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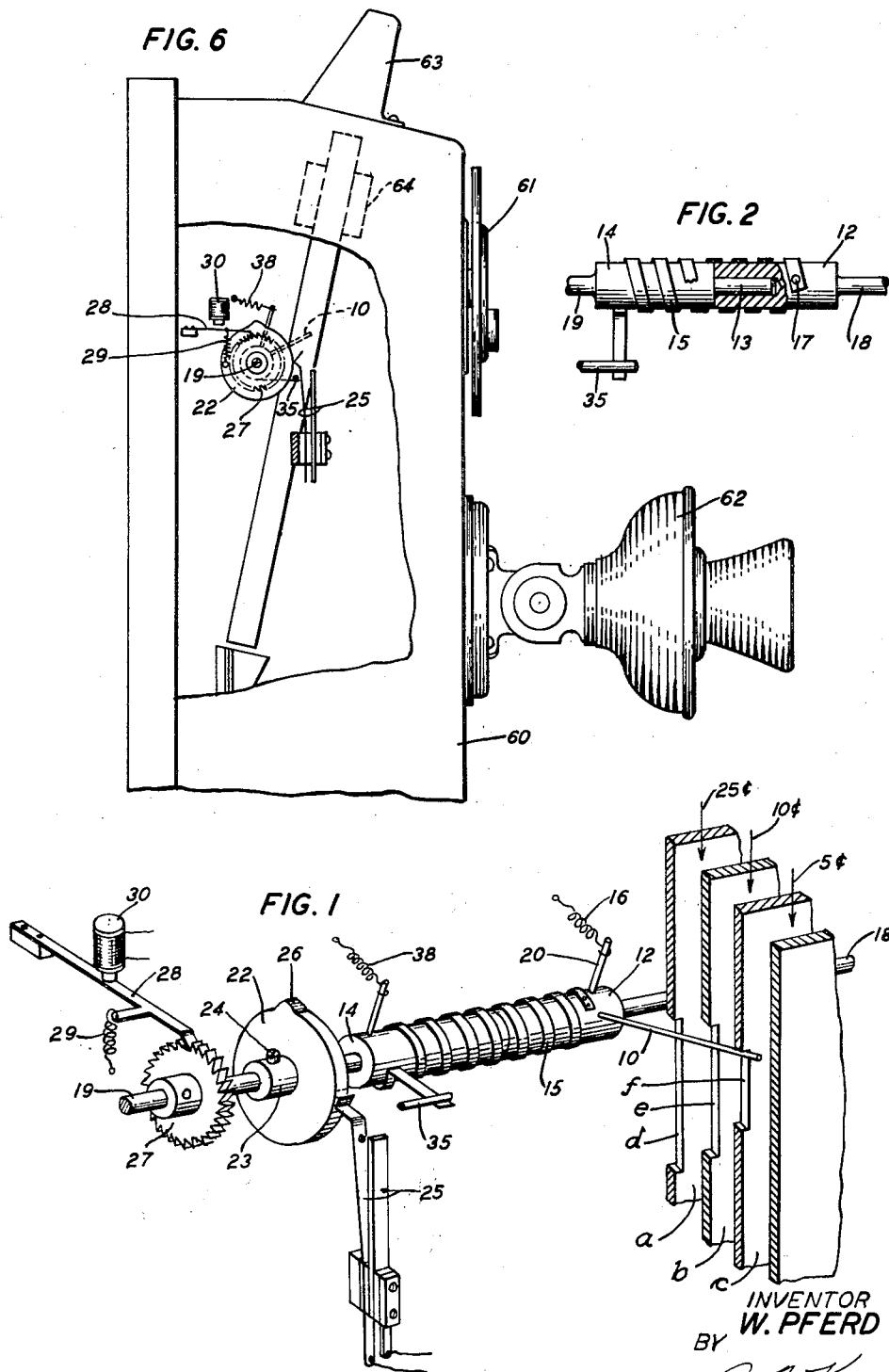
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MECHANICAL COIN TOTALIZER

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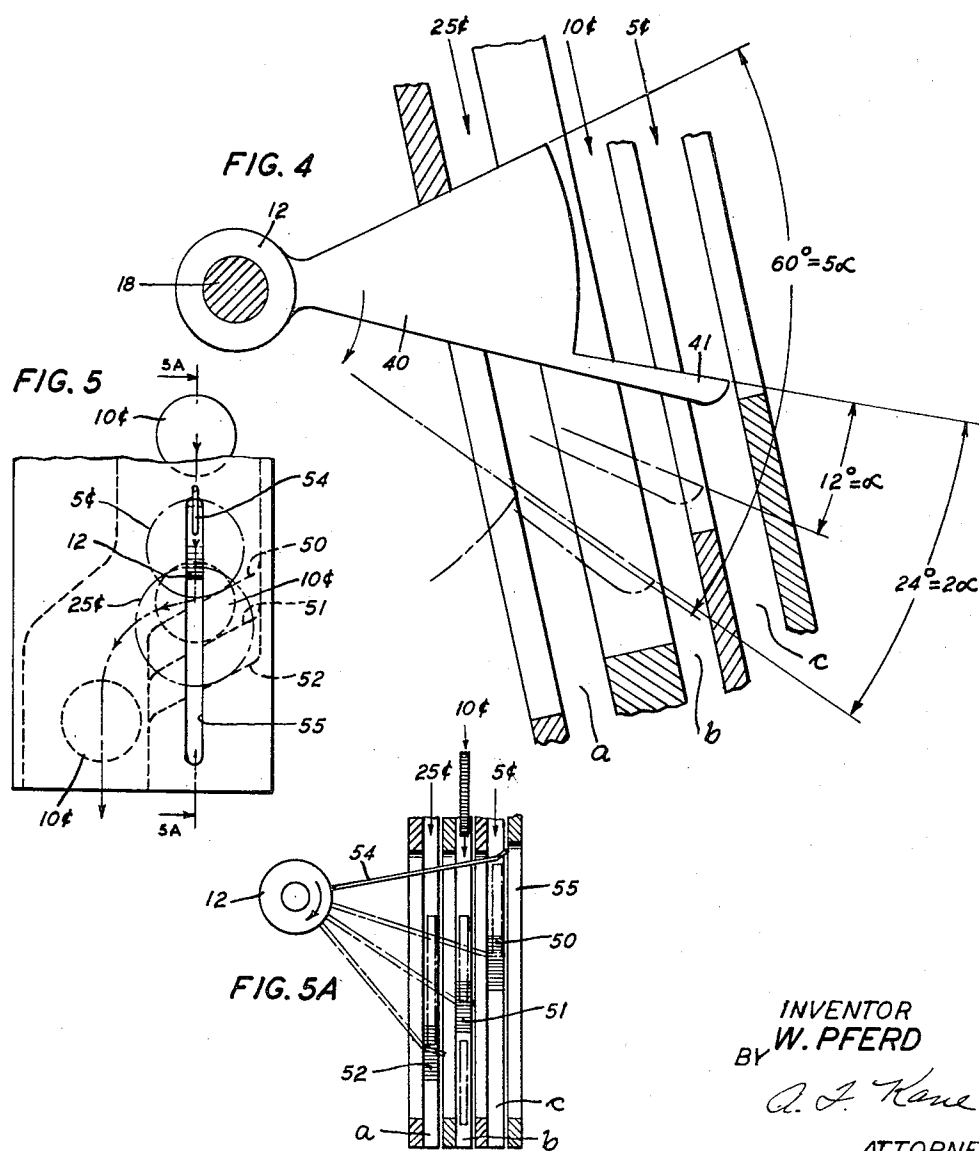
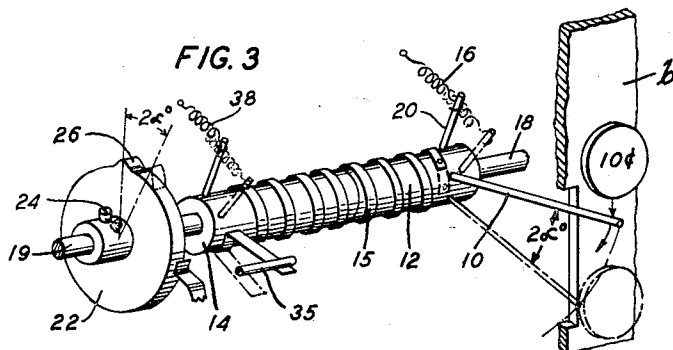
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MECHANICAL COIN TOTALIZER

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MECHANICAL COIN TOTALIZER

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2 Claims. (Cl. 194—1)

This invention relates to a coin-controlled merchandise or service-dispensing machine and particularly to a device for totalizing the deposit of an assortment of coins of various denominations therein preparatory to a dispensing operation thereby.

It is one object of this invention to provide an improved mechanical coin totalizer for a service-dispensing device which functions automatically to detect and recognize coins of various denominations; to total the value of a deposit of an assortment of coins; to compare the total with a predetermined cost of an item of service; and to enable the dispensing device when the compared total corresponds to the cost of the service item.

This object is attained in accordance with a feature of the invention by the provision of means, common to the coin chutes of a multichute coin receiving device, for translating the face values of coins deposited haphazardly in any one or more of such chutes, into commensurate angles of rotation of a dispenser-enabling device. More particularly, a single coin finger projects into all of the coin chutes of the service dispenser so as to be located in the paths traversed by coins deposited in the various chutes and to be moved by each coin through an arc which varies in direct proportion to the face value or denomination of the deposited coin, and to correspondingly rotate an electric circuit controller or dispenser-enabling device. In accordance with another feature of the invention the movement of the coin finger is transmitted to the circuit controlling device through a pair of cooperating shaft and sleeve members which are coupled through the medium of a band-type clutch.

Another feature of the invention pertains to locating each of the several coin chutes of the service-dispenser with respect to the axis of rotation of the finger-controlled shaft and sleeve combination, so that each deposited coin rotates the shaft and sleeve combination and, therefore, the enabling device through an arc whose length is in direct proportion to the face value of the deposited coin.

A further feature of the invention provides a circuit-controlling or dispenser-enabling device which is adjustable with respect to its coin finger control shaft so as to render it selectively operable to perform its control function when the total deposit of coins reaches any one of a number of different values.

These and other features of the invention will be readily understood from the following detailed description when read with reference to the accompanying drawings, in which:

Fig. 1 is a structural schematic disclosure of the coin totalizer of this invention showing the essential elements thereof in perspective;

Fig. 2 is a view of the band clutch mechanism which couples the coin finger control shaft and sleeve combination;

Fig. 3 is a structural schematic perspective view of the mechanism controlled by the coin finger and illustrates several positions thereof which are assumed during the passage of a dime through its respective coin chute;

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Fig. 4 is a schematic view of an alternative form of coin finger;

Figs. 5 and 5A are complementary fragmentary views of a particular form of coin chute structure which avoids the possibility of friction resulting from coin skidding over the end of the coin finger; and

Fig. 6 is a fragmentary view of a telephone instrument of the coin-box type and illustrates one of the applications of the coin totalizer of this invention.

The coin totalizer comprises, basically, a coin finger 10 secured to and projecting from a sleeve member 12 which is provided with a coaxial bore into which a reduced section 13 of shaft or cylinder 14 fits. Actually, the elements 12 and 14 constitute two cylinders having a common axis of rotation and torsionally coupled by the friction between the two and a coil spring 15 fitted over them. The cylinder 12, to which the coin finger 10 is secured in any suitable manner, is regarded as the driving cylinder and the cylinder 14 as the driven cylinder. It is well known that if the driving cylinder 12 is rotated in such a direction as to wind up the spring 15 and thereby decrease its diameter, the spring will grip the cylinders and will exert more torque than when the direction of rotation is such as to tend to unwind the spring. Viewing Figs. 1, 2 and 3, for example, when the driving cylinder 12 is rotated in a clockwise direction, the spring 15 is wound in a direction tending to decrease its diameter so that a substantial positive coupling torque is produced and the driven cylinder 14 follows the clockwise rotation of the cylinder 12. When the driving cylinder 12 is rotated counterclockwise under the influence of spring 16, the coupling torque is substantially lessened and the cylinder 14 does not tend to follow the cylinder 12 under this condition.

As illustrated, the coil spring 15 is a continuous strip of relatively stiff, flat spring material with one end fixed at 17 to the sleeve or cylinder 12, and the other end projecting radially from the cylinder 14 so as to abut a release finger 35. The cylinder 12 terminates one end of the shaft 18 while the cylinder 14 terminates one end of the shaft 19, the other ends of such shafts being journaled in suitable fixed supports (not shown) of the dispensing device of which the totalizer forms a part. The shafts 18 and 19 are coaxial.

The spring 16, which has one end anchored to any suitable structure, has its other end latched or otherwise secured to a finger 20 which, in turn is fixed to the cylinder 12. This spring tends to restore the cylinder 12 to normal position when the cylinder is not otherwise being rotated clockwise.

Adjustably mounted on shaft 19 and located to the left of cylinder 14 is a control device or contact controlling cam 22. This cam is provided with a shoulder 23 which accommodates a set screw 24 which permits rotational adjustments of the cam relative to the shaft 19 to be made. The cam is prevented from shifting laterally on shaft 19 by any suitable means.

A spring pile-up 25 is rigidly located, in any suitable manner, with respect to the circuit controller 22, so that the movable spring thereof is engaged by the cam node 26, when the cam is rotated clockwise through a predetermined arc. It is apparent that by manipulating the set screw 24 the cam 22 may be adjusted rotationally on the shaft 19 so that the arc through which it must rotate before the node 26 engages the working spring of pile-up 25 may be adjusted, as desired, or as conditions demand.

Located to the left of cam 22 and adjustably mounted on shaft 19 is a ratchet wheel 27 which is normally engaged by a detent 28 which is held in contact with the wheel 27 by means of the spring 29. The detent normally prevents counterclockwise rotation of the shaft 19. An electromagnet 30 is employed, in the exemplary dis-

closure, as a means for disengaging the detent 28 from the ratchet 27 and thus releasing shaft 19 for counterclockwise rotation under the influence of spring 38.

Located at the right of Fig. 1 is a bank of coin chutes *a*, *b* and *c*. In this illustration, the chute *a* is identified as the quarter chute, the chute *b* as the dime chute, and the chute *c* as the nickel chute, it being understood that only coins of the particular denominations identified reach the chutes when deposited in a service dispensing machine, such as the telephone coin collector shown in Fig. 5. The walls which define the coin chutes *a*, *b* and *c* are notched at *d*, *e* and *f*, respectively, in such a manner as to permit the coin finger 10 to pass therethrough and to have freedom of movement therein. It will be understood that the slot or notch dimensions are such that the outer end of the finger 10 can sweep clockwise from the position shown in Fig. 1 through an arc which carries it past the lower edge of notch *d*.

Each of the chutes *a*, *b* and *c* is so located and positioned with respect to the rotational axis of shaft 18, that is, with respect to the pivot point of the finger 10, that as the finger 10 moves clockwise to the point identified by the lower edge of notch *f*, it will have moved through an angle α which bears a direct relationship to the face value of a nickel, that is, to the denomination of the coin which traverses the chute *c*. Similarly, when the finger 10 is moved to a point defined by the lower edge of notch *e* it will have moved through an angle 2α which corresponds to the face value of a dime, that is, to the denomination of the coin which traverses the chute *b*. Also, when the finger 10 has moved to a position identified by the lower edge of notch *d* it will have moved through an angle 5α which corresponds to the face value of a quarter, that is, to the denomination of the coin which traverses chute *a*.

Any coin, nickel, dime or quarter, which passes through its respective chute *c*, *b* or *a*, engages the coin finger 10 and moves it downwardly against the action of spring 16 until the coin clears the finger end. If the coin deposited is a nickel, the finger 10 sweeps over an angle α ; if a dime, an angle 2α ; and if a quarter, an angle 5α . As the finger 10 moves clockwise, the sleeve or cylinder 12 experiences a similar rotational movement with the result that the coupling torque of the band clutch 15 is increased and the grip of the spring 15 on the cylinders 12 and 14 similarly increased to cause the shaft 14 to rotate with the cylinder 12 through an arc corresponding, in degrees, to the face value of the coin which propels the finger 10. Depending upon whether the deposited coin is a nickel, dime or quarter, the cylinder 14 and, therefore, the shaft 19 and its associated circuit controller or enabling device 22, move through an arc α , 2α , or 5α . If the setting of cam 22 on shaft 19 is such that it requires a 5α angle of rotation to cause the cam node 26 to operate the active spring of pile-up 25, then it will require the deposit of five nickels, or two dimes and a nickel, or three nickels and a dime, or one quarter to effect the required displacement of the cam 22.

When each deposited coin clears the end of coin finger 10, the spring 15 immediately functions to restore the cylinder 12 to a normal position in which the finger 10 abuts the upper edge of the notch *f*. As the cylinder 12 tends to restore to normal, the spring 15 tends to unwind causing a decrease in the coupling torque. The cylinder 14, therefore, no longer tends to follow the cylinder 12 in its counterclockwise movement. Furthermore, the detent 28, because of its engagement with ratchet wheel 27, prevents counterclockwise movement of the shaft 19 and, therefore, of the cam 22 and cylinder 14.

When the cam node 26 engages the spring pile-up 25, a circuit is closed to enable the dispensing device with which the coin totalizer is associated.

Fig. 3 illustrates the action which results from the deposit of a dime in coin chute *b*. When the dime, in its passage through chute *b*, strikes the coin finger 10, the

finger is moved through an angle 2α causing the finger to reach the position indicated by the broken line outline. In this position the spring 16 is distended and as the coin passes the extreme end of the finger 10 to continue its downward movement in chute *b*, the spring 16 recoils and restores the finger 10 and the cylinder 12 to normal position. The cam 22 and cylinder 14 do not return to normal positions since they are held in their advanced positions by the engagement of detent 28 with ratchet wheel 27 shown in Fig. 1. The spring 15 being free to turn on cylinder 14 returns to normal position with its free end engaging the release finger 35. The release finger 35 makes contact with the free end of the band clutch 15 at the rest position of the sleeve 12 and finger 10 and expands the band clutch. In this position the support shaft 14 and cam 22 are free to rotate in the reverse direction.

The time constant of spring 16 is such as to permit coins to be deposited in rapid succession in the chutes *a*, *b* and *c* with assurance that the coin finger 10 will experience a complete cycle of operation for each coin deposited. It is apparent also, that coins may be deposited in any order or sequence.

Any suitable means, such as the electromagnet 30, may be provided to disengage the detent 28 from ratchet wheel 27 and thus render the shaft 19 with its ratchet 27, cam 22 and cylinder 14, subject to the restoring influence of spring 38.

An alternate form of coin finger is shown in Fig. 4. This finger comprises a sector-shaped portion 40 and an integrally projecting portion 41. The upper edge of section 40 is individual to the quarter chute *a* while the upper edge of the projection 41 is common to the dime and nickel chutes *b* and *c*. As illustrated, the coin finger will rotate through an angle α of 12 degrees for every five-cent increment of total coin deposit. Except for the particular configuration of the coin finger shown in Fig. 4, the description heretofore made with reference to the coin finger of Figs. 1, 2 and 3 applies equally well to Fig. 4. The deposit of five-, ten- or twenty-five-cent coins in any order in a mechanism employing the coin finger shown in Fig. 4 and having coin channels positioned as shown, will cause successive rotations of the cam 22 to rest positions located at multiples of the 12-degree angle. The total angle rotated by the coin finger will be in direct proportion to the amount of money deposited.

It is not essential that the coin chutes *a*, *b* and *c* be located in a pile-up, one behind the other. An arrangement whereby the chutes are positioned side-by-side would be satisfactory as long as they are located, with respect to the axis of the rotatable sleeve 12, so that coins rotate the mechanism in direct proportion to their value. Any arrangement of channels or coin fingers, or sleeve and band clutch combinations which produce a fixed angle of rotation per unit of money will suffice.

Fig. 6 illustrates the application of the coin totalizer of this invention to a telephone instrument of the coin-box type. In this figure, the casing 60, a portion only of which is shown, supports on its front face the usual dial 61 and transmitter or mouthpiece 62, and on its top, supports the usual three-coin depository 63. In practice, the coin slots of the depository 63 communicate with the coin chutes *a*, *b* and *c* by way of a coin-sorting and slug-rejecting device such as schematically indicated by the broken-line box 64. The nature or construction of this device is immaterial in so far as the present invention is concerned. It may be of any well-known design. Suffice it to say that such device functions to direct the five-cent, ten-cent and twenty-five-cent coins to their respective coin chutes *c*, *b* and *a*, respectively. It is not deemed necessary to further describe Fig. 6 since it is apparent that any suitable means may be provided for supporting the totalizer elements within the coin box housing as shown.

In the chute design shown in Figs. 5 and 5A each of the three chutes *a*, *b* and *c* is provided with an interiorly lo-

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cated ramp such as shown at 50, 51 and 52. The ramp 50 is individual to chute c; the ramp 51 is individual to chute b; and the ramp 52 is individual to chute a. Each ramp is slanted downwardly at an angle of about 30 degrees from the horizontal and is located in its chute so as to obstruct the direct path of the coin as it travels down the chute and propels the coin finger 54 ahead of it. Each of the walls which define the three chutes is provided with a slot such as slot 55 and all such slots are in alignment and constitute a path or guide for the free end of the coin finger as it moves downwardly under the influence of a deposited coin. When the end of the coin finger 54 reaches the position in its downward movement which corresponds to a position reached by coin finger 10 in Fig. 1 at which the coin moves off the finger, the deposited coin encounters the corresponding ramp and is deflected in the direction of the curved arrow in Fig. 5 to continue its downward travel to its ultimate destination. As illustrated in Fig. 5, a dime would encounter ramp 51, while nickels and quarters would encounter ramps 50 and 52, respectively, to be similarly deflected and thus removed from contact with the end of the coin finger 54. Thus, the coin finger is released immediately after traversing an arc corresponding to the denomination of the coin propelling it and is immediately returned to normal position under the action of a return spring, such as spring 16 (Fig. 1). Friction resulting from coins skidding over the finger end is eliminated by the use of the coin-deflecting ramps just described.

What is claimed is:

1. A coin collector comprising a plurality of coin chutes each adapted to receive a coin of a particular different

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denomination, a first shaft, a rotatable control device fixed to said first shaft, a second shaft, means supporting said shafts in coaxial alignment, a coin finger common to said chutes and having one end thereof projecting within all of said chutes so as to be engaged by coins deposited therein and to be propelled by the weight thereof, means rigidly supporting the other end of said coin finger on said second shaft whereby said second shaft is rotated in a particular direction solely by the weight of a deposited coin on said coin finger, and means including a continuous radially expansible spring coiled on both said shafts for effectively coupling said shafts only when said second shaft is rotated in the said particular direction, whereby said control device is driven solely by the weight of a deposited coin and only when said second shaft is rotated in the said particular direction.

2. A coin collector in accordance with claim 1 including means for rotating said second shaft in a direction other than the said particular direction to render said coupling means ineffective.

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