J. POWERS.

COUNTER FOR ACCOUNTING MACHINES.

APPLICATION FILED JUNE 28, 1915.

1,312,807.

Patented Aug. 12, 1919.

5 SHEETS—SHEET 1.

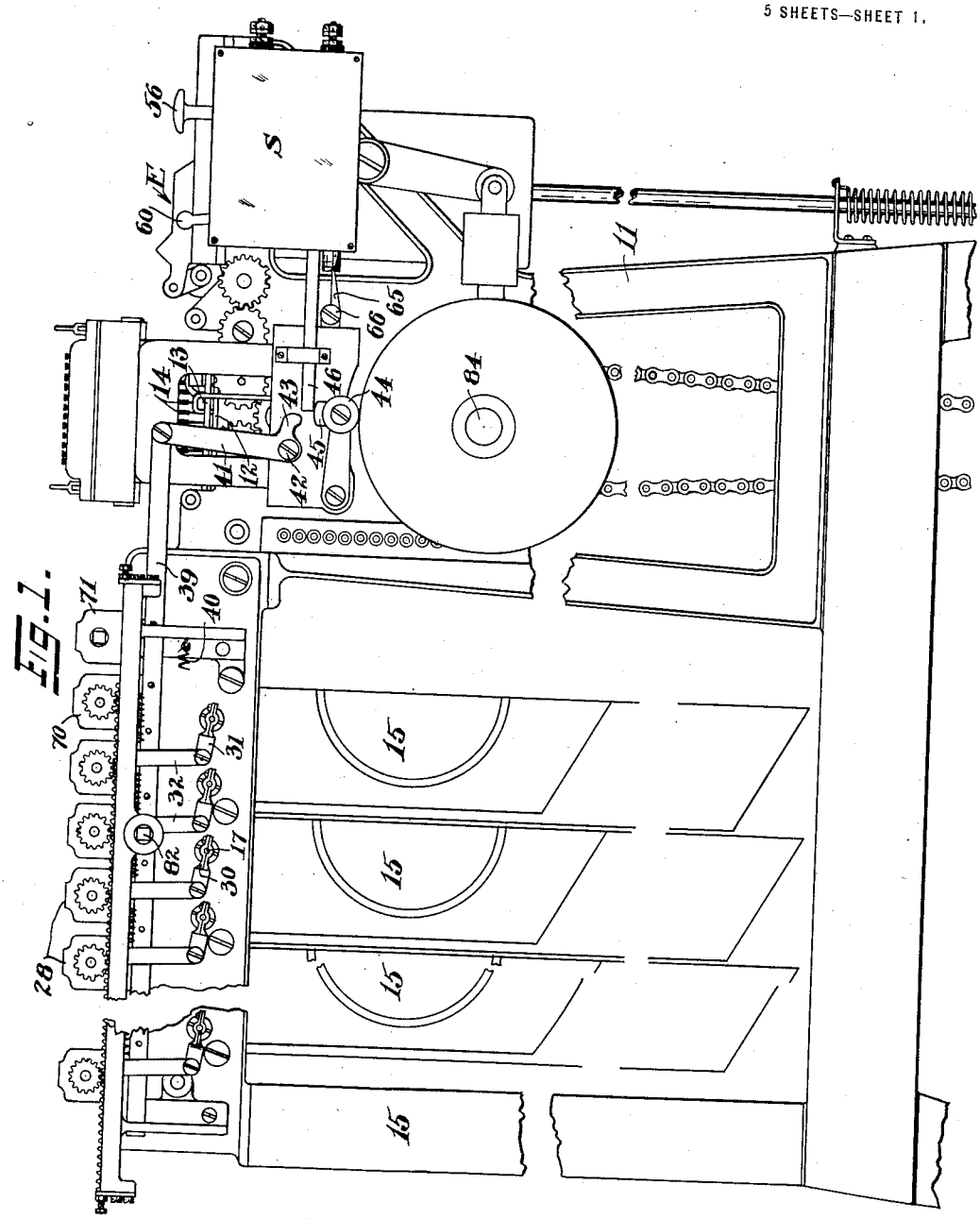

FIG. 1.

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5 SHEETS—SHEET 2.

Fig. 2.

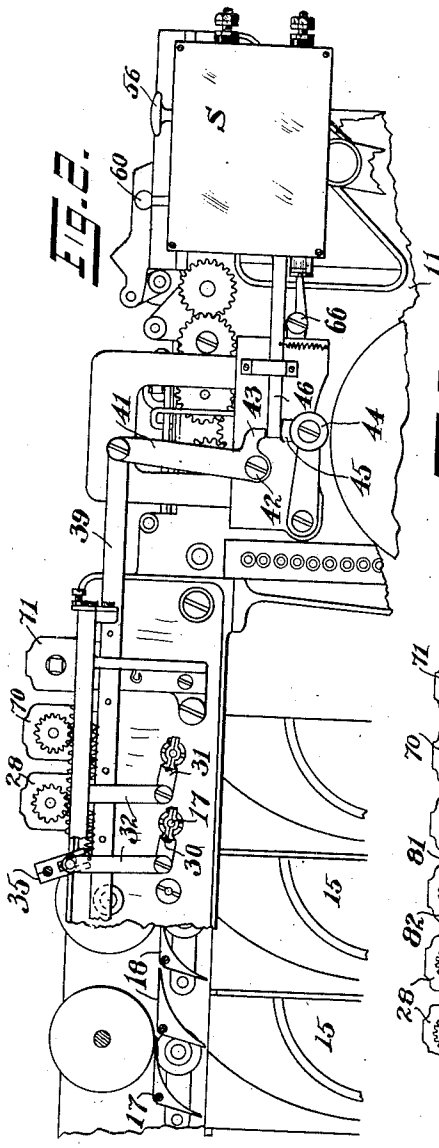
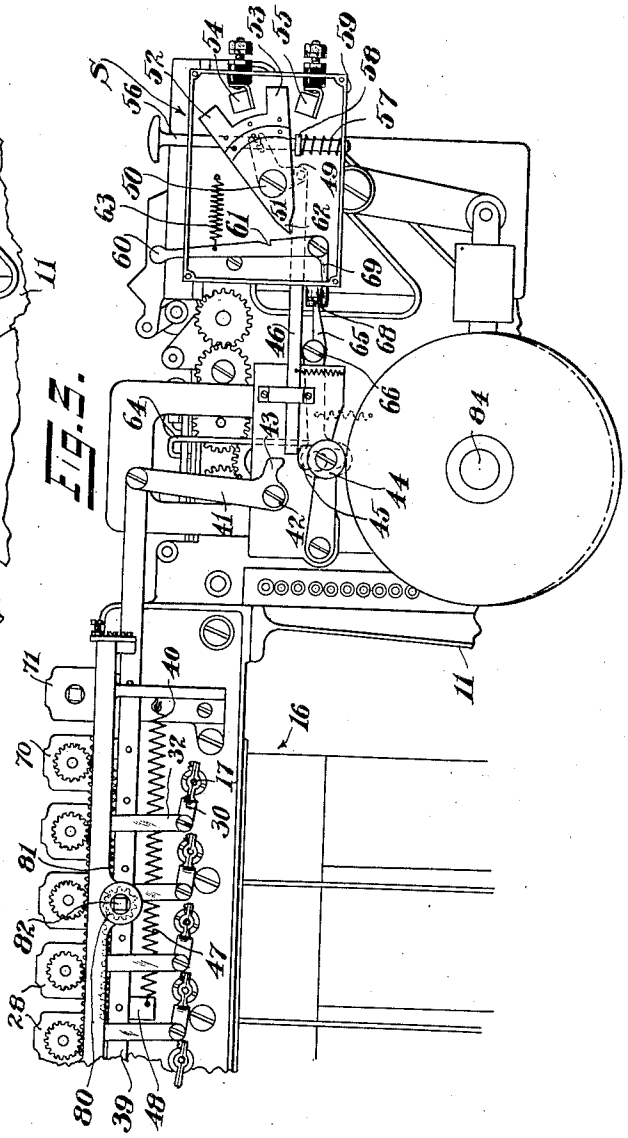


Fig. 3.



Witnesses:
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5 SHEETS—SHEET 3.

Fig. 5.

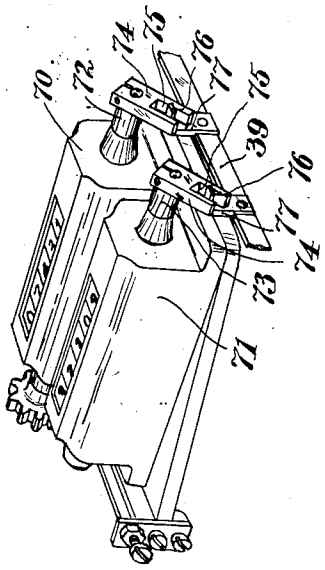

Fig. 4.

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5 SHEETS—SHEET 4.

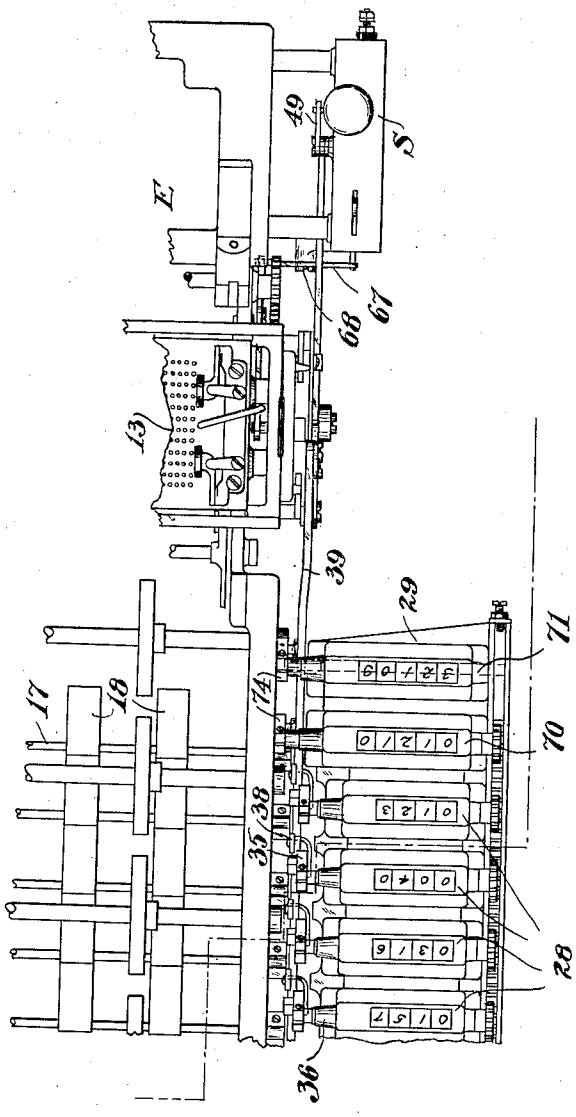

Fig. 6.

Witnesses:
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5 SHEETS—SHEET 5.

Fig. 7.

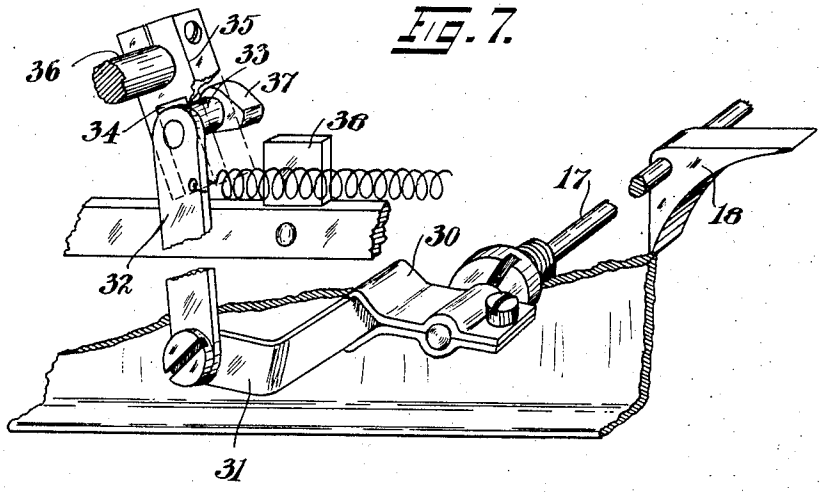


Fig. 8.

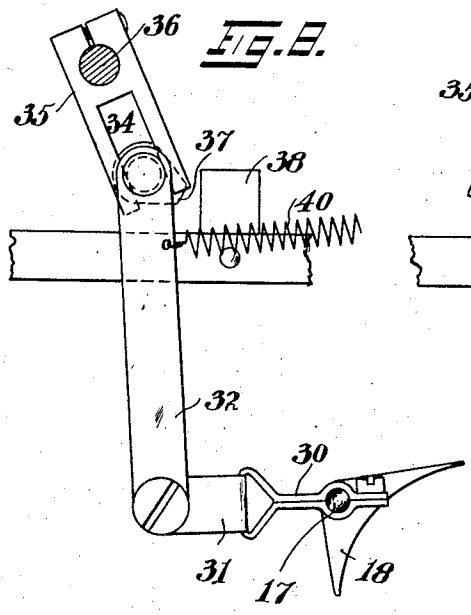
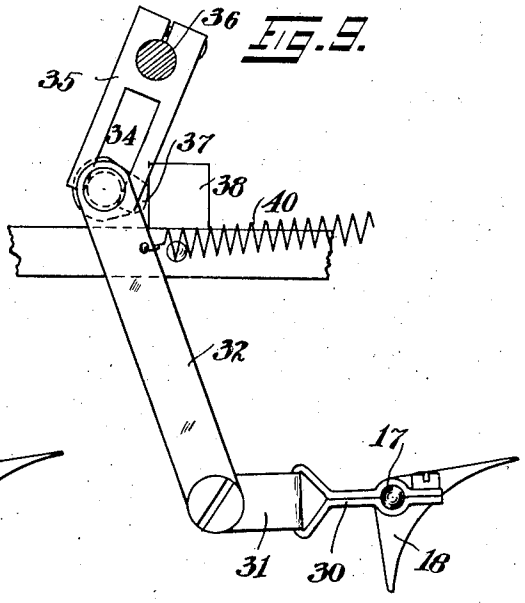


Fig. 9.



Witnesses:

Chas. E. Whiteman

H. D. Penney

Inventor:

James Powers,

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UNITED STATES PATENT OFFICE.

JAMES POWERS, OF NEW YORK, N. Y., ASSIGNOR TO POWERS ACCOUNTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

COUNTERS FOR ACCOUNTING-MACHINES.

1,312,807. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed June 28, 1915. Serial No. 36,644.

To all whom it may concern:

Be it known that I, JAMES POWERS, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Counters for Accounting-Machines, of which the following is a specification.

This invention relates to counting machines for use with perforated cards and especially to machines for sorting and counting such cards.

One of the main objects of the present invention is to provide means for counting the cards of each class separately, for counting the cards of a certain series of classes of cards which may be called the sub-total, and for counting the cards of the several series which may be called the grand total.

To this end, a series of counters are provided, one for each class of cards, one for taking the sub-totals, and one for taking the grand total.

Still another object of the invention is to provide an arrangement whereby the series of individual counters and the counter for taking the sub-totals can be quickly and simultaneously restored to zero to the exclusion of the grand total counter.

A further object of the invention is to provide an arrangement for disconnecting the actuating mechanism for the sub-total and grand total counters when the supply of record cards is exhausted or when a record card is misplaced in a machine and thus the true record of such card cannot be analyzed.

These and other features, capabilities and advantages of the invention will appear from the subjoined detail description of one specific embodiment thereof illustrated in the accompanying drawings in which

Figure 1 is an elevation showing the positions of the counters relative to one another and to the analyzing mechanism.

Fig. 2 is a similar elevation partly broken away to illustrate the relative positions of the deflectors.

Fig. 3 is another elevation partly broken away to illustrate the stop mechanism.

Fig. 4 is an enlarged fragmental perspective illustrating one complete section of a sorting machine, the individual counter and the means for connecting the two.

Fig. 5 is a fragmental perspective detached showing sub-total and grand total counters.

Fig. 6 is a fragmental plan view showing a series of counters connected to the analyzing mechanism.

Fig. 7 is an enlarged fragmental perspective showing the connection between a counter lever and a deflector.

Figs. 8 and 9 illustrate successive positions of the connection between a counter and a deflector.

In the embodiment shown, there is provided a main frame 11 at the upper end of which a card analyzing mechanism is disposed having a die plate 12 and a guide plate 13 both perforated with alined perforations to accommodate and permit the passage of pins 14 therethrough to analyze cards that are fed in between the plates 12 and 13 from the entrance side E and discharged from such plates 12 and 13 and advanced to the compartments 15.

The compartments 15 are disposed in an auxiliary frame 16 having shafts 17 extending transversely thereof near their upper ends on which are fixed deflectors 18. The pins 14 are arranged in rows, and below each row there is disposed a transverse bar 19 (Fig. 4) which is mounted on rods 20 guided in brackets 21 of the main frame 11, the lower ends of which rods are connected by links 22 with a shaft 23, the links 22 being fixedly connected to such shaft 23 which shaft 23 has fixed at one end thereof a lever 24 having a stepped end to coöperate with a rod 25 to which the lower end of a link 26 is resiliently connected, the upper end of which link is fixed to a shaft 17. Each link 26 is connected to a spring 27 by means of which the link 26 is drawn toward the analyzing mechanism thereby tilting the

deflectors 18 connected to the shaft 17 to which it is connected, whenever the transverse bar 19 connected to it is depressed by a pin 14. Each row of pins 14 is thereby connected with a shaft 17. Each shaft 17 with its deflectors 18 being disposed adjacent to the entrance of a compartment 15, thus when any pin of a certain row is depressed, a corresponding set of deflectors 18 will be actuated to obstruct the passage of the card having been discharged from the plates 12 and 13 and being advanced therefrom to deflect such card into the compartment 15 disposed below such set of deflectors 18.

For counting the number of cards received into the compartments, the shafts 17 are connected to a series of individual counters 28 which are all disposed on a platform 29 secured to the upper end of the auxiliary frame 16 on the side of said auxiliary frame on which the rods 25 are not disposed, and such connections in turn set into contact with an actuator whereby the counters are operated whenever set by such connections. The connections between the shaft 17 and the counters 28 each comprise a metal strap 30 fixed to the end of a shaft 17, at the end of which there is fixed a bent arm 31, pivotally connected at its outer end to a link 32, to the upper end of which is fixed a stub shaft 33 which rides in the slot 34 of the bifurcated arm 35 secured to the end of the shaft 36 of a counter 28. The free end of each stub shaft 33 is provided with a stop 37 illustrated as somewhat triangular which, whenever the shaft 17 connected to it is turned, is depressed into the path of movement of a stop 38 on a reciprocable bar 39, the bar 39 being provided with a series of such stops 38 one for each stop 37, the arrangement being as follows: The bifurcated arms 35 are inclined to the path of movement of the bar 39; and when a stop 37 has been depressed into the path of movement of a stop 38, such stop 37 is still disposed in the slot 34 of its arm 35 and the ensuing reciprocation of the bar 39 will advance the stop 38 into contact with the stop 37 and advance such stop 37 with it thereby turning the shaft 36 to actuate the counter 28. Each of the links 32 is connected by a spring 40 to the auxiliary frame 16 by means of which the same and the parts connected to it are restored to normal position after return of the bar 39.

The bar 39 is guided along the side of the auxiliary frame 16, and at the end thereof adjacent the analyzing mechanism it is pivotally connected to a bell crank 41 fulcrumed at 42 to the main frame 11. The bell crank 41 has a short arm 43 disposed above the cam roller 44 and spaced apart from the same a sufficient distance to permit the free oscillation of the roller 44. The roller 44 is provided with a stop 45 on which the bar 46 is adapted to rest. When the bar 46 is so disposed on the stop 45, it will be located between the short arm 43 of the bell crank 41 and such stop 45 and thereby transmit motion from said cam roller 44 to the bell crank 41 which in turn will actuate the bar 39. For returning the bar 39 to normal position after having been actuated by such cam roller 44, there is provided a spring 47 connected at one end to a stop 48 on the bar 39 and at its other end to the auxiliary frame 16.

The bar 46 is pivotally connected at one end to the downwardly extending arm of the bell crank 49 fulcrumed at the pivotal connection 50 (Fig. 3) of the switch sector 51 which is provided with two contacts 52 and 53 for engaging the two fixed contacts 54 and 55 on the switch frame S. Both the switch sector 51 and the bell crank 49 are operatively connected to the switch rod 56 so that when such switch rod 56 is depressed, the bar 46 will be moved over onto the stop 45 underneath the short arm 43 of the bell crank 41, and the switch sector 51 will be swung down so that its contacts 52 and 53 will engage the contacts 54 and 55, respectively, to start the machine. The switch rod 56 is normally maintained in, and returned to raised position by the spring 57 which is strained between the collar 58 on the rod 56 and the lower wall 59 of the switch frame S.

For anchoring the switch rod 56 in depressed position, the lever 60 is provided with a notch 61 to receive the end 62 of the switch sector 51 when the switch rod 56 is depressed. The lever 60 is normally maintained in anchoring position by a spring 63. For swinging the lever 60 out of engagement with the switch sector 51, an automatically operating mechanism is provided which operates whenever no card is being fed through the machine or a stop card is fed through the machine, or a card, when fed through the machine is not properly positioned for engagement by the analyzing mechanism. The automatically operating mechanism is more particularly described and illustrated in my copending application, Serial No. 758,774, filed April 14, 1913, and comprises an analyzing bar 64, the upper end of which is adapted to engage alined openings formed in the plates 12 and 13 whenever such openings are not obstructed by a card, and the lower end of such bar 64 is operatively connected to one arm of a lever 65 fulcrumed at 66 to the main frame 11, the other arm of which lever 65 is adapted to engage the lower side of one arm of a lever 67 fulcrumed at 68 and the lower side of the other arm of which lever 67 is adapted to be in engage-

ment with the finger 69 of the lever 60. By this arrangement, it will be seen, that whenever the analyzing bar 64 registers with exposed openings, such bar 64 will descend and thereby actuate the lever 60 away from the switch sector 51 to release the same. Whenever the switch sector 51 is so released, it will raise the switch rod 56 and actuate the bell crank 49 and thereby the bar 46 will be withdrawn from the stop 45 and permit the cam roller 44 to oscillate freely without actuating the bell crank 41.

In addition to the counters 28, there are provided on the platform 29, two other counters, the counter 70 for taking the sub-totals and the counter 71 for taking the grand total. In the present instance, the sub-total counter 70 is disposed adjacent to one of the counters 28 and the counter 71 is disposed on the other side of the sub-total counter 70. The shafts 72 and 73 of the counters 70 and 71 respectively are not connected to shafts 17 as are the shafts 36 of the individual counters 28, but these shafts 72 and 73 are connected directly to the actuating bar 39 so that the counters 70 and 71 will be actuated every time the bar 39 is actuated.

The connection between the shafts 72 and 73 and the bar 39 each comprises a bifurcated arm 74 having a slot 75 to receive a lug 76 extending laterally from the projection 77 formed on the bar 39.

For resetting the individual counters 28 and the sub-total counter 70 after a series of cards have been counted, a rack 78 is slidably mounted on the platform 29 adjacent to and below the gear wheels 79 mounted on the shafts of such counters and in mesh with such gear wheels. The gear wheels 79 are so connected to their respective shafts that they will not be actuated when their shafts are actuated by the bar 39. In other words, the rack 78 will remain at rest while the counters are being actuated by the bar 39. However, when it is desired to restore the individual counters 28 and the sub-total counter 70 to initial position, the reciprocation of the rack 78 will actuate the several gear wheels 79 and the connection of such gear wheels 79 with their respective shafts is such that upon their movement in a return direction, the counters connected to them will be restored to initial or zero position. When resetting the counters, the rack 78 is reciprocated by rotating the gear wheel 80 (Fig. 3) mounted on the bracket 81 of the auxiliary frame 16 which gear wheel 80 is in mesh with the teeth formed on the lower side of the rack 78, such gear wheel 80 being rotated by means of a key, adapted to engage the shank 82 of such gear wheel 80. For this purpose, the connection between the gear wheels 79 and their respective shafts is furthermore such that upon the return of the rack 78, the gear wheels 79 will return their respective counters to initial or zero position after which their further returning rotation will not affect their respective counters.

The grand total counter 71 is not provided with a gear wheel 79 and this counter cannot be reset simultaneously with the other counters, under ordinary circumstances, it is not intended to be reset, but permitted to go its full limit; however, as in the present instance, when it is intended to reset such grand total counter 71, it must be individually reset which may be done in any suitable manner such as providing the counter 71 with an angular conformation 83 on its shaft for the reception of a key which is adapted to restore such counter to initial position.

Since the main shaft 84 of the analyzing mechanism generally makes a complete revolution after power has been cut off, every such revolution would actuate the bell crank 41 if the bar 46 were disposed between the stop 45 and the short arm 43 of such bell crank 41. Furthermore since the counters 70 and 71 are directly connected to the bar 39, such actuation of the bell crank 41 would actuate the counters 70 and 71 even when there were no cards being passed through the analyzing mechanism. For this purpose, the disconnection of the actuating bar 39, immediately upon the absence of a card or condition arising where no card is being analyzed, will prevent the incorrect actuation of the counters 70 and 71.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention.

I claim:

1. In an apparatus of the character described, the combination of a series of compartments; guide means therefor; means for actuating the guide means; a counter for each guide means; an actuating member operable independently of the guide means for the counters; and means for operatively connecting the counters to the actuating members when the associated guide means is operated.

2. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; a series of counters, one for each compartment, each provided with a counting arm; a counting bar provided with abutments; a stop on each arm adapted to be moved into the path of the associated abutments; and means operatively connecting said deflectors to said stops whereby said stops are moved into said paths when the deflectors are actuated.

3. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into

the compartments; a series of counters one for each compartment, each provided with a counting shaft; a counting arm on each accounting shaft; a rocking arm connected to each deflector; a link having one end pivotally connected to each rocking arm and its upper end slidably engaged with each counting arm; a stop mounted at the upper end of each link; a reciprocating counting bar provided with abutments into the paths of which said stops are moved by said links when said deflectors are actuated.

4. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; a series of individual counters one for each compartment, one for each counting shaft; a sub-total counter; a counting shaft for each counter; an arm carried on each counting shaft; a reciprocating counting bar; and an operative connection between the reciprocating bar and each arm.

5. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; means for feeding cards to the deflectors; a supporting shaft for supporting each deflector; a series of individual counters one for each compartment, each provided with a counting shaft; a bifurcated arm on each counting shaft; a rocking arm on each deflector shaft; a link pivotally connected to each rocking arm; a stud shaft mounted upon the upper end of the link and movable between the prongs of the bifurcated arm; a stop mounted on the end of each stud shaft; a counting bar disposed near said stops and provided with abutments adapted to engage the respective stops; means for reciprocating the counting bar; a grand total counter and a sub-total counter each provided with a counting shaft; a slotted arm carried on said last named counting shaft; and an abutment carried on the counting bar and engaging in the slot of each slotted arm.

6. In an apparatus of the character described, the combination of a series of compartments; guide means for guiding cards into the compartments; means for actuating each guide means; means for feeding cards to the guide means; a counter associated with each guide means; counting means for actuating the counters when each associated guide means is actuated; means for driving the feeding means; and control means for causing the drive means to cease to drive and rendering said counting means inoperative.

7. In an apparatus of the character described, the combination of a series of compartments; guide means for guiding cards into the compartments; means for feeding cards to the guide means; a counter for each guide means; a reciprocating counting member; means for actuating the guide means; means for operatively connecting each counter to the reciprocating member when the associated guide means is actuated; a reciprocating part; means for operatively connecting said part and said reciprocating part and member; means for driving said feeding means and said reciprocating part; control means for causing drive means to cease to drive; and means for disconnecting said reciprocating part and member when said control means is operated.

8. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; means for feeding cards to the deflectors; a series of counters one for each compartment, each provided with an actuating stop; a counting bar provided with abutments; operative connections between said deflectors and said stops for moving the stops into the paths of the abutments when the deflectors are actuated; a reciprocating part; means for driving said feeding means and said reciprocating part; an interposing part adapted to be interposed between said reciprocating part and said counting bar for reciprocating the latter; and a device for simultaneously withdrawing said interposing part and arresting the driving of the drive means.

9. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; means for feeding cards to the deflectors; a cam; means for driving said cam and feeding means; a switch controlling said drive means; a series of counters one to each compartment, each provided with a counting shaft; an arm on each counting shaft; a counting bar provided with abutments near said arm; stops engaging said arms and operatively connected to said deflectors, whereby when said deflectors are actuated said stops are moved to the path of said abutments; a lever pivoted to said bar and provided with a motive arm; a cam lever actuated by said cam; a switch lever connected to said switch; and an interposing part operatively connected to said switch lever; and adapted to be interposed between said motive arm and said cam lever.

10. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; a card analyzer; means for conducting cards from the analyzer to the deflectors; an operative connection between the deflectors and the analyzer; a cam; drive means for operating the cam and the analyzer; a switch controlling said drive means; a series of individual counters one for each compartment, each provided

with a counting shaft; an arm on each counting shaft; a link operatively connected to each deflector and engaging said arm; a stop mounted on each arm; a counting bar disposed near said stops; abutments on said counting bar and adapted to engage the respective stops when the links are actuated by the deflectors; a bell crank having one arm pivoted to said bar and provided with a motive arm; a cam lever provided with an actuating stop near said motive arm; a roller on said cam lever and engaging said cam; a switch lever connected to said switch; an interposing bar operatively connected to said switch lever, and adapted to be interposed between said motive arm and said actuating stop; and means for actuating said switch lever.

11. In an apparatus of the character described, the combination of a series of compartments; guide means for feeding cards into the compartments; a counter for each guide means; a reciprocating counting member common to the counters for operating the counters; a drive means; and means for at will operatively connecting the drive means to the counting member.

12. In an apparatus of the character described, the combination of a series of compartments; guide means for feeding cards into the compartments; a counter for each guide means; a reciprocating counting member; means for operatively connecting each counter to the reciprocating member when the associated guide means is actuated; a lever having one arm pivoted to said member and provided with a motive arm; a cam lever engaging said cam and provided with an actuating stop near said motive arm; a control member; and an interposing bar pivotally connected to said control member and adapted to be interposed between said motive arm and said actuating stop.

13. In an apparatus of the character described, the combination of a series of compartments; guide means for guiding cards into the compartments; means for actuating each guide means; means for feeding cards to the guide means; a counter associated with each guide means; counting means for actuating the counters when each associated guide means is actuated; means for driving the feeding means; and control means for causing the drive means to cease to drive and rendering said counting means inoperative; and automatic means for automatically causing the drive means to cease the drive and the counting to cease to operate when said feeding means ceases to feed.

14. In an apparatus of the character described, the combination of a series of compartments; a card analyzer; means for feeding cards to the analyzer; guide means actuated by the analyzer for feeding cards into the respective compartments; a counter associated with each guide means; a reciprocating member; means for operatively connecting each counter to reciprocating member when the associated guide means is actuated; a reciprocating part; means for driving said feeding means and said reciprocating part; an interposing part adapted to operatively connect said reciprocating member and part; a device for simultaneously disconnecting said interposing part and arresting the driving of the drive means; a detent for holding said device in operative position; and means for automatically releasing said detent when the feeding means ceases to feed cards to the analyzer.

15. In an apparatus of the character described, the combination of a series of compartments; deflectors for guiding cards into the compartments; a card analyzer; means for feeding cards to the analyzer; means for conducting cards from the analyzer to the deflectors; an operative connection between the deflectors and the analyzer; a cam; drive means for operating the cam and the analyzer; a switch controlling said guide means; a series of individual counters one for each compartment; the reciprocating counting bar; means for operatively connecting the counting bar to the counters when the associated deflector is actuated; a bell crank pivoted to said bar and provided with a motive arm; a cam lever provided with a stop near said motive arm and engaging said cam; a switch lever connected to said switch; an interposing bar pivoted to said switch lever and interposed between said motive arm and actuating stop when the switch is closed; means for normally holding said switch lever in position for opening the switch and retracting said interposing bar; a detent lever for holding said switch in closed position; and means for automatically releasing said detent lever from the switch lever when said feeding means ceases to feed cards to the analyzer.

16. In an apparatus of the character described, the combination of a series of compartments; a counter for each compartment; a counter for all of the compartments; and means for zeroizing all of the counters.

17. In an apparatus of the character described, the combination of a series of compartments; a counter for each compartment; a counter for all of the compartments; a zeroizing gear for each counter; and a rack engaging all of the zeroizing gears.

18. In an apparatus of the character described, the combination of a series of compartments; means for guiding cards into the compartments; an individual counter for each guide means; each counter being pro-

vided with a zeroizing shaft; an actuating member for said counters; a sub-total counter operatively connected to said actuating member and provided with a zeroizing shaft; zeroizing gears carried on said shafts; and a zeroizing rack meshing with said gears.

19. In an apparatus of the character described, the combination of a series of compartments; means for guiding cards into the compartments; an individual counter for each guide-means, each counter being provided with a zeroizing shaft; a reciprocating counting bar for operating the counters; a grand total counter and a sub-total counter operatively connected to said bar, and provided with zeroizing shafts; zeroizing gears carried on the respective zeroizing shaft of the tub-total counters and the individual counters; and a slidable zeroizing rack meshing with all of said gears.

20. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a plurality of individual counters corresponding in number to the number of deflectors, a reciprocatable bar, means for actuating said bar, a stop on each individual counter, links each operatively connecting a stop with one of said deflectors so that whenever a deflector is actuated to guide a card into its compartment, a corresponding counter stop will be actuated, stops on said bar for coöperating with the actuating stops on said counters whenever said bar is reciprocated thereby to actuate said counters, and sub-total and grand-total counters operatively connected to said reciprocatable bar so that the sub-totals and grand totals may be taken simultaneously with the individual totals.

21. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a plurality of individual counters corresponding in number to the number of deflectors, a reciprocatable bar, means for actuating said bar during every cycle of the machine, a shaft for each individual counter, a bifurcated portion on the end of each shaft, a stop on each bifurcated portion, a link operatively connecting each deflector with a bifurcated portion so that whenever a deflector is actuated to guide a card into its compartment a coresponding bifurcated portion and counter stop will be actuated, and stops on said bar for coöperating with the actuated stops of said counters whenever said bar is reciprocated thereby to actuate said counters.

22. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a plurality of individual counters corresponding in number to the number of deflectors, a reciprocatable bar, means for actuating said bar during every cycle of the machine, a shaft for each individual counter, a bifurcated portion on the end of each shaft, a stop on each bifurcated portion, a link operatively connecting each deflector with a bifurcated portion so that whenever a deflector is actuated to guide a card into its compartment a corresponding bifurcated portion and counter stop will be actuated, stops on said bar for coöperating with the actuated stops of said counters whenever said bar is reciprocated thereby to actuate said counters, and means for automatically disconnecting said bar from said actuating means whenever a card fails to be fed through said machine or is improperly positioned in said machine so that said counters will not be actuated in such cycle.

23. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a reciprocatable bar, a plurality of counters, setting means on said counters operatively connected to said deflectors, means for operatively connecting said reciprocatable bar with any actuated setting means of said counters, and means for actuating said reciprocatable bar to thereby actuate said counters.

24. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a reciprocatable bar, a plurality of counters, setting means on said counters operatively connected to said deflectors, means for operatively connecting said reciprocatable bar with any actuated setting means of said counters, means for actuating said reciprocatable bar to thereby actuate said counters, said actuating means comprising a cam, a link in constant engagement with said cam, a bell crank operatively connected to said reciprocatable bar, and a second bar operable to be positioned between said link and said bell crank so that the actuation of said link by said cam will simultaneously actuate said reciprocatable bar.

25. In combination with a sorting machine for record cards having a series of compartments, actuatable deflectors for guiding the cards into the several compartments, a reciprocatable bar, a plurality of counters, setting means on said counters operatively connected to said deflectors, means for operatively connecting said reciprocatable bar with any actuated setting means of said counters, means for actuating said reciprocatable bar to thereby actuate said counters, said actuating means comprising a cam, a link in constant engagement with said cam,

a bell crank operatively connected to said reciprocatable bar, a second bar operable to be positioned between said link and said bell crank so that the actuation of said link by said cam will simultaneously actuate said reciprocatable bar, and means for withdrawing said second bar from engagement between said link and bell crank so that said bell crank may remain unaffected by the actuation of the link.

JAMES POWERS.

Witnesses:
GUSTAV DREWS,
H. D. PENNEY.