Nov. 25, 1952 M. M. HENNESSY ET AL 2,619,283

RECORDING COUNTER FOR ARTICLE DISPENSERS

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Fig. 1.

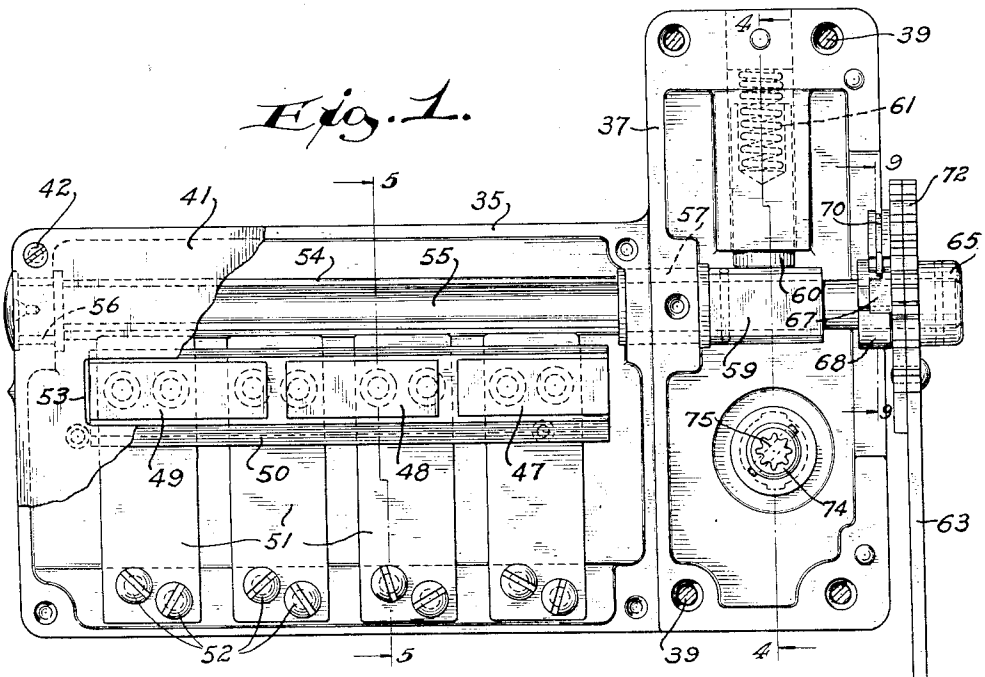
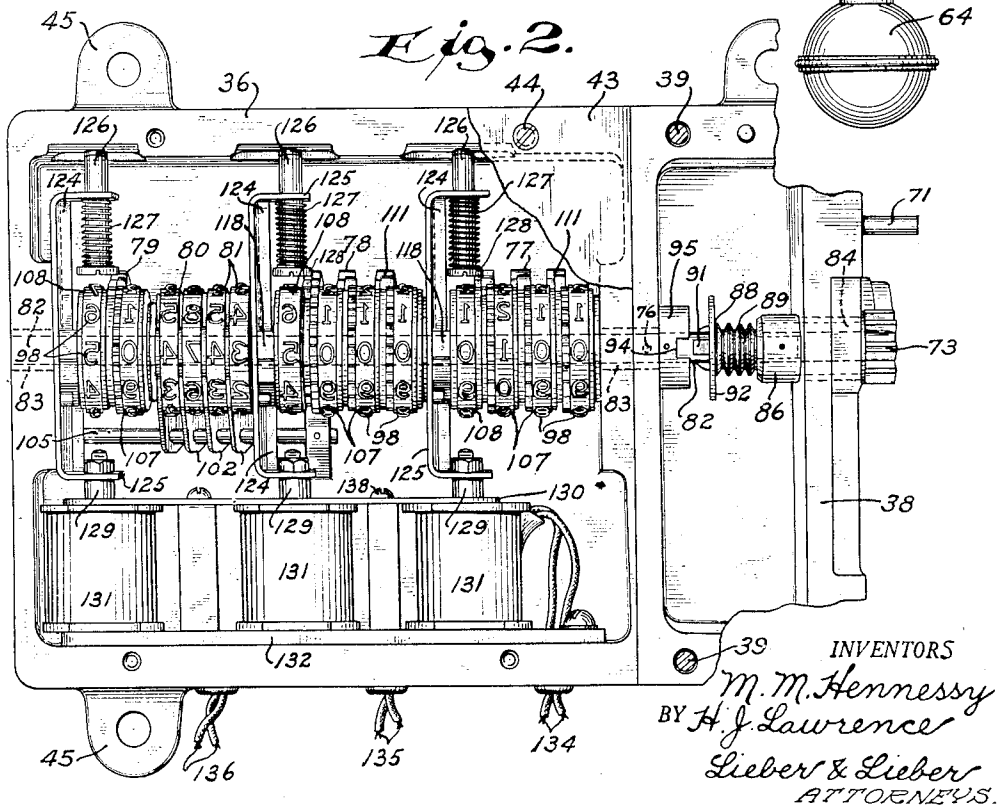


Fig. 2.



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RECORDING COUNTER FOR ARTICLE DISPENSERS

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Fig. 4.

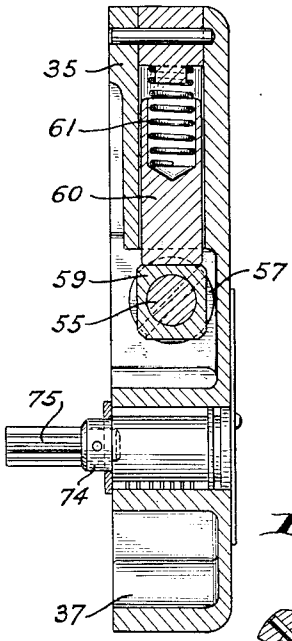


Fig. 3.

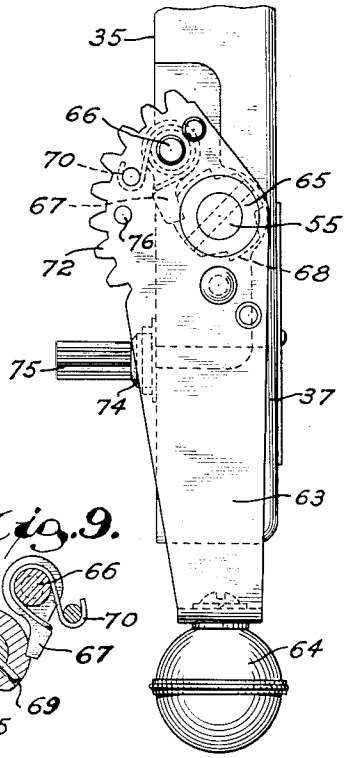


Fig. 5.

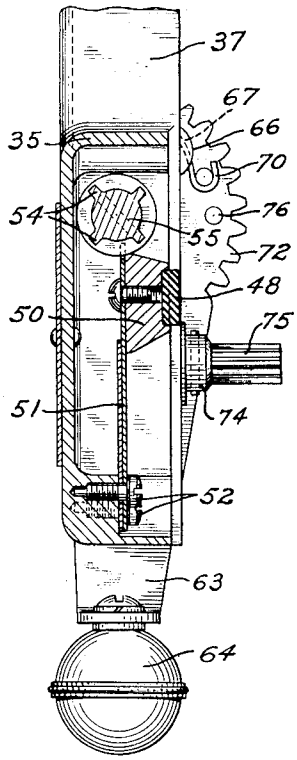
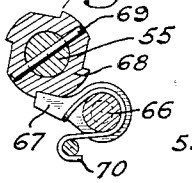


Fig. 9.

Fig. 10.



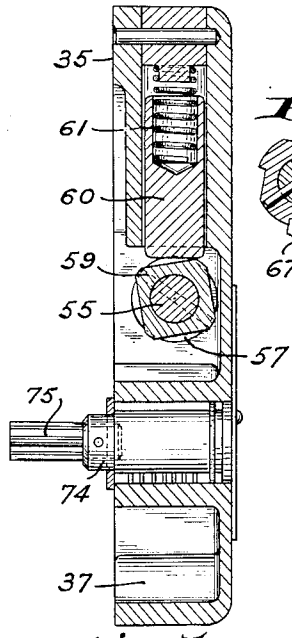


Fig. 7.

Fig. 6.

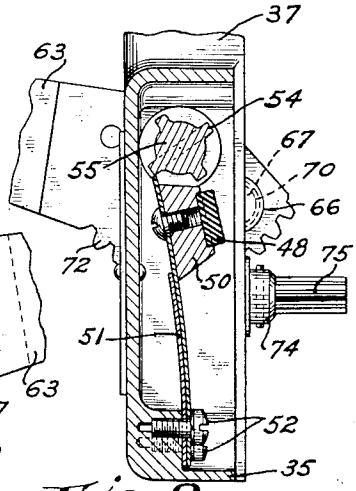


Fig. 8.

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RECORDING COUNTER FOR ARTICLE DISPENSERS

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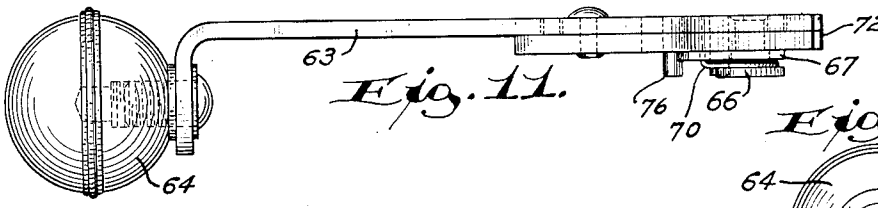


Fig. 11.

Fig. 13.

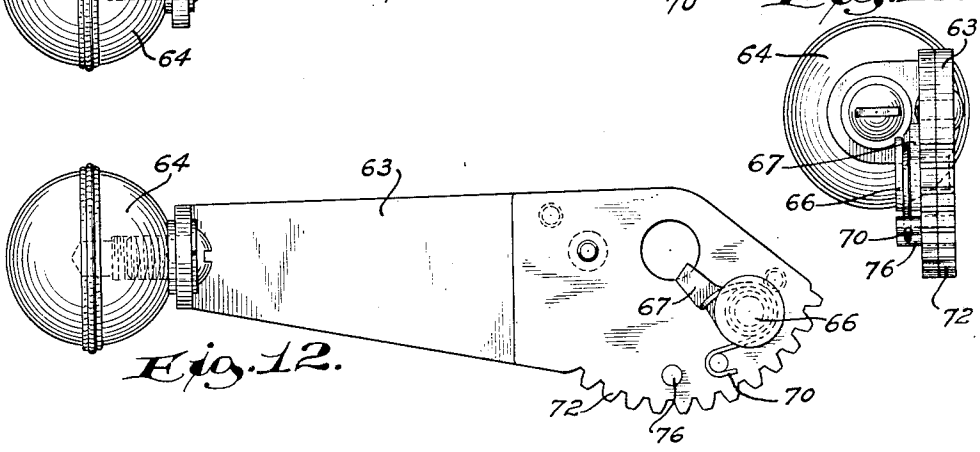


Fig. 12.

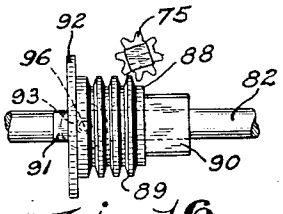


Fig. 16.

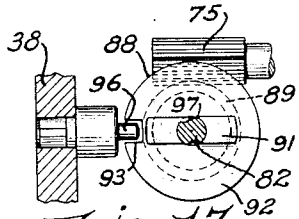


Fig. 17.

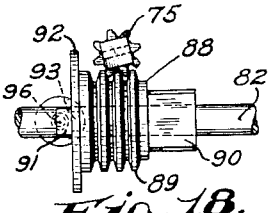


Fig. 18.

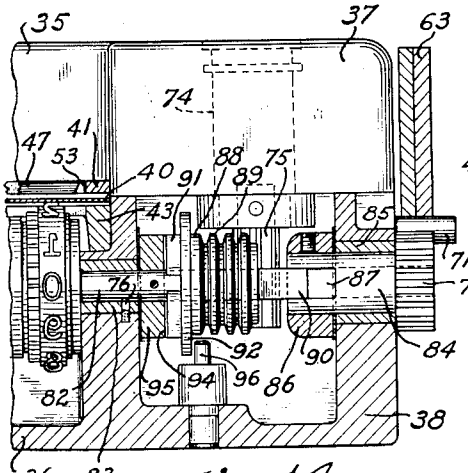


Fig. 14.

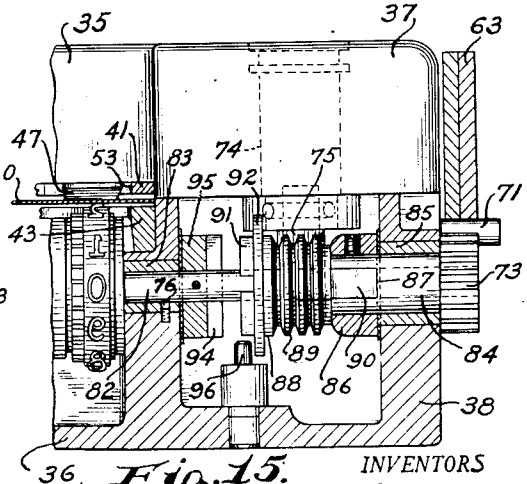


Fig. 15.

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RECORDING COUNTER FOR ARTICLE DISPENSERS

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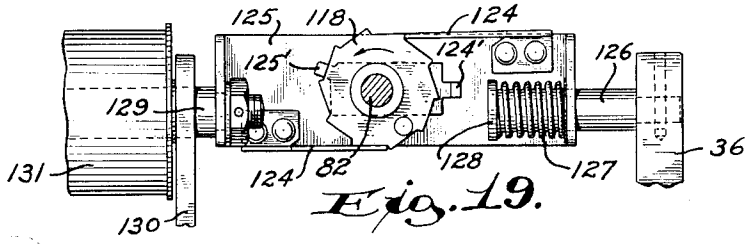


Fig. 19.

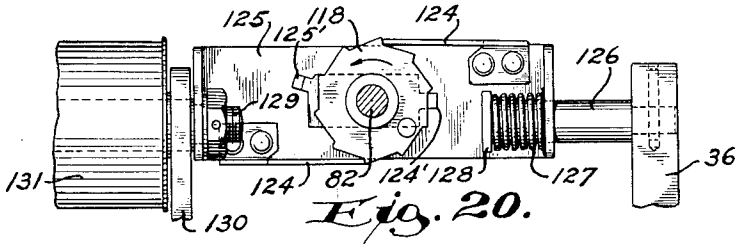


Fig. 20.

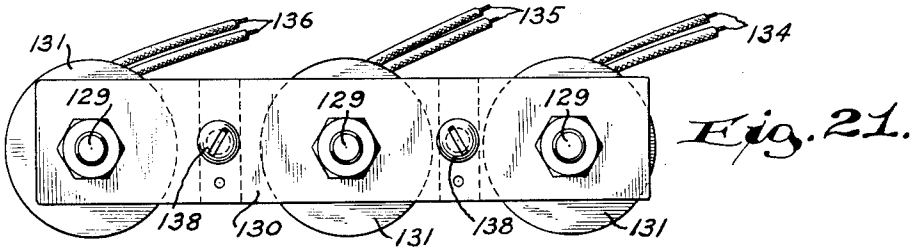


Fig. 21.

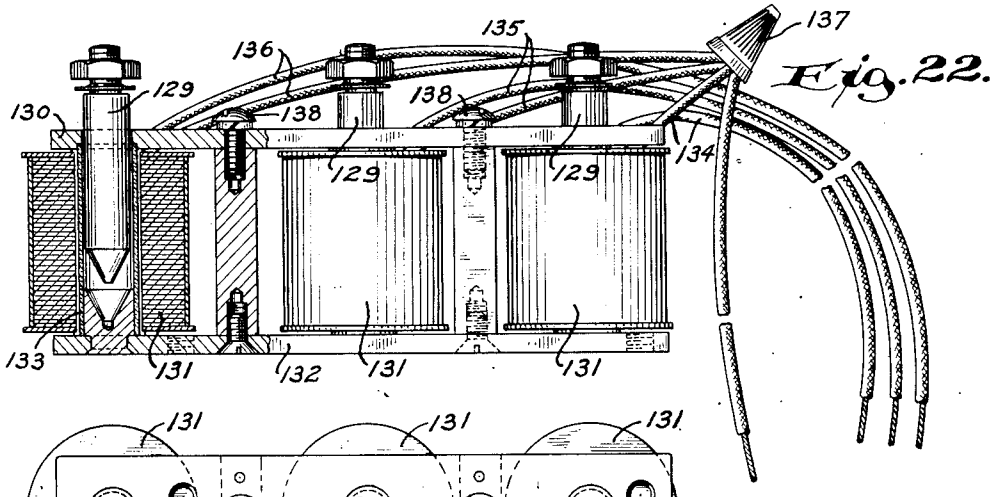


Fig. 22.

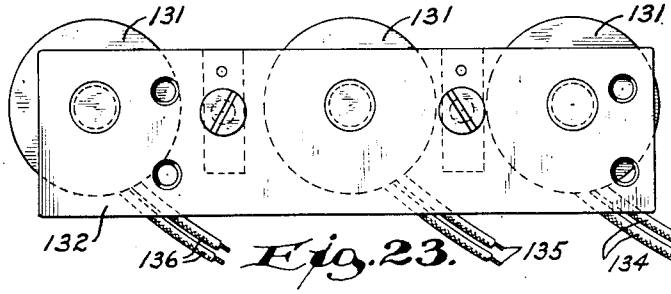


Fig. 23.

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RECORDING COUNTER FOR ARTICLE DISPENSERS

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Fig. 24.

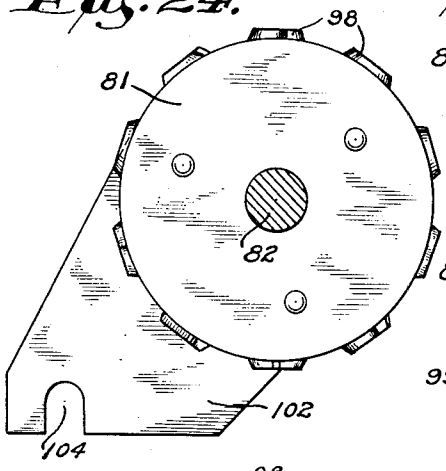


Fig. 25.

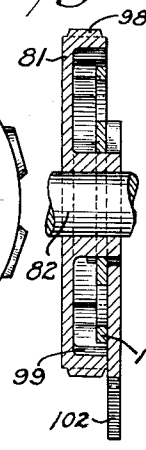
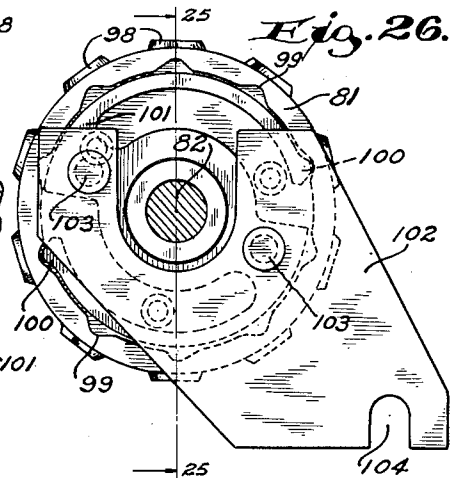


Fig. 26.



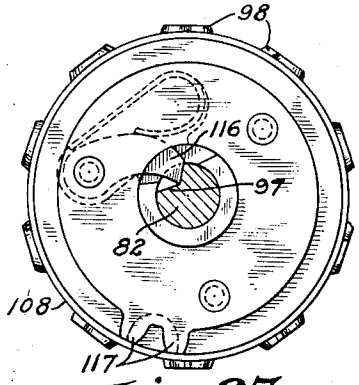


Fig. 27.

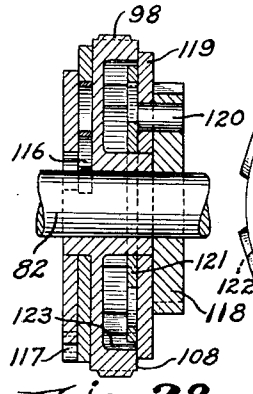


Fig. 28.

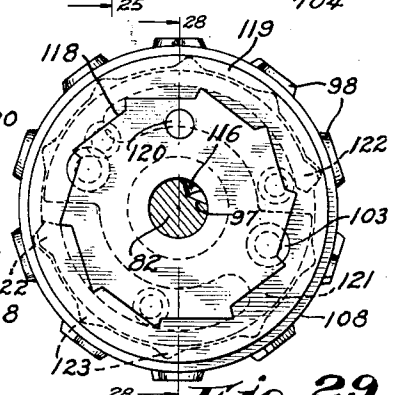


Fig. 29.

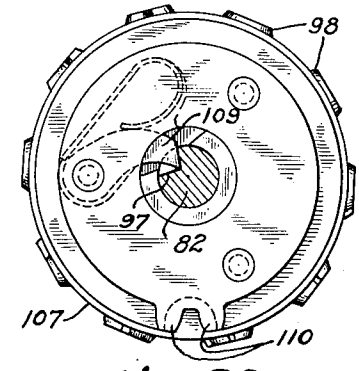


Fig. 30.

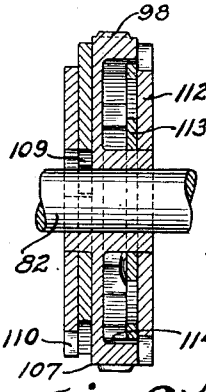


Fig. 31.

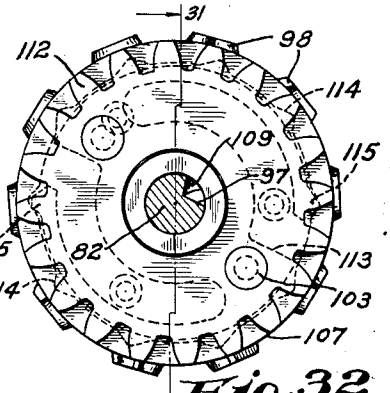


Fig. 32.

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Patented Nov. 25, 1952

2,619,283

UNITED STATES PATENT OFFICE

2,619,283

RECORDING COUNTER FOR ARTICLE DISPENSERS

Mark M. Hennessy and Harold J. Lawrence, Milwaukee, Wis., assignors to Durant Manufacturing Co., Milwaukee, Wis., a corporation of Wisconsin

Application August 30, 1948, Serial No. 46,772

7 Claims. (Cl. 235—144)

1

The present invention relates in general to improvements in the art of accounting, and relates more particularly to improvements in the construction and operation of counting and recording mechanism for diverse purposes, such as accounting for articles or services dispensed by vending machines, accounting for performances of production machines, or the like.

The primary object of our present invention is to provide improved mechanism for accurately counting and recording the number of articles produced or dispensed, the number of operations or services performed, and the number of coins or the like received, by production or vending machines of various types.

There are at the present time a great variety of normally unattended machines for dispensing different commodities in batches and for performing definite services, upon insertion of coins in each unit, and the matter of accounting for sales made by such vending machines has heretofore presented numerous perplexing problems. Where large numbers of such dispensing units are under the control of a common source and are spread over considerable territory, it is ordinary practice to have route salesmen, stock replenishers, and repairmen, make periodic visits to each machine, in order to collect the receipts and to maintain the devices properly stocked and in operating condition; and under present systems of accounting it is a tedious and almost impossible job to obtain an accurate audit of actual sales, and the accounts are subject to many irregularities which result from various personal influences.

In accordance with the prior universal practice, the route salesman must ordinarily account for the money accumulated in each dispensing machine, and he does so by making periodic visits to each unit and by removing and physically counting the coins, such procedure obviously resulting in considerable waste of time, in frequent errors, and being inducive to petty thievery if the salesman is dishonest. Then too, this method of collecting the financial returns, gives no definite indication as to whether the coin receptacles have been tampered with and money removed by unauthorized parties. The prior method moreover does not provide any indication as to whether the machines have in fact delivered too liberally, or have accepted payments without actually delivering batches of the commodity so that the salesman cannot determine exactly how many coins should be refunded; and the previous checking systems also failed to record the precise number of articles supplied to

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the dispensing machines by the stock replenishers, and the number of articles removed by repairmen when making trial runs or withdrawals of articles in order to check for proper operation of the units.

It is therefore an important object of our present invention to provide improved mechanism for positively eliminating all of the above mentioned difficulties and objections, and to furnish a systematic mechanical counting and recording device for coin actuated article dispensing or service rendering vending machines of various types.

Another important object of the present invention is to provide an improved counting and recording unit adapted for use in connection with articles or service vending machines of the coin or token actuated type, which will not only accurately count the coins deposited and the articles dispensed, but which will also produce a permanent printed record of the total number of the coins and articles involved in a definite period of time.

A further important object of this invention is to provide an improved article counting and recording assemblage for vending and production machines, or the like, wherein several independently functioning counters may be conveniently re-set or zeroized after each recording of performances or dispensations of articles.

Still another important object of the invention is to provide improved electro-mechanically actuated mechanism for the numeral wheels of counters, and which is adapted to be independently operated from various sources so as to provide a definite comparative recording of diverse events or performances.

An additional important object of our invention is to provide improved printing mechanism for recording the performance of one or more automatic counters, combined with mechanism for resetting the counters whenever a printed record has been produced.

A more specific additional object of this invention is to provide simple but highly effective printing means cooperable directly with the numerals of counter wheels so as to produce a legible and accurate printed record of successive counter readings, the printing means being operable either without resetting the counter wheels or to simultaneously reset the same.

Another more specific object of the invention is to provide improved clutch mechanism for effecting resetting or zeroization of a recording counter, and means for locking the clutch mechanism in inactive position.

Still another specific object of our invention is

to provide a reliable and efficient sales audit recorder which is especially applicable to liquid filled bottle or cup vending machines of various types operable by introduction of commodity purchasing coins, and which vastly facilitates maintenance and also furnishes accurate records of the performance of such machines.

These and other objects and advantages of the present invention will be apparent from the following description, and some features of the improved counter clutch mechanism shown herein are also revealed in co-pending application Serial No. 702,643, filed October 11, 1946, and now Patent No. 2,451,084, issued October 12, 1948.

A clear conception of the construction and operation of a recording counter unit for article dispensers, embodying the present improved features, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig 1 is an inverted plan view of the upper impact platten and actuating lever portions of the printing mechanism constituting part of our improved device, the lever being in inactive position;

Fig 2 is a perspective plan view of the lower counter wheel and actuating portion of the device, with which the assemblage of Fig. 1 normally coacts;

Fig. 3 is an end view of the assemblage of Fig. 1, looking toward the actuating lever which is shown in inactive position;

Fig. 4 is a transverse section through the mechanism of Fig. 1, taken along the line 4—4 and viewed toward the left;

Fig. 5 is another transverse section through the same mechanism, taken along the line 5—5 of Fig. 1 but looking toward the right;

Fig. 6 is an end view similar to Fig. 3, but showing a fragment of the actuating lever swung into active position as when producing a printed record, or when resetting the counters;

Fig. 7 is a transverse section through the upper portion of the unit, taken along the line 4—4 of Fig. 1 but showing the printing mechanism in action;

Fig. 8 is another transverse section through the platten portion of the mechanism, taken along the line 5—5 of Fig. 1, but showing the printing platten just prior to delivery of a blow;

Fig. 9 is a transverse section through the ratchet mechanism for effecting actuation of the printing platten, the section having been taken along the line 9—9 of Fig. 1 and showing the parts just prior to manipulation of the operating lever;

Fig. 10 is a section similar to that of Fig. 9, but showing the parts of the ratchet mechanism in position corresponding to Figs. 6 to 8 inclusive;

Fig. 11 is a plan view of the actuating lever for the printing mechanism with the ratchet pawl attached, and drawn to a somewhat enlarged scale;

Fig. 12 is a side elevation of the same platten actuating lever, looking toward the ratchet pawl pivotally mounted thereon;

Fig. 13 is an end view of the printing platten actuating lever and pawl;

Fig. 14 is a further enlarged fragmentary part sectional view taken longitudinally through the clutch mechanism operable by the printing platten actuating lever, for effecting resetting of the counters, showing the clutch engaged and in active position;

Fig. 15 is a view similar to Fig. 14, but showing the resetting clutch mechanism disengaged and in inactive position;

Fig. 16 is a likewise enlarged top view of a portion of the improved clutch mechanism, showing the same in active position as in Fig. 14;

Fig. 17 is a similarly enlarged end view of the portion of the clutch mechanism shown in Fig. 16, showing the mode of transforming this mechanism from inactive to active position and vice versa;

Fig. 18 is a likewise enlarged top view of the same clutch mechanism with the parts in inactive position as in Fig. 15;

Fig. 19 is a fragmentary side view of one of the counter wheel actuating electro-magnets showing the same retracted and inactive;

Fig. 20 is a similar side view of the same electro-magnet, showing the same in action as when registering a count;

Fig. 21 is an end view of the group of three counter wheel actuating electro-magnets;

Fig. 22 is a part sectional top view of the group of electro-magnets, showing one of the magnet units in section;

Fig. 23 is another end view of the group, viewed in a direction opposite to Fig. 21;

Fig. 24 is an enlarged end view of one of the serial number indicating wheels for identifying each individual vending unit;

Fig. 25 is a similarly enlarged central section through the numeral wheel of Fig. 24, taken along the line 25—25 of Fig. 26;

Fig. 26 is a likewise enlarged opposite end view of the serial number designating wheel of Fig. 24;

Fig. 27 is an enlarged end view of one of the magnet actuated numeral wheels of either the commodity, coin, or servicing counter of the improved unit;

Fig. 28 is a similarly enlarged central section through the wheel assemblage of Fig. 27, taken along the line 28—28 of Fig. 29;

Fig. 29 is a likewise enlarged opposite end view of the numeral wheel of Fig. 27;

Fig. 30 is an enlarged end view of one of the higher order numeral wheels of either of the three individual counters of the unit;

Fig. 31 is a similarly enlarged central section through the wheel assemblage of Fig. 30, taken along the line 31—31 of Fig. 32; and

Fig. 32 is a likewise enlarged opposite end view of the numeral wheel of Fig. 30.

While our invention has been shown and described herein as having been embodied in an audit recorder especially adapted for application to a drink vending machine, it is not our intention to unnecessarily limit the scope or utility of the improvement by virtue of this restricted disclosure, since some of the improved features may be advantageously applied to many other types of production and vending machines for diverse commodities, services, musical selections, and the like; and it is also contemplated that specific descriptive terms used herein be given the broadest possible interpretation consistent with the disclosure.

Referring to the drawings, the improved recording counter for vending machines, specifically illustrated, comprises in general two complementary casing sections, namely, an upper impact platen and actuating lever carrying section 35, and a lower base or counter wheel and electro-magnet confining section 36, see Figs. 1, 2, 14 and 15. The two sections 35, 36 are provided with integral housing portions 37,

38 respectively, at corresponding ends thereof for normally enclosing impact producing and clutch mechanisms; and the portions 37, 38 are detachably secured to each other by means of clamping screws 39. The remainers of the two complementary casing sections 35, 36, are spaced apart to provide an intervening printing zone into which a record sheet or card 40 and carbon-paper may be inserted as depicted in Figs. 14 and 15; and this printing gap or space is bounded at the top by a closure plate 41 secured to the upper section 35 by screws 42, and is also bounded at the bottom by another closure plate 43 attached to the lower base section 36 by screws 44. The base section 36 may also be provided with mounting lugs 45 for fastening the recording unit upon a vending or dispensing machine, or the like, in any desired position so that the printing zone and the manipulating lever and counter reset actuating lock of the unit are conveniently accessible.

Associated with the upper impact platten and actuating lever carrying section 35 of each unit, is a series of impact plattens 47, 48, 49 formed of relatively hard rubber or other suitable material, which are secured to a rather heavy elongated bar 50 firmly attached to the free end portions of several stiff leaf springs 51, the opposite ends of which are anchored to the casing section 35 by screws 52. These plattens 47, 48, 49 are adapted to be projected into the printing zone through an elongated slot or opening 53 formed in the upper plate 41, and the extreme free ends of the leaf springs 51 are cooperable with successive radial flanges or ribs 54 formed integral with a long sturdy shaft 55 which is journalled in bearings 56, 57 carried by the section 35, see Figs. 1, 5 and 8. The shaft ribs 54 coact with all of the spring ends on the order of a ratchet, and extend throughout the width of the printing zone; and the medial portion of the shaft 55 which is located within the housing portion 37 of the casing section 35, has a polygonal member 59 firmly attached thereto by a transverse pin; as illustrated in Figs. 1, 4 and 7. An impact producing plunger 60 which is slidably confined within a lateral bore formed in the casing portion 37 and which is constantly forced outwardly toward the axis of the shaft 55 by a stiff helical compression spring 61 as shown in Fig. 1, has an outer end face which is cooperable with the successive flats of the polygonal or square shaft member 59 to hold the shaft 55 and its associated parts against rotation or in fixed position after each successive printing impact has been delivered.

The outer end of the impact shaft 55, which projects beyond the bearing 58, is provided with an actuating lever 63 the swinging end of which has a manipulating handle or knob 64 attached thereto, and the opposite pivoted end of which is journalled for free oscillation about the shaft 55 and is confined upon the shaft end by a retaining collar 65, see Figs. 1, 3, 6, 11, 12 and 13. The pivoted end of the actuating lever 63 has a pivot pin 66 projecting laterally therefrom; and a pawl 67 which is cooperable with successive peripheral notches of a ratchet wheel 68 secured to the shaft 55 by a fastening pin 69, is constantly urged toward the ratchet wheel periphery by means of a spring 70, as shown in Figs. 1, 3, 6, 9 and 10. The successive ratchet teeth and a pin 76 coacting with the section 38 to serve to limit the swinging motion of the lever 63 in one

direction, while a stop pin 71 secured to the lower casing section 36 and which is shown in Figs. 2, 14 and 15, limits the swinging movement of this lever in the opposite direction. The pivoted end of the lever 63 is moreover provided with a gear tooth segment 72 swingable about the axis of the shaft 55, and which meshes with a pinion 73; and a key actuated tumbler lock 74 is mounted in the housing portion 37 of the casing section 35 and has an elongated pinion 75 suspended from its rotary cylinder and projecting into the housing portion 38 of the base section 36, as shown in Figs. 1, 14, 15, 16, 17 and 18.

Associated with the base section 36 of the main casing, in axial alinement with the pinion 75, and normally concealed beneath the closure plate 43, are three independent counters 77, 78, 78, and a group or set 80 of four or more serial number wheels 81, as clearly shown in Fig. 2. The numeral wheels of all of these counters 77, 78, 79 and of the group 80, are supported upon a common elongated shaft 82 which is journalled in bearings 83 carried by the casing section 36, and an end of which is also journalled in an integral supporting hub 84 of the pinion 75 as illustrated in Figs. 2, 14 and 15. The pinion hub 84 is rotatable in a bearing 85 carried by the frame portion 38, and this hub is prevented from shifting longitudinally by means of a collar 86 and has its end within this collar provided with diametrically opposite slots 87, see Figs. 2, 14 and 15. A circular rack 88 slidably embraces the shaft 82 between the collar 86 and the adjacent bearing 83, and has its medial portion provided with annular teeth 89 constantly meshing with the teeth of the pinion 75, while one end thereof has radial lugs 90 slidably engaging the pinion slots 87 and its opposite end has radial keys 91 disposed at ninety degrees relative to the lugs 90 and projecting laterally from an integral disc 92 having a single radial recess 93 therein, see Figs. 2, 14, 15, 16, 17 and 18. During resetting of the counters, the keys 91 are adapted to coact with the radial grooves 94 formed in the adjacent end of a collar 95 which is secured to the shaft 82 near the adjoining bearing 83, and a fixed pin 96 attached to the casing section 35 within the housing portion 37 is cooperable with the disc recess 93 to permit shifting of the disc 92 and rack 88 from the position shown in Fig. 14 to that shown in Fig. 15, and vice versa.

The portion of the counter wheel supporting shaft 82 which is located adjacent to the printing zone of the unit, is cylindrical at the bearings 83 and adjacent to the serial number wheel series 80, but is provided with longitudinal reset notches 97 in proximity to the counters 77, 78, 79, and with a detent engageable by a spring latch 76 for normally holding the shaft 82 and notches 97 in proper position. Each of the counter and serial number wheels supported by the shaft 82, is provided with a series of ten equally spaced and embossed peripheral numerals 98 adapted to be brought into alinement with the slot 53 in the upper housing plate 41 through a similar slot in the lower housing plate 43, and to be thus exposed to the printing zone in opposition to the impact plattens 47, 48, 49. The platten 49 is located so that it will coact with the exposed and alined projecting numerals 98 of the counter 77, while the platten 48 will simultaneously coact with the likewise exposed

and alined projecting numerals 98 of the counter 78, and the platten 49 will also simultaneously coact with the exposed and alined projecting numerals 98 of the serial number wheels 81 and of the service counter 79; whereby each impact delivered by the plattens 47, 48, 49 will cause these plattens to cooperate with all of the uppermost alined numerals 98 of all of the numeral wheels to produce a printed recording of these numerals upon a record sheet 40 disposed within the printing zone and having a carbon insert applied to one side thereof.

While the wheels 81 of the serial number group 80 are adapted to be manually adjusted about the adjacent cylindrical portion of the supporting shaft 82 and do not move during normal operation of the counters 77, 78, 79; the numeral wheels of the latter are operable to indicate successive performances such as insertion of coins, normal delivery of articles or service performances, and withdrawals of articles by service men, and all of the counters may be simultaneously reset or zeroized. The serial number wheels 81 are constructed and mounted for manual adjustment as shown in Figs. 2, 24, 25 and 26, and each of these wheels besides having the embossed numerals 98 projecting outwardly from its periphery, is provided with an inner annular series of notches 99 with which the pawls 100 of a resilient spider plate 101 are successively cooperable to firmly hold each wheel 81 in desired position of adjustment. The spider plates 101 are each fastened to an adjacent fixed division plate 102 by rivets 103 as shown in Fig. 26, and these division plates 102 coact with the base section 36 and are provided with recesses 104 adapted to engage a positioning rod 105 as illustrated in Fig. 2. The individual serial number wheels 81 may thus be independently adjusted about the adjacent cylindrical portion of the shaft 82 to produce variable serial numbers, and will be retained in fixed position by the pawls 100 while the shaft 82 is being rotated to reset the wheels of the adjacent automatic counters 77, 78, 79.

The numeral wheels 107 of higher order, of each of the automatic counters 77, 78, 79, are all constructed and operable from the lowest order wheel 108 of each of these counters, substantially as shown in our prior Patent No. 2,444,570, except for the embossed numerals 98, see Figs. 2, 30, 31 and 32, but the lowest order wheel 108 of each counter 77, 78, 79 is adapted to be independently actuated by means of an electro-magnet upon occurrence of a particular event. Each of the higher order wheels 107 has a spring pressed reset pawl 109 confined therein and adapted to coact with the adjacent shaft notch 97 whenever the shaft 82 is rotated counter-clockwise as viewed in Fig. 30, and each wheel 107 is provided on one side with a pair of teeth 110 cooperable with an adjacent transfer pinion 111, and on its opposite side with a driving gear 112 having a spider plate 113 secured thereto and coacting with internal notches 114 of the wheel 107 through integral spring pawls 115. The gears 112 are also cooperable with adjacent transfer pinions 111 in a well known manner so that each higher order wheel 107 will be rotated one-tenth of a revolution upon completion of a complete revolution of the adjoining lower order wheel of the same counter.

The driving or lowest order numeral wheel 108 of each counter 77, 78, 79 is of special construction as shown in Figs. 2, 27, 28 and 29, and each of these wheels 108 also has a spring pressed reset pawl 116 confined therein and adapted to coact with the shaft notch 97 when the shaft 82 is rotated in a counterclockwise direction as viewed in Fig. 27; and each wheel 108 is moreover provided on one side with a pair of teeth 117 cooperable with an adjacent transfer pinion 111, but has its opposite side provided with a ratchet wheel 118 rigidly attached to the driving plate 119 thereof by a rivet 120 or otherwise. The driving plate 119 of each of the wheels 108 also has a spider 121 provided with integral spring pawls 122, attached thereto, and these pawls likewise coact with internal notches 123 of the wheel 108. As shown in Figs. 2, 19 and 20, the teeth of each ratchet wheel 118, coact with a pair of upper and lower elongated spring pawls 124 carried by a reciprocable yoke 125 movable in a plane perpendicular to the axis of the reset shaft 82 and, confined within the casing section 36, and each of the yokes 125 has a flange at one end slidable upon a fixed guide rod 126 and constantly urged toward the right as viewed in Figs. 19 and 20, by a helical compression spring 127 coacting with the adjacent yoke flange and with a washer 128 secured to the corresponding rod 126. The medial portion of each yoke 125 is also provided with a pair of spaced stop lugs 124', 125' which project laterally from the side face of the yoke and are disposed on the opposite sides of the axis of the reset shaft 82 in close proximity to the teeth of the ratchet wheel 118. These stops 124', 125' are alternately cooperable with the peripheral teeth of the intervening ratchet wheel 118, as shown in Figs. 19 and 20, and the stop 124' is cooperable with the ratchet wheel teeth as in Fig. 20 to positively prevent the wheel from advancing more than one tenth of a revolution during each reciprocation of the corresponding yoke 125, while the other stop 125' is cooperable with the ratchet wheel teeth under the influence of the spring 127 as in Fig. 19, to positively prevent advancement of the wheel during resetting of the counter numeral wheels.

Each yoke 125 also has a flange at its opposite end detachably secured to the outer end of a magnet core 129 slidable through a plate 130 and movable within a coil 131, and these coils 131 are supported from the interior of the casing section 36 by means of a frame 132 and bushings 133 and are adapted to be energized by three independent electric circuits 134, 135, 136 controllable by several switches 137, see Figs. 2, 21, 22 and 23. The core guiding plate 130 is firmly but detachably secured to the frame 132 by screws 138, and the frame 132 may be likewise attached to the casing section 36; and the circuit 134 which controls the operation of the coin counter 77 may be closed to energize its coil 131 whenever a purchase coin is deposited in the vending machine, while the circuit 135 which controls the article counter 78 in response to deposition of a coin may be closed to energize its coil 131 whenever an article is dispensed normally, and the remaining circuit 136 which controls the servicing counter 79 may be closed to energize its coil 131 when the other two circuits 134, 135 or at least the circuit 135, are cut out and inactive. The actuation of the magnets is subject to wide variation, and while the circuit 134 has been described as controlling the coin counter 77 and the circuit 135 as controlling the dispensed article counter, these circuits may obviously be reversed so as to comply with a predetermined auditing system and the number of

numeral wheels in each series may also be varied to suit.

When the improved audit recording unit has been constructed and assembled as described, and has also been properly installed in an article or service vending machine, the numeral wheels 81 of the group 80 should first be set manually to expose the predetermined embossed serial number of the unit or of the vending machine to the printing zone. After such adjustment of the wheels 81 has been effected, they will be held in fixed position by the pawls 100 coacting with the wheel notches 98. When a coin is subsequently deposited in the vending machine preparatory to normal dispensation of an article the circuit 134 will be energized to cause the corresponding electro-magnet to actuate the counter 77; and the circuit 135 will also be promptly energized to cause its corresponding electro-magnet to actuate the counter 78 only if an article is actually dispensed by the vending machine in response to dropping of the coin therein. Successive coin deposits and article dispensations are thus accurately counted by the coin and article counters 77, 78 respectively; and in order to obtain a record of the functioning of the vending machine, a route salesman and stock replenisher should make periodic visits and inspections of the apparatus.

If this salesman is interested only in securing a continuing record of the coins deposited and of the articles dispensed by the vending machine during the interims between successive visits, and without resetting the counters 77, 78 during each inspection, he may insert a record sheet 40 within the printing zone and thereafter pull the lever 63 from the position shown in Fig. 3 to that shown in Fig. 6 while avoiding actuation of the lock 74. The counter zeroizing clutch afforded by the rack keys 91 and collar recesses 94 will then remain inactive as illustrated in Figs. 2 and 15, so that manipulation of the lever 63 will merely cause the ratchet pawl 67 to rotate the ratchet wheel 68 and shaft 55 approximately one-quarter turn, thereby causing one of the shaft ribs 54 to retract the plattens 47, 48, 49 and bar 50 and to stress the leaf springs 51 and the plunger actuating spring 61. As each swinging stroke of the lever 63 is completed, the rib 54 which has engaged the ends of the leaf springs 51 will release these spring ends as in Fig. 8, and the depressed plunger 60 and spring 61 will quickly engage the adjacent flat face of the polygonal member 59 to reposition the shaft 55 preparatory to the next printing operation while the leaf springs 51 will function to deliver a simultaneous impact blow to all of the plattens 47, 48, 49. These plattens will then coact with the numerals 98 of the momentarily stationary counter and serial number wheels, through the record sheet 40 and carbon paper associated therewith, to produce an accurate printed record of the serial number and of the coins deposited and articles dispensed.

If the inspector desires to test the operation of the vending machine without disturbing the coin and normal article counters 77, 78, he may do so by switching in the circuit 136 of the service counter 79 so as to permit withdrawal of articles for testing purposes while avoiding inaccuracy in normal sales count. The service counter 79 will then count the number of articles removed from the vending machine while test runs are being made, and these will also be recorded whenever an auditing printed record is being produced. Whenever a circuit 134, 135, 136 is closed to energize one of the magnets, the corresponding magnet core 129 will be pulled into its coil 131 thus causing the pawls 122 of the adjacent yoke 125 to rotate the adjoining ratchet wheel 118 one twentieth of a revolution; and when the circuit is interrupted, the spring 127 will move the yoke 125 and core 129 in the opposite direction to further rotate the ratchet wheel 118 one twentieth of a revolution, and to thereby complete the individual count.

In case it is desired to reset or zeroize the counters, the salesman or inspector must utilize a key applied to the tumbler lock 74, and when the cylinder of this lock is rotated, the pinion 75 coacting with the annular teeth 89 of the clutch rack 88 will shift this rack from inactive position as shown in Figs. 2, 15 and 18 to active position as depicted in Figs. 14 and 16. When the reset clutch is inactive, the fixed pin 96 coacts with one side face of the disc 92 and prevents the radial keys 91 from entering the recesses 94 of the resetting shaft collar 95; but when the pinion 75 is rotated by the tumbler lock cylinder and the lever 63 is oscillated, the pin 96 passes through the disc notch 93 and the circular rack 88 is shifted so as to place the pin 96 on the opposite side of the disc 92 and to bring the radial keys 91 into engagement with the recesses 94 while the latter are being held by the latch 76. Swinging movement of the lever 63 will then cause the teeth 72 to revolve the pinion 73 and the pinion hub 84 will rotate the clutch rack 88 through the lugs 99, thus revolving the shaft 92 in a counter-clockwise direction as viewed in Figs. 27 and 30, and causing the pawls 109 to coact with the shaft groove 97 and to thereby reset or zeroize all of the counter wheels 107, 108 without disturbing any of the serial number wheels 81. Reversal of the rotation of the lock cylinder 74 and withdrawal of the lock actuating key, after resetting of the counters 77, 78, 79 has been accomplished, places the unit in condition for subsequent normal operation, and by obtaining a printed record before each resetting of the counters, a perfect audit of each vending machine is obtainable.

From the foregoing detailed description of the construction and operation of our improved auditing unit, it will be apparent that we have in fact provided a simple, compact, and readily manipulable assemblage for obtaining an accurate printed record of the performance of various types of vending machines. The improved mechanism while having been shown as being electromagnetically operated, may obviously be automatically actuated in any other desired manner, and positively prevents the occurrence of any transactions within the vending machine, without producing a tabulated record thereof. The new device eliminates necessity of counting coins by the route inspectors or salesmen, and also reduces to a minimum the restocking or reloading time; and furthermore automatically reveals whether the vending machine has jackpotted or has accepted coins without delivering articles.

The auditing assemblage also eliminates requirement on the part of the inspectors to submit written reports, and materially reduces the time required in auditing and accounting; and the simultaneous resetting of the counters whenever a printed record of the sales is made, also simplifies the matter of maintaining performance records for each machine. The service counter 79 also protects the repair and testing man, and

reduces maintenance costs to a minimum; and the improved units may be easily installed and utilized with various kinds of vending machines such as drink and other article dispensers, juke boxes, shoe polishing machines, or the like. The invention has proven highly successful and practical in actual use, and the recording auditors may be manufactured and sold at moderate cost since various parts of the mechanism are interchangeably similar and can therefore be produced in quantity at extremely reasonable cost.

It should be understood that it is not desired to limit this invention to the exact details of construction and operation of the sales auditing recorder herein specifically shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art; and while the counter and serial number wheels are preferably provided with a succession of embossed numerals and thus produce a printed record of alined rows of the numerals of all of the wheels, these numerals may obviously be replaced by any other suitable type of indicia adapted to cooperate with a record card or sheet to produce a variety of permanent records. It is also to be noted that many of the improved features of counting and recording apparatus disclosed herein are advantageously applicable to production counters for the purpose of obtaining accurate records of the number of operations performed or articles produced, during normal functioning of production machines of various types.

We claim:

1. In a recording counter for a token controlled article vending machine, a normally fixed shaft, two series of counter wheels rotatable upon said shaft and each comprising a series of wheels having peripheral numerals thereon, one of said series being operable to indicate the number of articles dispensed by the machine and the other series being operable to indicate the number of tokens deposited in the machine, means coacting with said shaft to simultaneously reset the wheels of both of said series to zero, and means for producing a printed record of the reading on both of said counters without necessarily actuating said resetting means.

2. In a recording counter for a token controlled article vending machine, a normally fixed shaft, two series of counter wheels rotatable upon said shaft and each comprising a series of wheels having peripheral numerals thereon, one of said series being operable to indicate the number of articles dispensed by the machine and the other series being operable to indicate the number of tokens deposited in the machine, means coacting with said shaft to simultaneously reset the wheels of both of said series to zero, manually operable means for producing a printed record of the readings on both of said counters, and a clutch for connecting said manually operable means and said shaft at will to effect resetting of said wheels to a predetermined position.

3. In a recording counter for a token controlled article vending machine, a normally fixed shaft, two series of counter wheels rotatable upon said shaft and each comprising a series of wheels having peripheral numerals thereon, one of said series being operable to indicate the number of articles dispensed by the machine and the other series being operable to indicate the number of tokens deposited in the machine, means coacting with said shaft to simultaneously reset the wheels of both of said series to zero, manually operable means for producing a printed record of the readings on both of said counters, a clutch for connecting said manually operable means and said shaft at will to effect resetting of said wheels to a predetermined position, and a tumbler lock operable to connect and disconnect said clutch.

4. In a recording counter for a token controlled article vending machine, a normally fixed shaft, two series of counter wheels rotatable upon said shaft and each comprising a series of wheels having peripheral numerals thereon, one of said series being operable to indicate the number of articles dispensed by the machine and the other series being operable to indicate the number of tokens deposited in the machine, means coacting with said shaft to simultaneously reset the wheels of both of said series to zero, manually operable means for producing a printed record of the readings on both of said counters, a clutch for connecting said manually operable means and said shaft at will to effect resetting of said wheels to a predetermined position, and a circular rack operable independently of said manually operable means to connect and disconnect said resetting clutch.

5. In a recording counter, a normally fixed shaft, a series of numeral wheels of successively higher order rotatable upon said shaft, means for rotating said shaft to simultaneously reset all of said wheels to zero reading, a ratchet wheel cooperable with the numeral wheel of lowest order, a ratchet actuating member reciprocable perpendicular to the axis of said shaft, driving means for positively moving said member in one direction and a spring for likewise positively moving the member in the opposite direction, a pawl carried by said member and being cooperable with the teeth of said ratchet wheel upon movement of the member in one direction to advance said lowest order wheel by one numeral spacing, and a stop on said ratchet actuating member cooperable with the teeth of said ratchet wheel under the influence of said spring to positively prevent advancement of the ratchet wheel during resetting of said numeral wheels.

6. In a recording counter, a normally fixed shaft, a series of numeral wheels of successively higher order rotatable upon said shaft, means for rotating said shaft to simultaneously reset all of said wheels to zero reading, a ratchet wheel cooperable with the numeral wheel of lowest order, a ratchet actuating member reciprocable perpendicular to the axis of said shaft, driving means for positively moving said member in one direction and a spring for likewise positively moving the member in the opposite direction, a pawl carried by said member and being cooperable with the teeth of said ratchet wheel upon movement of the member in one direction to advance said lowest order wheel by one numeral spacing, a stop on said ratchet actuating member cooperable with the teeth of said ratchet wheel under the influence of said spring to positively prevent advancement of the ratchet wheel during resetting of said numeral wheels, and a second stop on said ratchet actuating member cooperable with the teeth of said ratchet wheel under the influence of said driving means to positively prevent advancement thereof by more than one numeral spacing during each reciprocation of the member.

7. In a recording counter, a normally fixed shaft, a series of numeral wheels of successively higher order rotatable upon said shaft, means for rotating said shaft to simultaneously reset all of said wheels to zero reading, a ratchet wheel cooperable with the numeral wheel of lowest order,

a ratchet actuating member reciprocable perpendicular to the axis of said shaft, driving means for positively moving said member in one direction and a spring for likewise positively moving the member in the opposite direction, a pawl carried by said member and being cooperable with the teeth of said ratchet wheel upon movement of the member in one direction to advance said lowest order wheel by one numeral spacing, and a pair of spaced stops projecting laterally from the side of said ratchet actuating member on opposite sides of the axis of said ratchet wheel, one of said stops being cooperable with the teeth of said ratchet wheel under the influence of said driving means to positively prevent advancement thereof by more than one numeral spacing during each reciprocation of said member, and the other of said stops being cooperable with the teeth of said ratchet wheel under the influence of said spring to positively prevent advancement of the latter during resetting of said numeral wheels.

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