

COIN DISPENSERS

This invention relates to coin dispensers, and is particularly but not exclusively concerned with coin dispensers for use in mechanisms for validating, separating and dispensing coins of different denominations.

Conventionally, coin dispensing apparatus comprises a coin tube for storing a stack of coins, and a coin slide arrangement mounted below the stack for dispensing the coins. The coin slide arrangement comprises an apertured slide mounted between the bottom of the coin tube and a base. The depth of the aperture is very slightly less than the thickness of the coins. The lowermost coin in the stack is received in the aperture and a solenoid is connected by a link to the slide so that actuation of the solenoid shifts the slide laterally so as to bring the coin over an aperture in the base and thereby dispense the coin. The power to the solenoid is then switched off and a spring retracts the slide so that it returns to its initial position, whereupon the next coin in the stack enters the aperture. Alternatively, the slide could be normally biased to the dispensing

position, and reciprocated by the solenoid so that it shifts first to a position where the lowermost of the stack of coins drops into the aperture and then back to the dispensing position.

5 Such arrangements involve a fairly large number of parts which need to be mounted accurately relative to each other to ensure reliable dispensing and avoid jamming. It may be necessary to remove the coin tube from a housing in which it is located, e.g. for
10 servicing or for security if the coin handling mechanism is being left unattended for a while, and it is usual in these circumstances to actuate the dispensing mechanism in order to dispense all the coins in the tube before removal.

15 In accordance with the present invention there is provided a coin handling mechanism having a coin dispenser comprising a coin store for storing coins in a stack, and a coin dispensing member which is arranged to engage the edge of the lowermost coin in
20 the stack and to move the coin substantially transversely with respect to the stack in order to dispense the coin, the coin dispensing member being pivotally reciprocable by an actuator to dispense the coin, and being mounted within a housing of the coin
25 handling mechanism, the coin store and coin dispensing member forming a sub-assembly which is removable from the housing while the dispensing member

supports the stack of coins within the coin store.

The need for dispensing all the coins before the tube is removed is therefore obviated. The sub-assembly may include further coin stores and
5 dispensing members for other denominations, or alternatively each of a plurality of coin stores for different denominations may form a respective sub-assembly.

Since the member is preferably arranged to
10 support the lowermost coin in the stack, there may thus be a single, integral unit which both supports the stack of coins and is pivotable to eject the lowermost coin in the stack. Preferably, as the unit is pivoted to a position where a coin is dispensed, a
15 surface holds the stack at a relatively elevated position until the unit is moved back whereupon the lowermost coin of the stack drops onto a further coin supporting surface.

The pivot axis is preferably substantially
20 perpendicular to the axis of the coin stack (i.e. normally horizontal), is preferably directly below the coin stack, and in the preferred embodiment is located beneath the centre of the coin stack.

Preferably an armature is directly engageable
25 with the unit so as to avoid the need for an intermediate link between the unit and the actuator. Preferably, for convenience, the

actuator does not form part of the removable sub-assembly mentioned above, and in the preferred embodiment the installation of the sub-assembly within the housing automatically brings the coin dispensing member into
5 operative relationship with the actuator, so that no mechanical link needs to be attached between the actuator and dispensing member. It has been found that these features can be achieved relatively easily using a pivotable coin dispensing member in accordance with the
10 invention, particularly if the armature is mounted for reciprocation in a direction substantially parallel to the axis of the stack of coins (i.e. normally in a substantially vertical direction).

An arrangement embodying the invention will now be
15 described by way of example with reference to the accompanying drawings, in which:-

Figure 1 is a section view showing part of a coin handling mechanism incorporating a coin dispenser according to the invention;

20 Figure 2 is a perspective view of a coin dispensing member of the dispenser;

Figures 3 to 5 are side views showing different conditions of the dispenser during operation thereof; and

Figure 6 is a schematic perspective view of the coin
25 handling mechanism showing a sub-assembly removed from a housing thereof.

Referring to Figures 1 and 6, a coin handling mechanism includes a housing within which are mounted a coin validator for receiving inserted coins and determining whether or not they are valid and a separator which
5 separates the coins into different paths depending on their denominations. A unit containing the validator and separator is schematically indicated at 3.

The mechanism also includes a plurality of coin storage tubes 4, each for receiving from the separator and storing in a stack coins of a respective denomination. The coin handling mechanism further includes a plurality of coin dispensers each formed by a respective coin tube 4 and a dispensing arrangement 6 mounted below the coin tube 4. Each coin dispensing arrangement 6
15 comprises a coin dispensing member 8 and an actuator formed by a solenoid 10 having an armature 12 for reciprocating the coin dispensing member 8. The dispensing members 8 are mounted in a common dispenser housing 13.

20 Each coin dispensing member 8 (shown more clearly in Figure 2) is pivoted about a horizontal axis 14, and supports the stack 16 of coins within the respective coin tube 4. The pivot axis 14 is mounted below, and preferably centrally of, the stack 16 and the coin tube 4.

25 In elevation, the coin dispensing member 8 is of generally segmental configuration, and has a first,

elevated, coin supporting surface 18 which normally supports the stack 16 of coins in the coin tube 4, and a second coin supporting surface 20 at a reduced radial distance from the axis 14 as compared with the surface 18. The surfaces 18 and 20 are joined together by a curved wall 22 which acts to engage the edge of the lowermost coin in the stack 16 when the coin is dispensed and which has a radius of curvature substantially equal to that of the coins in the stack 16 and that of the wall of the generally cylindrical coin tube 4. The height of the wall 22 is slightly less than the thickness of each of the coins.

As indicated in Figure 3, the coin dispensing member 8 is biased to a position in which the first coin supporting surface 18 is located underneath the stack 16 of coins by a spring 24 connected between a spigot 26 on the coin dispensing member 8 and a further spigot 28 fixed to the coin tube 4.

The coin dispensing member 8 has an integral extension 30 located above the armature 12 of the solenoid 10.

In operation, the coin dispensing arrangement 6 is normally in the condition shown in Figure 3. In order to dispense a coin, the solenoid 10 is actuated which causes the armature 12 to rise and pivot the coin dispensing member 8 anticlockwise as shown in Figure 4. The lower-

most coin in the stack 16 then drops onto the coin supporting surface 20, the major portion of which is substantially flat and (in the position shown in Figure 4) normal to the axis of the coin stack 16. The power to the solenoid is then discontinued, so that the armature 12 descends and the spring 24 moves the coin dispensing arrangement clockwise as shown in Figure 5. This causes the wall 22 to engage the edge of the lowermost coin in the stack and thus eject the coin to the right as shown in Figures 1 and 5, so that the coin will enter a dispensing passageway indicated at 32 via a slot 33.

The coin dispensing member 8 is pivotally supported by the dispenser housing 13 which is fixed to the lower ends of the coin tubes 4. The dispenser housing 13, the dispensing members 8 and the coin tubes 4 form a sub-assembly indicated at 34 in Figure 6 which can be removed from the coin handling mechanism and in particular from the housing 2 thereof for servicing or security. It will be appreciated that when this is done the coin dispensing members 8 retain the stacks 16 of coins within the coin tubes 4, and indeed because the springs 24 are part of the sub-assembly 34 the conditions of the dispensing arrangements are maintained (i.e. the coins remain supported on the surfaces 18 of the dispensing members 8). When the sub-assembly is replaced, the members 8 are automatically brought into operative relationship with

the solenoid actuators 10. The sub-assembly is fixed in position by suitable means (not shown) such as screws or inter-engaging snap fittings.

5 The above arrangement could be modified so that the coin dispensing member 8 is biased to the position shown in Figure 4, and so that energisation of the solenoid 10 causes the member to shift to the position shown in Figure 5 to eject a coin, following which the solenoid is de-energised and the member moves back to the position shown in Figure 4 whereupon the next coin in the stack drops onto the surface 20 of the member 8. This could be conveniently achieved by disposing the spring 24, the extension 30 and the solenoid 10 on the opposite sides of the centreline through the coin tube 4 from the arrangement shown in the drawings.

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It will be appreciated from the above that the present embodiment provides an arrangement which is simple to construct and assemble, in which there is a reduced number of parts compared with the conventional arrangement which involves a coin slide mounted between a base and a coin tube and connected to a solenoid via a link, and which is simple to service in that part of the dispensing arrangement (i.e. the dispensing member 8) can be removed with the coin tube 4 because it forms part of the same sub-assembly.

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In the above arrangement, the coin tube 4 extends generally vertically, and gravity causes the stack 16 of coins to engage the dispensing member 8. This however is not absolutely essential. It is conceivable that the
5 coin tube 4 can be mounted in any other desired orientation, and if necessary biasing means formed by e.g. a spring can be used to force the stack 16 of coins against the dispensing member 8. Accordingly, references herein to the dispensing member 8 or its pivot axis 14 being
10 "below" the coin tube 4 should be construed as covering the arrangement in which the dispensing member 8 and axis 14 are located along the axis of the coin tube 14, such that the coins in the stack 16 are urged toward the dispensing member 8 and axis 14.



CLAIMS:

1. A coin handling mechanism having a coin dispenser comprising a coin store for storing coins in a stack, and a coin dispensing member which is arranged to engage the edge of the lowermost coin in the stack and to move the coin substantially transversely with respect to the stack in order to dispense the coin, the coin dispensing member being pivotally reciprocable by an actuator to dispense the coin and being mounted within a housing of the coin handling mechanism, the coin store and coin dispensing member forming a sub-assembly which is removable from the housing while the dispensing member supports the stack of coins within the coin store.

2. A mechanism as claimed in claim 1 wherein the coin dispensing member is formed by an integral unit having a coin engaging surface for shifting the lowermost coin in the stack, the coin engaging surface forming a wall between a first supporting surface for supporting the stack in a relatively elevated position in a first position of the dispensing member, and a second coin supporting surface for receiving the lowermost coin in the stack in a second position of the dispensing member.



3. A mechanism as claimed in claim 2 wherein the unit is further provided with an extension engagable with the actuator for pivoting the unit.

4. A mechanism as claimed in claims 2 or 3, wherein the second coin supporting surface has a substantially flat portion for receiving the lowermost coin in the stack, the flat portion being disposed substantially normal to the axis of the stack in said second position of the dispensing member.

5. A mechanism as claimed in any preceding claim wherein the actuator remains in the housing when the sub-assembly is removed.

6. A mechanism as claimed in any preceding claim, wherein the pivot axis of the dispensing member is located below the coin stack and extends in a direction substantially perpendicular to the axis of the stack.

7. A mechanism as claimed in claim 6, wherein the pivot axis is disposed substantially centrally of the coin stack.



8. A mechanism as claimed in any preceding claim, wherein the housing contains a coin validator, a coin separator for separating validated coins received from the validator into different
5 denominations, and a plurality of coin dispensers each for storing and dispensing a respective denomination of coin.

9. A coin handling mechanism substantially as herein described with reference to the accompanying
10 drawings.
