

Coin dispenser

The present invention relates to a coin dispenser for use in vending machines for giving out change when the value of money inserted into the machine by a customer exceeds the price of the merchandise purchased.

The usual arrangement for dispensing coins is a vertical coin tube which contains a stack of coins of a single denomination. A channel extends horizontally beneath the lower end of the tube and has an upper wall with an aperture aligned with the coin tube and a lower wall with an aperture disposed over a change dispensing passageway. The aperture in the lower wall is offset from the vertical axis of the coin tube so that coins in the coin tube cannot fall directly through the aperture in the lower wall. A slide plate is disposed in the channel and serves to transfer coins from the bottom of the stack in the coin tube to the aperture in the lower wall. The plate has circular apertures for receiving coins from the stack. The plate can be slid back and forth in the channel between a position in which the aperture in the plate is below the coin tube and there receives a coin from the tube and a position in which it is over the aperture in the lower wall from where the coin falls into the dispensing passageway. The height of the channel is between one and two coin thicknesses so that only one coin at a time can be dispensed. A machine which dispenses more than one denomination of coin as change will have such an arrangement for each denomination of coin.

For the dispenser described above to work reliably the dimensions of the dispenser must closely correspond to the diameter and thickness of the particular denomination of coin being dispensed. This means that the manufacturer of such dispensers for several countries must offer a large number of different sizes of mechanism to suit the large variety of sizes of coins in use.

Various approaches to achieving correct, but different, gap sizes for different coin denominations in a single apparatus have been suggested in U.S. Patents Nos. 3,841,341 and 3,822,713, and British Specification No. 1,137,059. The latter suggests that coin tubes be vertically adjustable so as to set the sizes of the gaps beneath them.

According to the present invention there is provided a coin dispenser comprising a plurality of upright coin holders for different respective coin denominations, each adapted to hold a plurality of coins in a stack, coin support means located opposite lower open ends of the coin holders to receive from each coin holder the coin at the open end of that coin holder, an edge portion of each coin holder and said coin support means defining between them a gap between one and two coin thicknesses for the coin denomination concerned, through which

the bottom coin concerned can be shifted edge-wise, means for shifting coins edgewise through said gaps, and means securing the coin holders relative to said support means such that the gaps are set according to the denomination concerned, characterised in that said securing means comprises a plurality of deformed pegs carried by each coin holder and received by slots which are in a structure fixedly disposed relative to the support means and which are elongated in a direction substantially perpendicular to the coin support means, the deformation of the pegs on each holder locking that holder in a position that yields the desired gap for that holder.

When using the invention, the coin shifting means and coin support means do not have to be specially made to suit the individual thickness of coins: it is possible to use one set of components to serve a large number of different sizes of coins. The coin shifting means and support means can be used in combination with coin holders selected from a range of different sizes of coin tubes and the securing means in accordance with the invention are used to simply and firmly mount the selected coin tubes at the appropriate height for the particular thickness of coins being used. Thus for the manufacturer the number of different parts needed to meet the requirements of customers in different countries can be substantially reduced.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, of which:—

Figure 1 shows an exploded perspective view of a coin dispenser according to the invention;

Figure 2 shows a front view, partly in section, of the coin dispenser of Figure 1;

Figure 3 shows a horizontal section of the coin dispenser taken on the line III—III of Figure 2;

Figure 4 shows a vertical section of the coin dispenser taken on the line IV—IV of Figure 2; and

Figure 5 shows a plan view partly in section of the coin dispenser taken on the line V—V of Figure 4.

The drawings show a coin dispenser 11 for dispensing three denominations of coins. The dispenser 11 includes three vertical coin tubes 12, 13 and 14 of moulded plastics, one for each denomination of coin. The coin tubes hold the coins in vertical stacks.

Beneath each of the coin tubes 12, 13 and 14 a respective channel 15, 16 and 17 extends horizontally. In the upper wall of each channel is an aperture 18, 19 and 20 through which the lower end of the coin tube 12, 13 and 14 extends. In the lower wall of each channel and out of alignment with the coin tube 12, 13 and 14 is an aperture 21, 22 and 23 leading to a

coin dispensing passage (not shown). The coin dispensing passage leads to a receptacle which is accessible to a customer outside the machine in which the dispenser is housed so that the customer may collect the change dispensed.

A slide plate 24, 25 and 26 is disposed in each channel 15, 16 and 17. The plates each have an aperture 27, 28 and 29 for receiving coins from their associated tubes 12, 13 and 14. The slide plates 24, 25 and 26 are movable between positions in which the apertures in the plates are below their respective coin tubes and positions in which they are above their respective apertures in the lower walls of the channels by means of three solenoid actuators 30, 31 and 32.

The coin dispenser is made up from a mounting member 33 of moulded plastics material to which all other parts are secured. The mounting member comprises a horizontal plate 34 which forms the upper walls of the channels 15, 16, and 17 and contains the three apertures 18, 19 and 20. The mounting member also comprises a vertical plate 35 to the back of which are secured the solenoid actuators 30, 31 and 32 by means of screws 36.

As can be seen in Figure 4 each solenoid actuator includes a bell crank lever 37 of moulded plastics material which is pivoted on a rod 38 which passes through lugs 39 carried by partition walls 40 moulded on the base member 33. The armature 41 of the solenoid actuator is pivotally connected to the bell crank lever 37. A leg 42 moulded on the lower end of the lever 37 sits in a slot 43 between two upstanding projections 44 at the rear of the slide plate 24, 25 or 26. A spring 45 is wound around the armature of the solenoid actuator and acts between the casing of the solenoid and a flange 46 on the armature to urge the armature into the extended position. In this position the bell crank lever 37 is fully rotated in the anti-clockwise direction and the leg 42 holds the slide at the right hand end of its travel as shown in Figure 4. Movement of the slide plates towards the rear is limited by abutment with the dispenser enclosure (not shown). When the solenoids are energised the armatures are retracted against the action of the springs 45, the bell crank levers 37 are rotated in the clockwise direction and the legs 42 engaging the slots 43 push the slide plates forward until the apertures 27, 28 and 29 in the plates are below the coin tubes 12, 13 and 14 respectively when the slide plates abut bosses 48 on the underside of the plate 34 or, alternatively, when projections 44 abut the horizontal plate 34. The solenoids are immediately de-energised and the slides return to the back of the channels under the action of the springs 45.

The lower walls of the channels 15, 16 and 17 are formed by a moulded plastics plate 49 which is secured to the underside of the plate 34 by screws 50. The bosses 47 and 48 serve as spacers to space the plate 49 from the plate

34. The plate 49 is spaced from the plate 34 by a distance at least as great as the thickness of the thickest coin which the dispenser may be required to dispense. The plate 49 contains the apertures, 21, 22 and 23. Two of the apertures are of the same diameter, one, 21, is larger but is partially covered on one side by a moulded web 51, the upper surface of which slopes down towards the chordal edge. The web 51 covers almost half of the area of the aperture 21. The diameter of the apertures 27, 28 and 29 in the slide plates match the diameters of the holes in the plate 49.

When the coins from the tube 12 are moved by the slide 24 to the aperture 21 they drop into the recessed upper part of the aperture and then slide down the inclined upper surface of the web 51 and through the open part of the aperture into the dispensing passageway. The web 51 serves to deflect coins dispensed through the aperture 21 into a defined coin-return area. Grooves 52 running from front to back are formed in the upper surface of the plate 49 and engaged by runners 53 on the underside edges of the slide plates 24, 25 and 26 to guide the plates for rectilinear sliding movement in the channels.

The coin tubes 12, 13 and 14 are mounted on a plastics mounting plate 54. Each tube has two pairs of pegs or studs 55 moulded on it which are received in corresponding pairs of holes 56 drilled in the plate. The tubes are of different diameter, but the horizontal and vertical spacing of the pegs is identical for every tube, such that any tube may be assembled into any one of the three locations in the mounting plate.

The peg holes in the mounting plate are slotted vertically to allow adjustment of the tube position so that the lower end of each tube is at the correct height above the lower wall of the channel when the dispenser is assembled.

The correct height is between one and two coin thicknesses so that coins are dispensed singly.

Once the coin tubes have been assembled on the plate and their positions adjusted, they are secured in place by collapsing the pegs as by ultrasonic melting to fill the slots completely and form mushroom-shaped heads.

Vertical location is achieved in any suitable manner. In a preferred arrangement, pegs or studs 61, 62 located in recessed pockets 63, 64 protrude beyond the planar surface of vertical plate 35 and are received in close-fitting holes 65, 66 drilled in mounting plate 54. Pegs 61, 62 and holes 65, 66 serve to position accurately the sub-assembly of plate 54 and the coin tubes with respect to vertical plate 35.

The sub-assembly of tubes and mounting plate is secured on the vertical plate 35 by two hooks 58 which are moulded integrally with the outer two partition walls 40. The lower ends of the tubes extend through into the apertures 18, 19, 20, and a packing ring 59 may be inserted

between the lower ends of the smaller tubes and the aperture 18 to provide further stability.

We have found it possible to build dispensers for the coin sets of three different coins of the major currencies of the world from a single size of sub-assembly of base-member 33, bottom plate 49, slide plates 18, 19, 20, solenoid activators 30, 31, 32, tube mounting plate 54 and a range of up to six different sizes of coin tubes.

In this particular dispenser the tubes are selected from five having the following dimensions:

Tube no.	Internal dia.
1	29.5
2	24.5
3	21.5
4	19.5
5	17.5

The slides have the following dimensions:

Slide plate	Aperture dia.	Thickness
24	29.85	1.15
25	21.85	1.1
26	24.85	1.1

The bottom plate has the following aperture diameters:

Bottom plate	Aperture dia.
21	30.3
22	22.3
23	25.3

As examples of the tubes that may be used for different currencies the following are given:

Country	Switzerland		
Coins	10 c.	50 c.	20 c.
Tube no.	4	4	3
Height (h)	2.1	1.95	2.43

Country	West Germany		
Coins	10 pf.	50 pf.	1 DM
Tube no.	2	3	2
Height (h)	2.3	2.18	2.38

Country	Norway		
Coins	50 ø	25 ø	1 kr.
Tube no.	2	5	1
Height (h)	2.33	2.0	2.46

Where (h) is the height of the lower end of the tube above the lower wall of the channel on the assembled dispenser.

All dimensions are in millimetres.

Claims

1. A coin dispenser comprising a plurality of upright coin holders (12, 13, 14) for different respective coin denominations, each adapted to hold a plurality of coins in a stack, coin support

means (49) located opposite lower open ends of the coin holders to receive from each coin holder the coin at the open end of that coin holder, an edge portion of each coin holder and said coin support means defining between them a gap between one and two coin thicknesses for the coin denomination concerned, through which the bottom coin concerned can be shifted edgewise, means (24, 25, 26) for shifting coins edgewise through said gaps, and means securing the coin holders relative to said support means such that the gaps are set according to the denomination concerned, characterised in that said securing means comprises a plurality of deformed pegs (55) carried by each coin holder (12, 13, 14) and received by slots (56) which are in a structure fixedly disposed relative to the support means and which are elongated in a direction substantially perpendicular to the coin support means (49), the deformation of the pegs on each holder locking that holder in a position that yields the desired gap for that holder.

2. A coin dispenser according to claim 1, characterised in that the pegs are deformed so as to substantially fill the slots.

3. A coin dispenser as claimed in claim 1 or claim 2, characterised in that the coin support means (49) is a unitary member common to all the coin holders.

4. A coin dispenser according to any one of claims 1 to 3, characterised by a plurality of upright coin tubes (12, 13, 14) each of which extends down through an opening (18, 19, 20) in an upper wall (34) of a substantially horizontally extending channel (15, 16, 17) of shallow cross-section whose lower wall constitutes said coin support means (49), and said coin shifting means (24, 25, 26) comprising an apertured slide plate mounted for reciprocating movement in the channel (15, 16, 17) between a position in which its aperture is below the coin tube and a position in which it is above an aperture (21, 22, 23) in the lower wall (49) of the channel (15, 16, 17).

5. A coin dispenser according to any preceding claim, characterised in that the size of each gap is slightly greater than the thickness of the denomination to be dispensed from the coin holder or tube (12, 13, 14) concerned.

6. A coin dispenser according to any preceding claim, characterised in that said structure is an upright plate (54) which is fixedly disposed relative to the coin support means (49).

7. A coin dispenser according to claim 6, characterised in that the assembly which comprises the upright plate (54) and the coin holders or tubes (12, 13, 14) is positioned with respect to the coin support means (49) by protruding studs (61, 62) on a mounting member (33) to which the coin support means is secured, the studs being accommodated in close fitting holes (65, 66) in the upright plate (54).

8. A coin dispenser according to any one of

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2. A coin dispenser according to claim 1, characterised in that the pegs are deformed so as to substantially fill the slots.

3. A coin dispenser as claimed in claim 1 or claim 2, characterised in that the coin support means (49) is a unitary member common to all the coin holders.

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8. A coin dispenser according to any one of



claims 1 to 7, characterised in that the coin holders or tubes (12, 13, 14) are selected from a range of five standard tubes whose internal diameters are substantially 17.5, 19.5, 21.5, 24.5 and 29.5 mm.

9. A coin dispenser according to any preceding claim characterised in that the deformed pegs (55) are moulded on the holders (12, 13, 14).

10. A coin dispenser according to any preceding claim, characterised in that each coin holder (12, 13, 14) has two pairs of deformed pegs (55).

11. A coin dispenser according to any preceding claim, characterised in that both ends of each slot (56) are closed.

12. A coin dispenser according to any preceding claim, characterised in that the deformed pegs are on flat bearing surfaces on the holders (12, 13, 14).

Revendications

1. Un distributeur de pièces de monnaie comprenant une pluralité de conteneurs à pièces de monnaie verticaux (12, 13, 14) prévus respectivement pour différentes valeurs de pièces de monnaie, dont chacun est adapté pour contenir une pluralité de pièces de monnaie en un empilement, des moyens d'appui des pièces de monnaie (49) placés en face des extrémités ouvertes inférieures opposées des conteneurs à pièces de monnaie pour recevoir de chaque conteneur de pièces de monnaie la pièce de monnaie située à l'extrémité ouverte de ce conteneur à pièces de monnaie, une partie de bord de chaque conteneur à pièces de monnaie et lesdits moyens d'appui des pièces de monnaie définissant entre eux un intervalle compris entre une et deux épaisseurs de pièces de monnaie pour la valeur de pièce de monnaie intéressée, à travers laquelle la pièce de monnaie inférieure concernée peut être déplacée latéralement, des moyens (24, 25, 26) servant à déplacer les pièces de monnaie latéralement à travers lesdits intervalles, et des moyens servant à fixer les conteneurs à pièces de monnaie par rapport auxdits moyens d'appui de telle manière que les intervalles soient ajustés conformément à la valeur concernée, caractérisé en ce que lesdits moyens de fixation comprennent une pluralité de chevilles déformées (55) portées par chaque conteneur à pièces de monnaie (12, 13, 14), et reçues par des fentes (56) qui se trouvent dans une structure disposée en position fixe relativement auxdits moyens d'appui et qui sont allongées dans une direction sensiblement perpendiculaire au moyens d'appui des pièces de monnaie (49), la déformation des chevilles de chaque conteneur verrouillant ce conteneur dans une position qui engendre l'intervalle désiré pour ce support.

2. Un distributeur de pièces de monnaie selon la revendication 1, caractérisé en ce que

les chevilles sont déformées de manière à remplir sensiblement les fentes.

3. Un distributeur de pièces de monnaie selon la revendication 1 ou la revendication 2, caractérisé en ce que les moyens d'appui (49) des pièces de monnaie sont un élément unitaire commun à tous les conteneurs de pièces de monnaie.

4. Un distributeur de pièces de monnaie selon l'une des revendications 1 à 3, caractérisé par une pluralité de tubes à pièces de monnaie verticaux (12, 13, 14), dont chacun s'étend vers le bas à travers une ouverture (18, 19, 20), ménagée dans une paroi supérieure (34) d'un canal (15, 16, 17) s'étendant sensiblement horizontalement, de section transversale peu profonde, dont la paroi inférieure constitue lesdits moyens d'appui des pièces de monnaie (49), et lesdits moyens de déplacement des pièces de monnaie (24, 25, 26) comprenant une plaque coulissante ajourée montée pour décrire un mouvement alternatif dans le canal (15, 16, 17) entre une position dans laquelle l'ouverture se trouve au-dessous du tube à pièces de monnaie et une position dans laquelle elle se trouve au-dessus d'une ouverture (21, 22, 23) de la paroi inférieure (49) du canal (15, 16, 17).

5. Un distributeur de pièces de monnaie selon l'une des revendications précédentes, caractérisé en ce que la dimension de chaque intervalle est légèrement plus grande que l'épaisseur de la valeur qui doit être distribuée à partir du conteneur ou tube à pièces de monnaie (12, 13, 14) concerné.

6. Un distributeur de pièces de monnaie selon l'une des revendications précédentes, caractérisé en ce que ladite structure est une plaque verticale (54) qui est disposée en position fixe par rapport aux moyens d'appui des pièces de monnaie (49).

7. Un distributeur de pièces de monnaie selon la revendication 6, caractérisé en ce que l'ensemble qui comprend la plaque verticale (54) et les conteneurs ou tubes à pièces de monnaie (12, 13, 14) est positionné par rapport aux moyens d'appui de pièces de monnaie par des goujons saillants (61, 62) prévus sur un élément de montage (33) auquel lesdits moyens d'appui des pièces de monnaie sont fixés, les goujons étant logés dans des trous exactement ajustés (65, 66) de la plaque verticale (54).

8. Un distributeur de pièces de monnaie selon l'une des revendications 1 à 7, caractérisé en ce que les conteneurs ou tubes à pièces de monnaie (12, 13, 14) sont choisis dans une gamme de cinq tubes standards dont les diamètres intérieurs sont sensiblement de 17,5; 19,5; 21,5; 24,5 et 29,5 mm.

9. Un distributeur de pièces de monnaie selon l'une des revendications précédentes, caractérisé en ce que les chevilles déformées (55) sont moulées sur les conteneurs (12, 13, 14).

10. Un distributeur de pièces de monnaie



selon l'une des revendications précédentes, caractérisé en ce que chaque conteneur à pièces de monnaie (12, 13, 14) a deux paires de chevilles déformées (55).

11. Un distributeur de pièces de monnaie selon l'une des revendications précédentes, caractérisé en ce que les deux extrémités de chaque fente (56) sont fermées.

12. Un distributeur de pièces de monnaie selon l'une des revendications précédentes, caractérisé en ce que les chevilles déformées sont situées sur des surfaces de portée plates des conteneurs (12, 13, 14).

Patentansprüche

1. Münzenabgabevorrichtung, umfassend mehrere stehende Münzenhalter (12, 13, 14) für jeweils unterschiedliche Münzwerte, deren jeder zur Aufnahme mehrerer Münzen in einem Stapel ausgelegt ist, eine unteren offenen Enden der Münzenhalter gegenüber angeordnete Münzentrageinrichtung (49), die aus jedem Münzenhalter die Münze am offenen Ende diese Münzenhalters aufnimmt, wobei zwischen einem Randabschnitt jedes Münzenhalters und der Münzentrageinrichtung ein Spalt zwischen ein und zwei Münzendicken des betreffenden Münzwertes definiert ist, durch den die jeweilige unterste Münze mit ihrer Kante voran geschoben werden kann, eine Einrichtung (24, 25, 26) zum Schieben der Münzen mit ihren Kanten voran durch die Spalte, sowie eine Einrichtung zum Befestigen der Münzenhalter relativ zu der Trageinrichtung derart, daß die Spalte entsprechend den jeweiligen Münzwerten eingestellt sind, dadurch gekennzeichnet, daß die Befestigungseinrichtung mehrere an den einzelnen Münzenhaltern (12, 13, 14) angebrachte verformte Zapfen (55) aufweist, die in Schlitze (56) eingreifen, welche in einer relativ zu der Trageinrichtung fest angeordneten Struktur vorhanden und in einer zu der Münzentrageinrichtung (49) im wesentlichen senkrechten Richtung länglich gestaltet sind, wobei die Verformung der Zapfen an jedem Halter diesen Halter in einer Stellung verriegelt, die den gewünschten Spalt für diesen Halter ergibt.

2. Münzenabgabevorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Zapfen derart verformt sind, daß sie die Schlitze im wesentlichen ausfüllen.

3. Münzenabgabevorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Münzentrageinrichtung (49) ein allen Münzenhaltern gemeinsames einheitliches Bauteil bildet.

4. Münzenabgabevorrichtung nach einem der Ansprüche 1 bis 3, gekennzeichnet durch mehrere stehende Münzenrohre (12, 13, 14), deren jedes durch eine Öffnung (18, 19, 20) in

einer oberen Wand (34) eines im wesentlichen horizontal verlaufenden Kanals (15, 16, 17) flachen Querschnitts hindurch verläuft, wobei die untere Wand des Kanals die Münzentrageinrichtung (49) bildet, und wobei die Einrichtung (24, 25, 26) zum Verschieben der Münzen eine mit einer Öffnung versehene Gleitplatte umfaßt, die in dem Kanal (15, 16, 17) zwischen einer Stellung, in der ihre Öffnung sich unterhalb dem Münzenrohr befindet, und einer Stellung, in der sie über einer Öffnung (21, 22, 23) in der unteren Wand (49) des Kanals (15, 16, 17) steht, hin- und herbewegbar montiert ist.

5. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Abmessung jedes Spalts etwas größer ist als die Dicke desjenigen Münzwertes, der von dem betreffenden Münzenhalter oder -rohr (12, 13, 14) abgegeben werden soll.

6. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die besagte Struktur eine stehende Platte (54) ist, die bezüglich der Münzentrageinrichtung (49) fest angeordnet ist.

7. Münzenabgabevorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die stehende Platte (54) und die Münzenhalter oder -rohre (12, 13, 14) umfassende Baugruppe bezüglich der Münzentrageinrichtung (49) durch herausragende Stifte (61, 62) an einem Montagelement (33) positioniert ist, an dem die Münzentrageinrichtung befestigt ist, wobei die Stifte in Paßlöcher (65, 66) in der stehenden Platte (54) eingreifen.

8. Münzenabgabevorrichtung nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Münzenhalter oder -rohre (12, 13, 14) aus einem Sortiment von fünf Standardrohren ausgewählt sind, deren Innendurchmesser im wesentlichen 17,5; 19,5; 21,5; 24,5; und 29,5 mm betragen.

9. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die verformten Zapfen (55) an den Haltern (12, 13, 14) angeformt sind.

10. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß jeder Münzenhalter (12, 13, 14) zwei Paare von verformten Zapfen (55) aufweist.

11. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß beide Enden jedes Schlitzes (56) geschlossen sind.

12. Münzenabgabevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die verformten Zapfen an ebenen Lagerflächen der Halter (12, 13, 14) vorgesehen sind.

