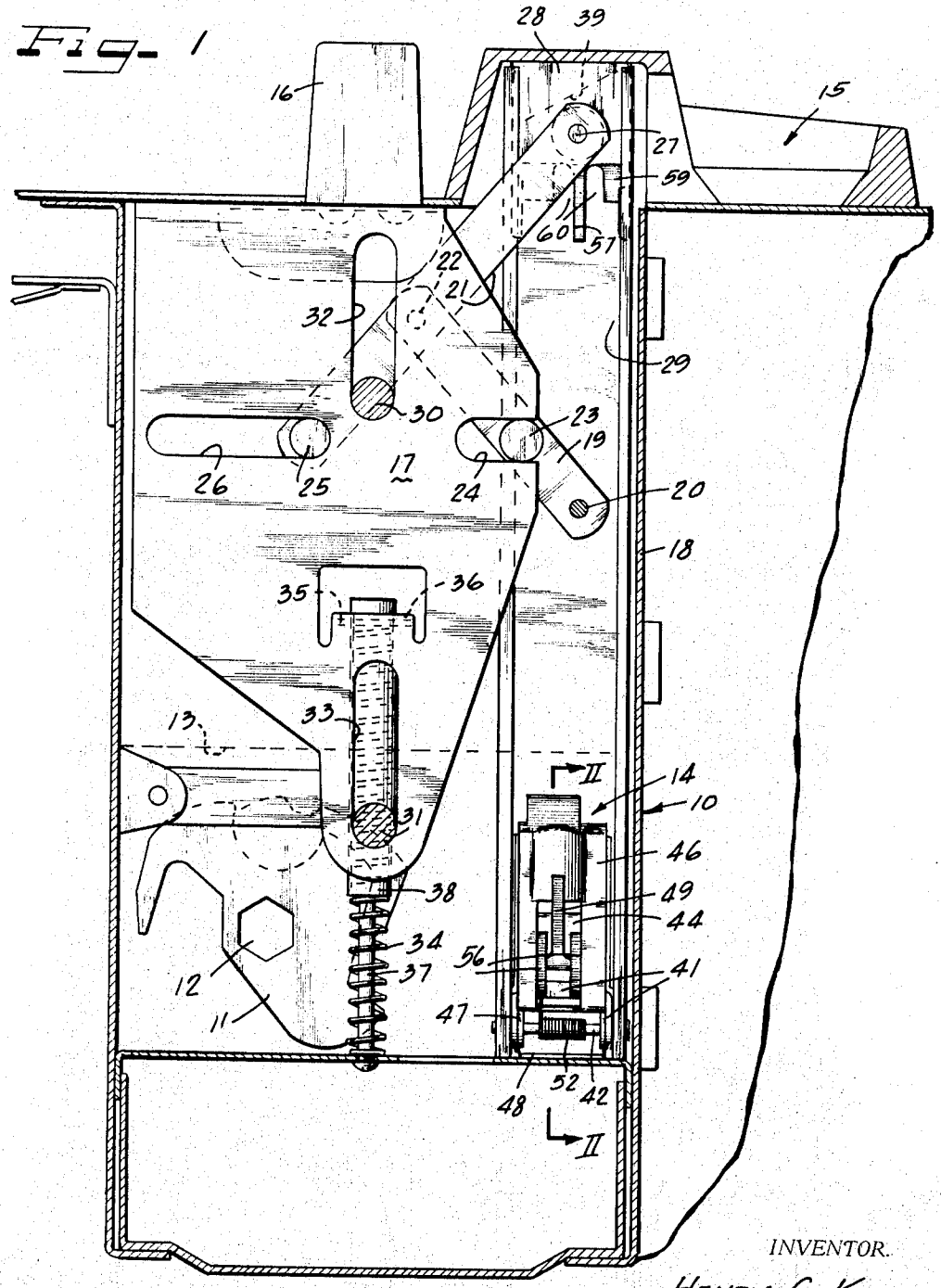
March 12, 1968 H. C. KOVAR 3,372,864

COIN RETURN MECHANISM

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Fig. 1



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Fig. 2

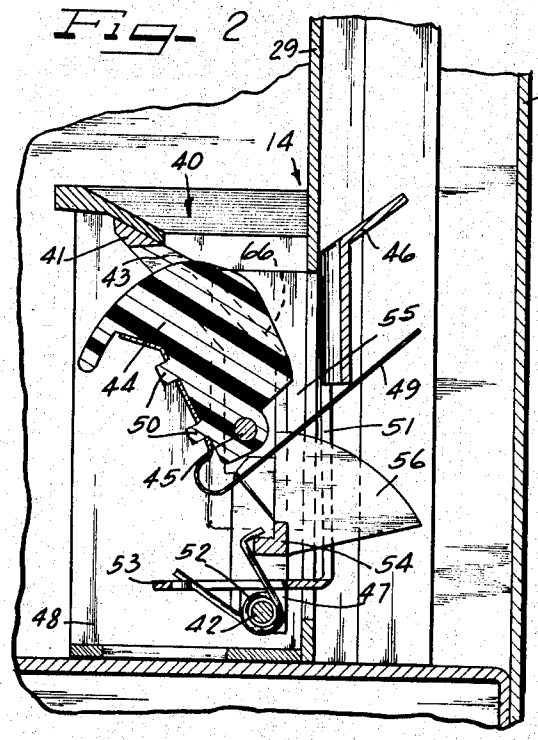


Fig. 3

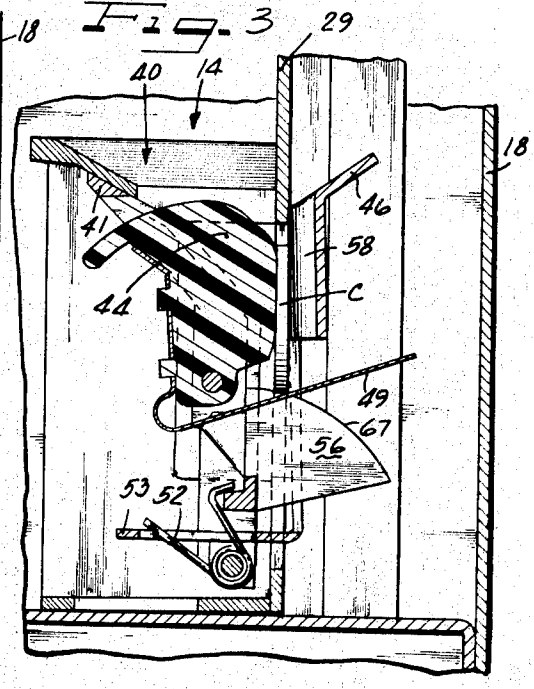


Fig. 4

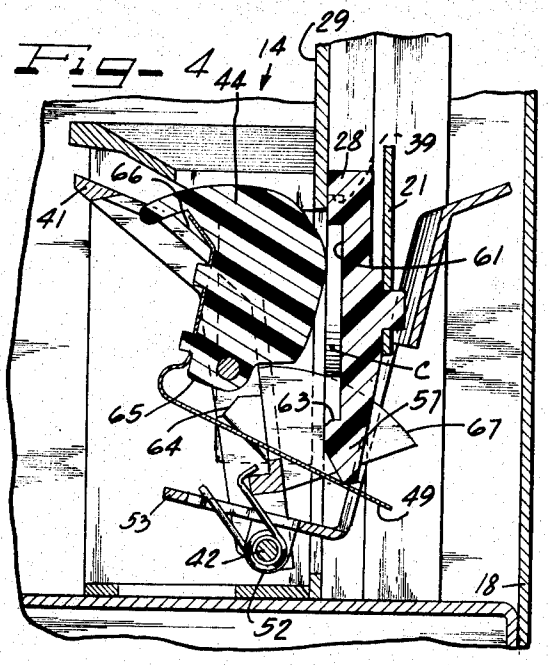
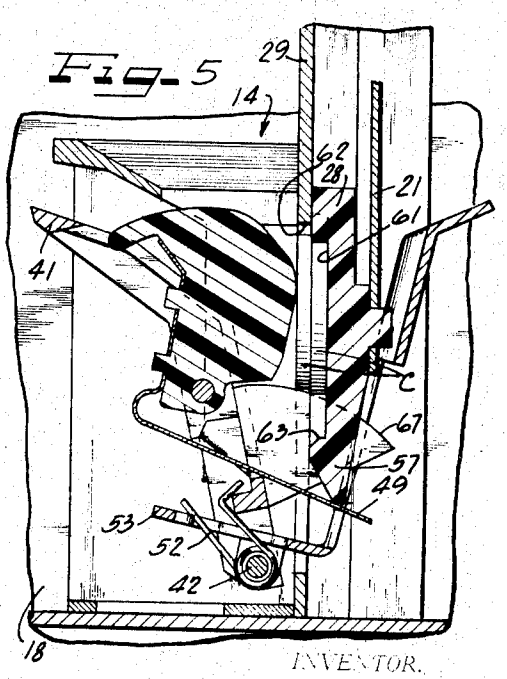


Fig. 5



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United States Patent Office 3,372,864
Patented Mar. 12, 1968

3,372,864

COIN RETURN MECHANISM

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Filed Oct. 31, 1966, Ser. No. 590,912
14 Claims. (Cl. 232—57.5)

This invention relates generally to coin mechanisms, and more specifically to coin mechanism construction which is particularly adapted to elevate a coin after it has been rejected.

This invention is an improvement on that shown in U.S. Patent No. 3,225,880 of which I am one of the patentees. The construction shown in that patent performs as required. However, occasional malfunction thereof or jamming thereof has been observed which has been attributed to the presence of too large a number of rejected coins, for example, two or more coins, or the presence of a badly deformed coin.

Accordingly, it is an object of the present invention to provide an improved coin return mechanism.

A further object of the present invention is to provide a coin return mechanism which can handle or accommodate by storage a relatively large number of rejected coins.

A still further object of the present invention is to provide a coin return mechanism which is jam-free, even in the presence of a deformed coin.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

On the drawings:

FIG. 1 is an elevational view, partly in cross-section, of a coin return mechanism provided in accordance with the principles of the present invention;

FIG. 2 is a fragmentary enlarged cross-sectional view taken along the line II—II of FIG. 1; and

FIGS. 3–5 correspond to FIG. 2, and illustrate the coin return mechanism in various operational positions or conditions described below.

As shown on the drawings:

The principles of this invention are particularly useful when embodied in a coin return mechanism such as illustrated in FIG. 1, generally indicated by the numeral **10**. The coin return mechanism **10** is particularly useful when embodied in a vending machine or dispensing device of the top opening bin type having an article release mechanism (not shown) under the control of a coin acceptor **11** carried on a shaft **12**. To obtain release of an article, proper coinage is deposited in a coin slot (not shown), such coinage passing through a coin rejector **13**, and being directed by it into the acceptor **11**. Any improper coinage is directed to a portion **14** of the coin return mechanism **10** for being elevated by the mechanism **10** to a remote position of ready access, such as to a coin tray **15**. The rejector **13** includes a coin return button **16** which not only releases any rejected coin, but which also actuates the coin return mechanism **10**. The coin return button **16** is connected to a slide member **17** which is disposed in a frame or housing **18** that provides suitable support for the various fixed components.

A first lever **19** is pivotally supported at one end by a stub shaft **20** carried by the housing **18**, the other end of the lever **19** being pivoted to a second lever **21** at a point **22**. The lever **19** is provided with means **23** disposed intermediate its ends which has slidable engagement with a slot **24** in the slide member **17**, and the

lever **21** is provided with means **25** at one end which has slidable engagement with a further slot **26** in the slide member **17**. The other end of the lever **21** is pivotally connected at **27** to a coin carrier **28** which is vertically slidable in a guide **29**. Thus the coin carrier **28** is manually movable to a lower position for cooperation with the portion **14** of the coin return mechanism **10**, and to a second or upper remote position as drawn.

The slide member **17** is suitably guided for vertical sliding movement by means which includes an upper guide pin **30** and a lower guide pin **31**, such pins **30**, **31** being held by the housing **18** and slidably received in a pair of slots **32**, **33** respectively in the slide member **17**. The slide member **17** is urged in a vertical direction by a spring **34** acting between a portion of the frame **18** and the slide member **17** through a cross pin **35** on a laterally extending ear **36**. The spring **34** is internally guided by an internal guide pin **37** secured to the frame or housing **18**, and is jacketed by an external sleeve **38** through which the pin **37** extends. Upon depression of the button **16**, energy is stored in the spring **34**, and on release of the button **16**, the spring **34** returns the slide member **17** to the position illustrated, whereby the levers **19** and **21** are actuated to restore the coin carrier **28** to the position shown in FIG. 1 with considerable velocity so that any coin in the carrier **28** will be whipped against a deflection surface **39** and directed to the coin tray **15**.

When the coin rejector **13** discharges rejected coinage, such coinage is directed to a hopper means **40**, best seen in FIG. 2. The portion **14** of the coin return mechanism **10** includes a coin support member **41** which is pivotally supported by a pin **42**, the coin support member **41** having a central opening **43** within which there is disposed a transfer member **44** which is pivoted on a pin **45** carried on the pivoted coin support member **41**. A check member **46** has a pair of ears **47** which are also pivoted on the pin **42**. The pin **42** is carried by a housing or frame portion **48** which is stationary and which is secured to and in a sense is a part of the frame or housing **18**. The stationary portions of the hopper **40** are thus defined by part of the frame portion **48** and a portion of the carrier guide **29**.

A first spring **49** comprises a blade that is secured to the transfer member **44** as by integral rivets **50**, the other end of the spring blade **49** extending through the lower part of the slot **43** of the coin support member **41**, through an opening in the carrier guide **29**, and through a further opening **51** in the check member **46**, spanning the space in which the coin carrier **28** is movable for engagement by such coin carrier **28**.

A second spring **52** is a torsion spring which acts between a part **53** of the check member **51** and a part **54** of the coin support member **41**, biasing the coin support member **41** in a clockwise direction to a limiting position of engagement with the hopper means **40**, and biasing the check member **51** in a counterclockwise direction to a limiting position in engagement with the coin carrier guide **29**.

The yieldably pivoted members **41**, **44** extend under any coins in the hopper **40** and support such coins. More specifically, the lower end of the hopper **40** extends downwardly or terminates in a coin pocket **55** which is normally open as shown in FIG. 2. When the first coin falls therein, it moves edgewise into engagement with the spring or spring blade **49**, thereby transmitting a force through the spring blade **49** to the transfer member **44** to rock such transfer member **44** in a clockwise direction to engage such coin. The downward edgewise movement of the coin is terminated by a bifurcated portion **56** of the coin support member **41**, both bifurcations **56** being shown in FIG. 1, which center the coin. FIG. 3 illustrates

the position taken by the transfer member 44 in response to reception of the coin C.

As shown in FIG. 3, the configuration of the transfer member 44 is such that once it has pivoted, it also thereby moves to a position where it blocks the bottom of the hopper 40, for being engaged by further coinage.

As shown in FIG. 1, the coin carrier 28 has a downwardly directed finger 57 which is pointed at its lower end as shown in FIG. 4, the finger 57 being tapered on both sides. As shown in FIG. 3, the check member 46 has a vertical channel 58 which is directed toward the pocket 55 or the coin C disposed therein the width of the channel 58 being less than the diameter of any coin to be received therein. The pointed finger 57 of the coin carrier 28 is received in the channel 58, and the finger 57 slightly rocks or pivots the check member 46 in a clockwise direction, and permits the finger 57 to move in the channel 58 between the check member 46 and the coin C. The opposite side of the finger 57 may temporarily slightly move the coin C and thus the transfer member 44 to further bias the spring 49. The check member 46 is rocked further in a clockwise direction by cam surfaces 59 (FIG. 1) which engage the check member 46 on opposite sides of the channel 58, thereby enabling the coin carrier 28 to be moved to a lowermost position as illustrated in FIG. 4. As the downward movement of the coin carrier 28 continues, the coin C is held vertically fixed by the bifurcations 56 of the coin support member 41, the lower edge of the coin carrier 28 being slotted as at 60 (FIG. 1) for reception of the bifurcations 56.

The coin carrier 28 has a cavity 61 facing the coin pocket and into which the transfer member 44 urges the coin C. Depending upon the coins to be handled, the depth of the cavity 61 is fairly critical. For instance, if a mixture of U.S. coinage is employed which includes new pennies, new nickels, new dimes, worn pennies, worn dimes and worn nickels, it is evident that there is a considerable variation in coin thickness. Thus the cavity must be deep enough to support or receive the thickest coin, such as a new nickel. The cavity depth in operation includes the clearance that the coin carrier 28 has in a left-to-right direction as shown in FIG. 4 with respect to the coin carrier guide 29. I have found that the cavity depth should not exceed 0.086 in. for reliable operation. Further, the depth of the cavity 61 must not be so great as to enable reception of two of the thinnest coins, such as two worn dimes. If two dimes were received in the cavity 61, there would be a tendency for the coin carrier to jam in the coin carrier guide 29.

If a second coin is partially received in the cavity 61, or if a second coin tends to move with the coin in the cavity 61 due to surface friction, movement of such second coin out of the pocket 55 is precluded by a fixed abutment 62 which, as shown in FIG. 5, is engageable with the edge of the second coin to retain it in the pocket during upward movement of the coin carrier 28.

The lower end of the cavity 61 of the coin carrier 28 is defined by an upwardly directed shoulder 63 which is engageable with the lower edge of the coin C during upward movement of the coin carrier 28. I have found that with the mix of coins described above, the width of this shoulder 63 is critical. It should be no wider than the thickness of the thinnest coin, and it should not be so narrow that a positive drive of every coin is not obtained. On the basis of experiments, I have learned that the width of the shoulder 63 should be within the range of 0.036 to 0.041 in. As this dimension is less than the thickness of the cavity 61, a chamfer may be provided on the finger 57 if the finger 57 extends a greater distance so as to transmit a minimal force to any second coin projecting into the cavity 61.

The downward movement of the coin carrier 28 not only pivots the check member 46 as described above, but also, by acting through the spring 49, provides a positive clockwise pivoting of the transfer member 44 to assure

firm seating of the coin C in the coin cavity 61. Still further, the coin carrier 28 transmits a force, usually through coinage, to the yieldably pivoted transfer member 44 to cause it to yield to enable enlargement of the pocket 55 to accommodate additional coins. The number of coins that may thus be present in indeterminate, and the extent of counterclockwise pivoting of the transfer member 44, against the force of the spring 49, is limited by engagement between stop means 64, 65 respectively carried by the coin support member 41 and the transfer member 44. Such counterclockwise pivoting enables the transfer member 44 to assume a position where it is substantially flush with or slightly below an upper surface 66 on the coin support member 41. Thereafter, if still additional coinage is present, the transfer member 44 along with the coin support member 41 are rocked as a unit in a counterclockwise direction about the pin 42 against the force of the torsion spring 52.

The bifurcations 56 have an upper edge 67 which is convex or curved, the center of curvature of the edge 67 being substantially the axis of the pin 42, about which the coin support member 41 is pivoted. Therefore, during rocking of the coin support member 41 as explained, the height at which the coin C is supported remains constant, and the support remains present, even though considerable rocking may take place.

With the structure in the position shown in FIG. 3, the reception of a second coin on top of the transfer member 44 will cause the transfer member to pivot counterclockwise to the position shown in FIG. 2, and the addition of further coins increases this tendency. However, engagement of the coin carrier finger 57 with the spring 49 provides considerable force which causes the transfer member 44 to pivot and the surplus of such force serves to pivot the coin support member 41 slightly in the counterclockwise direction as shown in FIGS. 4 and 5. It will be appreciated that the transmission of forces to the coin support member 41 is not always predictable as such transmission at least in part is through whatever coins are disposed therein, and such coins may vary considerably in orientation as their position is a random one. At any event, coin support member 41 yields to accommodate excess coins while the transfer member 44 acts through such additional coins as may be in the pocket to transfer a coin into the cavity 61. On occasion, the random orientation of coins may be such that no coin is removed. However, the jiggling of the coinage by the entry and retraction of the coin carrier 28 realigns them without jamming to enable the removal of a coin the next time that the coin carrier 28 is reciprocated.

Although minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon, all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A coin return mechanism, comprising:
   (a) means defining a hopper directed to receive a rejected coin;
   (b) a pivoted coin support member disposed beneath said hopper for extending beneath any coins therein;
   (c) a transfer member pivoted on said pivoted coin support member and defining one side of a coin pocket therewith;
   (d) a pivoted check member defining an opposite side of said coin pocket; and
   (e) a manually movable coin carrier adapted at one position to pivot said check member in a direction away from the coin, to pivot said transfer member toward the coin to effect transfer of the coin from said pocket into said carrier, and to effect pivoting of said coin support member away from said pocket to accommodate temporarily an additional number of coins, said carrier being movable to a second carrier position where any coin in said carrier is accessible.

2. A coin return mechanism according to claim 1, in which said transfer member is pivotal to a hopper-blocking position in direct response to the entry of a coin into said pocket, said coin support member thereafter providing the support of such coin in said pocket.

3. A coin mechanism according to claim 1, having spring means biasing said coin support member toward said pocket, and biasing said check member toward said pocket.

4. A coin mechanism according to claim 3, in which said spring means comprises a torsion spring continuously acting between said coin support member and said check member.

5. A coin mechanism according to claim 1, in which said coin support member has a bifurcated portion for supporting the rejected coin on edge, said bifurcated portion being curved and having a center of curvature substantially coinciding with the axis about which said coin support member is pivoted.

6. A coin mechanism according to claim 1,

(a) said pivoted check member having a vertical channel directed toward said pocket, said channel being narrower than the diameter of any coin to be received in said mechanism; and

(b) said coin carrier having a finger pointed at its lower end for reciprocation in said channel to enter between any coin in said pocket and said check member, said finger having an upwardly directed shoulder for supporting any such coin.

7. A coin return mechanism according to claim 1, in which said pocket is receptive of at least two coins,

(a) said coin carrier having a coin cavity, the lower end of which cavity comprises an upwardly directed shoulder of a width no greater than the thinnest coin to be handled, said cavity having a depth greater than the thickest coin to be handled but less than double the thickness of such thinnest coin; and

(b) a fixed abutment above said pocket for engaging the edge of any second coin tending to move with said coin carrier toward said second carrier position.

8. A coin return mechanism according to claim 1, comprising:

(a) a first spring secured to said transfer member and through which said coin carrier pivots said transfer member toward the coin in said pocket;

(b) a second spring acting between said coin support member and said check member, said second spring being yieldable to enable enlargement of the effective size of said pocket for reception of additional coins; and

(c) stop means on said coin support member and said transfer member for limiting pivoting of said transfer member against the force of said first spring to a position substantially flush with said coin support member, and for thereafter enabling further pivoting of said transfer member with said coin support member against the force of said second spring.

9. A coin return mechanism according to claim 1, in which said coin support member has a bifurcated portion for supporting the rejected coin on edge, said bifurcated portion extending through said check member for all pivotal positions of both said coin support member and said check member, and said coin carrier having a slotted lower edge receptive of said bifurcations.

10. A coin return mechanism, comprising:

(a) means defining a hopper directed to receive a rejected coin;

(b) yieldably pivoted means disposed beneath said hopper and receptive of the rejected coin therefrom and defining one side of a coin pocket;

(c) a pivoted check member defining an opposite side of said coin pocket, and having a vertical channel directed toward said pocket, said channel being narrower than the diameter of any coin to be received in said mechanism; and

(d) a manually movable coin carrier having a finger pointed at its lower end, said carrier at one position having its finger movable downwardly in said channel for entering between any coin in said pocket and said check member, said finger having an upwardly directed shoulder defining the lower end of a coin cavity in said coin carrier, said carrier being movable to a second position where any coin in said cavity is made accessible.

11. A coin return mechanism, comprising:

(a) means defining a hopper directed to receive a rejected coin;

(b) yieldably pivoted means disposed beneath said hopper and receptive of the rejected coin therefrom and defining one side of a coin pocket receptive of at least two coins;

(c) a pivoted check member defining an opposite side of said coin pocket;

(d) a manually movable coin carrier having a coin cavity, the lower end of which cavity comprises an upwardly directed shoulder of a width no greater than the thinnest coin to be handled, said cavity having a depth greater than the thickest coin to be handled, but less than double the thickness of such thinnest coin, said carrier being movable into said pocket to receive in its cavity any coin in said pocket, said carrier being movable to a position remote from said pocket where any coin in said cavity is made accessible; and

(e) a fixed abutment above said pocket for engaging the edge of any second coin tending to move with said coin carrier toward said remote position, thereby retaining such second coin in said pocket.

12. A coin return mechanism according to claim 9, wherein the width of said shoulder is between 0.036 and 0.041 inch.

13. A coin return mechanism according to claim 9, wherein the depth of said cavity does not exceed 0.086 inch.

14. A coin return mechanism, comprising:

(a) means defining a hopper directed to receive a rejected coin;

(b) yieldably pivoted means disposed beneath said hopper and receptive of the rejected coin therefrom and defining one side of a coin pocket;

(c) a pivoted check member defining an opposite side of said coin pocket;

(d) bifurcated means secured to said yieldably pivoted means for supporting the rejected coin on edge, said bifurcated means extending through said check member for all pivotal positions of both said yieldably pivoted means and said pivoted check member; and

(e) a manually movable coin carrier adapted at one position to enter said pocket for receiving a coin therefrom, and being movable to a second position where any coin in said carrier is made accessible, said coin carrier having a slotted lower edge receptive of said bifurcations.

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