United States Patent [19]

Shah

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[54] **ALTERNATING FEED FOR COINS OR THE LIKE**

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[52] **U.S. Cl.** ..... **194/1 H**

[51] **Int. Cl.** **G07f 1/00**

[58] **Field of Search** ..... 194/1 G, 1 C, 1 H, 194/1 K, DIG. 2; 133/1, 2, 4, 5; 221/295

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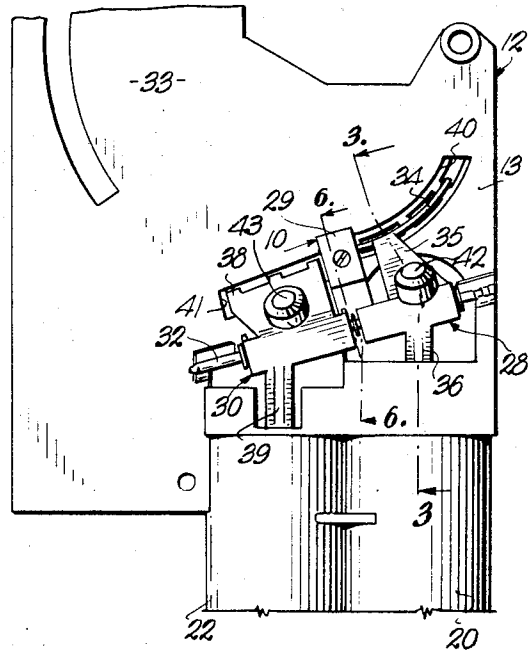
Primary Examiner—Samuel F. Coleman

Attorney—Schmidt, Johnson, Hovey & Williams

[57] **ABSTRACT**

Mechanism for successively feeding coins or the like from a single passage alternately into each of a pair of receiving channels or storage tubes is provided, which employs a rockable coin deflector assembly that is movable into blocking relationship to one channel by entry of a coin into that channel, releasable latching means for holding such deflector assembly in blocking relationship to that one channel, and a second rockable assembly associated with the other channel and adapted to release the latching means for movement of the first mentioned deflector assembly away from its blocking position whenever a coin enters the other channel. The mechanism also includes a deflector forming a part of the second assembly for blocking the other channel to divert coins to a third channel when said one and said other channels are both filled with stored coins.

5 Claims, 6 Drawing Figures



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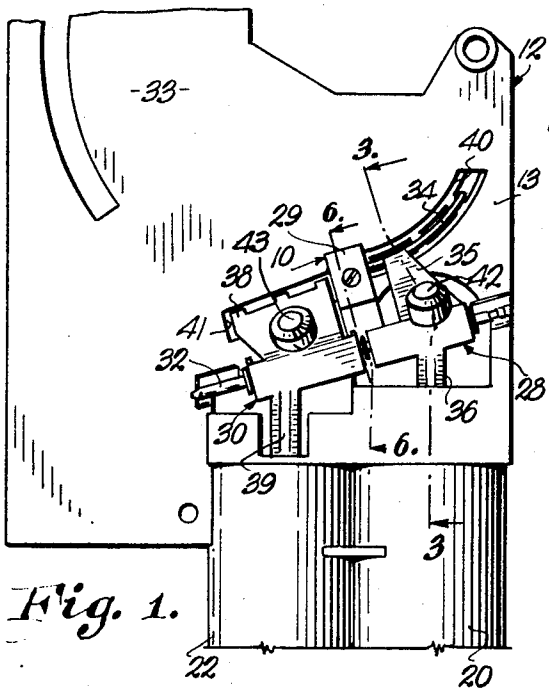


Fig. 1.

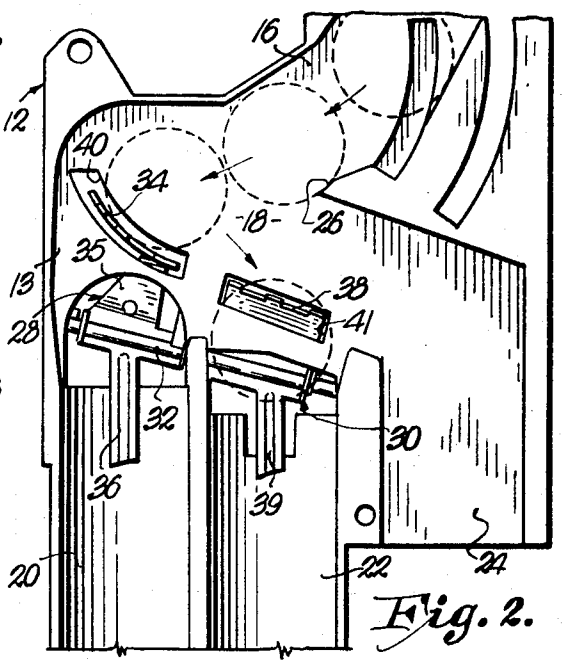


Fig. 2.

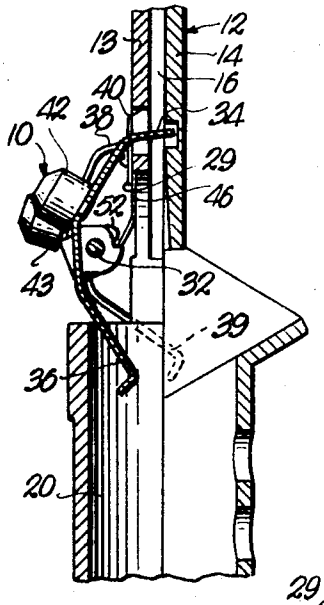


Fig. 3.

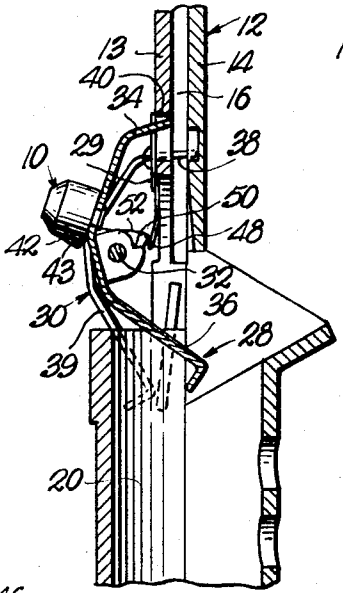


Fig. 4.

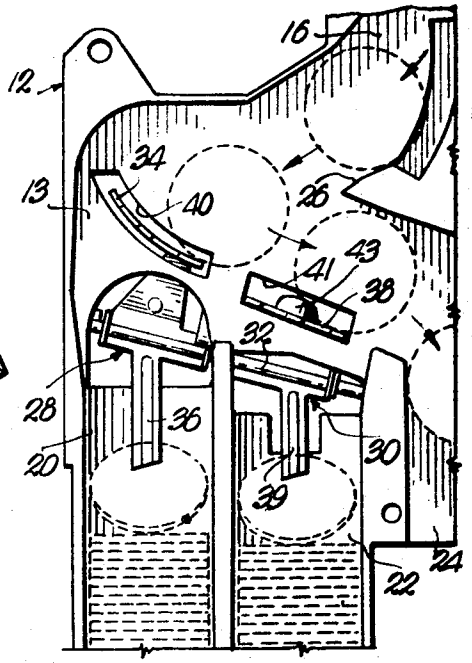


Fig. 5.

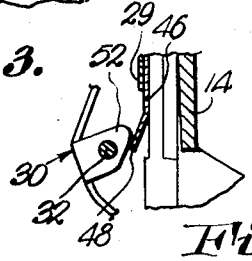


Fig. 6.

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ALTERNATING FEED FOR COINS OR THE LIKE

This invention relates to equipment for handling disc-like objects such as coins and, more particularly, to means for automatically feeding such objects from a passage alternately into a pair of channels, as is required for example in certain coin changer apparatus employed in vending machines for feeding coins successively deposited by customers alternately into a pair of storage tubes from which coins are obtained for returning change to customers.

Because of rising prices of articles dispensed from vending machines, it is now common for customers to deposit coins of larger denomination than required for the purchase of an article from vending machines and to receive from the machine appropriate change paid back by the machine in coins of smaller denomination. For example, articles selling for 20 cents are most often purchased by the deposit of a quarter, which requires the coin changer apparatus of the vending machine to pay back a nickel in change. The coin changer apparatus must, therefore, continuously maintain an adequate supply of nickels, gathered from nickels that are deposited by customers in the machine; and it has been found necessary in order to accomplish this, in view of the high proportion of transactions requiring change to be made, to provide the coin changer with a pair of nickel storage tubes from which change may alternately be paid out. Still other coin changer apparatuses employed in vending machines intended to dispense articles priced at 15 cents are provided with a pair of nickel storage tubes so that two nickels in change may be paid back to a customer depositing a quarter upon a single cycling of the coin changer apparatus. In both of such instances, it is desirable and often necessary that the number of nickels or other coins being stored in the pair of storage tubes provided in the coin changer apparatus shall be maintained as nearly equal as possible at all times.

The mentioned problem has given rise to the need for means for alternately directing deposited coins of the denomination to be stored between the pair of storage tubes provided in the changer apparatus. Various mechanisms for this purpose have heretofore been proposed, but they have been characterized either by undue complexity and cost, or by a lack of suitable reliability in operation under field conditions.

Accordingly, it is the primary object of this invention to provide an alternate coin feed mechanism which is simple and inexpensive in character, yet is highly reliable and capable of prolonged maintenance-free operation.

It is another important object of the invention to provide such an alternating feed mechanism which may be operated solely by the action of the gravitating coins, without the necessity for powered actuating or control means.

Another important object of the invention is to provide such an alternating feed mechanism which includes means for automatically diverting coins of the denomination being stored into an additional channel leading to a collection box when the change supply storage tubes are filled.

Still other important objects and advantages of the invention will be made clear or become apparent to those skilled in the art from the accompanying drawing and the following description illustrating a preferred embodiment of the invention.

In the drawing:

FIG. 1 is a fragmentary, elevational view of one section of a coin track assembly of a typical coin changer apparatus provided with alternating feed mechanism embodying the principles of the invention, taken from one side of such section;

FIG. 2 is a fragmentary elevational view of the same section of the assembly shown in FIG. 1, taken from the opposite side thereof and with the other normally facing section of the assembly removed;

FIG. 3 is a fragmentary cross-sectional view taken on line 3—3 of FIG. 1, illustrating the mechanism in condition for blocking entry of a coin into one of the storage tubes;

FIG. 4 is a fragmentary cross-sectional view similar to that of FIG. 3, but illustrating the condition of the mechanism upon entry of a coin into the other storage tube;

FIG. 5 is a fragmentary elevational view similar to FIG. 2, but illustrating the mechanism in condition for diverting coins away from both of the primary storage tubes and into an auxiliary channel when the primary storage tubes are both filled with stored coins; and

FIG. 6 is a cross-sectional view taken on line 6—6 of FIG. 1.

The feeding mechanism 10 of the invention is shown mounted on a coin track assembly 12 of a typical coin changer device. The assembly 12 includes a track section 13 and a cover section 14 which normally face each other and together define various passages and compartments for the gravitational movement and storage of coins. More particularly, the assembly 12 is provided with a main coin delivery track or passage 16 formed in section 13 and oppositely bounded by section 14. The passage 16 opens at its lowermost end into a feeding area 18 disposed immediately above and in communication with a pair of adjacent coin storage channels or tubes 20 and 22, as well as in communication with an auxiliary channel 24 which leads to a coin collection box (not shown). Section 13 has a shoulder 26 projecting into the passage 16 at the lowermost end thereof for directing all gravitating coins initially toward the tube 20 as they issue from passage 16, the trajectory being such that coins will fall toward and enter tube 20 unless the latter is blocked; thus, coins will normally reach the tube 22 or the auxiliary channel 24 only when diverted thereto by the mechanism 10, as hereinafter described.

It is to be understood that the track assembly 12 may be associated with or form a part of any conventional conventional coin changing apparatus and will normally be disposed below a conventional coin accepting and rejecting unit which is capable of testing coins inserted by a customer for genuineness and separating them into the various denominations thereof, of which only those coins of the particular denomination to be stored in tubes 20 and 22 will be dropped into the top of passage 16 for gravitational movement therethrough. Since the remaining portions of such changing apparatus and the structure of the coin accepting and rejecting unit form no part of the instant invention and their nature is well known to those skilled in the art, they have not been illustrated in the drawing and need not be further described here.

The mechanism 10 broadly includes a pair of generally C-shaped, rocking, blocking and deflecting assemblies 28 and 30 disposed respectively adjacent the tops

of the coin tubes 20 and 22 and within the feeding area 18, and a latch 29 disposed between assemblies 28 and 30. The assemblies 28 and 30 are pivotally supported by a common inclined shaft 32 in side-by-side relationship carried on the outer face of section 13 in any suitable manner. The arcs of rocking movement of the assemblies 28 and 30 are limited by the interferences that occur with the section 13 at the extremes of such arcs.

Assembly 28 has a blocking and deflector member 34 on the upper leg 35 thereof and a finger 36 as the lower leg thereof, while assembly 30 is similarly provided with an upper blocking and deflector member 38 and a lower finger 39. The blocking and deflector member 34 of assembly 28 is slightly bowed and is aligned with an arcuate opening 40 in section 13 for projection into area 18 within the path of travel of coins issuing from passage 16 when assembly 28 is swung to one limit of its rocking pivotal movement. In this position of the assembly 28, member 34 blocks the open top of tube 20 from the entry thereinto of coins from passage 16, as particularly illustrated in FIG. 3. When assembly 28 is at the other extreme of its rocking movement, finger 36 protrudes into the path of any coins entering the tube 20 from the passage 16, as best shown in FIG. 4, and the member 34 is withdrawn from its blocking position.

The member 38 of assembly 30 is flat and is adapted for projection through a rectangular opening 41 in section 13 into a position for blocking the open top of tube 22 when the assembly 30 is swung to one limit of its rocking travel, as shown in FIG. 4. When assembly 30 is at the other extreme of its rocking movement, finger 39 protrudes into the path of any coins entering the tube 22 from passage 16 and the member 38 is withdrawn from its blocking position, as shown in FIG. 3. Assemblies 28 and 30 have weights 42 and 43 thereon disposed above the shaft 32 and to the outside thereof to yieldably bias the deflector members 34 and 38 away from the openings 40 and 41 and the fingers 36 and 39 into the tubes 20 and 22.

The latch 29, which is mounted on the outer face of section 13, includes a thin, resilient, metal tab 46 secured at the upper end thereof to section 13 in any suitable fashion and having its lowermost extremity 48 bent slightly outwardly to present a free edge. In the normal condition of tab 46, the extremity 48 thereof is adapted to engage a catch in the nature of a shouldered notch 50 on the assembly 28 to hold the latter in its blocking position, as shown in FIG. 3, whenever it is moved to that position by the rocking action of a coin gravitating against the finger 36 in tube 20. Assembly 30 is provided with a cam 52 thereon (see: FIG. 6), which is engageable with the outer side of tab 46 when the finger 39 is engaged by a coin gravitating in tube 22, which moves the tab end 48 out of the notch 50, thereby releasing assembly 28 to rock to the unblocking position shown in FIG. 4 under the influence of weight 42.

Since the tab 46 latches only the assembly 28, the assembly 30 is normally disposed as shown in FIG. 3 with its deflector member 38 out of blocking position and its finger 39 projecting substantially into tube 22.

In operation, the assemblies 28 and 30 serve to alternately open and close the tops of tubes 20 and 22, so that successive coins issuing from the passage 16 are permitted to enter first one tube and then the other. The sequence of events in the coin feeding cycle may most easily be understood by initially viewing mechanism 10 when it is disposed in the condition illustrated in FIGS. 2 and 3. At this time the deflector member 34 of assembly 28 is in its blocking position, and the deflector member 38 of assembly 30 is out of its blocking position with the finger 39 thereof disposed well within the tube 22.

As the first coin, such as a nickel, issues from the passage 16, it is directed by the shoulder 26 onto the deflector member 34 of lever 28 and is denied entrance into tube 20. Because of the inclination of deflector member 34, the nickel then gravitates toward the open top of tube 22, which it finds unblocked and enters. As such nickel enters tube 22, it engages finger 39 of assembly 30 shown in FIG. 4 causing cam 52 thereof to swing against tab 46 and depress the extremity 48 away from notch 50, thereby releasing assembly 28 so that it is free to rock in the direction moving its deflector member 34 out of its blocking position. When the same nickel completely clears the finger 39 of assembly 30, the latter is free to swing back into its normal position such that, at this time, both of the deflector members 34 and 38 of levers 28 and 30 are out of their blocking positions.

When the next succeeding nickel issues from passage 16 and is directed toward the assembly 28 by shoulder 26, that nickel is free to enter the now unobstructed tube 20. As such nickel gravitates into tube 20, it engages finger 36 of assembly 28, causing the latter to swing about shaft 32 in a clockwise direction viewing FIGS. 3 and 4 to relatch tab end 48 in the notch 50 and return deflector member 34 into its blocking position. Thus, when the nickel entering tube 20 has cleared finger 36, the assembly 28 remains in its blocking position shown in FIG. 3 by virtue of the latch 29. Assemblies 28 and 30 are then in their original positions and ready to repeat the alternating feed cycle as additional nickels are subsequently deposited.

The above described cycle is then repeated until such time as the tubes 20 and 22 become completely filled, as indicated in FIG. 5. At this time, it will be seen that the top coin in each of the tubes 20 and 22 engages the corresponding finger 36 or 39 and depresses the latter so that the deflector members 34 and 38 are both held in their respective blocking positions. Then, when the next nickel issues from passage 16, it is first deflected by deflector member 34 of assembly 28 onto deflector member 38 of assembly 30, which in turn directs the nickel into the channel 24 for storage in the coin collection box. Once enough change coins have been dispensed from the lower end of tubes 20 and 22 to release the fingers 36 and 39, the mechanism 10 is once again enabled to feed coins into tubes 20 and 22 alternately by the cycle above described.

Those skilled in the art will appreciate that the invention is not limited in its application and utility to employment in coin changers, or with any particular denominations of coins, or even with coins in a restrictive sense excluding other disc-like objects. The illustration of the principles of the invention with reference to a preferred coin changer application should, therefore, be understood as merely exemplary, and the invention should be deemed limited only by the fair scope of the claims that follow.

I claim:

1. In apparatus for handling coins or other disc-like objects having a minor thickness dimension and a generally annular edge defining a major diameter dimen-

sion, the improvement of which comprises means operable independently of the relative weights of the individual coins for alternately feeding successive ones of said coins from a common inlet to a pair of reception paths, said means comprising:

an assembly having a pair of opposed, upright wall sections, certain opposed portions of said sections being horizontally spaced apart a distance greater than the thickness but less than the diameter of the coins to be handled to present said common inlet path through which the coins move edgewise;

a pair of elongated coin-control units, each having a coin actuatable operating finger at one end and at least one of the pair having a coin deflector at its opposite end;

a pivot shaft carried by one of said sections and mounting said units in side-by-side relationship generally above said reception paths for individual swinging movement of the units about a common axis extending generally parallel to said sections,

said one unit being mounted intermediate its opposed ends on said shaft for swinging of its finger and deflector alternately toward and away from the other of said sections to shift said deflector into and out of a position within said inlet path in which the deflector blocks entry of a coin to one of said reception paths and directs the coin to the other of said reception paths,

said finger of the one unit being located below the deflector of said one unit and being responsive to the entrance of a coin into said one reception path when the deflector of said one unit is out of its blocking position for swinging the deflector into said position,

the other of said units being mounted on said shaft for swinging of its finger toward and away from said other section for receiving the operating impact of a coin deflected by said one unit into said other reception path;

means yieldably biasing said deflector of said one unit away from said other section and out of said blocking position but incapable of counteracting the force of a coin impacting the finger of said one unit;

an actuatable latch on said one section located between said units, physically separate from both of the latter, and shiftable independently thereof into and out of a latching position;

a catch on said one unit for receiving said latch in its latching position when the deflector of said one unit is in said blocking position to releasably hold the deflector in said blocking position;

means on said other unit disposed to engage and shift said latch out of said latching position to free said one unit in response to the actuation of the finger of said other unit by a coin entering said other channel; and

means yieldably biasing said latch engaging and shifting means of said other unit out of actuation of said latch but incapable of counteracting the force of a coin impacting the finger of said second unit.

2. The invention of claim **1**, wherein said sections define a third reception path, said other unit having its own deflector at the end thereof opposite to said finger for movement into and out of a second position within said inlet path for blocking entry of a coin into said other reception path, said deflector of said other unit being operable to direct a coin into said third reception path when both deflectors of the units are held in their respective blocking positions by coins filling the respective reception paths and depressing the fingers of said units.

3. The invention of claim **1**, wherein said latch includes a resilient tab having a deflectable extremity, said catch on said one unit being engageable with said extremity of the tab.

4. The invention of claim **3**, wherein said engaging and shifting means includes a cam displaceable about said axis during swinging of said other unit and engageable with said tab for deflecting said extremity of the latter away from said catch.

5. The invention of claim **1**, wherein said biasing means includes a weight on each unit.

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