April 28, 1953 J. C. KOCH 2,636,587

ACCUMULATOR

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Fig. 1

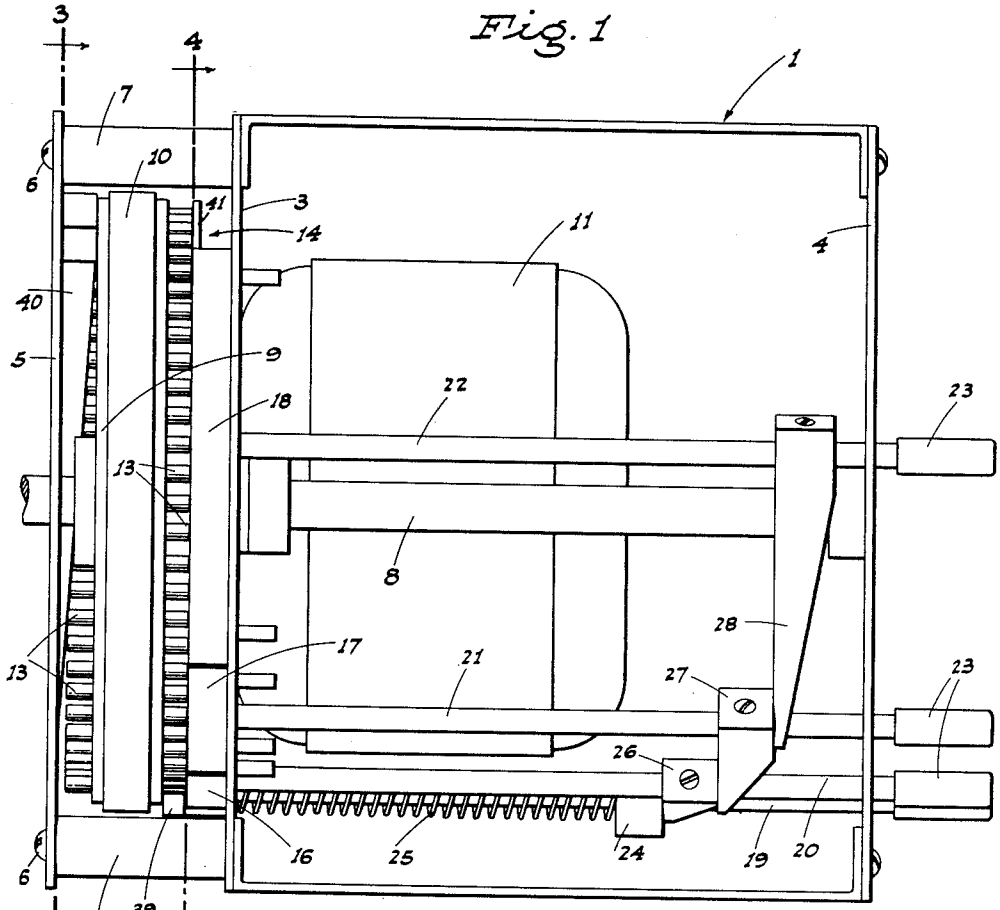
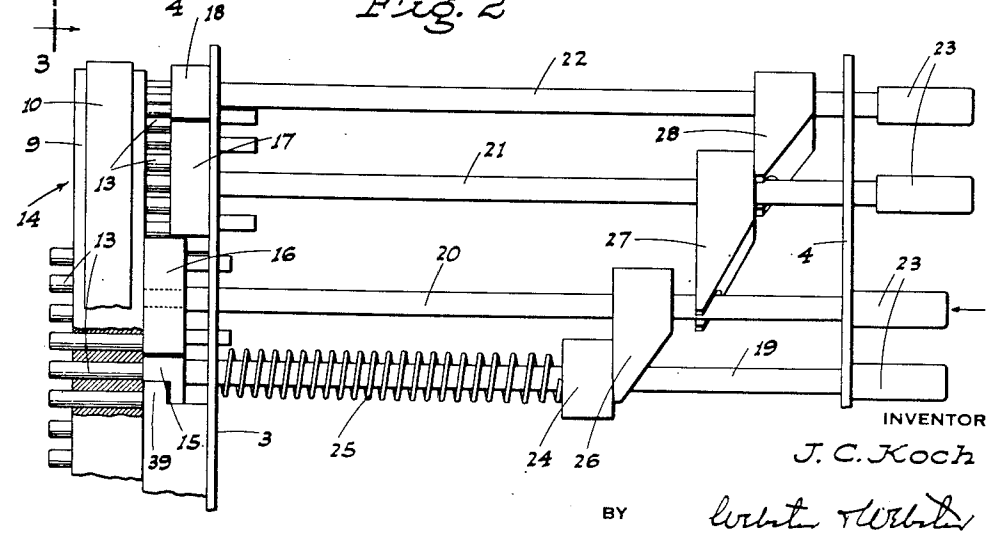


Fig. 2



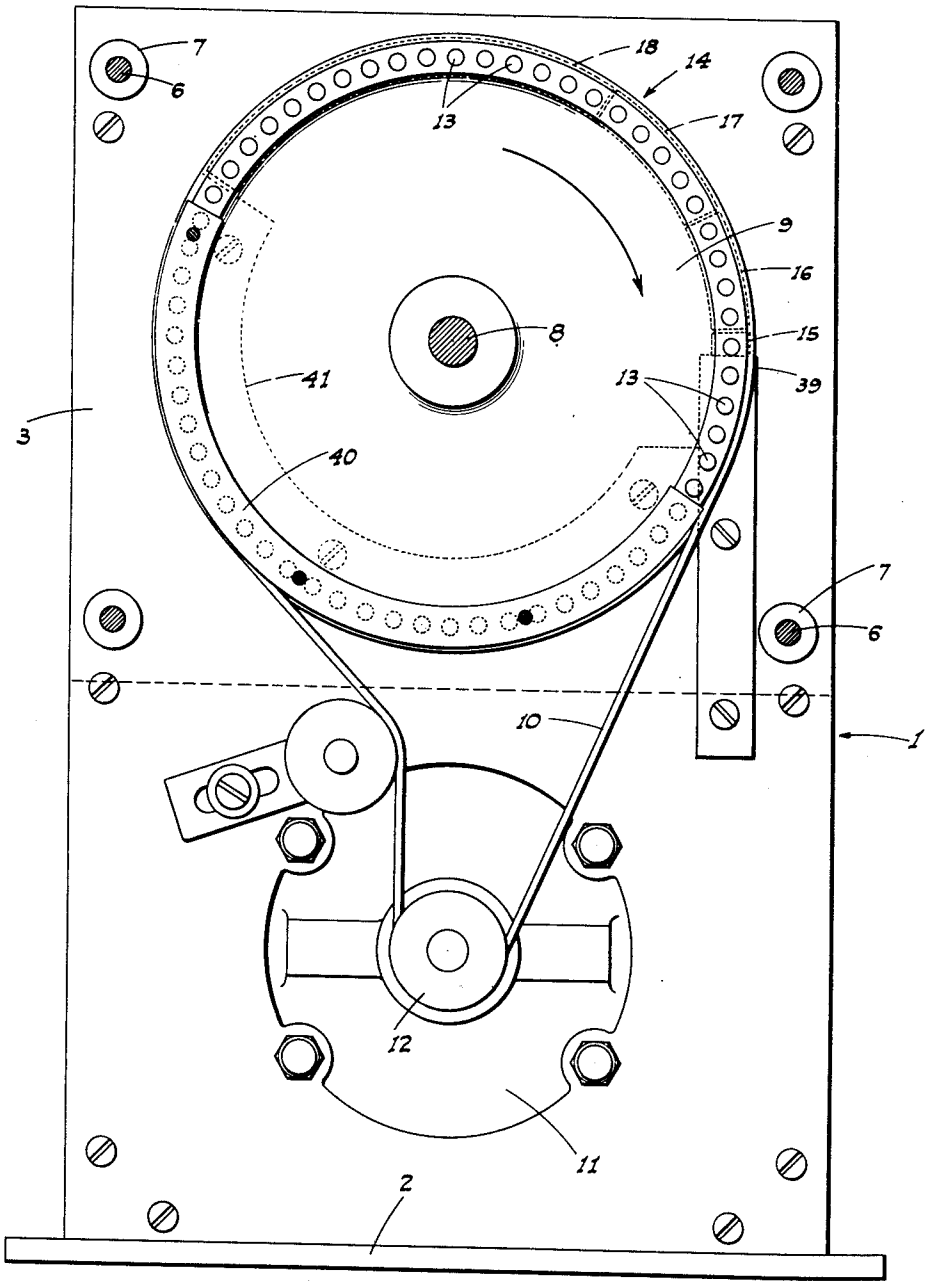
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Fig. 3



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Fig. 4

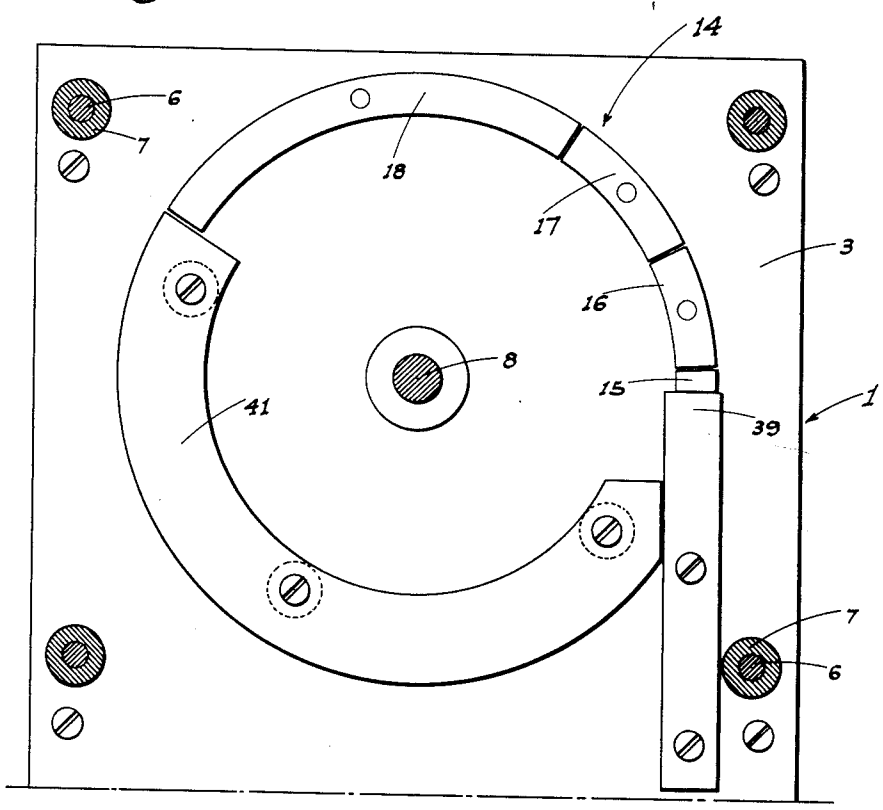
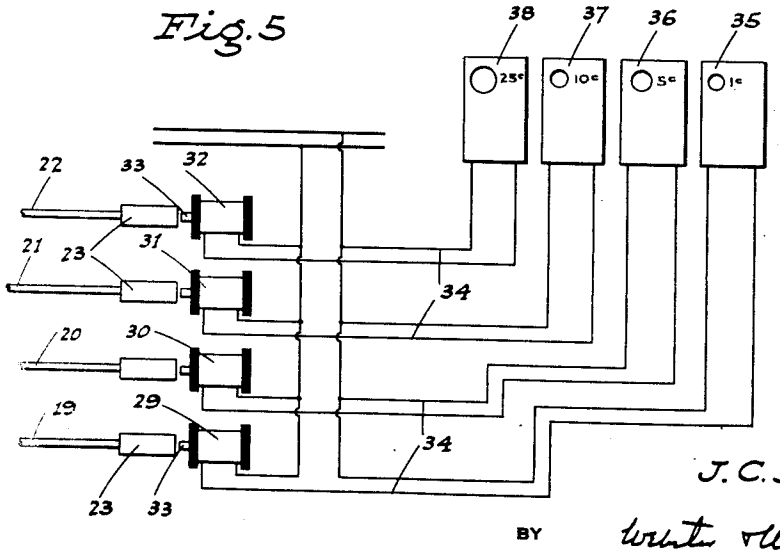


Fig. 5



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2,636,587

ACCUMULATOR

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6 Claims. (Cl. 194—1)

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The present invention is directed to, and it is an object to provide, a novel accumulator for coin controlled, automatic vending machines.

The accumulator is a device which translates the total value of coins, regardless of the number or combination thereof, inserted in the machine to make up a predetermined total value, into an accumulated mechanical movement of predetermined extent; such movement controlling the dispensing mechanism of the machine so that an article of sale corresponding to such total value is dispensed.

Another object of the invention is to provide an accumulator which includes a novel mechanism for the accomplishment of the above translation of total coin value to accumulated mechanical movement, said movement being of a single member and the mechanism including a shaft as said member, and the mechanical movement being part-circle relation of said shaft.

A further object of the invention is to provide an accumulator, as in the preceding paragraph, in which said mechanism is adapted to be electrically actuated; the action being rapid, yet smooth and positive, and there being automatic reset means embodied in the device.

An additional object of the invention is to provide an accumulator whose structure is rugged, reliable, and fool-proof; the device also being efficient and accurate with respect to the translation of total coin value to an accumulated mechanical movement.

It is also an object of the invention to provide a practical and relatively simple accumulator, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a plan view of the accumulator with the parts in starting position.

Fig. 2 is a fragmentary side elevation, with a bank of the holding pins in advanced or out of the way position to permit corresponding rotation of the control disc and mounting shaft.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Fig. 4 is a transverse section on line 4—4 of Fig. 1.

Fig. 5 is a diagram of the circuit between the coin boxes and accumulator actuating solenoids.

Referring now more particularly to the characters of reference on the drawings, the device

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comprises a rectangular upstanding housing, indicated generally at 1, supported by a base 2, and said housing includes spaced vertical walls 3 and 4.

Outwardly of the wall 3 there is a vertical mounting plate 5 supported in facing parallel relation to said wall 3, by bolts 6 and spacers 7. Some distance above the base 2, the housing is fitted with a horizontal shaft 8 which extends in journaled relation from the wall 4, and through the wall 3 and mounting plate 5.

Between the wall 3 and plate 5 the shaft 8 is fitted with a control disc 9 of substantial diameter; such control disc 9 being formed as a pulley at its periphery and is adapted to be driven by an endless belt and pulley unit 10 from an electric motor 11 mounted in the lower portion of the housing 1. The endless belt and pulley unit 10 includes a relatively small drive pulley 12 on the motor shaft. The direction of rotation of the control disc 9 is indicated by the arrow in Fig. 3.

The control disc 9 is fitted, in its peripheral portion, with a continuous or circumferential row of transversely slidable pins 13; such pins 13 being of a length greater than the thickness of said control disc 9 whereby said pins may be shifted axially from one side or the other of the disc in the manner hereinafter described.

The pins in the upper portion of the row thereof project inwardly from the disc 9 a certain extent, but terminate short of the wall 3. This is their retracted position. Between said upper portion of the row of pins 13 and the wall 3 there is an arcuate presser head assembly, indicated generally at 14; such presser head assembly including a plurality of arcuate presser heads 15, 16, 17, and 18 of progressively greater arcuate extent, respectively. The presser heads 15–18 inclusive are normally retracted into engagement with the wall 3, thus being ineffective with respect to the adjacent or corresponding upper portion of the row of pins 13; such presser heads being mounted on push rods 19, 20, 21, and 22, respectively. The push rods 19–22 inclusive are slidably supported in connection with, and extend between, the walls 3 and 4, projecting outwardly of the latter and there being fitted with heads 23.

It will be noted that upon advance of any one of the push rods 19–22 inclusive, a corresponding one of the presser heads 15–18 inclusive will be advanced, for the purpose hereinafter described.

The push rod 19 is fitted, intermediate its ends, with a stop 24, and a loaded compression spring

25 surrounds said push rod between the stop 24 and the wall 3 to normally maintain said rod retracted, as in Fig. 1.

The push rod 20 includes a laterally projecting stop 26 cooperating with the back side of the stop 24; the push rod 21 including a laterally projecting stop 27 cooperating with the back side of the stop 26; and the push rod 22 including a laterally projecting stop 28 which cooperates with the back side of the stop 27.

With this arrangement advance of the rod 19 has no effect on the other rods; advance of the rod 20 advances also the rod 19; advance of the rod 21 advances also the rods 20 and 19; and advance of the rod 22 advances also the rods 21, 20, and 19.

The rods 19–22 inclusive are adapted to be power advanced by corresponding solenoids 29, 30, 31, and 32, indicated diagrammatically in Fig. 5, and adapted to be mounted exteriorly of the housing 1, in a manner such that the solenoid plungers 33 are axially alined in actuating relation to the head 23 of the corresponding push rod.

The solenoids 29–32 inclusive each include an actuating circuit, indicated generally at 34, and such circuits lead to coin boxes 35, 36, 37, and 38, respectively.

In the present example, the coin boxes 35–38 inclusive are for one cent, five cents, ten cents, and twenty-five cents, respectively; the present embodiment of the accumulator being for the control of the dispensing of an article whose price is twenty-five cents (or twenty-six cents, including one cent sales tax).

The wall 3 is fitted with an upwardly facing stop 39 which is normally engaged by the lead one of the retracted pins 13 in the upper portion of the circumferential row thereof. The arcuate presser head assembly 14 extends in matching relation to said upper portion of the circumferential row of pins 13 backward from said lead one thereof. The presser heads 15, 16, 17, and 18 are of an arcuate extent to engage one, four, five, and fifteen pins, respectively, upon one reciprocation, i. e. an advancing motion followed by a retracting motion to starting position. The solenoids' action to advance the rods and presser heads is momentary, and the spring 25 acts to retract said rods and heads to normal position.

The horizontal shaft 8 is connected to a mechanism of the vending machine which controls the dispensing operation, and which operation takes place only after a part-circle rotation of said shaft 8 of an arcuate extent at least equal to the arcuate extent of the total presser head assembly 14.

With the described accumulator such part-circle rotation of the shaft 5, to cause a dispensing operation of the machine, results from the deposit, in the coin boxes, of a twenty-five cent piece in the box 38, or a deposit in the boxes 36 and 37 of a combination of five cent or ten cent coins totaling twenty-five cents.

The mechanical action is as follows:

If a twenty-five cent piece is deposited in the coin box 38, the solenoid 32 operates to cause one reciprocation of the push rod 22. Upon reciprocation of the push rod 22, the presser head 18 will likewise reciprocate, as will the remaining presser heads 17, 16, and 15, by reason of the cooperating stop assembly previously described. When this occurs twenty-five of the pins 13 are advanced outwardly through the control disc 9, and clear of the stop 39 whereby the motor 11 then rotates the control disc 9 through a part circle whose extent is sufficient to cause the vending machine to operate. The twenty-sixth pin then abuts the stop 39 (as the next lead pin) to prevent further immediate rotation of the disc.

The motor 11 is placed in operation at the outset of a deposit of a coin in one of the coin boxes by a means of a circuit (not shown), and thereafter is maintained in operation by said circuit until the dispensing operation is complete, when the motor 11 is stopped. The motor belt slips pulley 12 except during said part-circle rotation of the disc.

If a combination of two ten-cent coins and a five-cent coin are placed in the boxes 36 and 37, respectively, to total the required twenty-five cents, the described solenoid and push rod assembly will cause the presser heads 17, 16, and 15 to reciprocate twice, shifting two successive banks of ten pins to advanced position, and the presser heads 16 and 15 will be reciprocated once to advance a bank of five pins to complete the twenty-five total.

Similarly, five five-cent pieces placed in the coin box 36 would cause the presser heads 16 and 15 to be reciprocated five times, each time advancing five pins to total the required twenty-five.

The device is therefore operative to accumulate the total value of the coins deposited in the coin boxes, regardless of the number or combination of said coins required to make up the predetermined total value.

In those instances where, for example, a one-cent sales tax is required, the part-circle rotation required of the shaft 8 to cause actuation of the dispensing mechanism is the total arcuate extent of twenty-five pins, or other pre-selected number, plus one. It is therefore necessary to insert one cent in the coin box 35 in addition to the remaining coins required to total the sales price before the dispensing machine will operate; the accumulating process being the same as hereinbefore described.

Below the stop 39 the advanced pins ride onto an arcuate cam 40 concentric to the shaft 8, which cam extends from adjacent said stop 39 about the lower portion of the row of pins and up to the adjacent end of the presser head 18. Thus, by the time the pins travel about the bottom portion of the row and up to said presser head 18, the arcuate cam 40 has caused retraction of the pins to their normal or starting position in the upper portion of the row, as in Fig. 1.

To prevent the pins retracting beyond the vertical plane of the outer face of the presser head assembly, there is an arcuate limit plate 41 mounted concentric to the horizontal shaft in predetermined position inwardly of the control disc 9.

The accumulator, above described, provides a reliable and effective device for the control of a vending machine; such device functioning smoothly and accurately, and without tendency to jam, upon rapid introduction of coins into the coin boxes.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a de-

parture from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. An accumulator adapted to translate the total value of coin deposited in a receiving unit, into a predetermined mechanical movement, comprising a member mounted for movement in a certain path, means tending to move the member in one direction, a row of elements extending on the member in such direction, a stop, the elements projecting from the member and being movable from one position for engagement by the stop to another position to clear the same, a portion of the row normally being in said one position with the lead element of said portion engaged by the stop to prevent movement of the member, and translation mechanism responsive to coin deposited in the receiving unit operative to move the elements of said portion of the row, beginning with said lead element, to said other position and in a number proportionately corresponding to the total value of the deposited coin, whereby the resultant movement of the member provides said predetermined mechanical movement; the coin receiving unit being adapted to receive coins of different denominations; and the translation mechanism including a row of separate heads corresponding to coins of said denominations and extending along said portion of the row of elements, each head being mounted for independent motion to simultaneously move a predetermined number of adjacent ones of the elements to said other position from their normal position, the heads having effective lengths proportionate to corresponding coin values, means to actuate each head upon deposit of a corresponding coin in the receiving unit, and instrumentalities between said last named means operative, upon actuation of each head, to automatically cause actuation of all heads of lesser extent to thus accomplish an accumulative movement of corresponding elements to said other position.

2. An accumulator adapted to translate the total value of coin deposited in a receiving unit, into a predetermined mechanical movement, comprising a rotary disc, means tending to rotate the disc in one direction, a concentric row of elements projecting from the disc, a stop, said elements being movable from one position for engagement by the stop to another position to clear the stop, a portion of said row normally being in said one position with the lead element of said portion engaging the stop to prevent rotation of the disc in said direction, translation mechanism responsive to coin deposited in the receiving unit operative to move the elements of said portion of the row, beginning with said lead element, to said other position and in a number proportionately corresponding to the total value of the deposited coin, whereby the resultant part-circle rotation of the disc provides said predetermined mechanical movement, and means to reset the elements, to said one position, in another portion of the row beyond the stop; the coin receiving unit being adapted to receive coins of different denominations; and the translation mechanism including an arcuate row of separate heads corresponding to coins of said denominations and extending parallel to and along said portion of the row of elements, each head being mounted for independent motion to simultaneously move a predetermined number of adjacent ones of the elements to said other position from their normal position, the heads having effective lengths proportionate to corresponding coin values, means to actuate each head upon deposit of a corresponding coin in the receiving unit, and instrumentalities between said last named means operative, upon actuation of each head, to automatically cause actuation of all heads of lesser extent to thus accomplish an accumulative movement of corresponding elements to said other position.

3. An accumulator adapted to translate the total value of coin deposited in a receiving unit, into a predetermined mechanical movement, comprising a rotary disc, means tending to rotate the disc in one direction, a concentric row of pins in the disc in slidable relation transversely therethrough, a portion of the row of pins normally in one position projecting from one side of the disc, a stop positioned for engagement, normally, by the lead pin of said portion of the row to prevent rotation of the disc in said direction, a concentric row of separate presser heads extending in cooperative, matching relation alongside said portion of the row of pins but normally clear thereof, means mounting said heads for reciprocating motion into engagement with and to retract from a predetermined number of adjacent and corresponding pins of said portion of the row whereby to shift said corresponding pins in the disc to a position to clear the stop, said heads corresponding to and having effective lengths proportionate to the value of different coins deposited in the receiving unit, actuating means operative to cause one reciprocation of the corresponding pressure head upon deposit of a coin in said unit, means beyond the stop to reset the pins to said one position, and instrumentalities, associated with said actuating means, operative to cause reciprocation of all presser heads of lesser effective extent, upon reciprocation of each such head whereby to accomplish an accumulative shifting of all the pins of said portion from said lead pin rearward to the rearmost pin shifted by such head.

4. An accumulator adapted to translate the total value of coin deposited in a receiving unit, into a predetermined mechanical movement, comprising a rotary disc, means tending to rotate the disc in one direction, a concentric row of pins in the disc in slidable relation transversely therethrough, a portion of the row of pins normally in one position projecting from one side of the disc, a stop positioned for engagement, normally, by the lead pin of said portion of the row to prevent rotation of the disc in said direction, a concentric row of separate presser heads extending in cooperative, matching relation alongside said portion of the row of pins but normally clear thereof, rods slidable axially of the pins mounting the heads for reciprocating motion into engagement with and retract from adjacent and corresponding pins of said portion of the row whereby to shift said corresponding pins in the disc to a position clear of the stop, said heads corresponding to and having an effective length proportionate to the value of different coins deposited in the receiving unit, actuating means operative to cause one reciprocation of the corresponding presser head and rod upon deposit of a coin in said unit, and means beyond the stop to reset the pins to said one position; there being a stop on each rod cooperating with the back end of the stop on the rod corresponding to the presser head having the next lesser effective

length, whereby as each rod is reciprocated there is an automatic reciprocation of all the rods carrying presser heads of lesser effective extent.

5. An accumulator, as in claim 4, including a spring tending to retract the rod having the least effective extent, and said actuating means including a separate solenoid operative to advance each rod.

6. An accumulator to translate the total value of coin deposited in a receiving unit into a predetermined mechanical movement comprising a plurality of push rods mounted for independent movement in one direction in response to coins deposited in the receiving unit, an arcuate presser head on the outer end of each push rod, the several presser heads being disposed in end to end relation in the form of a part circle, a shaft disposed coaxially with the axis of said part circle; a disc fixed on the shaft, a plurality of pins extending transversely and slidably through the disc in a continuous circumferential row, the pins being longer than the thickness of the disc and a portion of the row of pins projecting from the inner face of the disc to a point adjacent the presser heads for engagement thereby, means tending to rotate the shaft in one direction, a stop, the pin at the leading end of said projecting portion normally engaging the stop to prevent rotation of the disc and shaft; the presser heads when pushed by their rods being effective to push the pins contacted thereby out of the path of the stop and the respective lengths of the presser heads relative to each other being proportionate to the relative value of coins deposited in the receiving unit and the presser head representing the coin of least value being the one immediately adjacent the stop, and instrumentalities between the rods arranged so that irrespective of which rod is pushed, the last named presser head will always be actuated to push the corresponding pins clear of the stop.

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