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COIN HOPPER AND CHUTE

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The present invention relates to fare boxes, coin collectors and coin registers, and has particular reference to a novel receiving coin hopper therefor.

The principal object of the invention is to provide a hopper construction into which a number of coins may be simultaneously dropped, and from which the coins exit in sequence.

Another object of the invention is to provide a hopper construction which comprises a gravity type coin channel adapted to initially receive a number of coins simultaneously and to separate the received coins for exiting in sequence.

A further object is to provide a coin receiving hopper with an elongated coin channel into which a number of coins may simultaneously enter, the coins falling at an accelerated rate and being selectively retarded during their fall to exit in sequence.

An additional object of the invention is to provide a coin hopper with a coin flow channel through which inserted or dropped coins are constrained to freely roll on edge, the faces of the coins contacting the channel sides to be selectively frictionally retarded.

Still another object is to provide a coin hopper having a gravity flow coin channel with an exit slot for passing one coin at a time to exit, and an overflow recess for receiving a coin which overruns the exit slot.

A further object is to provide a coin hopper having a gravity flow coin channel with an exit slot for passing one coin at a time to exit, and an overflow recess for receiving a coin which overruns the exit slot and returning the received coin to the exit slot.

An additional object is to provide a coin hopper having a coin flow channel with a coin entry slot of substantial length, whereby several coins may be simultaneously inserted into the slot.

Another object of the invention is to provide a gravity flow coin channel for a coin hopper, which follows a tortuous path along which coins deposited into the hopper are guided to roll uninterrupted.

A further object is to provide a gravity flow type coin hopper with a coin flow channel which is completely visible, whereby a deposited coin may be viewed and inspected throughout its travel in the coin flow channel.

An additional object of the invention is to provide a hopper having a coin flow channel with a manually controlled block for the exit slot, whereby deposited coins may be releasably

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retained in the channel for inspection and counting.

Another object of the invention is to provide a coin hopper having a gravity flow coin channel adapted to receive a number of deposited coins and an exit slot adapted to pass the deposited coins in sequence therethrough, with mechanism for separating any coins that might become jammed therein.

With the above and other objects and advantageous features in view, the invention consists of a novel arrangement of parts and a novel method of procedure, more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

In the drawings:

Fig. 1 is an elevation of an illustrative embodiment of the invention;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a rear detail showing the slot closure cam arrangement; and

Fig. 4 is an enlarged detail section on the line 4—4 of Fig. 3, the slot closure cam being shown in closed position.

It has been found desirable to provide a hopper construction for fare boxes, coin registers and coin collectors of the coin slot type, which is adapted to receive a number of coins simultaneously and selectively separate the received coins so that they exit from the hopper in sequence. To this end, I have devised an arrangement whereby the inserted or dropped coins freely enter a long coin channel, which is preferably made tortuous to reduce the over-all hopper size, and are constrained to roll along the bottom wall of the channel while sliding along the side wall of the channel, this being readily accomplished by setting the channel at a predetermined angle. The channel is preferably designed to receive coins of a particular size, for example, dimes, and is arranged so that the falling coins continually roll on edge with no interruption or break, and selectively frictionally contact the channel side wall, whereby the falling coins are selectively retarded to finally assume a sequential stream or file and drop through the exit slot in sequence to enter the coin slot of the fare box or other coin registering or collecting device.

The preferred construction for the coin channel is in the form of a tortuous passageway in one plane, which may be formed by cutting or molding a metal or a plastic block, whereby it becomes

feasible to position a transparent cover of glass or plastic over the channel to form the other side wall thereof and thus render the entire coin channel and the coins passing therethrough visible, thus facilitating inspection of the dropped coins.

Since the length of the coin channel is limited by practical considerations, and the coin hopper may be subject to vibrations and tilting, as when mounted on automotive vehicles, I have found it desirable to provide an over-pass or by-pass channel contiguous the exit slot, whereby any coin which should overrun or by-pass the exit slot is diverted into a by-pass channel from which it may pass out of the hopper into a coin receiver or the like, but preferably may return by gravity to drop into the exit slot. I have further provided a stop cam which may be manually shifted to block the exit slot, whereby any coins inserted or dropped into the hopper may be retained therein for inspection and counting before release through the exit slot.

Referring to the drawings, which illustrate one embodiment of the invention, the hopper 10 includes a base 11 of metal or of other suitable materials such as plastics, which has a coin flow channel 12 therein of tortuous form, and a cover 13 which is preferably of transparent material, such as glass or plastics and which forms one wall of the channel. The upper portion of the channel is open to provide an elongated coin entry slot 14, and a coin drop funnel 14a is mounted on the base 11 to receive inserted or dropped coins which then fall into the channel 12. The coin entry slot 14 is of substantial length, to permit coins to enter along the length thereof in edge to edge relation, as well as in parallel or side to side relation, and is preferably fully open, although it may be divided into separate coin receiving sections by narrow transverse bars, not shown, if desired.

The channel 12 has a rear wall 15, an upper wall 15a, a runway wall 16, and a side wall 17 which is provided by the inner surface of the cover 13, the spacing between the upper and the runway walls accommodating a particular size of coin, although it will also receive coins of smaller size, and the runway wall being of a width to accommodate several coins in parallel. The channel is of the slanting type, and reverses in direction as shown in Fig. 1 to provide a substantial length in a relatively small space, the channel being curved at the turns 18 to constrain the falling coins to continuous rolling contact with the runway wall 16.

As the coins roll down the runway wall, they are successively engaged with the rear wall 15 by mounting the base at an angle, as shown in Fig. 2, the runway wall being inclined to the horizontal and the rear wall being inclined to the vertical, whereby frictional engagement with the rear wall retards the engaged coins and permits the other coins to roll ahead at a faster rate, thus causing the coins to spread into aligned sequential relation, whereby the coins reach the lower portion 19 of the channel in file while remaining in contact with the rear channel wall. They thus successively roll against a rounded narrow guide shoulder 20 and down through an exit slot 21 and into the slot of a fare box or the like, not shown.

The shoulder 20 is preferably formed by reducing the width of the channel at the exit slot, and the reduced channel 22 is extended upwardly as shown in Fig. 1, whereby the upper of two

parallel coins which had not separated into file relation due to vibration, tilting of an automotive vehicle or the like, can by-pass the exiting coin and roll up into the reduced channel 22 and then roll back and then forwardly to the slot to drop therethrough. The reduced channel 22 may lead to a release opening or to a second coin box (not shown), if desired, so as to remove the coin.

The rear of the base is recessed, see Fig. 3, to provide a space for a slot closure cam 23 which is keyed to a shaft 24, the shaft 24 extending rotatably through a closure plate 25 and having a hand knob 26 or the like for manual actuation, whereby the cam 23 may be turned into the exit slot 21 as shown in Fig. 4 and as indicated in dotted lines in Fig. 3, to close the exit slot and thus hold all the coins in the coin channel until released.

The manually movable cam 23 also functions as a jam breaker if coins jam the exit slot, as may occur from the presence of mutilated or worn coins or from excessive vibration of a vehicle on which the fare box is mounted. The operator readily breaks such jam by turning the hand knob 26 to move the cam 23 into the exit slot, thus ejecting the jammed coins upwardly and out of the exit slot; the coins then separate and readily exit in sequence.

The novel hopper arrangement thus receives dropped coins, which may initially be deposited into the entry slot in parallel or side by side relation, and disposes the coins into linear or edge-to-edge relation by causing the deposited coins to continuously roll along a runway through an elongated channel while selectively retarding the coins by frictional engagement of the faces of the coins with the side wall of the channel. The coins thus exit from the hopper in sequence, although simultaneously dropped into the hopper.

Although I have disclosed a specific constructional embodiment of the invention, it is obvious that changes in the size, shape and arrangement of the parts may be made to meet different hopper requirements for different types and styles of fare boxes, coin collectors and coin registers, without departing from the spirit and the scope of the invention as defined in the appended claims.

I claim:

1. A coin hopper construction comprising a base having a coin runway of tortuous form having downwardly slanting portions and reverse turns and being of a width to accommodate several coins in parallel, a coin drop funnel at the upper end of said base having a slot communicating with the upper end of the runway, the rear wall of the runway being inclined to the vertical and the upper and lower walls of the runway being at right angles to the rear wall and uniformly spaced apart, whereby descending coins slide against the rear runway wall and roll down the lower runway wall, said lower runway wall having a coin exit slot at the lower end thereof adjacent the rear runway wall and of a width permitting passing of a single coin only, said runway having an upwardly slanting portion beyond the exit slot for receiving coins overpassing the exit slot.

2. A coin hopper construction comprising a base having a coin runway of tortuous form having downwardly slanting portions and reverse turns and being of a width to accommodate several coins in parallel, a coin drop funnel at the upper end of said base having a slot communicating with the upper end of the runway, the

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rear wall of the runway being inclined to the vertical and the upper and lower walls of the runway being at right angles to the rear wall and uniformly spaced apart, whereby descending coins slide against the rear runway wall and roll down the lower runway wall, said lower runway wall having a coin exit slot adjacent the rear wall at the lower end thereof and of a width to permit exit of a single coin only, and an abutment projecting into the runway from the rear wall and adjacent the exit slot and having a width substantially the width of a single coin, for guiding the downwardly rolling coins sliding against the rear runway wall into the exit slot, said runway having an upwardly slanting portion beyond the exit slot for receiving coins overpassing the exit slot and the abutment.

3. A coin hopper construction comprising a base having a coin runway of tortuous form having downwardly slanting portions and reverse turns and being of a width to accommodate several coins in parallel, a coin drop funnel at the upper end of said base having a slot communicating with the upper end of the runway, the rear wall of the runway being inclined to the vertical and the upper and lower walls of the runway being at right angles to the rear wall and uniformly spaced apart, whereby descending coins slide against the rear runway wall and roll down the lower runway wall, said lower runway wall having a coin exit slot at the lower end thereof, a coin exit passage below the coin exit slot adjacent the rear runway wall and of a width permitting passing of a single coin only, and a closure cam pivotally mounted in said exit passage and movable through said exit slot.

4. A coin hopper construction comprising a base having a coin runway of tortuous form having downwardly slanting portions and reverse turns and being of a width to accommodate several coins in parallel, a coin drop funnel at the upper end of said base having a slot communicating with the upper end of the runway, the rear wall of the runway being inclined to the

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vertical and the upper and lower walls of the runway being at right angles to the rear wall and uniformly spaced apart, whereby descending coins slide against the rear runway wall and roll down the lower runway wall, said lower runway wall having a coin exit slot at the lower end thereof adjacent the rear runway wall and of a width permitting passing of a single coin only, an abutment projecting into the runway from the rear wall and adjacent the exit slot and having a width substantially the width of a single coin for guiding the downwardly rolling coins sliding against the rear runway wall into the exit slot, said runway having an upwardly slanting portion beyond the exit slot for receiving coins overpassing the exit slot, a coin exit passage below the coin exit slot adjacent the rear runway wall, and a closure cam pivotally mounted in said exit passage and movable through said exit slot.

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