

Description

The present invention relates to an apparatus for dispensing coins or tokens, and more particularly to a hopper type coin dispensing apparatus including a hopper for storing coins or tokens in bulk and a rotary disc for delivering the coins from the hopper one at a time and in specific quantities.

US-A-3,942,544 is illustrative of the prior art. There is disclosed a coin dispensing apparatus for various coin denominations including a hopper for storing coins, a rotary disc rotatably disposed in the hopper at an angle to the horizontal, a removably secured central disc on the rotary disc and a delivery knife, in which the central disc is removable and replaceable with different diameter central discs to accommodate varying denominations of coins and the delivery knife is pivotably mounted to accommodate varying diameters of varying coin dimensions. The rotary disc is provided with a plurality of pins extruded from the front surface thereof in positions spaced in the peripheral direction. The central disc and the extruded pins define coin receiving spaces. These coin receiving spaces pick up coins from a gutter formed in the lower portion of the hopper and deliver them to the upper delivery portion one at a time and in specific quantities when the rotary disc is rotated within the hopper. The coins delivered into the upper delivery portion are guided by the delivery knife to a coin discharge chute. The coins passing the upper delivery portion are usually counted by means of a coin counter which has an actuator or an actuating roller of a microswitch resiliently projected into a position to be engaged with the coins effectively. Alternatively the coin counter is constructed by a photoelectric switch adapted for detecting the coin pushed out by a leaf spring extending from the one side of the delivery passage.

However, such a coin dispensing apparatus has a disadvantage that the arrangement for rotatably supporting the rotary disc by means of rollers and knife edge formed at the periphery of the rotary disc is rather difficult and expensive to manufacture. The object of the invention is to remove the above-mentioned disadvantage and to provide a coin dispensing apparatus which operates effectively and is of inexpensive construction. The coin dispensing apparatus of the present invention is characterised in that the rotary disc has a circular race grooved on the bottom surface at the peripheral portion thereof and is rotatably supported on the upper plane surface of an inclined supporting plate by means of a plurality of balls which are arranged in the circumferential direction between the circular race and the upper plane surface of the supporting plate by means of retainers for rotatably retaining the balls in the circular race at positions spaced from each other circumferentially, in that the drive shaft extends through a central opening in the rotary disc and in that there is provided urging means on the drive shaft for urging the central portion of the rotary disc

towards the supporting plate to thereby maintain the peripheral portion of the rotary disc at a constant position with respect to the supporting plate. If the rotary disc is not supported at its peripheral portion the upper peripheral portion of the rotary disc is pushed or floated out of its normal position so as to interfere with the fixed delivery knife as the result of a load of coins in the hopper pressing on the lower portion of the rotary disc. By the use of the present invention, however, the rotary disc is rotated smoothly without any interference with the fixed delivery knife.

US-A-2,886,045 discloses a coin sorting and counting machine of a kind which does not include a delivery knife in the coin dispensing apparatus. In the machine of US-A-2,886,045 a main rotary table is rotatably supported at a position remote from its periphery by means of a plurality of ball bearings in a construction which requires severe accuracy in the manufacture and assembly of the apparatus.

The present invention will be further understood from the following detailed description of an embodiment thereof which is made, by way of example, with reference to the accompanying drawing in which:

Fig. 1 is a front elevation of the coin dispensing apparatus according to the present invention,

Fig. 2 is a side elevation of the coin dispensing apparatus shown in Fig. 1,

Fig. 3 is a front elevation in large scale of the coin dispensing apparatus with the hopper removed to show the rotary disc and the counting means,

Fig. 4 is an enlarged sectional view illustrating the relationship between the drive gear box, drive pin, rotary disc and rotary disc supporting means, and

Fig. 5 is an illustrative perspective view of a portion of the proximity switch.

With reference to drawings, it will be seen that a mounting frame 1 is composed of a base plate 2 and side plates 3, 3 having flanges 4, 4 on the inclined front edges, respectively. On the mounting frame 1, a rotary disc supporting plate 5 is fixedly mounted by means of bolts 6, 6 secured to the flanges 4, 4 at an angle to the horizontal and a motor 7 is mounted for driving a drive shaft 9 through a reduction gear box 8. The motor 7 is provided with a conventional braking mechanism 10 for stopping at a desired angular position.

In order to rotatably support a rotary disc 13 on the inclined supporting plate 5, a plurality of balls 11 are interposed between the upper or front surface of the supporting plate 5 and the bottom surface of the rotary disc 13. The balls 11 are rotatably retained in retainers 12, respectively, which are spaced in the peripheral direction and fixed to the front surface of the supporting plate 5. The rotary disc 13 has a circular race 14 formed on the bottom surface thereof for engaging the balls 11 in the retainers 12.

The rotary disc 13 has also a driven pin 15 extruded from the bottom surface thereof so as to engage with a drive pin 16 secured to the drive

shaft 9 when the motor is operative and rotates the drive shaft 9 and thereby the rotary disc 13 is connected operatively to the drive shaft 9. The rotary disc 13 has a plurality of delivery pins 17 extruded from the front surface thereof in positions spaced in the peripheral direction. The delivery pins 17 may be formed by means of such as press working of the rotary disc.

The rotary disc 13 is also provided with a central disc 18 on the front side thereof. The central disc has a central opening 19 for inserting the drive shaft 9 which is extended through the rotary disc 13 and a plurality of agitators 20 protruded from the front surface thereof, the agitators 20 may also be formed by means of such as press working.

In order to prevent lift and runout of the rotary disc 13 as the result of unbalance of the weight of coins applied to the rotary disc, a provision is made of urging means such as a belleville spring 21 to engage the circular race 14 of the rotary disc 13 with the balls 11 on the supporting plate 5 effectively under a desired pressure. The belleville spring 21 is secured to the extended end of the drive shaft 9 through a washer 22 by means of a screw 23 to urge the central disc 18 against the rotary disc 13.

The hopper 25 is made of plastics and is resiliently mounted on the supporting plate 5 by means of pins 26, each of which is extended through a hole (not shown) in the supporting plate 5 and provided with a spring 28 interposed between the bottom side of the supporting plate 5 and a collar 27 secured to the extended end portion of the pin 26 so as to permit the hopper 25 to lift it from the supporting plate resiliently against the force of the spring. Such lifting movement of the hopper 25 relative to the supporting plate 5 prevents coins contained within the hopper 25 from jamming in the gutter portion of the hopper. The hopper 25 is also movably supported by means of supporting roller 29 which is mounted rotatably on a stationary supporting arm 30 and engaged with the guide portion 25' of the hopper 25.

In order to increase the amount of coins to be stored in the coin dispensing apparatus, an additional hopper 31 is removably mounted on a bracket 32 extended from the upper portion of the mounting frame 1 above the hopper 25. Also, in order to detect the amount of coins contained in the hopper, a detector arm 33 is pivoted to the bracket 32 and is provided with a detecting element 34 secured to the free end thereof so as to contact with the coins within the hopper. The detecting arm 33 is further arranged to actuate a detecting microswitch 35 when the amount of the coins attains to the upper or lower limit level.

The coin dispensing apparatus includes a delivery knife 40 adapted for guiding coins to a coin discharge chute at the upper delivery portion 41 and further a removable and replaceable counter roller 42 adapted for the diameter of the coins to be dispensed so as to define a delivery passage 43 together with the knife 40.

The counter roller 42 is rotatably and removably mounted on a pin 45 at the free end of a rocker arm 44 by means of a split ring. The rocker arm is pivoted to the supporting plate 5 by means of a pin 46 and is usually urged in the position shown in Fig. 3 by means of a spring 47. The one end 47a of the spring 47 is engaged with the rocker arm 44 and the other end 47b is engaged with the supporting plate 5 so as to pivot the rocker arm 44 in a counterclockwise direction until a stopper 48 adjustably secured to the rocker arm 44 engages the upper edge of the supporting plate 5 so as to position the counter roller 42 at the one side of the delivery passage 43 so that as a coin having a predetermined diameter is delivered to the delivery passage 43 along the knife 40 by pushing action of the pin 17 provided on the rotating disc 13, the coin effectively contacts the counter roller 42 to pivot the rocker arm 44 in a clockwise direction against the force of the spring 47. The pivotal movement of the rocker arm 44 causes a switch actuating arm 50 formed integrally with the rocker arm 44 to move into a gap or slot 52 between a pair of sensor coils 51, 51 of an electromagnetic sensor such as a slot switch or a proximity switch 53 to make switching action.

It will be seen from the above mentioned that the coin dispensing apparatus according to the present invention comprising a plurality of balls interposed between the bottom surface of the rotary disc and the upper surface of the supporting plate so as to support the rotary disc on the supporting plate rotatably and means for urging the rotary disc to the supporting plate so as to prevent from the rotary disc disengaging the balls, makes it possible to overcome the problem of lift and runout of the rotary disc with a simple and low cost construction. Furthermore, the above mentioned apparatus comprising a removable and replaceable counter roller, rotatably mounted on the rocker arm integrally formed with the actuating arm of the electromagnetic sensor and usually positioned at the opposite side of the delivery knife by means of spring so that as a coin having a predetermined diameter is delivered to the delivery passage along the knife, the coin pivots the rocker arm so as to move the actuating arm into the detecting gap or slot of the electromagnetic sensor to make switching action, makes it possible to modify the apparatus easily and quickly by replacing with the counter roller having different diameter adapted for the diameter of the coins to be dispensed without necessary of replacement of the center disc and adjustment of the position of the delivery knife and/or the sensitive adjustment of the counter switch.

Furthermore, the actuating arm can move freely into the detecting gap or slot between a pair of sensor coils of the electromagnetic sensor so that as a coin having larger diameter than the predetermined diameter may pass through the delivery passage, it permits to pass such a large coin without any jams so that the apparatus can operate continuously in safety condition.

Claim

A coin dispensing apparatus including a hopper (25) for holding a supply of coins, a rotary disc (13) mounted within said hopper at an angle inclined to the horizontal and having coin engaging means (17) on an upper face thereof, said rotary disc being rotated by means of a drive shaft (9) at the centre thereof in one direction to carry coins upwardly from near the bottom of the hopper, a delivery knife (40) near the top of the disc to which coins are delivered by the rotary disc for guidance to a delivery chute and which has a substantially upwardly facing surface which the coins engage edgewise, characterised in that the rotary disc (13) has a circular race (14) grooved on the bottom surface at the peripheral portion thereof and is rotatably supported on the upper plane surface of an inclined supporting plate (5) by means of a plurality of balls (11) which are arranged in the circumferential direction between the circular race (14) and the upper plane surface of the supporting plate (5) by means of retainers (12) for rotatably retaining the balls in the circular race (14) at positions spaced from each other circumferentially, in that the drive shaft (9) extends through a central opening in the rotary disc (13) and in that there is provided urging means (21) on the drive shaft (9) for urging the central portion of the rotary disc (13) towards the supporting plate (5) to thereby maintain the peripheral portion of the rotary disc (13) at a constant position with respect to the supporting plate (5).

Patentanspruch

Münzausgabeeinrichtung, enthaltend einen Trichter (25) zur Aufnahme einer Münzenmenge, eine Drehscheibe (13), die in dem Trichter unter einem zur Horizontalen geneigten Winkel montiert ist und Münzenmitnahmeeinrichtungen (17) an einer Oberseite derselben aufweist, wobei die Drehscheibe mittels einer Antriebswelle (9) in ihrer Mitte in einer Richtung gedreht wird, um Münzen aus dem Bodenbereich des Trichters nach oben zu transportieren, und ferner enthaltend eine Ausgabeklinge (40) nahe dem oberen Bereich der Scheibe, der Münzen durch die Drehscheibe zugeführt werden zur Überführung zu einer Abgaberinne und die eine im wesentlichen aufwärtsweisende Fläche aufweist, die mit den Münzen randseitig in Berührung kommt, dadurch gekennzeichnet, daß die Drehscheibe (13) eine kreisförmige Laufbahn (14) aufweist, die an der Unterseite im Umfangsbereich derselben eingestochen ist, und sie drehbar auf

der oberen ebenen Seite einer geneigten Tragplatte (5) mittels einer Vielzahl von Kugeln (11) drehbar abgestützt ist, die in Umfangsrichtung zwischen der kreisförmigen Laufbahn (14) und der oberen ebenen Seite der Tragplatte (5) mittels Halteeinrichtungen (12) angeordnet sind, um die Kugeln in der kreisförmigen Laufbahn (14) an Stellen drehbar zu halten, die voneinander in Umfangsrichtung Abstand haben, und daß die Antriebswelle (9) sich durch eine zentrale Öffnung in der Drehscheibe (13) erstreckt und daß eine Spanneinrichtung (13) an der Antriebswelle (9) vorgesehen ist, die den mittleren Abschnitt der Drehscheibe (13) gegen die Tragplatte (5) drückt, um dadurch den Umfangsabschnitt der Drehscheibe (13) in einer konstanten Lage in bezug auf die Tragplatte (5) zu halten.

Revendication

Distributeur de pièces de monnaie comportant une trémie (25) pour le stockage des pièces de monnaie, un disque rotatif (13) monté à l'intérieur de ladite trémie à un certain angle par rapport à l'horizontale et ayant des moyens d'engagement des pièces (17) sur une face supérieure de celui-ci, ledit disque rotatif pouvant tourner au moyen d'un arbre d'entraînement (9) au centre de celui-ci dans une direction pour transporter les pièces vers le haut à partir du voisinage du fond de la trémie, un couteau de distribution (40) à proximité de l'extrémité supérieure du disque vers lequel les pièces sont amenées par le disque rotatif pour les guider vers une glissière de distribution et qui présente une surface faisant sensiblement face vers le haut que les pièces engagent sur le côté, caractérisé en ce que le disque rotatif (13) présente une piste circulaire (14) creusée sur la surface de fond à sa partie périphérique et est supporté, de façon rotative, sur la surface plane supérieure d'une plaque de support inclinée (5) au moyen d'une pluralité de billes (11) qui sont agencées en direction circonférentielle entre la piste circulaire (14) et la surface plane supérieure de la plaque de support (5) grâce à des moyens de retenue (12) pour retenir, de façon rotative, les billes dans la piste circulaire (14) en des positions espacées circonférentiellement l'une de l'autre, en ce que l'arbre d'entraînement (9) s'étend à travers une ouverture centrale dans le disque rotatif (13) et en ce qu'il est prévu des moyens de sollicitation (21) sur l'arbre d'entraînement (9) pour solliciter la partie centrale du disque rotatif (13) vers la plaque de support (5) pour ainsi maintenir la partie périphérique du disque rotatif (13) dans une position constante par rapport à la plaque de support (5).

