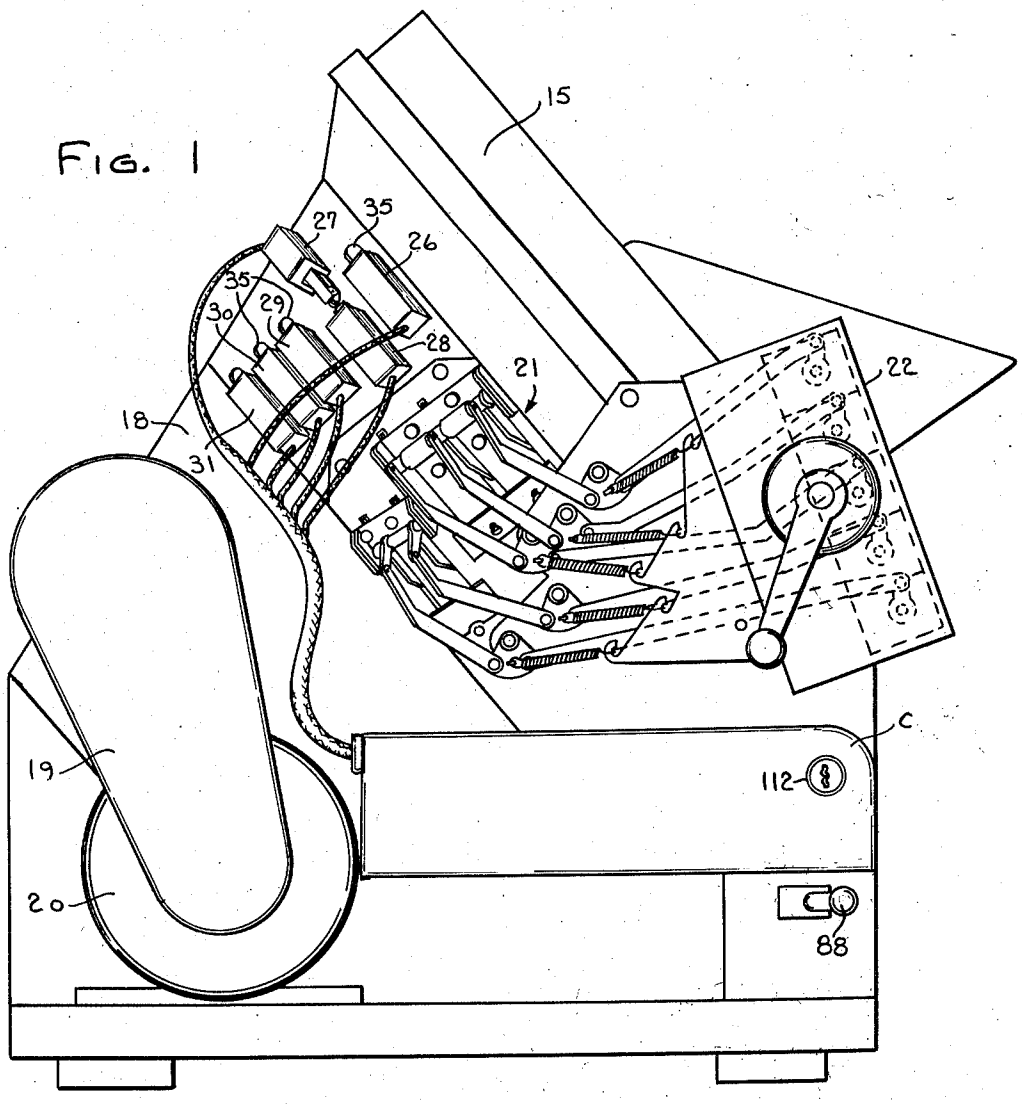
March 25, 1958 J. A. FENNERTY 2,828,073

TOTALIZING COUNTER MECHANISM FOR COIN HANDLING MACHINES

Filed Jan. 19, 1953 4 Sheets-Sheet 1

Fig. 1



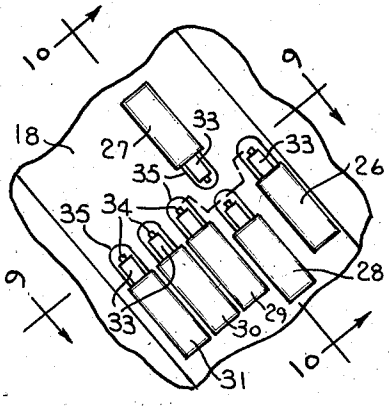


Fig. 2

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TOTALIZING COUNTER MECHANISM FOR COIN HANDLING MACHINES

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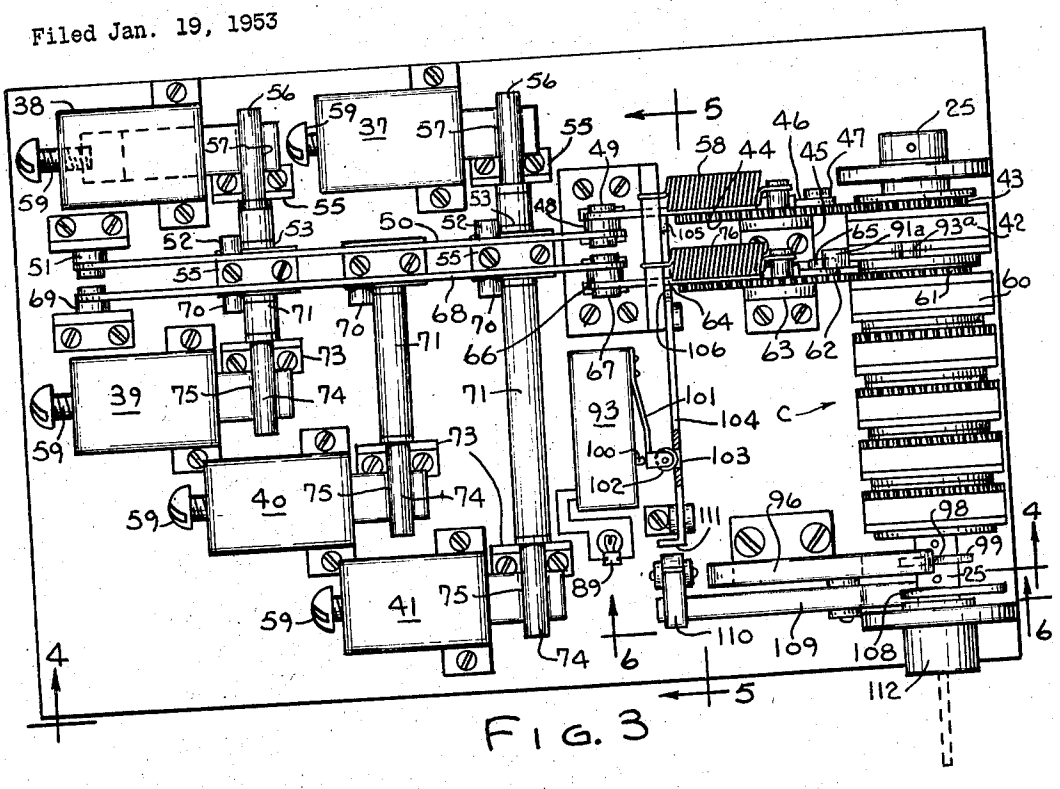

FIG. 3

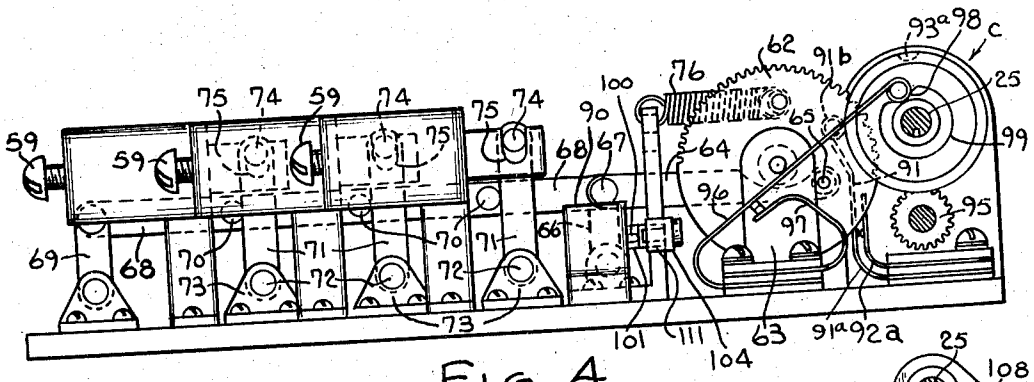

FIG. 4

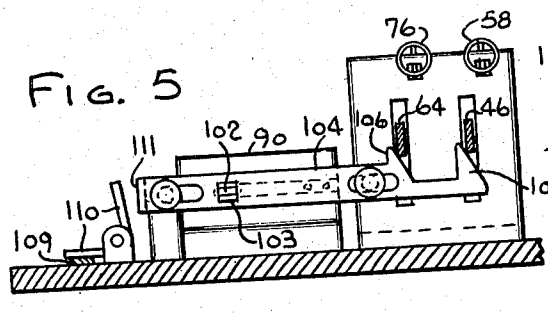

FIG. 5

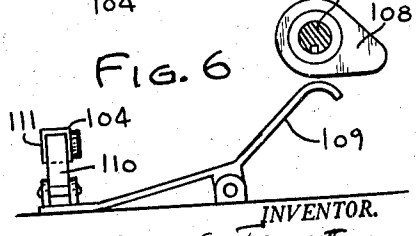

FIG. 6

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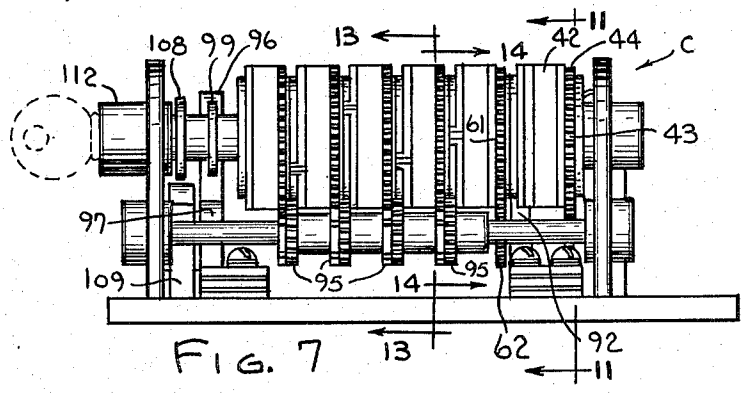


FIG. 7

FIG. 8

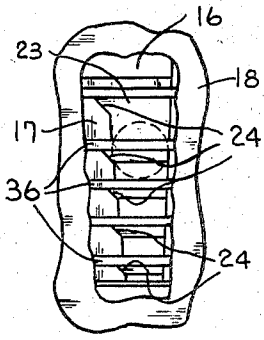
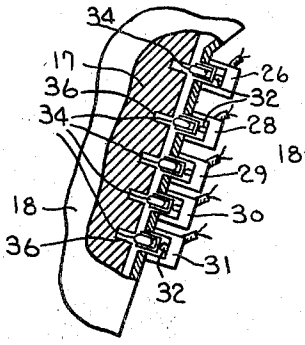


FIG. 9



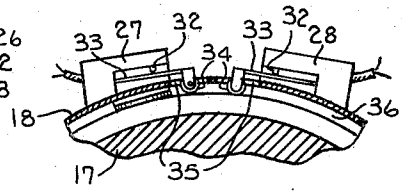


FIG. 10

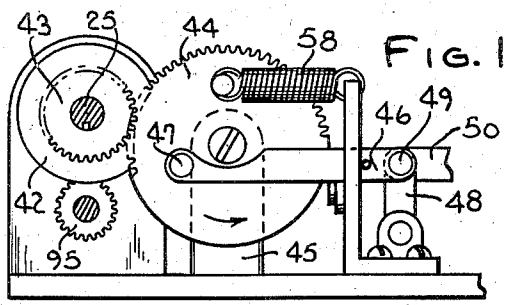


FIG. 11

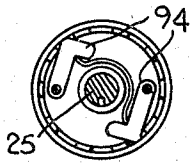


FIG. 13

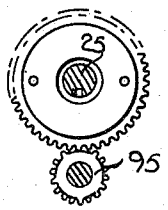


FIG. 14

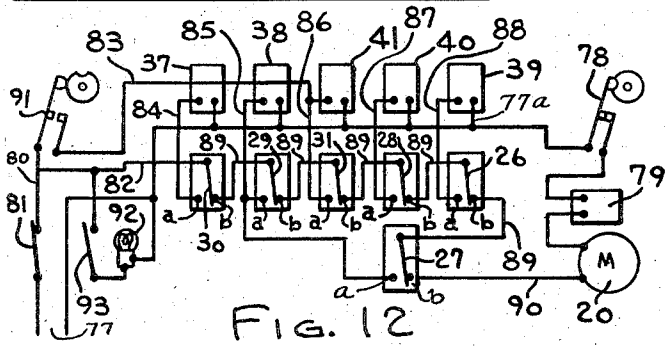


FIG. 12

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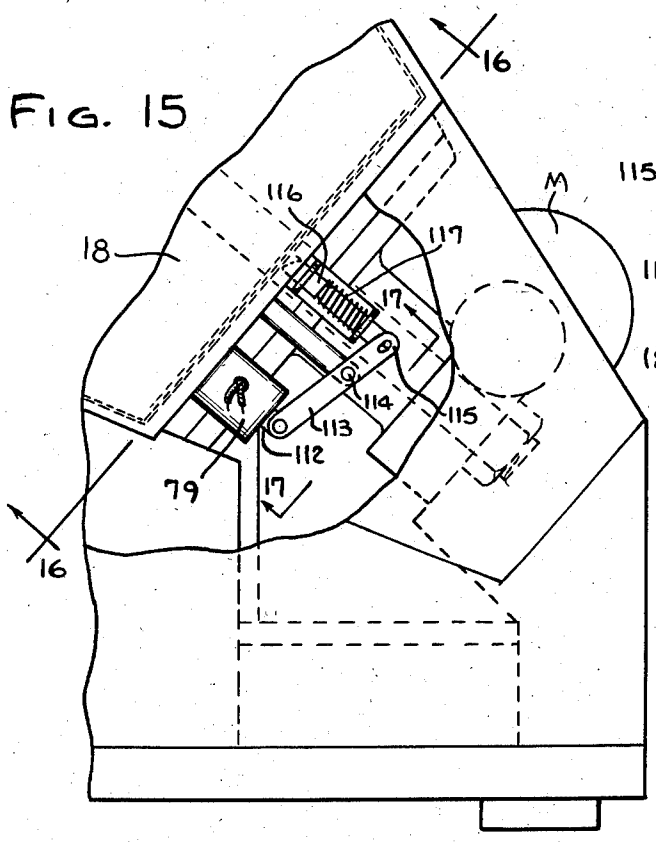
TOTALIZING COUNTER MECHANISM FOR COIN HANDLING MACHINES

Filed Jan. 19, 1953 4 Sheets-Sheet 4

FIG. 15



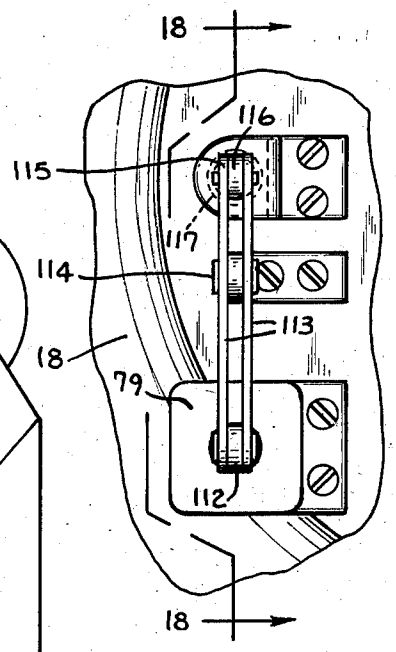


FIG. 17

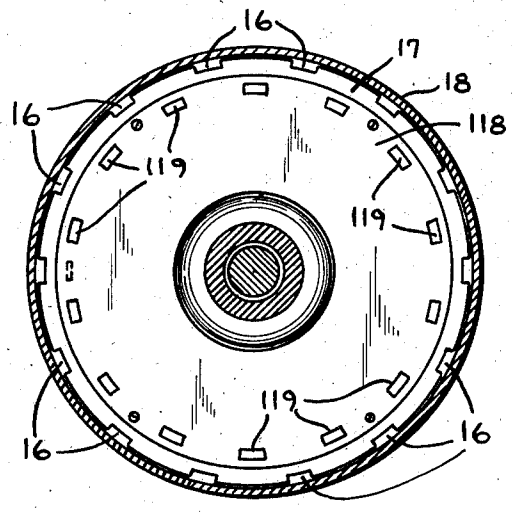


FIG. 16

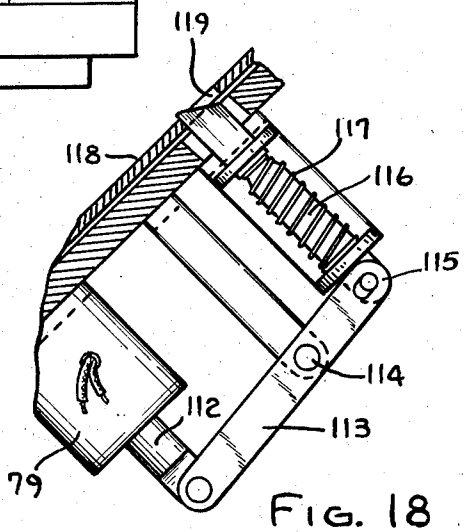


FIG. 18

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United States Patent Office 2,828,073 Patented Mar. 25, 1958

2,828,073

TOTALIZING COUNTER MECHANISM FOR COIN HANDLING MACHINES

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Application January 19, 1953, Serial No. 331,827

4 Claims. (Cl. 235—92)

The invention relates to coin handling machines, and more particularly to a coin controlled electrically operated totalizing counter for a coin handling machine, either of the receiving type such as a coin sorter, or coin payer type whereby all the coins of different denomination may be totalized by the counter to show the total dollar and cents value of the coins handled.

One object of the invention is to provide an electrically operated coin controlled totalizing counter in which the transfer from the unit wheel to the tens wheel is effected by an electromagnet controlled by a transfer switch rendered operable when the unit wheel completes its count of ten.

A further object of the invention is to provide novel reset mechanism for the totalizing counter including a reset switch.

A further object of the invention is to provide electrically controlled mechanism for stopping the delivery of coins by the coin handling machine in the event that any one of the coin controlled switches controlling the totalizing counter should become defective or fail to operate.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is an elevation view of a coin sorter equipped with totalizing counter mechanism embodying the invention;

Fig. 2 is a detailed elevation view of a portion of the mechanism;

Fig. 3 is a plan view of the totalizing counter and its actuators;

Fig. 4 is a detailed vertical sectional view taken on the broken line 4—4 of Fig. 3;

Fig. 5 is a detailed vertical sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a detailed vertical sectional view taken on the line 6—6 of Fig. 3;

Fig. 7 is an end elevation view of the mechanism shown in Fig. 3;

Fig. 8 is a detailed front elevation view of a portion of the sorting drum;

Fig. 9 is a detailed vertical sectional view taken on the line 9—9 of Fig. 2;

Fig. 10 is a detailed vertical sectional view taken on the line 10—10 of Fig. 2;

Fig. 11 is a detailed side elevation view of parts of the mechanism;

Fig. 12 is a wiring diagram;

Fig. 13 is a detailed vertical sectional view taken on the line 13—13 of Fig. 7;

Fig. 14 is a detailed vertical sectional view taken on the line 14—14 of Fig. 7;

Fig. 15 is a side elevation view of a portion of a coin sorting machine showing the automatic stopping mechanism embodying the invention;

Fig. 16 is a detailed horizontal sectional view taken on the line 16—16 of Fig. 15;

Fig. 17 is a detailed horizontal sectional view taken on the line 17—17 of Fig. 15;

Fig. 18 is a detailed vertical sectional view taken on the line 18—18 of Fig. 17.

I have shown the invention applied to a coin sorting machine of known construction, and only so much of this machine as is necessary for an understanding of the novel improvements later described herein has been shown. This machine includes a hopper 15 supported at an angle so that the coins to be sorted may be carried upwardly in a notched rotary bottom plate (not shown) and allowed to drop from the notches into a series of coin sorting slots 16 formed on the periphery of a sorting drum or core 17 which rotates within a fixed enclosing shell 18 and carries the notched plate. Rotation of the drum and its connected parts is accomplished by a suitable transmission drive, part of which is indicated by the cover 19, connected to the shaft of an electric motor 20. Also the drive mechanism 21 for the individual counter 22 for each coin denomination has been indicated, the particular drive mechanism here shown being that disclosed in the application of Arnold R. Buchholz, Serial No. 182,209, filed August 30, 1950, now Patent No. 2,642,882, for coin sorting and counting machine.

The sorter is of the type in which the slots 16 form a series of radially disposed channels 23 whose width decreases from top to bottom, one side of these channels at spaced intervals having inclined shelf or ledge portions 24 forming a series of graduated stops for arresting coins of different denominations. Thus in Fig. 8, in which a portion of the drum is shown through an opening in the shell, the top shelf 24 arrests a half dollar, the next a quarter, one of which is shown in dotted, the next a nickel, the next a penny, and the next or lower slot a dime. As the drum is revolved, one coin from the hopper finds its way into one of the slots 16, and as it drops down in such slot, it is caught by one or the other of the shelves 24, depending upon their denomination and is carried around by the drum past the circuit closures hereinafter described and the individual counter actuating mechanisms 21 and then deposited in known manner into separate receptacles for each denomination.

The present invention deals with mechanism for registering in dollars and cents the total amount of the coins sorted, and for this purpose includes a counter C and mechanism controlled by the sorted coins to actuate this counter. The counter C is of the conventional or known zero setting type in which the wheels are set back to zero by the turning of a zero setting shaft 25 except that the usual transfer gear between the unit wheel and the tens wheel has been omitted, and cams hereinafter described are associated with the shaft 25.

Referring to Figs. 1, 9 and 10, switches or circuit closures 26, 27, 28, 29, 30 and 31 of the type having a button actuator 32 and a resilient actuating arm 33 carrying a roller 34 are mounted on the shell 18 in such a position that the rollers 34 of the arms 33 will work through slots 35 in the shell and annular slots 36 in the drum 17, so that as the drum carries coins past these rollers, they will engage the coins and with their arms 33 be moved to cause the arms to press inwardly on the buttons 32 to close the switches controlled thereby. The switch 26 is actuated by the passage beneath it of a fifty cent piece. The switches 27 and 28 are actuated by the passage beneath them of a twenty-five cent piece. The switch 29 is actuated by the passage beneath it of a five cent piece. The switch 30 is actuated by the passage beneath it of a penny piece, and the switch 31 is actuated by the passage beneath it of a ten cent piece. The

above named switches are in electrical circuits controlling solenoids 37, 38, 39, 40 and 41.

The unit wheel 42 of the counter C carries a gear 43 which meshes with a segmental gear 44 journalled on a bracket 45 and having a link 46 pivotally secured thereto by a crank pin 47 and pivotally connected at its other end to an oscillatory lever 48 by a pin 49. A rod or link 50 is pivotally connected at one end to the pin 49 and is pivotally connected at its other end to an oscillatory lever 51, similar to the lever 69. The link 50 has spaced pins 52 each adapted to be engaged by an oscillatory lever 53, similar to the levers 71, and carrying a pin, similar to the pin 72, journalled in a bracket 55. At its upper end each lever 53 carries an arm or pin 56 adapted to work in a slot 57 of the plunger of its associated solenoid. Thus energization of either the solenoid 37 or 38 will through its plunger and associated lever 53 and pin 52 cause a movement of the link 50 and crank 46 toward the left as viewed in Fig. 3 against the action of a return spring 58 to partially rotate the gear 44 and consequently the counter unit wheel 42. The extent of rotary movement of the wheel 42 is controlled by the stroke of the solenoids through their adjustable stops 59. The stop for solenoid 37 is adjusted so that the stroke of its plunger will advance the wheel 42 one tooth or unit space, which represents the registry of one cent, while the stop for solenoid 38 is adjusted so that the stroke of its plunger will advance the wheel 42 five teeth to register a five cent count.

The tens wheel 60 of the counter carries a gear 61 which meshes with a segmental gear 62 journalled in a bracket 63 and having link 64 pivotally secured thereto by a crank pin 65 and pivotally connected at its other end to an oscillatory lever 66 by a pin 67. A rod or link 68 is pivotally connected at one end to the pin 67 and is pivotally connected at its other end to an oscillatory lever 69. The link 68 is similar to the link 50 and carries spaced pins 70, each adapted to be engaged by an oscillatory lever 71, similar to the lever 53, and carrying a pin 72 journalled in a bracket 73. At its upper end each lever 71 carries an arm or pin 74 adapted to work in a slot 75 of the plunger of its associated solenoid. Thus energization of either the solenoid 39, 40 or 41 will through its plunger and associated lever 71 and pin 67 cause a movement of the link 68 and crank 64 toward the left as viewed in Fig. 3 against the action of a return spring 76 to partially rotate the gear 62 and consequently the counter tens wheel 60. As before the strokes of the solenoids are adjusted so that the stroke of the plunger for solenoid 41 will advance the wheel 60 one tooth which represents ten cents or ten units, that of the plunger for solenoid 40 so as to advance the wheel 60 two teeth which represents twenty cents or twenty units and that of the plunger for the solenoid 39 so as to advance the wheel 60 five teeth which represents fifty cents or fifty units.

The relation of the switches 26 to 31 and the solenoids 37 to 41 is shown in Fig. 12 wherein the line wire 77 has branch circuit connections such as 77*a* to one terminal of the solenoids 37 to 41 and includes a cut out switch 78 functioning during resetting, the coil of a solenoid 79 and connects with one terminal of the drive motor 20. The line wire 80 includes a manual cut out switch 81 and branch connections 82 and 83. The switches 26 to 31 are of the double throw type, that is, their movable switch arms 33 make contact with either a fixed contact *a* or *b*. The contact *a* of the switch 30 is connected by a conductor 84 with the other terminal of the coil of solenoid 37. The contacts *a* of switches 27 and 29 are connected by a conductor 85 to the other terminal of the coil of solenoid 38. The contact *a* of switch 31 is connected by a conductor 86 to the other terminal of the coil of solenoid 41 and also to the conductor 83. The contact *a* of switch 38 is connected by a conductor 87 to the other terminal of the coil of solenoid 40. The contact *a* of switch 26 is connected by a conductor 88 to the other terminal of the coil of solenoid 39. The switches 26 to 31 are connected in series through connectors 89, each of which connects their *b* contact with the movable arm of the next switch and the contact *b* of the switch 27, the last switch in the series being connected by a conductor 90 with the other terminal of the motor 20. A transfer control switch 91 is included in the conductor 83. A pilot light 92 and a reset controlled control switch 96 is connected across the line 77 and the conductor 82.

With the above arrangement when the switch 81 is closed, the circuit through the motor 20 is completed through the normally closed switch 78, the coil 79 and the return circuit including the switches 26 to 31. Since the motor supply current is through the switches 26 to 31, when any one of these switches is operated by the passage of a coin beneath its arm 33, the motor circuit will be opened, but after the coin passes the arm, it will be again closed so that the machine will still keep on running unless one of the contact arms or the contacts associated with these arms is defective so that the circuit cannot be completed. Referring to Figs. 1, 8, and 12, whenever the sorter carries a fifty cent piece past the switch 26, the contact of the arm of this switch engages its *a* contact so that the coil of solenoid 39 is connected across the current supply by the conductor 88 and its connections with the switches 28, 31, 29, and 30 and conductor 82 and is energized, and through the mechanism previously described the tens wheel 60 is advanced five teeth to register a count of fifty. When the sorter carries a quarter past the switches 27 and 28, the arm of each switch contacts its *a* contact, but the arm for the switch 27 being spaced from that of the switch 28 is operated before that of the switch 28. Movement of switch 27 to its contact *a* connects the coil of solenoid 38 across the current supply by the conductor 85 and its connections with the switches 31 to 27 and conductor 82 so that solenoid 38 is energized, and through the mechanism previously described the unit wheel 42 is advanced five teeth or five units. Movement of switch 28 to its contact *a* connects the coil of solenoid 40 across the current supply by conductor 87 and its connections with switches 31, 29 and 30 and conductor 82 so that solenoid 40 is energized and through the mechanism previously described the tens wheel 60 is advanced two teeth or twenty units so that the combined total registered by the counter is twenty-five. When the sorter carries a penny past the circuit closure 30, the arm of this switch engages its *a* contact so that the coil of solenoid 37 is connected across the current supply by the conductors 84 and 82 and energized and through the mechanism previously described the unit wheel is advanced one tooth to register a count of one cent. When the sorter carries a dime past the switch 31, its *a* contact is connected across the current supply by the conductor 86 and its connections with switches 29 and 28 and conductor 82 and is energized, and through the mechanism previously described the tens wheel is advanced one tooth to register a count of ten or ten cents.

As previously noted, the unit wheel 42 and the tens wheel 60 are not connected in the usual manner by a transfer gear, but these wheels are separate and the transfer is effected through the energization of the solenoid 41 brought about by the closing of the switch 91 which is rendered operative when the unit wheel makes one complete revolution. Referring to Figs. 3 and 4, the switch 91 includes flexible contact members 91*a* and 92*a* which are normally open but which are permitted to be closed when the digit wheel makes one complete turn by providing an extension 91*b* on member 91*a* which normally rides on the periphery of the wheel 42 but which drops down into a cam notch 93*a* in said periphery when the wheel 42 has been advanced ten teeth, thus closing the switch 91 to energize the solenoid 41 and thereby advance

the wheel 60 one tooth or ten units. The counter wheels are provided with the usual one way clutches 94 indicated in Fig. 13 which permit them to be advanced in the counting direction but prevent their retrograde movement. All the other higher count wheels including the wheel 60 have the usual transfer gear 95 associated with them to transfer the count from the lower value wheel to the next higher as shown in Figs. 7 and 14.

For resetting the counter C to zero it is necessary to prevent the switch 91 from being effective, and this is done by the opening of the line 77 by the opening of the normally closed switch 78 to prevent energization of the solenoid 41. Referring to Figs. 3 and 4, the switch 78 includes flexible resilient contacts 96 and 97 normally closed during counter operation since the extended end of contact 96 rests in a relief groove 98 in a cam 99 on the reset shaft 25 but which is moved to open the circuit between contacts 96 and 97 as soon as the operator turns the shaft 25 to reset the counter.

The switch 93 for the pilot light 92 is a normally open switch whose actuator button 100 is associated with a resilient actuator arm 101 having a roller 102 disposed in a slot 103 in a slidably mounted bar 104 that has spaced wedge cam fingers 105 and 106 associated with the links 46 and 64, respectively, as shown in Fig. 5, so that whenever either the link 46 or the link 64 is actuated by its associated solenoid on the downward movement of either of these links, the bar 104 will be pushed to the left as viewed in Fig. 5 to move the arm 101 against the button 100 and close the switch 93 to light the pilot light which stays on until the counter C is reset. During reseting a cam 108 on the reset shaft 25 is turned with said shaft to tilt a lever 109 that in turn tilts a bell crank lever 110 whose free arm engages the end 111 of the bar 104 to move it back to an inoperative position so that the switch 93 remains open during resetting.

The counter is shown as provided with a key-controlled lock 112 for the reset shaft 25 to prevent its unauthorized resetting.

Since as previously noted all the switches 26 to 31 are in series with the current supply to the motor 20, if any one of these switches gets out of order as by breakage of a contact arm or burning of a contact, the current supply to the motor 20 will be stopped. However, due to the momentum of the motor and the drum 17, the drum would not be stopped immediately so that a coin might be carried by the defective switch and would not be registered by the counter. To prevent this occurring means have been provided for positively stopping the drum 17 and consequently the motor 20 which as shown in Figs. 15 to 18 includes the coil of the solenoid 79 whose plunger 112 is connected to one end of a lever 113 pivoted intermediate its ends at 114 and operatively connected at its other end 115 to a latch member 116. The latch member 116 is normally urged by a spring 117 toward a locking plate 118 secured to the drum and provided with a series of radially disposed notches 119, which notches are circumferentially spaced half way between the circumferential spacing of the sorting notches 16 so that when the latch 116 engages any one of the notches 119, the drum 17 is stopped before a succeeding notch 16 can be moved to a position where one of the circuit closers would be effective. The solenoid 79 acts to hold the latch 116 in a release position against the loading of its spring 117.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. A totalizer mechanism for registering the total value in dollars and cents of the coins of different denominations handled by a coin handling machine comprising a counter of the reset type having a zero setting shaft and having separately driven unit and tens wheels and transfer gear connections betwen the tens wheel and the wheels of higher order, electrically operated counter driving mechanisms including solenoids operatively connected to the unit wheel and solenoids operatively connected to the tens wheel, a source of electric current, circuits supplied by said source to energize said solenoids, coin controlled switches in said circuits determining which of said solenoids are energized to actuate said wheels to register the value of the coins, a circuit connection including a transfer switch controlled by the unit wheel and operable to energize one of said solenoids to move the tens wheel one unit to transfer the count completed by the single revolution of the unit wheel to the tens wheel, and a normally closed switch in said circuit connection opened by means operated by the counter reset shaft during resetting to render said transfer switch ineffective to complete a circuit through one of said solenoids.

2. A totalizer mechanism for registering the total value in dollars and cents of the coins of different denominations handled by a coin handling machine comprising a counter of the zero setting type having separately driven unit and tens wheels and transfer gear connections between the tens wheel and the wheels of higher order, electrically operated counter driving mechanisms including solenoids operatively connected to the unit wheel and solenoids operatively connected to the tens wheel, a source of electric current, circuits supplied by said source to energize said solenoids, coin controlled switches in said circuits determining which of said solenoids are energized to actuate said wheels to register the value of the coins, electrically controlled transfer mechanism for controlling one of said solenoids to energize the same to transfer the count completed by the single revolution of the unit wheel to the tens wheel, a pilot light supplied with current from said source, a switch controlling the pilot light, said switch being normally open, means actuated by the operation of any one of said driving mechanisms for closing said last named switch, and means operated during resetting for moving said last named means to an inoperative position so as to open said pilot light switch.

3. A totalizer mechanism for registering the total value in dollars and cents of coins of different denominations handled by a coin handling machine including a coin carrier and an electric motor for driving said carrier, comprising a counter having separately driven unit and tens wheels, and transfer means between said wheels, electrically operated counter driving mechanism including solenoids operatively connected to the unit wheel and solenoids operatively connected to the tens wheel, a source of electric current, circuits supplied by said source to energize said solenoids, coin controlled switches in said circuits determining which of sad solenoids are energized to actuate said wheels to register the value of the coins, said switches having circuit connections in series with the current supply to said motor so that if any one of said switches fails to operate the current supply to said motor is cut off, and means for stopping said motor when its current supply is shut off due to failure of any one of said coin controlled switches.

4. Totalizer mechanism as defined in claim 3 wherein the means for stopping the motor includes a solenoid controlled spring operated latch in series with the current supply for the motor, said latch on the failure of motor current being movable into locking engagement with said coin carrier.

References Cited in the file of this patent

UNITED STATES PATENTS

284,755	Pidgin et al.	Sept. 11, 1883
1,799,784	Donnellan	Apr. 7, 1931
1,902,035	Lake	Mar. 21, 1933

FOREIGN PATENTS

375,264	Great Britain	Dec. 24, 1930