Jan. 18, 1966 H. OTTO ETAL 3,229,806

COIN FEEDER

Filed June 19, 1963 3 Sheets-Sheet 1

Fig. 1

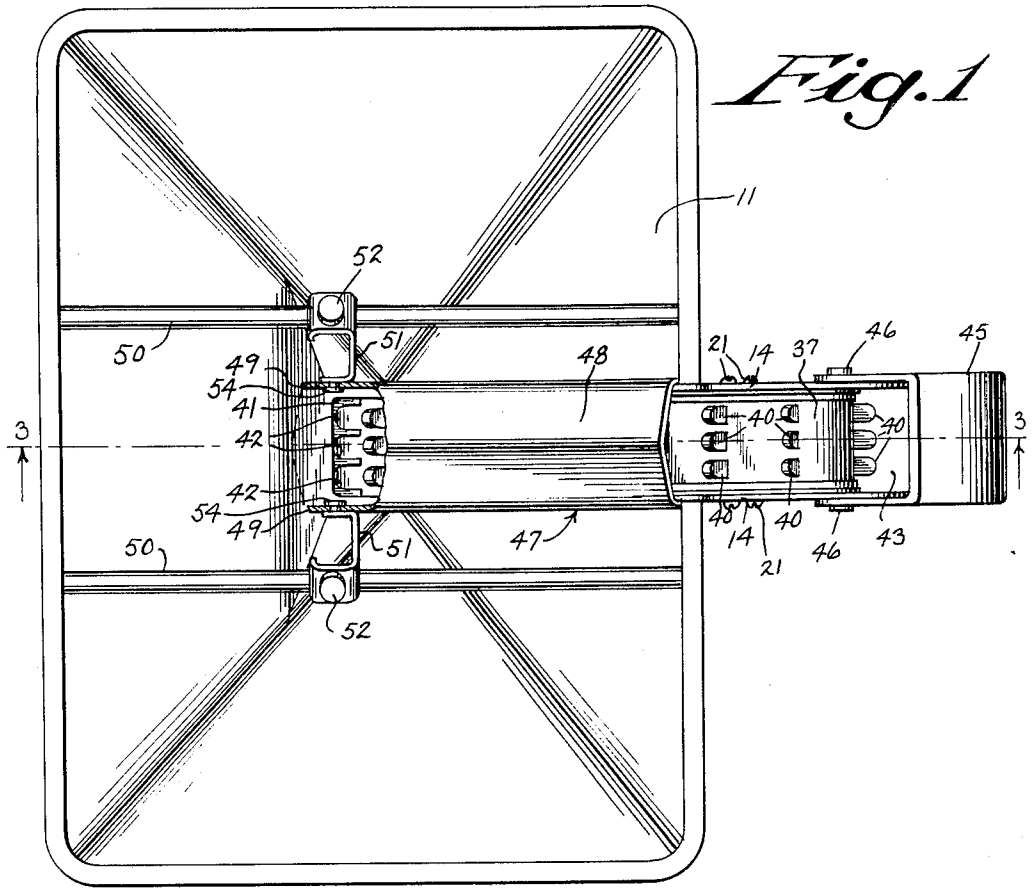
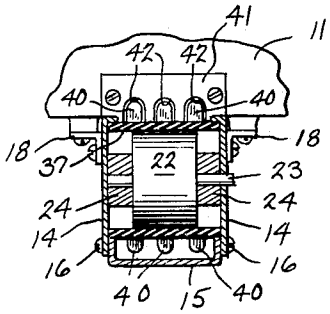


Fig. 5



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Filed June 19, 1963 3 Sheets-Sheet 2

Fig. 2

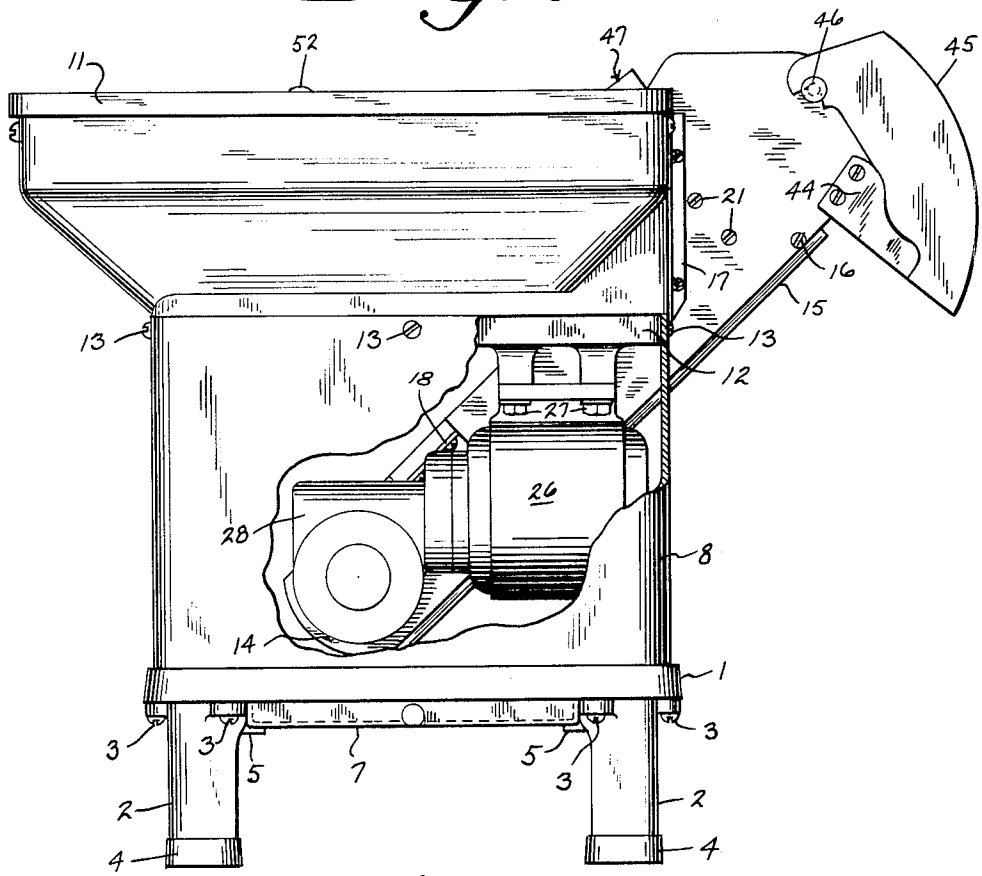
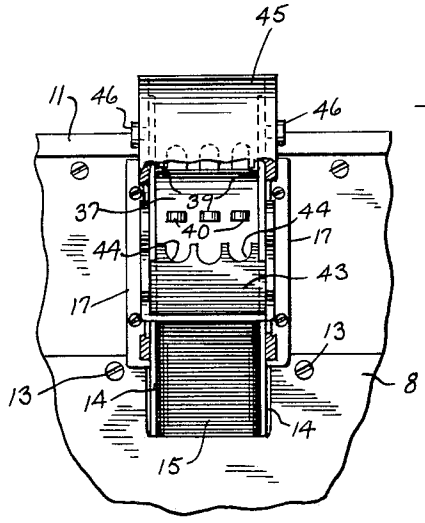


Fig. 6



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COIN FEEDER

Filed June 19, 1963 3 Sheets-Sheet 3

Fig. 3

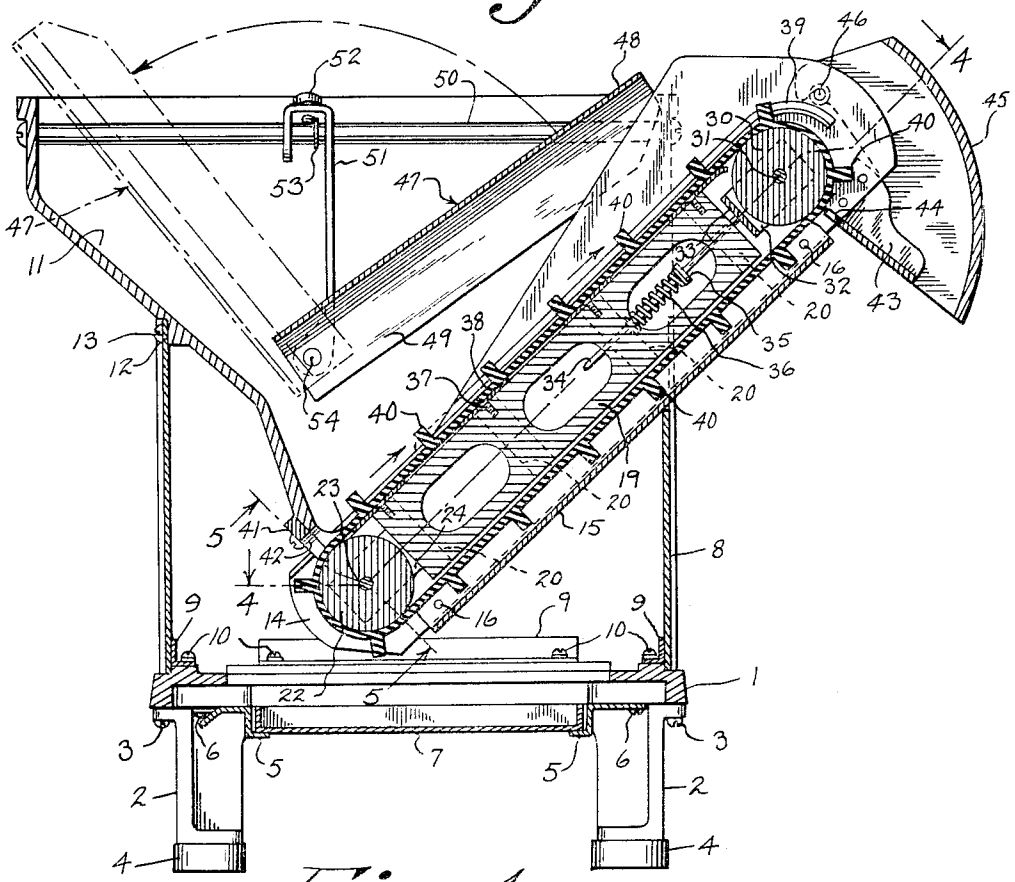
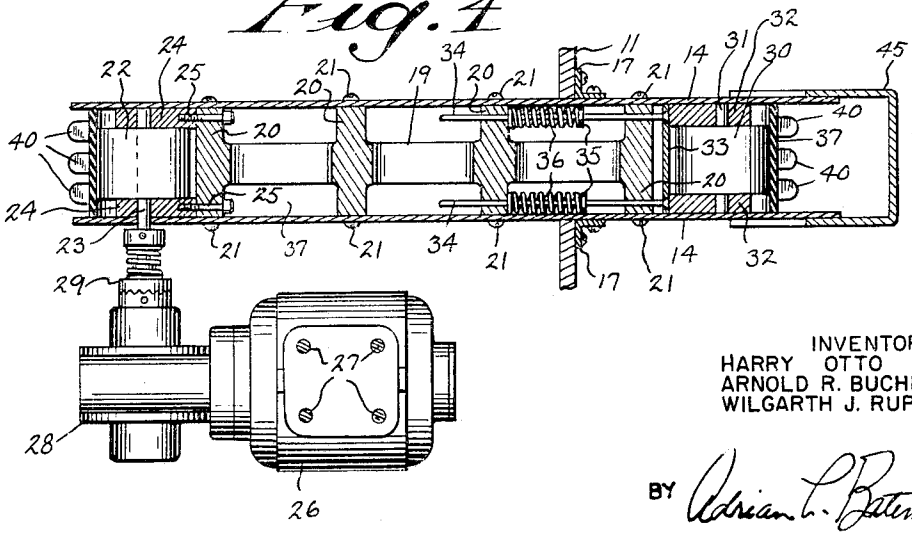


Fig. 4



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3,229,806

COIN FEEDER

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3 Claims. (Cl. 198—54)

This invention relates to coin feeders for use, for example, in conjunction with coin counters or sorters; and it resides more particularly in an improved feeder that is capable of operating under heavy loads without difficulty and of effectively handling both coins and relatively small tokens.

Coin feeders are often used to supply coins to counting or sorting machines. They usually comprise a large storage bin and an exposed endless conveyor belt to lift the coins from the bin and deposit them in the smaller hopper of the counting or sorting machine. Often, there is a control system for periodically actuating the conveyor in response to the needs of the machine being served. An example of such an arrangement, which serves also to show one manner in which a feeder constructed according to this invention may be used, is shown in U.S. Patent No. 2,581,074, issued January 1, 1952, to Arnold R. Buchholz and Walter A. Barganz.

Previously devised feeders have not proven entirely satisfactory. For example, most older feeders are not capable of readily handling the .650 inch tokens which are now in common use. Also, many older feeders cannot operate successfully under heavy loads, and when the feeder storage bin is filled the weight of the coins or tokens acting on the exposed belt slows or stops the belt. Also, the conveyor belts of some older feeders tend to become loose after use, thus interfering with their effectiveness.

It is one object of this invention to provide a feeder having a shield protecting an exposed conveyor belt to reduce the weight bearing on the belt when the storage bin is full, while allowing sufficient space for coins or tokens to feed onto the loading end of the conveyor belt, with the shield being mounted so that it may easily be moved for clearing or cleaning the belt.

It is another object of this invention to provide a feeder with an improved conveyor belt and grate and rake means to insure effective handling of coins or similar articles of all sizes, including relatively small tokens.

It is a further object of this invention to provide a feeder which incorporates simple, effective tensioning means for a conveyor belt to insure proper tensioning even after long use.

It is still another object of this invention to provide a feeder having chute and guide means at the discharge end of the conveyor belt to insure that coins or tokens are properly directed, with the guide means being readily removable for cleaning or clearing the belt.

It is a still further object of this invention to provide a feeder which may easily be incorporated into an automatically controlled circuit in combination with a coin counter or sorter.

It is still another object of this invention to provide a feeder in which a conveyor belt is provided with upstanding side pieces near its loading end to prevent coins thereon from falling off the sides of the belt, which side pieces cooperate with depending sides of a shield to prevent coins from feeding onto the belt near its discharge end.

It is a still further object of this invention to provide a feeder having the foregoing advantages which is relatively simple and inexpensive to manufacture.

Other objects and advantages will appear from the description to follow. In the description, reference is made to the accompanying drawings which form a part hereof and in which there is shown, by way of illustration and not of limitation, a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a top plan view, with a portion of the conveyor shield broken away, of a coin feeder formed according to this invention,

FIG. 2 is a side view in elevation, with a part of the enclosure broken away, of the feeder of FIG. 1,

FIG. 3 is a view in cross-section, with an alternative position of the conveyor shield shown in broken lines, taken along the plane 3—3 shown in FIG. 1,

FIG. 4 is a partial view in cross-section, showing the conveyor and drive means, taken along the plane 4—4 shown in FIG. 3,

FIG. 5 is a fragmentary view in cross-section taken along the plane 5—5 shown in FIG. 3, and

FIG. 6 is a fragmentary side view in elevation, with a portion of the guide means shown broken away, of the feeder of FIG. 1 showing the discharge end of the conveyor belt, chute and guide means.

Referring again to the drawings, the feeder of the invention is supported by a generally rectangular, centrally open frame or base 1, formed of cast metal. At each of its corners the frame 1 is provided with legs 2, attached thereto by screws 3 and provided with rubber tips 4. A pair of parallel angle members 5 are attached to opposite sides of the base 1, on its underside, by screws 6 and serve as slideways to receive a removable tray 7 which serves as a cover for the access opening provided by the centrally open frame 1.

A generally rectangular enclosure 8, formed of four sheet metal side walls bolted together, rests on the frame 1 and is attached thereto by means of four angle members 9, one on each side of the enclosure 8, which have their vertical legs welded to the enclosure 8 and their horizontal legs attached to the frame 1 by screws 10.

A generally pyramidal, upwardly opening storage bin 11, formed of cast metal, has its bottom extending downwardly into the enclosure 8. The bin 11 is mounted in the enclosure 8 by means of a recessed annular ledge 12 formed on the outer surfaces of the bin 11 which fits within the upper edges of the walls of the enclosure 8, screws 13 being used to secure the bin 11 in place.

A trough-like conveyor housing is attached to the bin 11 and comprises vertical side pieces 14 and an upwardly opening, channel shaped bottom wall 15 secured to the side pieces 14 by assembly screws 16. The bin 11 is provided with a slot, along its right hand side as seen in FIG. 1, and the side pieces 14 are mounted in the slot, near their top ends, by means of angle members 17 attached to the outside of the bin 11 and, at their lower ends, by means of angle members 18, one of which is seen in FIG. 2, attached to the bin 11. The housing formed by the members 14 and 15 thus opens upwardly through the bin 11 and, as can be seen in FIG. 3, extends upwardly along one wall of the bin 11 from its bottom to terminate outside of and at about the level of the top of the bin 11.

A cast metal conveyor belt mounting beam member 19 having integral transverse flanges 20 is mounted between the side pieces 14 by means of mounting screws 21 which pass through the side pieces 14 and engage the flanges 20. A drive roll 22, preferably coated with a frictional material such as a polyurethane, is rotatably mounted at the lower end of the beam 19, as seen in FIGS. 3 and 4, by means of a shaft 23 that is journaled at its ends in bearing blocks 24 mounted on the lower end of the beam 19 by bolts 25.

As can be seen in FIGS. 2 and 4, a conventional electric motor 26 is suspended from the bin 11 by means of

bolts 27. The output shaft of the motor 26 is connected to a conventional speed reducer 28, and the output shaft of the speed reducer 28 is drivingly connected, through an overload clutch 29, to the shaft 23. Suitable electrical connections (not shown) may easily be provided to connect the motor 26 into a control circuit for periodic actuation.

An idler roll 30 has its shaft 31 journaled in an outwardly opening cradle formed by bearing blocks 32 mounted at the upper end of the beam 19 and a connecting base bar 33. The bar 33 is connected to a pair of pins 34 which extend therefrom along opposite sides of the beam 19 and are slidably received through the two endmost flanges 20. Stop washers 35 are firmly secured to the pins 34 between the two endmost flanges 20, and compression springs 36 disposed about the pins 34 and acting between a flange 20 and the stop means 35, serve to urge the pins 34, and thus the idler roll 30, away from the beam 19, to the right as seen in FIG. 4. Having the pins 34 extend through the two flanges 20 is a simple but effective means of insuring a straight line force acting on the roll 30, and also makes possible the use of inexpensive springs and washers as bias means.

An endless reinforced rubber conveyor belt 37 passes about the rolls 22 and 30, to have a loading end near the roll 22 at the bottom of the bin 11, and a discharge end near the roll 30 at the top of the bin 11. The top or conveying portion of the belt 37 extends from the bottom of the bin 11 to its top and is exposed along its entire length. The underside of the belt 37 is in frictional driving engagement with the drive roll 22 so that it is driven in response to the motor 26, the belt 37 moving clockwise as seen in FIG. 3. A constant tension on the resilient belt 37 is maintained by the springs 36 acting on the roll 30, and the stop washers 35 may be set during assembly so that the springs 36 will exert any desired force within their capabilities.

A pair of smooth guide tracks 38, one of which can be seen in FIG. 3, are bolted to the tops of the flanges 20 under the edges of the belt 37 to reduce friction thereon. Similarly, the side pieces 14 are provided with angled guide tracks 39, seen most clearly in FIGS. 1 and 3, which engage the upper edges of the belt 37. The angled tracks 39 extend over the belt 37 to prevent coins or tokens from falling between the belt 37 and the side pieces 14. The tracks 39 and 38, as well as guiding the belt 37, hold its edges to prevent slapping. As can be seen in FIG. 3, the guides 39 extend upwardly beyond the end of the belt 37 to compensate for movement of the roller 30 upwardly in response to the springs 36 which might occur as a result of initial adjustment or if the belt 37 loses its resilience and becomes stretched after long use.

The outer surface of the conveyor belt 37 is provided with upstanding rubber lugs or elevators 40 in spaced groups of three extending transversely across the belt 37. The lugs 40 are relatively thick and are generally rectangular with semicircular tops. As can be seen in FIG. 1, the lugs 40 in each group are closely spaced to take up most of the effective width of the belt 37, which is the distance between the inner edges of the guides 39. In the particular embodiment of the invention shown herein, the lugs 40 have a base width of about three-eighths of an inch and are spaced apart, at their bases, about thirteen sixty-fourths of an inch, and the effective width of the belt 37 is about one and three-fourths inches. Although these dimensions may be varied, it is important that the lugs 40 be closely spaced and take up most of the width of the belt 37 to prevent coins or tokens from falling therebetween.

As can be seen in FIGS. 1 and 5, the opening near the bottom of the bin 11 through which the belt 37 passes is provided with a grate 41 having rounded openings 42 complementary to the shape of the lugs 40, which openings allow the lugs 40 to pass therethrough with a relatively close fit, the grate 41 serving to prevent coins or tokens from falling through the open bottom of the bin 11.

As can be seen in FIGS. 2 and 6, a downwardly inclined chute and rake member 43 is mounted between the upper ends of the side pieces 14 and serves to channel and direct the flow of coins or tokens brought up by the conveyor belt 37. At its rear side, the chute 43 is provided with rounded notches 44 complementary to the lugs 40 and through which the lugs 40 may pass with a relatively close fit, the clearance around the lugs 40 being only about one thirty-second of an inch. The member 43 serves both as a chute and as a rake means to insure that coins carried up by the belt 37 are not carried therewith as it begins its return run.

As stated, a feeder formed according to this invention is capable of handling all sizes of coins as well as .650 inch tokens, and the arrangement of the lugs 40, grate 41 and chute and rake member 43 allows this versatility. Again, and although actual measurements may be varied, it is important that the lugs 40 be closely spaced and take up the bulk of the width of the belt 37, and that the openings 42 and 44 have a relatively close fit with the lugs 40. Also, the openings 42 and 44 should be small enough to prevent coins or tokens from falling therethrough. In the embodiment shown herein, for example, the notches 44 have a maximum width of about fifteen thirty-seconds of an inch and a maximum height of about seventeen thirty-seconds of an inch. The inner edges of the members 41 and 43 should have a minimal clearance with the surface of the belt 37.

A curved, channel shaped guide 45 is pivotally mounted on the side pieces 14 by means of having notches on its depending edges hooked over pins 46 on the outer sides of the side pieces. The depending sides of the guide 45 have curved edges complementary in configuration to curved upstanding sides of the chute 43 so that, as can be seen most clearly in FIG. 3, coins brought up by the conveyor belt 37 will be discharged through a relatively small, tubelike passageway so that they will be accurately directed. The guide 45 is easily pivotable or removable by virtue of its hooked connection, so that the belt 37 can be cleaned or cleared without difficulty.

As can also be seen from FIG. 3, the side pieces 14 are inclined to extend above the belt 37 starting somewhat above the bottom of the bin 11. Thus, coins or tokens are free to feed onto the belt 37 at its lower end, but coins piled on the belt 37 near its discharge end are prevented from falling to the sides and back into the bin 11.

An elongated, downwardly opening, channel shaped metal shield, designated generally by the reference numeral 47, is mounted above and parallel to the belt 37 and comprises a gabled roof portion 48 and depending sides 49. The shield 47 is mounted by means of a pair of rods 50 securely mounted between the walls of the bin 11 and lying parallel to and on either side of the belt 37. A pair of brackets 51 extend downwardly, one from each rod 50, the brackets 51 having upper ends that are bent back upon themselves and are provided with apertures through which the rods 50 are slidably received. Set screws 52 are threadedly received through the upper ends of the brackets 51 and engageable with the rods 50 to hold the brackets 51 in place. Stop washers 53 are mounted on the rods 50 and are engageable with the brackets 51 and screws 50 to limit sliding movement of the brackets on the rods.

The lower end of the shield 47, which is that end lying over the loading end of the belt 37, is pivotally mounted between the brackets 51 by means of pins 54 which engage its sides 49. The upper end of the shield 47, the end lying over the discharge end of the belt 37, is free so that it may be swung upwardly therefrom to the broken line position shown in FIG. 3 wherein the belt 37 is fully exposed for clearing or cleaning. When the shield 47

is in the full line position shown in FIG. 3, the roof portion **48** rests on the side pieces **14** to support the shield, with the sides **49** lying outside of the side pieces **14** and cooperating therewith to close off access to the belt **37** from the sides. The roof portion **48** is of width and length sufficient to cover substantially all of the exposed surface of the belt **37** in the bin **11**.

The shield **47** serves to prevent excess weight or force from being exerted on the belt **37** when the bin **11** is full of coins or tokens. That is, when the bin **11** shown herein is full it holds approximately 100 pounds of coins and the downward force exerted on the belt **37**, which is exposed along its entire length in the bin **11**, could cause it to be slowed or stoped entirely. When the shield **47** is in the full line position shown in FIG. 3, however, a great deal of the downward force which would otherwise be exerted on the belt **37** is instead exerted on the roof **48**. At the loading end of the belt **37**, that portion near the bottom of the bin **11**, the shield **47** is raised above the belt **37** a substantial distance so that coins or tokens will feed onto the belt **37** from the sides and be conveyed out of the bin **11**. At its upper end, the shield **47** is quite close to the belt **37** to limit feeding onto the belt. The shield **47** is smooth surfaced and this together with the gabled configuration of the roof **48** insures that no coins will be left laying on the top thereof as the bin **11** empties.

Although a preferred embodiment of the invention has been shown and described herein, it will be understood that variations may be made without departure from the invention. Accordingly, the invention is not intended to be limited except insofar as such limitations appear in the following claims.

We claim:

1. In a coin feeder, the combination comprising: an upwardly opening, pyramidal storage bin; an exposed conveyor belt having a loading end at the bottom of the bin from which it leads upwardly along a wall of the bin to a discharge end at the top of the bin; side pieces extending above the surface of the belt from a point intermediate its ends to its discharge end; and an elongated, channel shaped, downwardly opening shield of a width approximately equal to the width of the belt, said shield lying above and parallel to the belt with a lower end spaced substantially above the loading end of the belt to permit coins to feed thereon and an upper end spaced relatively closely above the discharge end of the belt, said shield having downwardly extending sides cooperating with the side pieces to prevent coins from moving onto and off of the belt, said shield being pivotally mounted at its lower end with its upper end free so that the upper end may be swung upwardly away from the belt.

2. In a coin feeder, the combination comprising: an upwardly opening, pyramidal storage bin; an exposed conveyor belt forming a portion of one wall of the bin and having a loading end at the bottom of the bin from which it leads upwardly along the wall of the bin to a discharge end at the top of the bin; a pair of rods mounted on and extending between walls of the bin, said rods being above, parallel to and one either side of the conveyor belt; a pair of downwardly extending brackets, one mounted on each of the rods; and an elongated shield lying above and parallel to the belt, said shield covering an area substantially coextensive with the surface of the belt, said shield having an upper end spaced relatively closely above the discharge end of the belt and a lower end spaced substantially above the loading end of the belt to permit coins to feed onto the belt from the end and sides of the belt, said lower end of the shield being pivotally suspended between the brackets so that the upper end of the shield may by swung upwardly away from the discharge end of the belt.

3. In a coin feeder, the combination comprising: an upwardly opening, pyramidal storage bin; an exposed conveyor belt having a loading end at the bottom of the bin from which it leads upwardly along a wall of the bin to a discharge end; side pieces extending over the surface of the belt from a point intermediate its ends to its discharge end; an elongated, channel shaped, downwardly opening shield of a width approximately equal to the width of the belt, said shield lying above and parallel to the belt with a lower end spaced substantially above the loading end of the belt to permit coins to feed thereon and an upper end spaced relatively closely above the discharge end of the belt, said shield having downwardly extending sides cooperating with the side pieces to prevent coins from moving onto and off of the belt; a chute mounted at the discharge end of the belt to direct coins discharged from the belt and having upwardly extending sides; and a curved, channel shaped, downwardly opening guide removably mounted at the discharge end of the belt which has downwardly extending sides which mate with the sides of the chute to form a tube-like channel for coins discharged from the belt.

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