Feb. 28, 1961 M. P. HAVERSTICK 2,973,074

COIN SEPARATORS

Filed Sept. 9, 1957

FIG. 1

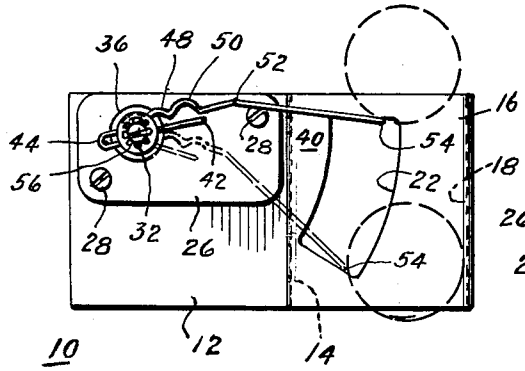


FIG. 2

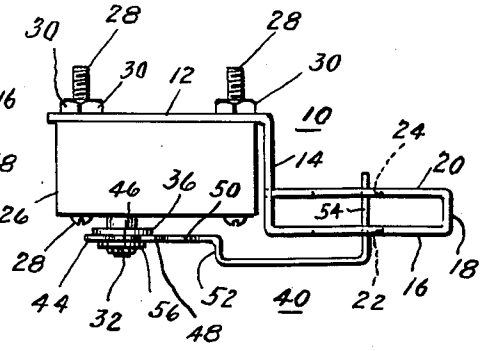


FIG. 3

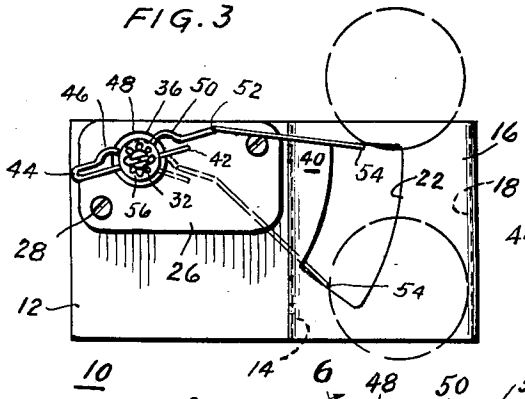


FIG. 4

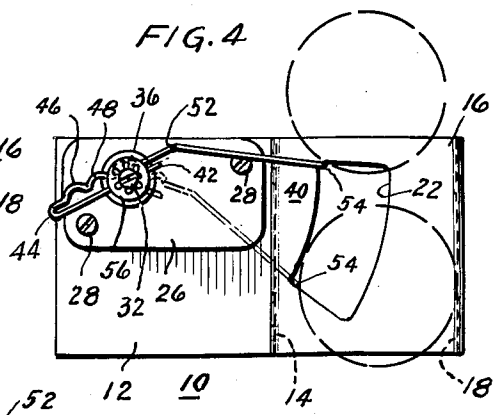


FIG. 5

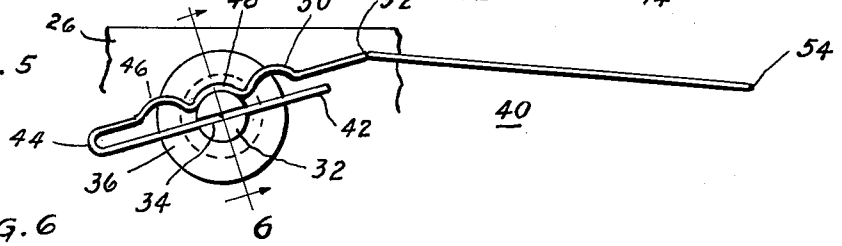
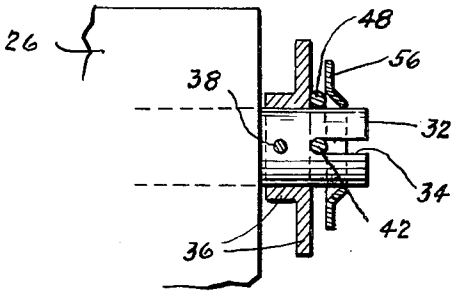


FIG. 6



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2,973,074

COIN SEPARATORS

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7 Claims. (Cl. 194—9)

This invention relates to improvements in coin separators. More particularly, this invention relates to an improved switch and actuator usable with coin separators.

It is therefore an object of the present invention to provide an improved switch and actuator usable with coin separators.

In the construction of a coin-handling device, it is customary to mount a switch adjacent a coin chute and to equip the actuator of that switch with a portion that extends into the coin chute to intercept and be moved by the coins passing through that chute. That actuator is frequently secured to a rotatable shaft of the switch, and the engagement of a coin with the said portion of that actuator causes the said shaft to rotate and shift the contacts of the switch. It is desirable that the actuator be secured to the rotatable shaft in a simple but precise way; and the present invention provides an actuator which can be readily assembled with the rotatable shaft of a switch and which will, when so assembled, be precisely positioned relative to the coin chute. It is therefore an object of the present invention to provide an actuator for a coin switch which can be readily assembled with the rotatable shaft of that switch and which will, when so assembled, be precisely poistioned relative to the coin chute.

In some instances, operators of vending machines wish to change the prices charged for the product or service being vended. Where those vending machines are equipped with the usual switches and actuators, the operators have to replace the actuators or replace the actuators and switches. Such replacement is frequently expensive and time-consuming. The present invention obviates the expenditure of money and the loss of time that is involved in the replacement of the actuators or of the actuators and switches, as by providing one actuator that can be used regardless of changes in the prices charged for the product or service being vended. It is therefore an object of the present invention to provide a switch actuator that can be used regardless of changes in the prices charged for the product or service being vended.

In one embodiment of the present invention, the actuator can be used to intercept and be moved by a nickel, a dime or a quarter. This means that the operator of a vending machine equipped with a switch that utilizes the actuator of the present invention can select a five cent, ten cent or twenty-five cent sales price without any need of replacing the switch or its actuator.

The actuator provided by the present invention is held within a slot in the rotatable shaft of the switch, and that actuator can be set at different poistions transversely of the axis of that shaft and thereby be caused to extend different distances into the coin chute. This is desirable because it enables the actuator to intercept and be moved by coins of different diameters. For example where the actuator is intended to intercept and be moved by a quarter, it will be set so it does not extend very far into

the coin chute; where that actuator is intended to intercept and be moved by a nickel, it will be set to extend further into that chute; and where that actuator is intended to intercept and be moved by a dime, it will be set to extend still further into that chute. It is therefore an object of the present invention to provide an actuator that can be set at different positions transversely of the axis of the rotatable shaft of a switch, and thereby be caused to extend different distances into the coin chute.

The rotatable shaft of the switch is circular in cross section, and the actuator has a plurality of spaced apart semi-circular offsets that can selectively engage and be held by the periphery of the rotatable shaft. By placing the various spaced apart, semi-circular offsets in engagement with the periphery of the rotatable shaft, the present invention makes it possible to change the distance the actuator extends into the coin chute. The spaced apart, semi-circular offsets will not only hold the actuator against movement relative to the rotatable shaft, but they will precisely position that actuator relative to that shaft and relative to the coin chute.

The fact that the switch actuator can be intercepted and moved by a plurality of different coins is also desirable because it reduces the cost of manufacturing coin-handling devices. Instead of having to manufacture and stock a number of individually different switch actuators, the manufacturer can make and stock just the one actuator. Further, the assembler does not have to pick and choose actuators from different bins or baskets; instead he need only pick up one type of actuator, regardless of the size of coin to be accommodated.

Other and further objects and advantages of the present invention should become apparent from an examination of the drawing and accompanying description.

In the drawing and accompanying description a preferred embodiment of the present invention is shown and described but it is to be understood that the drawing and accompanying description are for the purpose of illustration only and do not limit the invention and that the invention will be defined by the appended claims.

In the drawing,

Fig. 1 is a side elevational view of one form of switch and one form of actuator that are made in accordance with the principles and teachings of the present invention,

Fig. 2 is a plan view of the switch and actuator of Fig. 1,

Fig. 3 is a side elevational view of the switch and actuator of Figs. 1 and 2 after the switch actuator has been set to accommodate a larger diameter coin,

Fig. 4 is a side elevational view of the switch and actuator of Figs. 1–3 after the switch actuator has been set to accommodate a still larger coin,

Fig. 5 is a side elevational view, on a larger scale, of a portion of the switch and switch actuator of Figs. 1–4, and

Fig. 6 is a sectional view, on said larger scale, taken along the plane indicated by the line 6—6 in Fig. 5.

Referring to the drawing in detail, the numeral 10 generally denotes a mounting bracket for a coin-actuated switch. That bracket includes a generally square, vertically directed wall 12. A forwardly extending, vertically directed wall 14 is disposed at the right-hand edge of the generally square wall 12, and a laterally extending, vertically directed wall 16 extends to the right from the forward edge of the wall 14. A rearwardly extending, vertically directed wall 18 is disposed at the right-hand edge of the laterally extending wall 16, and a vertically directed rear wall 20 extends to the left from the rear edge of the wall 18.

The mounting bracket 10 can be made in different

ways, but it will preferably be made by bending a flat piece of metal into the configuration shown by the drawing. The left-hand edge of the wall **20** will abut the wall **14**, as shown; and the walls **20** and **14** can be secured together by forming slots in the wall **14** and by forming projections on the left-hand edge of wall **20** that extend into those slots. The walls **14** and **20** could also be secured together by brazing, soldering or other methods known to the art.

An arcuate slot **22** is provided in the wall **16**; and the geometric center of that slot is located adjacent the upper left-hand corner of the wall **12** of mounting bracket **10**. A similar arcuate slot **24** is provided in the rear wall **20**; and the slots **22** and **24** are in register with each other.

The numeral **26** denotes a small enclosed electrical switch, and the housing for that switch has openings through it which receive bolts **28**. Those bolts extend through the openings in the housing for switch **26** and also extend through openings in the generally square wall **12**. Nuts **30** are threaded onto the projecting ends of the bolts **28** to fixedly secure the switch **26** to the mounting bracket **10**.

The switch **26** has a rotatable shaft **32**; and when that shaft is in the normal position shown in Fig. 5, two contacts, not shown, of that switch will be spaced apart. A suitable spring, not shown, is provided within the housing of switch **26** to normally hold those contacts apart. When the shaft **32** is rotated in the clockwise direction approximately thirty five degrees, the two normally open contacts will be closed to complete a circuit between two terminals, not shown, of the switch. When the shaft **32** is permitted to return to its initial position, the spring within the switch housing will re-open the two normally open contacts. The switch **26** is a standard commercially available switch and is not, per se, a part of the present invention.

The rotatable shaft **32** of the switch **26** has a slot **34** formed in the outer end thereof; and that slot is coincident with a diameter of the shaft **32**. This slot accommodates part of the switch actuator for the switch **26**.

A flanged sleeve **36** is provided for the rotatable shaft **32**; and the sleeve-like portion thereof is large enough to telescope freely over that shaft. The flange portion of the flanged sleeve **36** projects radially outwardly from the sleeve-like portion and also projects radially outwardly from the shaft **32**. An opening, not shown, is provided in the sleeve-like portion of the flanged sleeve **36**, and that opening will be alined with a diametric opening through the shaft **32**. A pin **38** can be passed through the openings in the flanged sleeve **36** and in the shaft **32** to lock that flanged sleeve and shaft together for conjoint rotation. As indicated particularly by Fig. 6, the flange portion of the flanged sleeve **36** is immediately adjacent the inner end of the slot **34** in the shaft **32** whenever that flanged sleeve is pinned to the shaft **32** by the pin **38**. The slot **34** and the flange portion of the flanged sleeve **36** thus are enabled to hold a switch actuator in a plane which is perpendicular to the axis of the shaft **32**.

The numeral **40** generally denotes the actuator for the switch **26**. That actuator is preferably made from a length of heavy piano wire which is bent to have the desired configuration. That actuator has a straight portion **42** that is small enough in diameter to fit into the slot **34** in the shaft **32**. One end of the straight portion **42** is free, but the other end merges into a rounded end **44** of the switch actuator **40**. The rounded end **44** constitutes a reentrant bend for the switch actuator **40**, and it makes one end of that switch actuator generally U-shaped. A semi-circular offset **46** is provided in that portion of the switch actuator **40** which is opposite the straight portion **42**. Semi-circular offsets **48** and **50** are also provided in that section of that switch actuator, and those offsets are spaced from the offset **46** and from each other. A horizontal offset **52** is provided in the switch actuator **40**, and that offset is disposed to the right of the semi-circular offset **50** of that actuator. The actuator **40** has a coin-receiving portion **54**, and that coin-receiving portion extends rearwardly of the switch actuator and extends through the slots **22** and **24**.

The switch actuator **40** is made so the semi-circular offsets **46**, **48** and **50** are complementary to part of the periphery of the shaft **32**, as indicated particularly by Fig. 5. Further, the switch actuator **40** is dimensioned so the coin-receiving portion **54** thereof is adjacent the left-hand sides of the slots **22** and **24** when the semi-circular offset **50** is in engagement with the shaft **32**, so the coin-receiving portion **54** is adjacent the centers of the slots **22** and **24** when the semi-circular offset **48** is in engagement with the shaft **32**, and so the coin-receiving portion **54** is adjacent the right-hand edges of the slots **22** and **24** when the semi-circular offset **46** is in engagement with the shaft **32**. This arrangement is desirable because it makes it possible to set the coin-receiving portion **54** of the switch actuator **40** at various positions relative to the slots **22** and **24** in the walls **16** and **20**. The switch actuator **40** is carefully dimensioned, relative to the mounting bracket **10**, so the engagement between the semi-circular offsets **46**, **48** and **50** and the shaft **32** precisely positions the coin-receiving portion **54** of that actuator relative to the slots **22** and **24**.

The numeral **56** denotes a generally circular disc of springy metal with a central opening and with resilient fingers contiguous with that opening. The resilient fingers of that disc extend inwardly toward the geometric center of that disc and are spaced apart a distance less than the diameter of the shaft **32**. However, those fingers are flexible and resilient, and they can yield to permit the disc to be telescoped over the outer end of the shaft **32**. When the disc **56** is telescoped over the outer end of the shaft **32**, those fingers bend outwardly, as shown particularly by Fig. 6. Those fingers have sharp edges, and those sharp edges resist accidental separation of that disc from the shaft **32**; and hence the disc **56** serves as a keeper. The fingers of disc **56** can, however, be pried up to permit that disc to be separated from that shaft.

As long as the keeper **56** is in position on the shaft **32**, it will coact with the flange portion of the flanged sleeve **36** to confine the switch actuator **40** against accidental separation from the shaft **32**. However, that keeper will not prevent movement of that switch actuator laterally of the slot **34** in the shaft **32**. In particular, the keeper **56** will hold the switch actuator **40** in assembled relation with the shaft **32** but will permit that switch actuator to be moved laterally of that shaft to place the semi-circular offset **46**, the semi-circular offset **48** or the semi-circular offset **50** in engagement with the shaft **32**.

To incorporate the switch actuator of the present invention into a coin-handling device, the assembler on the production line checks his work ticket to determine whether the mounting bracket **10** is intended to accommodate a nickel, a dime or a quarter. If a dime is to be accommodated, the assembler will set the switch actuator **40** with its semi-circular offset **46** in engagement with the rotatable shaft **32** and will then telescope the keeper **56** over the outer end of that shaft. If, on the other hand, the work ticket calls for the mounting bracket to accommodate a nickel, the assembler will set the switch actuator **40** with its semi-circular offset **48** in engagement with the shaft **32** and will then telescope the keeper **56** over the outer end of that shaft. If the work ticket calls for the mounting bracket **10** to accommodate a quarter, the assembler will mount the switch actuator **40** on the shaft **32** with its semi-circular offset **50** in engagement with that shaft and will then telescope the keeper **56** over the outer end of that shaft.

When the coin-handling device, with the mounting bracket **10** and switch **26**, goes into service in the field, coins will pass through a coin separator, usually referred

to as a slug rejector, and then enter the coin chute defined by the walls 14, 16, 18 and 20. Those coins will be intercepted by the coin-receiving portion 54 of the switch actuator 40, and will move that portion downwardly; rotating the shaft 32 in the clockwise direction and closing the normally open contacts, not shown, of that switch. The coins will continue to pass downwardly through the coin chute and will free the coin-receiving portion 54 for return to its initial, upper position, thereby permitting the normally open contacts of switch 26 to reopen. The resulting pulse from the switch 26 can "start" the vending machine.

If the operator of the vending machine decides to change the price of the product or service being vended, he need only shift the switch actuator 40 relative to the shaft 32. The easiest way of doing that is to push on the right-hand end of the straight portion 42 when the actuator 40 is to be shifted to the left and to push on the reentrant end 44 when the actuator 40 is to be shifted to the right. In this simple way, the operator of the vending machine can enable the mounting bracket 10, the switch 26 and the switch actuator to accommodate the different coins that will be introduced to meet the different price.

For example, if the vending machine was originally intended to dispense a product or service for five cents, and the operator decided to increase the price to ten cents, he need only push on the reentrant end 44 of switch actuator 40 until the semi-circular offset 48 shifted out of engagement with shaft 32 and semi-circular offset 46 shifted into engagement with that shaft. If a higher priced product, as for example a twenty five cent product, was to be dispensed, the operator of the vending machine need only push on the free end of the straight portion of switch actuator 40 until the semi-circle offset 50 shifts into engagement with the shaft 32.

Whenever the switch actuator 40 is shifted relative to the shaft 32, the U-shaped portion of that switch actuator must "open" somewhat, because the normal spacing between the straight portion 42 and the opposite side of the switch actuator 40 is less than the radius of the shaft 32. The resilience of the switch actuator 40 is such, however, that the said actuator can "open" to the desired extent and then return to its normal position. In returning to its normal position, the switch actuator 40 causes the semi-circular offset that is closest to the shaft 32 to apply "centering" forces to the actuator 40. As a result, the switch actuator 40 automatically seats itself precisely on the shaft 32 whenever it is shifted to a new position relative to that shaft.

Whereas a preferred embodiment of the present invention has been shown and described in the drawing and accompanying description, it should be apparent to those skilled in the art that various changes may be made in the form of the invention without affecting the scope thereof.

What I claim is:

1. In a coin-actuated switch that has relatively movable contacts and a rotatable shaft and is mounted on a bracket, the improvement that comprises a diametric slot in said shaft opening to one end of said shaft, a flange on a flanged sleeve on said shaft that projects radially outwardly beyond the periphery of said shaft, said flange being adjacent the closed end of said diametric slot and defining a plane that is contiguous with said closed end of said slot, a switch actuator in the form of an elongated wire, said switch actuator having a straight portion disposable in but movable relative to said diametric slot and having a second portion spaced from said straight portion by a reentrant bend and having a plurality of semi-circular offsets in said second portion that are complementary to and selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said bracket having a coin chute therein and having a slot in the side of said chute to accommodate said coin-receiving portion, said semi-circular offsets being spaced apart, and a retaining disc that telescopes over said one end of said shaft and holds the first said and said second portions of said switch actuator against said closed end of saids lot and against said flange, respectively, one of said semi-circular offsets being engageable with said part of said periphery of said shaft to dispose said coin-receiving portion at one side of said slot and in the path of a coin of predetermined diameter, another of said semi-circular offsets being engageable with said part of said periphery of said shaft to dispose said coin-receiving portion at the opposite side of said slot and in the path of a coin of different predetermined diameter, said reentrant bend being openable to permit said second portion of said switch actuator to be moved relative to said part of said periphery of said shaft to dispose said one or said other semi-circular offset in engagement with said part of said periphery of said shaft, said reentrant bend restoring itself to cause said one or said other semi-circular offset to precisely center itself on and thereafter hold itself adjacent said part of said periphery of said shaft.

2. In a coin-actuated switch that has relatively movable contacts and a rotatable shaft, the improvement that comprises a diametric slot in said shaft opening to one end of said shaft, a flange on said shaft that projects radially outwardly beyond the periphery of said shaft, said flange being adjacent the closed end of said diametric slot and defining a plane that is contiguous with said closed end of said slot, a switch actuator in the form of an elongated wire, said switch actuator having a straight portion disposable in but movable relative to said diametric slot and having a second portion spaced from said straight portion by a reentrant bend and having a plurality of semi-circular offsets in said second portion that are complementary to and selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said semi-circular offsets being spaced apart, and a retaining disc that telescopes over said one end of said shaft and holds the first said and said second portions of said switch actuator against said closed end of said slot and against said flange, respectively, one of said semi-circular offsets being engageable with said part of said periphery of said shaft to dispose said coin-receiving portion in the path of a coin of predetermined diameter, another of said semi-circular offsets being engageable with said part of said periphery of said shaft to dispose said coin-receiving portion in the path of a coin of different predetermined diameter.

3. In a coin-actuated switch that has a rotatable shaft, the improvement that comprises a diametric slot in said shaft opening to one end of said shaft, a flange on said shaft that projects radially outwardly beyond the periphery of said shaft, said flange being adjacent the closed end of said diametric slot and defining a plane that is contiguous with said closed end of said slot, a switch actuator in the form of an elongated wire, said switch actuator having a straight portion disposable in and movable relative to said diametric slot and having a second portion spaced from said straight portion by a reentrant bend and having a plurality of semi-circular offsets in said portion that are complementary to and selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said semi-circular offsets being spaced apart, and a keeper that holds the first said and said second portions of said switch actuator against said closed end of said slot and against said flange, respectively.

4. In a coin-actuated switch that has a rotatable shaft, the improvement that comprises a slot in said shaft opening to one end of said shaft, a flange on said shaft that projects radially outwardly beyond the periphery of said shaft, said flange being adjacent the closed end of said slot, a switch actuator in the form of an elongated wire, said switch actuator having a straight portion disposable

in and movable relative to said slot and having a second portion spaced from said straight portion and having a plurality of semi-circular offsets in said second portion that are complementary to and selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said semi-circular offsets being spaced apart, and a keeper that holds the first said and said second portions of said switch actuator against said closed end of said slot and against said flange, respectively.

5. In a coin-actuated switch that has a rotatable shaft, the improvement that comprises a passage through said shaft, a flange on said shaft that projects radially outwardly beyond the periphery of said shaft, said flange being adjacent said passage, a switch actuation in the form of an elongated wire having a straight portion disposable in and movable relative to said passage and having a second portion spaced from said straight portion and having a plurality of offsets in said second portion that are complementary to and selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said offsets being spaced apart, and a keeper that holds the first said and said second portions of said switch actuator against said passage and against said flange, respectively.

6. In a coin-actuated switch that has a rotatable shaft, the improvement that comprises a passage through said shaft, and a switch actuator in the form of an elongated

wire having a portion disposable in and movable relative to said passage and having a second portion spaced from the first said portion and having a plurality of offsets in said second portion that are selectively engageable with part of said periphery of said shaft and having a coin-receiving portion, said offsets being spaced apart.

7. In a coin-actuated switch that has a movable element, the improvement that comprises a passage in said movable element and a switch actuator having a portion disposable in said passage and having a plurality of offsets in a second portion that are selectively engageable with part of said shaft and having a coin-receiving portion, said offsets being spaced apart, one of said offsets being engageable with said part of said shaft to dispose said coin-receiving portion in the path of a coin of predetermined diameter, another of said offsets being engageable with said part of said shaft to dispose said coin-receiving portion in the path of a coin of different predetermined diameter.

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