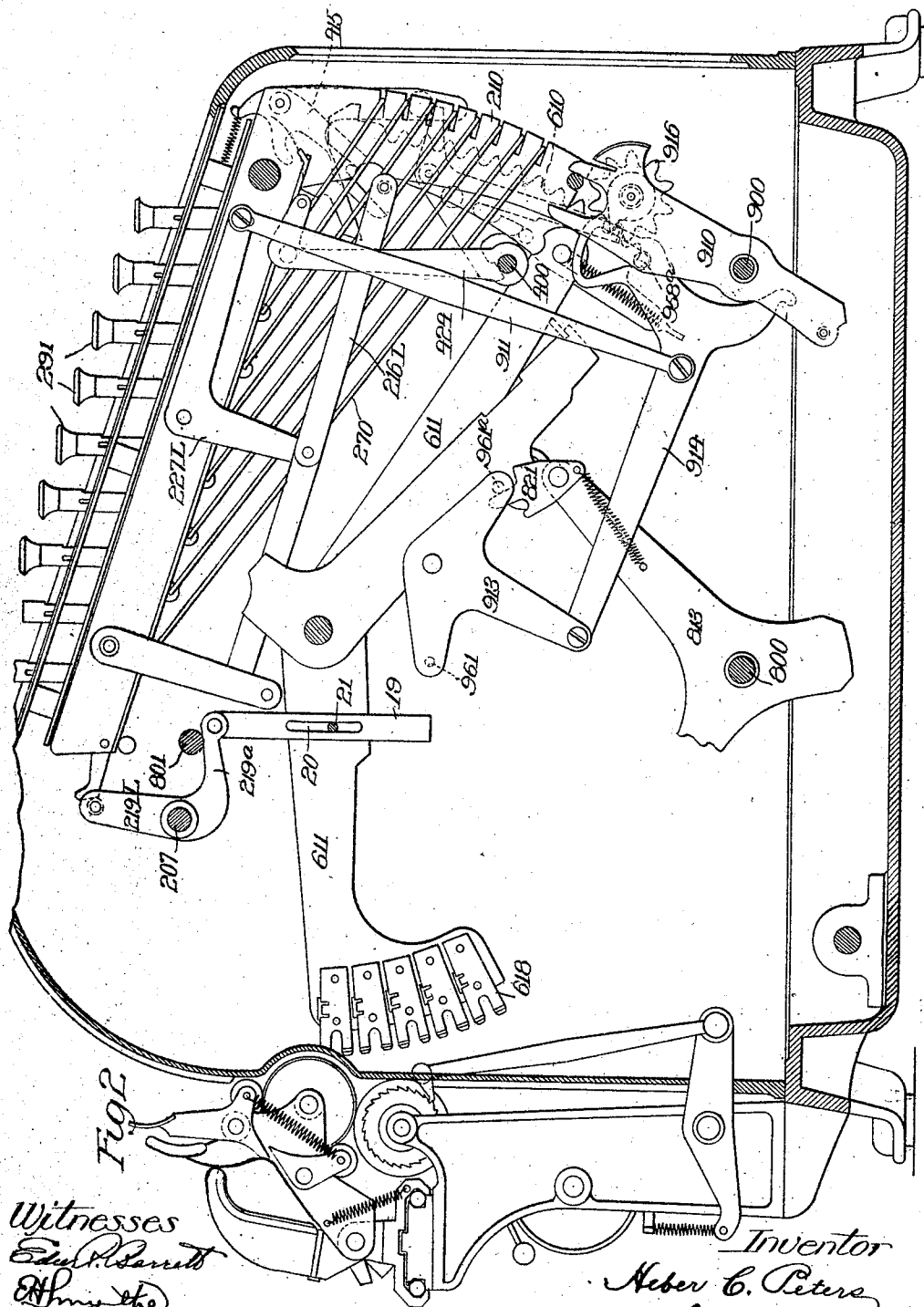
Inventor
 H. C. Peters
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 3.

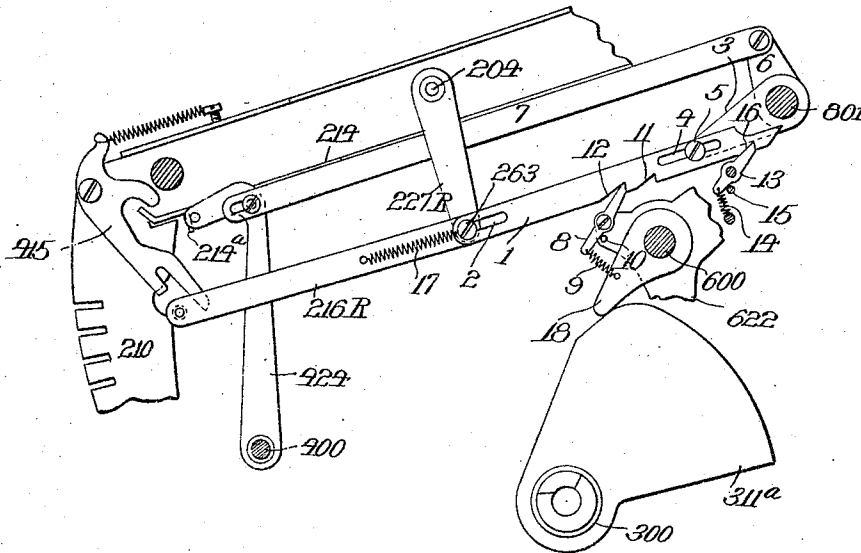
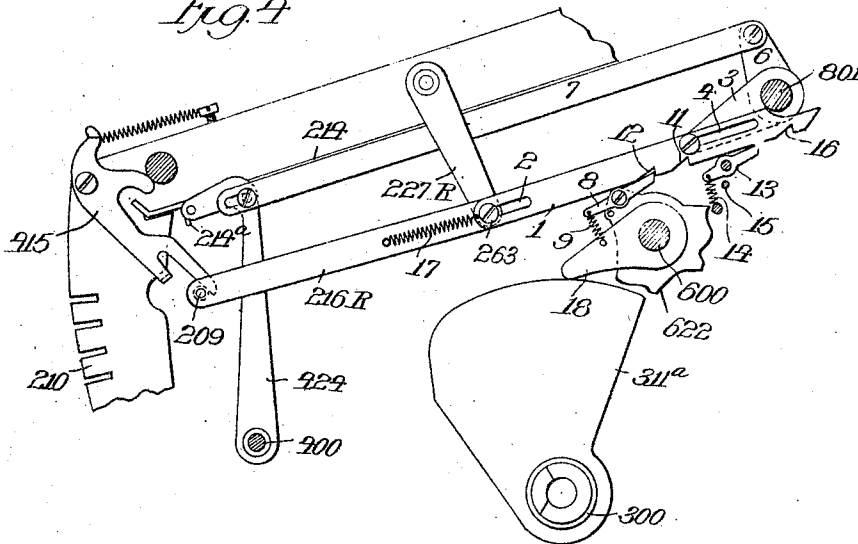


Fig. 4



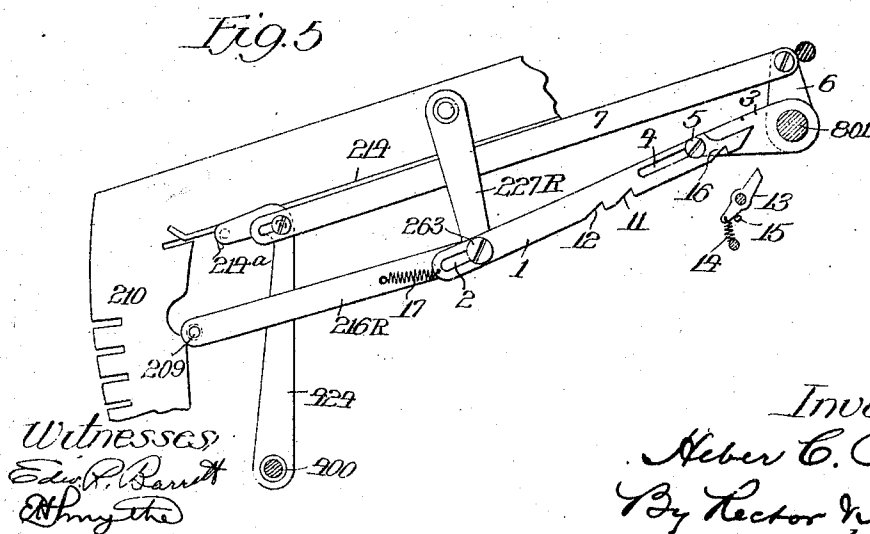
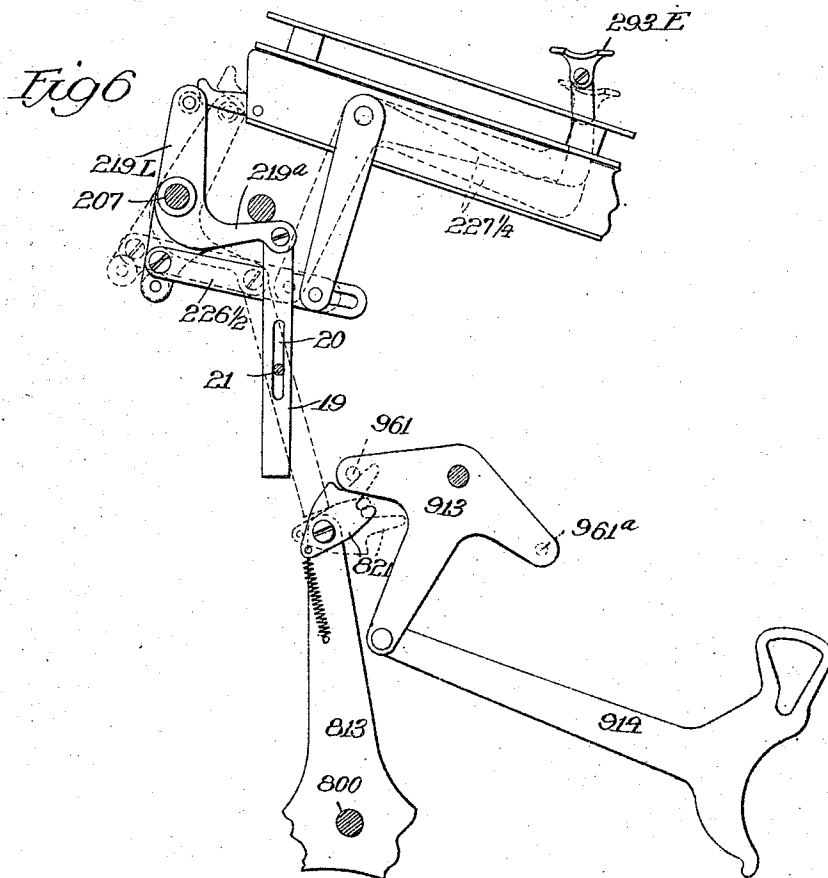
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 APPLICATION FILED APR. 29, 1905.

Patented Jan. 7, 1913.
 4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

HEBER C. PETERS, OF NEW YORK, N. Y., ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

1,050,039.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed April 29, 1905. Serial No. 258,088.

To all whom it may concern:

Be it known that I, HEBER C. PETERS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

My invention relates to adding machines and the like, capable of printing, listing and adding or accumulating individual items or amounts and of printing the total thereof at the will of the operator, such type of machine being exemplified by the well known Burroughs adding machine, made substantially in accordance with Letters Patent of the United States Nos. 504,963 and 505,078, issued on September 12, 1893, on the invention of William S. Burroughs.

The object of my invention is to provide means for taking a total in an automatic manner without any manual adjustment or manipulation of the machine, as has heretofore been the practice, through the medium of a total key or button. In the present instance, the total is automatically taken by simply operating the machine a certain number of times on blank operations, that is without any items set up on the keyboard and, according to the present construction as hereinafter described, the total is automatically taken during a second blank or spacing operation of the machine, that is during a second blank stroke or movement of the main operating machine or of the operating handle, if a handle is employed as the means for operating the machine. The usual total key or button may thus be dispensed with and the total taken by a plurality of operations of the machine which would ordinarily be blank or spacing operations or strokes of the machine.

In the present instance, for the sake of a clear and definite description and understanding of my invention, I have illustrated and will hereinafter describe the same in connection with a Burroughs adding machine, but it will be understood that my invention is not limited in its application and scope to such particular type of machines, but that it may be employed in connection with or embodied in adding machines of the same general character and used for the same general purposes.

In the drawings, Figure 1 is a side elevation of the right-hand side of a Burroughs

adding machine illustrating only those parts of the ordinary machine which are necessary to an understanding of my invention; Fig. 2 a view similar to that of Fig. 1, but of the left-hand side of the machine; Figs. 3 to 6 detail views principally of my improvements or attachments showing different positions thereof.

Briefly describing those parts of a Burroughs machine which are more or less directly concerned with the operation of my improvements or attachments, the keyboard is provided as usual with a series of keys arranged in rows representing the different denominations increasing from right to left and each row containing keys 291 representing the digits 1 to 9. Upon the depression or operation of any one of the keys on the keyboard the sliding plate or plates 214 corresponding to the row or rows of the keys which have been operated are moved rearwardly, with the result that the projection or lug 214^a depending from such sliding bar will rock the bail composed of the universal bar or rod 209, extending transversely of the machine, and the parallel side arms 424 rocking on the shaft 400. This longitudinal movement of any one of the sliding bars 214 will operate to rock the detent 415 corresponding thereto and thereby release its corresponding rack 610, which is thereby permitted to move downwardly between the plates 210 a distance as permitted by the particular one of the stop rods 270, which may have been operated, this movement or descent of the rack corresponding in value to the value of the particular key operated or depressed. The racks 610 correspond in number with the number of rows of keys and cooperate with a corresponding number of adding wheels 912 which are each provided with a pinion 916 meshing with said racks in a manner hereinafter explained. The racks are carried at the forward ends of a series of main levers or bars 611 pivoted intermediate of their length on the main transverse shaft 600 and carrying at their forward ends the movable type 618. As is well known, the rearward or type bearing ends of the main levers, that is those levers corresponding to the rows in which any key may have been operated, are elevated, in the operation of the machine, a distance corresponding to the degree of descent of their respective racks 610, with the result that in

the further operation of the machine and the actuation of the printing mechanism, the amount or value indicated by the depressed keys will be printed upon the paper on the platen and in the subsequent restoration of the parts of the machine such amount or value will be accumulated on the adding wheels or dials.

Describing next the totalizing mechanism employed for taking a total, either a grand total, or a sub-total, and referring particularly to Fig. 2 of the drawings, the adding wheels are mounted in a swinging frame composed essentially of the side or end plates 910 which are pivoted upon the main cross shaft 900. This adding wheel or pinion frame is rocked forwardly and backwardly at the proper times in the operation of the machine so as to cause engagement and disengagement between the racks and their respective pinions. In accumulating items, the pinion frame is swung forwardly upon the initial movement of the main shaft 300 of the machine and the racks, that is the racks corresponding to the particular keys which have been operated are permitted to descend while out of mesh with their pinions. Upon the restoring movement of the parts of the machine and just before the racks begin their upward movement, the pinion frame is swung rearwardly and the pinions put into mesh with their respective racks, with the result that an amount or value is transferred to the pinions whose racks have been operated, such amount or value corresponding to the value or amount set up on the keyboard. Each item or amount is thus added or accumulated on the pinions and wheels. In a Burroughs machine, this rocking movement of the pinion frame is brought about through the medium of the bifurcated pitman 914 operatively connected to the three-armed lever or plate 913, which is itself rocked by means of the rocking arm or lever 813 secured to the main rock shaft 800 of the machine. As is well known, the lever 913 is rocked through the medium of the wipe plate 821 pivoted on one of the arms of the rocking lever 813 and arranged to cooperate with the pins or studs 961 and 961^a on the lever 913. The arms or forks of the pitman cooperate with the pinion frame 910 for rocking the latter in the well known way and for the purposes above stated and it will suffice to say that upon the initial movement or rocking of the main shaft 300, the pitman 914 is moved forwardly, that is to the right in Fig. 2, with the result that the pinion frame 910, through contact of one of the arms of the pitman with the stud 958^a will be rocked forwardly, but upon the restoring movement of the main shaft and of the rock shaft 800, the pitman will be reciprocated in the opposite direction, carrying the pinion frame with it

and causing its pinions to again engage with their respective racks for the purpose of accumulating the amounts or values represented by those racks which have been operated. Heretofore, in taking a total, a total key or button has been employed for the purpose of controlling the movements of the totalizing mechanism described, such total key or button having been connected with the pitman 914, through the medium of the link 911, with the result that when the total key or button was operated or depressed the pitman 914 was removed from its operating connection with the pinion frame 910 through the medium of the stud or pin 958^a, with the result that upon the initial movement of the main shaft of the machine and the descent of the operated racks, the pinions would remain in mesh with their racks, and the latter would descend distances corresponding to the accumulation or total indicated by the adding wheels, (the latter being stopped at zero position by contact of their transfer projections against the feet of the transfer pawls as usual) and after such total had been printed, the pinion frame would be swung forwardly, thereby disengaging the pinions from their racks and permitting the latter to be restored to normal position and leaving the adding wheels at their reset or zero position. Upon the completion of the operation of the machine the pinion frame is swung forwardly to its normal position. The totalizing operation just referred to is that for taking a grand total, but in taking a sub-total (referring to the ordinary Burroughs machine) the total key or button is released at the end of the forward stroke of the main shaft of the machine, so that upon the return movement of the racks, their pinions are left in mesh, with the result that the amounts or values which were transferred from the pinions to the racks will now be re-transferred to the pinions and their adding wheels.

In the operation of taking a total an arm 227L secured on the transverse shaft 204 (which arm has heretofore been made in the form of a bell crank connected with the total key) is moved or rocked rearwardly as to its lower end for the purpose of reciprocating the link 216L which, together with the similar link 216R on the right-hand side of the machine carries the transverse or universal rod 209 serving the purpose of rocking the series of detents 415 and thereby releasing all of the racks. This arm 227L also serves to reciprocate the bar 226, for the purpose of resetting the keys, but as this part of the machine is not concerned directly with the operation of my improvements, the same need not be further described.

The parts hereinbefore described are those which are usual and well known in the ordinary Burroughs machine, to which

I have chosen to apply my invention for the purpose of a comprehensive description. In general terms, my invention provides means under the control of the machine in its operations for accomplishing, in an automatic manner, the same results heretofore accomplished by the manual operation or manipulation of a total key or button, such being performed by a certain number of blank strokes or operations of the machine, with the result that the total key or button and the connections and locks heretofore associated therewith may be entirely dispensed with and the total automatically taken without any manual operation or adjustment of the totalizing mechanism.

Referring to the new parts or attachments, I provide a link or bar 1, which is normally substantially in alinement with the link 216R and having a pin and slot connection with the lower end of the rocking arm 227R, in the present instance such link or bar having a longitudinal slot 2 received by the stud 263 at the lower end of the rocking arm 227R. At its rearward end, the bar 1 has a pin and slot connection with a rock arm 3, which is secured upon the rock shaft 801. In the present instance, the bar 1 has a longitudinal slot 4 toward its rearward end and adapted to receive the pin or stud 5 carried at the outer or forward end of the rock arm 3. In order to rock the rearward end of the bar 1 upwardly for the purpose hereinafter made apparent and at the time any key on the keyboard is depressed, I provide means for rocking the shaft 801 simultaneously with the operation of any one of the keys. To this end, in the present instance, I provide the rock shaft 801 with a crank arm 6, which is operatively connected with the arm 424 by means of the link 7 extending parallel of the sliding bars 214, with the result that whenever the arm 424 is rocked rearwardly by the depressing of any one of the keys on the keyboard, the link 7 will likewise be shifted rearwardly and the rock shaft 801 rocked in a clockwise direction, Fig. 1, thereby rocking and elevating the outer end of the rock arm 3 and likewise elevating the outer end of the link or bar 1. It will be seen that this elevating or raising of the link or bar 1 as to its rearward end occurs only when one of the keys on the keyboard is operated, such operation being for the purpose of moving the link or bar 1 to an inoperative position so as to be removed from the range of the mechanism hereinafter explained. The relative positions of the bar 1 and its rock arm 3 in their elevated condition is illustrated in Fig. 5 of the drawings, their normal position being shown in Fig. 1.

It is evident that a swinging or rocking

of the depending arm 227R rearwardly as to its lower end will so set or position the totalizing mechanism on the left-hand side of the machine as to enable a total to be taken and such rocking or swinging of this depending arm is brought about, in the present instance, by the link or bar 1 just described. It will be understood that whenever such link or bar is shifted or reciprocated longitudinally sufficiently to the rear of the machine to cause the outer end of its slot 2 to engage and move the stud or pin at the lower end of the arm 227R, such arm will be rocked in the manner and for the purposes already described. To accomplish this desired longitudinal movement of the bar 1 in an automatic manner when, according to the present embodiment of the invention, a certain number of operations of the machine are performed, I provide suitable mechanism which, in the present instance, consists of the following parts: Upon a rocking plate 622, which is hung or pivoted upon the main transverse shaft 600 of the machine, I pivot an actuating pawl 8, which is normally spring pressed by a spring 9, to cause its outer or toothed end to cooperate with the lower notched edge of the link or bar 1. However, this spring pressed movement of the pawl is limited by means of a pin 10. As shown in the drawings, the lower edge of the link or bar is provided with two separate angular notches 11 and 12, with which the pawl 8 is arranged to cooperate under different conditions or positions of the operating parts. The link or bar 1 is adapted, upon a blank or spacing operation of the machine, to be shifted rearwardly to a partial extent without the raising or elevating movement hereinbefore referred to and is further adapted to be retained in this shifted position, in order, in the present instance, to enable the actuating pawl 8 upon the next blank or spacing operation of the machine, to engage the forward notch 12 of the link or bar and thereby fully reciprocate or shift the latter in the manner hereinafter explained. To this end, I provide means for retaining the link or bar in its first or partially shifted position, such means, in the present instance, comprising a dog 13 pivoted on the side frame of the machine and spring pressed by means of the spring 14 toward the lower edge of the link or bar 1, but limited as to degree of swinging movement by means of a pin 15, as clearly indicated in Figs. 1, 3, 4 and 5. This dog is arranged to cooperate with a third angular notch 16 located near the rearward end of the link or bar, with the result that when the latter is shifted rearwardly, as hereinafter explained, the same will be caught and retained against return movement by such dog 13, in the manner clearly indicated in

Fig. 3, it being understood that such link or bar is normally spring pressed forwardly by means of a spring 17, secured to its forward end.

5 For the purpose of positively rocking the plate 622 by means of a moving part of the machine, I provide such plate with an operating arm 18 pivoted upon the shaft 600 and forming a part of or separate from the
10 plate 622, but arranged to positively rock the latter when it is itself rocked. This operating arm depends in the path of movement of a cam plate 311^a which, in the present instance, is operatively connected with
15 the usual sector 311, but which may obviously constitute an integral part of such sector if desired. The lower end of the operating arm 18 normally bears against the forward or inclined corner of the cam
20 plate 311^a, with the result that when the cam plate and sector is rocked in an anti-clockwise direction at the initial operation of the machine, the operating arm is quickly
25 rocked in a clockwise direction, but owing to the illustrated contour of the remainder of the cam face, the operating arm is not rocked after its initial rocking, but the sector is permitted to complete its forward
30 rocking movement without further effect upon the operating arm. The result of this rocking of the operating arm and the consequent rocking of the plate 622 is to cause
35 the actuating pawl 8 which normally engages the notch 11 to move the link or bar rearwardly to such a position as to be caught and retained by the dog 13, it being
40 understood that the assumed stroke or operation of the sector is what is generally known as a blank or spacing stroke, at which time no keys on the keyboard have
45 been operated or depressed, with the result that the link or bar has not been elevated, but has been left in position to be engaged by the actuating pawl 8 in the manner just
50 described. The position of the link or bar 1 at the end of the first blank or spacing stroke is illustrated in Fig. 3; the pin or stud at the lower end of the depending arm
55 227R being positioned near the outer end of the slot 2 of the link or bar, with the result that when the latter is further shifted in a rearward direction, such depending
60 arm will be rocked for the purpose of bringing the totalizing and clearing mechanisms in proper position for the taking of a total or the clearing of the machine. Referring
65 more particularly to Fig. 3 of the drawings which illustrates the relative position of the parts at the end of the first blank or spacing stroke or operation of the machine, it will be observed that upon the second blank or spacing stroke or operation of the machine, the cam plate 311^a will rock the operating arm 18 and the actuating pawl 8 in the same manner as before, but at this time such

actuating pawl has already taken its place in the forward notch 12, due to the fact that the dog 13 held or retained the link or bar 1 in its rearward position to which it had been shifted on the first blank stroke or operation of the machine. Upon the rocking of the arm 18 and the consequent rocking of the actuating pawl 8, the link or bar will be shifted rearwardly to its full extent in the manner illustrated in Fig. 4, with the result that the depending arm 227R which controls the position of the totalizing and clearing mechanisms has been rocked rearwardly and at the same time the series of detents 415 have been rocked by the universal bar so as to release all of the racks. Owing to the illustrated contour of the cam plate 311^a, the link or bar 1 is operated quickly at the initial movement of the sector 311 and its operating shaft 300, to which
35 it is connected so that the totalizing or clearing mechanisms are properly set or adjusted for the totalizing or clearing operations in advance of the other operations of the machine, which take place in the further movements of the operating shaft.

According to the machine as so far described, the total which will be taken as above explained will be a grand total and the machine would be cleared after such
95 total had been taken. However, to enable a sub-total to be taken upon the second blank or spacing operation of the machine, I provide suitable means for preventing the rocking or swinging of the pinion frame 910 forwardly upon the return movement of the
100 main operating or rock shaft 300, with the result that the adding wheel pinions will be kept in mesh with their racks upon both the descent and return of the latter, so that the accumulation or total, after being
105 printed, will be transferred back to the adding wheel pinions in the usual and well known manner. In the present instance, I accomplish these results by interfering with
110 the operation of the wipe plate 821 upon its return movement and thereby prevent the same from engaging the pin 961 and from rocking the arm or plate 913. According to the present embodiment of my invention in this respect, as clearly illustrated
115 in Fig. 6, I take advantage of the movements of the usual error key 293E and its operating connections consisting of the bell crank 2271/4, the link 2261/2, connected to
120 the side arm 219R of the bail for restoring the keys, which bail rocks as usual on the shaft 207. At the left-hand end of the shaft 207 the end of the bail is formed as a bell crank 219L, whose lower or forwardly extending arm 219^a is arranged to rock downwardly at every depression of the error key to the position indicated in dotted lines in
125 Fig. 6. At the outer end of this arm of the bell crank is pivotally connected a depend-

ing bar or strip 19 which is of such length and arranged in such relative position as to be projected into the path of movement of the wipe plate 821 whenever the error key is depressed, as indicated in dotted lines in said Fig. 6. To guide and support this bar 19 I provide a pin and slot connection with a fixed part of the frame of the machine and in the present instance I provide the bar with a longitudinal slot 20 which is arranged to receive a fixed pin 21 projecting from a stationary part of the machine, with the result that such pin not only guides and supports the bar 19 in its movement, but also serves as a fulcrum in the slight pivotal movement which the bar possesses.

It will be understood from the foregoing description that whenever it is desired to take a grand total or to clear the machine, the machine is operated twice without any keys being operated, that is, two blank or spacing strokes are taken, the total being taken and printed and the machine cleared automatically merely by reason of such plurality of blank or spacing strokes or operations of the machine. When, however, it is desired to simply take a sub-total, the error key is depressed as above explained, in order to interfere with one of the functions of the wipe plate 821 and the two strokes or operations of the machine are then performed, the sub-total being printed and retained on the adding wheels and without any clearing of the machine. It will be understood, however, that the error key need not be depressed until the second stroke or operation of the machine is about to be made.

By the use of my invention, I am enabled to dispense with the usual total key or button and its immediate connections and to automatically take a total and clear the machine by simply taking a plurality of blank or spacing strokes or operations of the machine, so that the operator need use one hand only in securing the desired results.

According to the present embodiment of my invention in the Burroughs machine, as described, the total is automatically taken on the second blank or spacing stroke or operation of the machine because of the fact that in a machine of this particular type, it is necessary to take the first blank or spacing stroke for the purpose of restoring any of racks 610 which may have been operated in the carrying of one from a lower to a higher denomination when the last item was accumulated, but it will be understood that my invention in its broader aspect is not limited to the particular number of strokes or operations of the machine for obtaining such automatic operation of the totalizing mechanism, but that my invention relates broadly to means for automatically taking a total or clearing the machine.

My invention also contemplates means, under the control of the operator, for rendering the automatic total mechanism inoperative in order that blank strokes or operations of the machine may be taken, as for spacing, without causing an operation of the automatic total or clearing mechanism. In the present instance I utilize for this purpose the repeat key 215 and its bell-crank connection 218 which is fulcrumed upon the rod or shaft 208. Upon this bell-crank 218 I provide a stud or pin 218^a which is arranged in the path of movement of the link or bar 1 of said automatic mechanism, with the result that when the repeat key is depressed the link or bar 1 is raised or rendered inoperative in the same manner as when any one or more of the value or number keys are operated or depressed. As usual, this repeat key is provided with means for locking the same in operated position so that after one operation or depression thereof as many blank strokes as desired may be taken without operating the automatic total or clearing mechanism. In the present instance the bell-crank 218 of the repeat key mechanism cooperates directly with the pawl 623 for the purpose of interfering with the action of the latter and thereby preventing the restoring movement of the arm 219R which when operated restores the sliding bars 214 and permits the operated keys to return to normal position. For this purpose the bell-crank 218 is provided near its rearward end with a stud or pin 218^b which, when the repeat key is operated is projected in the path of movement of the lower end or tail of the pawl 623 so that when the arm 622 on which such pawl is carried is rocked, its pawl is moved to an inoperative position so as to rise upwardly in front of the roller 232 instead of contacting or engaging the latter and operating the key-restoring mechanism as ordinarily. The pawl 623 is spring-pressed by means of the spring 688 against whose tension the stud 218^b holds such pawls in the interfering position just described.

It will be understood from the foregoing description that my automatic mechanism may be rendered inoperative at the will of the operator by simply operating the repeat key. When the repeat key is permitted to be restored to normal position, the link or bar 1 is also permitted to be restored to normal position. Moreover, it will be understood that my invention contemplates and covers broadly mechanism for the automatic taking of a total, either a grand total or a sub-total, or both, and regardless of whether it is the taking of the grand total or the subtotal which requires the setting or operation of a special key.

I claim:

1. In a machine of the character de-

scribed, the combination with an accumulator, differential actuating mechanism therefor, a prime mover, and total controlling means; of means for setting the same by normal operation of said prime mover.

2. In a machine of the character described, the combination with an accumulator, differential actuating mechanism therefor, a prime mover, and total controlling means; of means for setting the same by repeated normal operations of said prime mover.

3. In a machine of the character described, the combination with an accumulator, differential actuating mechanism therefor, a prime mover, and total controlling means; of means for partially setting the same by normal operation of said prime mover and completing the setting of such means by repetition of normal operation of the prime mover.

4. In a machine of the character described, the combination with an accumulator, differential actuating mechanism therefor, manipulative amount-determining devices, a prime mover, and total controlling means; of means for setting the same by normal operation of said prime mover without said amount-determining devices being manipulated.

5. In a machine of the character described, the combination with an accumulator, differential actuating mechanism therefor, manipulative amount-determining devices, a prime mover and total controlling means; of means for setting the same by repeated normal operations of said prime mover without said amount-determining devices being manipulated.

6. In a machine of the character described, the combination with an accumulator, differential actuating mechanism therefor, manipulative amount-determining devices, a prime mover, and total controlling means; of means for partially setting the same by normal operation of said prime mover without said amount-determining devices being manipulated, and for completing the setting of such means by repetition of normal operation of the prime mover without the amount-determining devices being manipulated.

7. In a machine of the character described, the combination with adding wheels, reciprocatory actuators therefor, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for setting said controlling devices by normal operation of the prime mover.

8. In a machine of the character described, the combination with adding

wheels, reciprocatory actuators therefor, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for setting said controlling devices by repeated normal operations of the prime mover.

9. In a machine of the character described, the combination with adding wheels, reciprocatory actuators therefor, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for partially setting said controlling devices by normal operation of said prime mover and for completing the setting of said devices by repetition of normal operation of the prime mover.

10. In a machine of the character described, the combination with adding wheels, reciprocatory actuators therefor, manipulative devices for measuring excursions of said actuators, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for setting said controlling devices by normal operation of the prime mover without said measuring devices being manipulated.

11. In a machine of the character described, the combination with adding wheels, reciprocatory actuators therefor, manipulative devices for measuring excursions of said actuators, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for setting said controlling devices by repeated normal operations of said prime mover without said measuring devices being manipulated.

12. In a machine of the character described, the combination with adding wheels, reciprocatory actuators therefor, manipulative devices for measuring excursions of said actuators, means for effecting disengagement of the wheels therefrom during their advance and engagement during their return movement, controlling devices for reversing this order of engagement and disengagement, and a prime mover; of means for partially setting said controlling devices by normal operation of said prime mover without said measuring devices being manipulated and for completing the setting of said devices by repetition of normal operation of the prime mover without said measuring devices being manipulated.

13. In a machine of the character described, the combination with reciprocatory racks, amount key stops for variously measuring excursions thereof, adding wheels, a support therefor movable to engage and disengage the wheels and racks, a pitman shiftably engageable with said support, and a prime mover; of means actuated by the latter in normal operation to shift said pitman.

14. In a machine of the character described, the combination with reciprocatory racks, amount key stops for variously measuring excursions thereof, adding wheels, a support therefor movable to engage and disengage the wheels and racks, a pitman shiftably engageable with said support, and a prime mover; of means actuated by the latter in repeated normal operations to shift said pitman.

15. In a machine of the character described, the combination with reciprocatory racks, amount key stops for variously measuring excursions thereof, adding wheels, a support therefor movable to engage and disengage the wheels and racks, a pitman shiftably engageable with said support, and a prime mover; of means for shifting said pitman, and means for actuating said shifting means step by step by said prime mover in successive normal operations thereof.

16. In a machine of the character described, the combination with reciprocatory racks, amount key stops for variously measuring excursions thereof, adding wheels, a support therefor movable to engage and disengage the wheels and racks, a pitman shiftably engageable with said support, and a prime mover; of means for shifting said pitman, and means for actuating said shifting means step by step by said prime mover in successive normal operations thereof, the first of which operations sets said shifting means without affecting the pitman and the second of which operations causes said means to become effective upon the pitman.

17. In a machine of the character described, the combination with reciprocatory racks, amount key stops for variously measuring excursions thereof, adding wheels, a support therefor movable to engage and disengage the wheels and racks, a pitman shiftably engageable with said support, and a prime mover; of means for shifting said pitman, and means for actuating said shifting means step by step by said prime mover in successive normal operations thereof, the first of which operations sets said shifting means without affecting the pitman and the second of which operations causes said means to become effective upon the pitman; means being provided for disabling the shifting means by the setting of an amount key-stop.

18. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link

or bar connected with the totalizing mechanism for operating the latter and arranged to be actuated upon a blank operation of said prime mover.

19. In an adding machine, the combination, with the clearing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the clearing mechanism for operating the latter and arranged to be actuated upon a blank operation of said prime mover.

20. In an adding machine, the combination, with item setting-up; totalizing and printing mechanisms thereof, of a link or bar connected with the totalizing mechanism for operating the latter, an operating member operatively connected with the link or bar, and means for interfering with said operative connection of the link or bar when an item is set up.

21. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter, and means reciprocating the link or bar upon a second blank operation of said prime mover.

22. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter and a rock arm arranged to reciprocate the link or bar upon a blank operation of said prime mover.

23. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm or plate, and a pawl mounted on such rock arm and arranged to engage and operate the link or bar upon a blank operation of the prime mover.

24. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm or plate arranged to reciprocate the link upon the second blank operation of the prime mover and thereby set the totalizing mechanism in operative position.

25. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm or plate operated by the prime mover, and a pawl mounted on such rock arm and arranged to engage and partially shift the link at one blank operation of the prime mover and to fully shift such link at a succeeding blank operation thereof and thereby set the totalizing mechanism in operative position.

26. In an adding machine, the combination

tion, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter, said link or bar having two notches along one edge, a rock arm or plate operated by the machine at every operation thereof, and a pawl on such rock arm and arranged to engage one of the notches and partially shift the link at one blank operation of the prime mover and to engage the second of the notches and fully shift such link at a succeeding blank operation of the prime mover and thereby set the totalizing mechanism in operative position.

27. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm or plate operated by the prime mover at every operation thereof and arranged to partially shift the link at one blank operation of the prime mover and to fully shift the same and thereby actuate the totalizing mechanism at a succeeding blank operation of the prime mover, and means for retaining the link in its partially shifted position.

28. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm or plate operated by the prime mover at every operation thereof and arranged to partially shift the link at one blank operation of the prime mover and to fully shift the same and thereby actuate the totalizing mechanism at a succeeding blank operation of the prime mover, and a dog arranged to engage and retain the link in its partially shifted position.

29. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm operatively connected with the link except when an item is set up on the machine, and means actuated by a movable part of the machine for operating said arm.

30. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm operatively connected with the link except when an item is set up on the machine, and a cam operated by the machine in its movements and arranged to rock said arm.

31. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm operatively connected

with the link except when an item is set up on the machine, and means actuated by a movable part of the machine for rocking said arm at the initial movement of the machine.

32. In an adding machine, the combination with the totalizing and printing mechanism thereof, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm operatively connected with the link except when an item is set up on the machine, and a cam plate having a contact surface for fully rocking said arm at the initial movement of the machine.

33. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, of a link or bar connected with the totalizing mechanism for operating the latter, a rock arm operatively connected with the link except when an item is set up on the machine, a contact arm connected with the rock arm, and a cam plate for actuating said contact arm and thereby rocking said arm.

34. In an adding machine, the combination, with the totalizing and printing mechanisms thereof and with the main operating rock shaft of the machine, of operating connections with the totalizing mechanism, and a cam mounted on the rock shaft and arranged to actuate said operating connections.

35. In an adding machine, the combination, with the totalizing and printing mechanisms thereof and with the main operating rock shaft of the machine, of operating connections with the totalizing mechanism, a rock arm arranged to be operatively connected with said connections except when an item is set up on the machine, and a cam mounted on the rock shaft and arranged to actuate said rock arm.

36. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a rock arm connected with the totalizing mechanism, a link operatively connected with the rock arm but having a movement independent thereof, and means actuated by the prime mover for shifting said link the extent of its independent movement on the first blank operation of the prime mover and for positively operating and rocking said arm on the second blank operation thereof.

37. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a rock arm connected with the totalizing mechanism, a link having a pin and slot connection with the rock arm providing a preliminary partial reciprocation of the link before actuation of the rock arm, and means actuated by the prime mover for moving the link through its said partial re-

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ciprocation on the first blank operation of the prime mover and for positively operating and rocking said arm on the second blank operation thereof.

5 38. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a rock arm connected with the totalizing mechanism, a link having a pin and slot connection with the rock arm and spring
10 pressed in one direction with relation thereto, and means actuated by the prime mover for shifting said link and thereby operating the totalizing mechanism upon a blank operation of the prime mover.

15 39. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and a prime mover; of a rock arm connected with the totalizing mechanism, a link having a pin and slot
20 connection with the rock arm and spring pressed in one direction with relation thereto, means actuated by the prime mover for partially shifting the link upon a blank operation of the prime mover and the remainder of its movement in the same direction upon a second succeeding operation thereof, and means for retaining said link against return from its partially shifted position.

30 40. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, of an operating connection cooperating with the totalizing mechanism to actuate it and normally in position to be operated by a movable part of the machine, and means for shifting said operating connection to an inoperative position whenever an item is set up on the machine.

40 41. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of an operating connection cooperating with the totalizing mechanism to actuate it and normally in position to be operated by a movable part of the machine, said connection being under the control of the key mechanism and shifted thereby to inoperative position whenever the key mechanism is operated.

50 42. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of an operating connection between the totalizing mechanism and a movable part of the machine, and means under the control of the key mechanism for interfering with said connection and preventing operation thereof by the machine whenever the key mechanism is operated.

60 43. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, and also with the main operating shaft, of an operating connection
65 between the totalizing mechanism and the

shaft, and means under the control of the key mechanism for interfering with said connection and preventing operation thereof whenever the key mechanism is operated.

70 44. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, and also with its main operating shaft, of an operating connection between the totalizing mechanism and the shaft, said connection being normally in operative relationship with said shaft and arranged to be actuated thereby upon a blank operation of said shaft, and means under the control of the key mechanism for interfering with said connection and preventing operation thereof whenever the key mechanism is operated.

80 45. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link or bar operatively connected with the totalizing mechanism, and in position to be actuated by a movable part of the machine except when the key mechanism is operated, and means controlled by such key mechanism for interfering with the operation of the link by said movable part of the machine whenever the key mechanism is operated.

90 46. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link or bar operatively connected with the totalizing mechanism and normally in range of, or in position to be actuated by a movable part of the machine, and means for shifting such link or bar from the range of said movable part of the machine whenever the key mechanism is operated.

100 47. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link pivotally connected with the totalizing mechanism for operating the latter and normally in position to be actuated by a movable part of the machine, and means under the control of the key mechanism for rocking such link on its pivot to remove it from the range of said movable part of the machine and thereby prevent its operation whenever the key mechanism is operated.

115 48. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link pivotally connected with the totalizing mechanism for operating the latter and normally in position to be actuated by a movable part of the machine, and an arm under the control of the key mechanism and operatively connected with the link for rocking the latter and thereby preventing its operation whenever the key mechanism is operated.

125 49. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link pivotally connected at one end with the totalizing mechanism and at the other end with the
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anism for operating the latter and normally in position to be actuated by a movable part of the machine, an arm pivotally connected with the other end of the link to rock the latter, and means actuated whenever any one of the keys is operated for rocking said arm.

50. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link operatively connected with the totalizing mechanism and normally in position to be actuated by a movable part of the machine, and a crank arm operatively connected with the link and controlled by the key mechanism to prevent operation of the link whenever the key mechanism is operated.

51. In an adding machine, the combination, with the totalizing, printing and key mechanisms thereof, of a link operatively connected with the totalizing mechanism and normally in position to be actuated by a movable part of the machine and a crank arm operatively connected with the link and controlled by the key mechanism to prevent operation of the link whenever the key mechanism is operated, said link having a pin and slot connection with the totalizing mechanism and the crank arm.

52. In an adding machine, the combination, with the accumulating, totalizing and printing mechanisms thereof, and a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and means cooperating with the accumulating mechanism for preventing a clearing thereof but permitting a sub-total to be printed when such totalizing mechanism is operated.

53. In an adding machine, the combination, with the accumulating, totalizing and printing mechanisms thereof, and a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and means under the control of the operator cooperating with the accumulating mechanism for preventing a clearing thereof but permitting a sub-total to be printed when such totalizing mechanism is operated.

54. In an adding machine, the combination, with the accumulating, totalizing and printing mechanisms thereof, and a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and key-controlled means cooperating with the accumulating mechanism for preventing a clearing thereof but permitting a sub-total to be printed when such totalizing mechanism is operated.

55. In an adding machine, the combination, with the totalizing and printing mechanism thereof and with its accumulating

mechanism, including actuators and the accumulator arranged to be rocked in and out of cooperative relationship therewith and including also the operating connections controlling such rocking movement, and with a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and means under the control of the operator for governing said operating connections and preventing the rocking of the accumulator out of cooperative relationship with the actuators when a sub-total is taken.

56. In an adding machine, the combination, with the totalizing and printing mechanism thereof and with its accumulating mechanism including actuators and the accumulator arranged to be rocked in and out of cooperative relationship therewith and including also the operating connections controlling such rocking movement and with a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and a key-controlled bar cooperating with said operating connections and arranged to interfere with its function of rocking the accumulator out of cooperative relationship with the actuator and thereby permit a sub-total to be taken.

57. In an adding machine, the combination, with the totalizing and printing mechanisms thereof and with its accumulating mechanism including actuators and the accumulator arranged to be rocked in and out of cooperative relationship therewith and including also a wipe plate 821 and operating connections actuated by said plate for controlling the rocking movement of the accumulator, and with a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and means under the control of the operator for interfering with one of the functions of said plate and thereby preventing the rocking of the accumulator from cooperative relationship with the accumulator when a sub-total is taken.

58. In an adding machine, the combination, with the totalizing and printing mechanism thereof and with its accumulating mechanism, including actuators and the accumulator arranged to be rocked in and out of cooperative relationship therewith and including also a wipe plate 821 and operating connections actuated by said plate for controlling the rocking movement of the accumulator, and with a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and a key-controlled rod or bar arranged to be interposed in the path of movement of said plate to in-

terfere with one of its functions and thereby prevent the rocking of the accumulator from coöperative relationship with the accumulator when a sub-total is taken.

5 59. In an adding machine, the combination, with the accumulating, printing, and key mechanisms thereof and with the error key and connections for restoring the key mechanism at the will of the operator, and
10 with a prime mover; of means automatically actuated by a blank operation of the prime mover for taking a total, and means under the control of the error key and co-operating with the accumulating mechanism for preventing a clearing thereof when
15 a subtotal is taken.

60. In an adding machine, the combination, with the accumulating, printing, and key mechanisms thereof and with the error
20 key and connections for restoring the key mechanism at the will of the operator, and also with the means controlling the operation of the accumulating mechanism in taking a total, and with a prime mover; of
25 means automatically actuated by a blank operation of the prime mover for taking a total, and a bar or arm under the control of the error key and coöperating with the totalizing mechanism for preventing a clearing
30 of the accumulating mechanism when a sub-total is taken.

61. In an adding machine, the combination, with the totalizing and printing mechanism thereof and with its accumulating
35 mechanism, including actuators and the accumulator arranged to be rocked in and out of coöperative relationship therewith and including also the operating connections
40 controlling such rocking movement, and also with the key mechanism thereof and its error key for restoring the keys at the will of the operator, and with a prime mover; of
45 means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and an operating device under the control of the error key for governing said operating connections
50 and preventing the rocking of the accumulator out of coöperative relationship with the actuators when a sub-total is taken.

62. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and with a prime mover; of
55 operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, and means under the control of the operator for completely disabling said operating connections.

63. In an adding machine, the combination, with the totalizing and printing mechanisms thereof, and with a prime mover;
60 of operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, and means under the control of the operator for rendering said oper-
65 ating connections inoperative and for maintaining them in that condition.

64. In an adding machine, the combination, with the totalizing, printing, and key mechanisms thereof, and with a prime
70 mover; of operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, means for rendering said connections inoperative when
75 an amount or item is set up on the key mechanism, and manually operated mechanism for rendering said connections inoperative to permit blank strokes of the prime mover to be taken without affecting the
80 totalizing mechanism.

65. In an adding machine, the combination, with the totalizing, printing, and key mechanisms thereof, and with a prime
85 mover; of operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, means for rendering said connections inoperative when
90 an amount or item is set up on the key mechanism, and manually operated mechanism for rendering said connections inoperative independently of the key mechanism and at the will of the operator.

66. In an adding machine, the combination, with the totalizing, printing, and key mechanisms thereof, and with a prime
95 mover; of operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, means for rendering said connections inoperative when
100 an amount or item is set up on the key mechanism, and key-controlled mechanism for rendering said connections inoperative at the will of the operator to permit blank
105 strokes of the prime mover to be taken without affecting the totalizing mechanism.

67. In an adding machine, the combination, with the totalizing, printing and repeat mechanisms, and with a prime mover;
110 of operating connections with the totalizing mechanism actuated by a blank operation of the prime mover, and means actuated by the repeat mechanism for rendering said connections inoperative when the latter mechanism is operated.

68. In an adding machine, the combination, with the totalizing and printing mechanisms, and with a prime mover; of
115 an operating link connected with the totalizing mechanism and arranged to be actuated by a blank operation of the prime mover, and means under the control of the operator,
120 for rendering said link inoperative.

69. In an adding machine, the combination, with the totalizing and printing mechanisms, and with a prime mover, of an operating
125 link connected with the totalizing mechanism, an operating member actuated by the prime mover at every operation thereof and arranged to actuate said link at a blank operation of the prime mover and
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means, under the control of the operator, for breaking the operating connection between said member and link and thereby rendering the latter inoperative.

70. In an adding machine, the combination, with the totalizing, printing and repeat mechanisms and with the repeat key of the latter mechanism, and with a prime mover; of an operating link connected with the totalizing mechanism and arranged to be actuated by a blank operation of the prime mover, and a movable member actuated by the operation of the repeat key for engaging said link to move the latter to an inoperative position.

71. In an adding machine, the combination, with the totalizing, printing and repeat mechanisms and with the repeat key and the operating arm or lever of the latter mechanism, and with a prime mover; of an operating link connected with the totalizing mechanism and arranged to be actuated by a blank operation of the prime mover, and a pin or stud located on said lever of the repeat mechanism and arranged in the path of movement of said link to move the latter and render it inoperative whenever the repeat key is operated.

72. In an adding machine, the combination, with the totalizing and printing mechanism thereof and with its accumulating mechanism, including actuators and the accumulator arranged to be rocked in and out of coöperative relationship therewith and including also a wipe plate 821 and operating connections actuated by said plate for controlling the rocking movement of the accumulator, the key mechanism of the machine and the error key and connections for

restoring the keys at the will of the operator, and with a prime mover, of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and means under the control of the error key and its connections for interfering with one of the functions of said plate and thereby preventing the rocking of the accumulator from coöperative relationship with the actuator when a sub-total is taken.

73. In an adding machine, the combination, with the totalizing and printing mechanisms thereof and with its accumulating mechanism including actuators and the accumulator arranged to be rocked in and out of coöperative relationship therewith and including also a wipe plate 821 and operating connections actuated by said plate for controlling the rocking movement of the accumulator, the key mechanism of the machine and the error key and connections for restoring the keys at the will of the operator, and with a prime mover; of means automatically actuated by a blank operation of the prime mover for operating the totalizing mechanism, and a bar or arm under the control of the error key and its connections and arranged to be interposed in the path of movement of said plate to interfere with one of its functions and thereby prevent the rocking of the accumulator from coöperative relationship with the actuator when a sub-total is taken.

HEBER C. PETERS.

Witnesses:

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F. C. RYMARCZICK.