Dec. 30, 1941. T. DIETRICH 2,267,857

CONTROL DEVICE OF PREPAYMENT METERS

Filed Aug. 11, 1939 4 Sheets-Sheet 1

Fig. 2

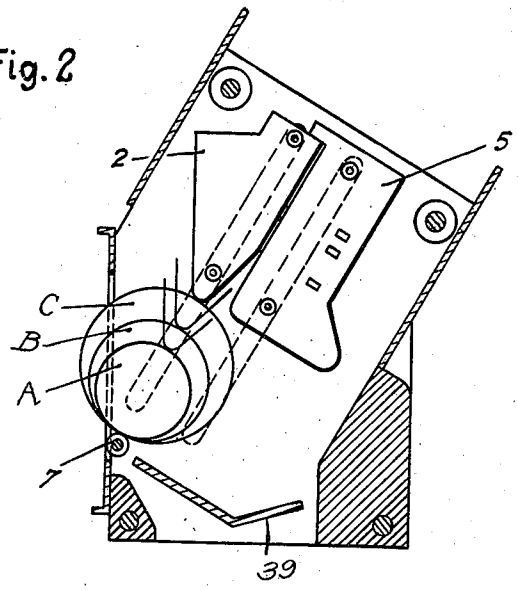
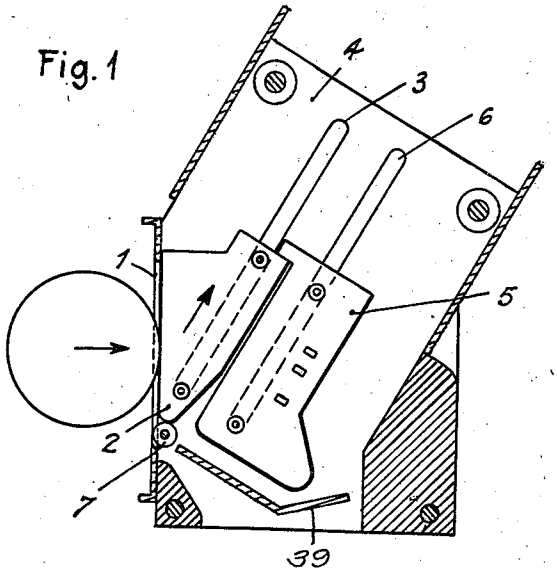


Fig. 1



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CONTROL DEVICE OF PREPAYMENT METERS

Filed Aug. 11, 1939 4 Sheets-Sheet 2

Fig.3

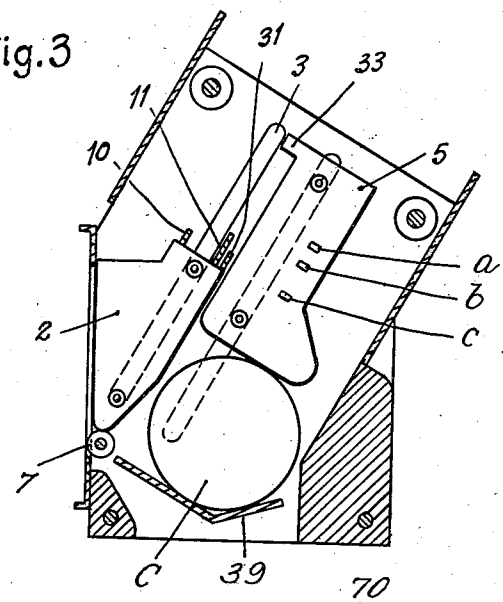
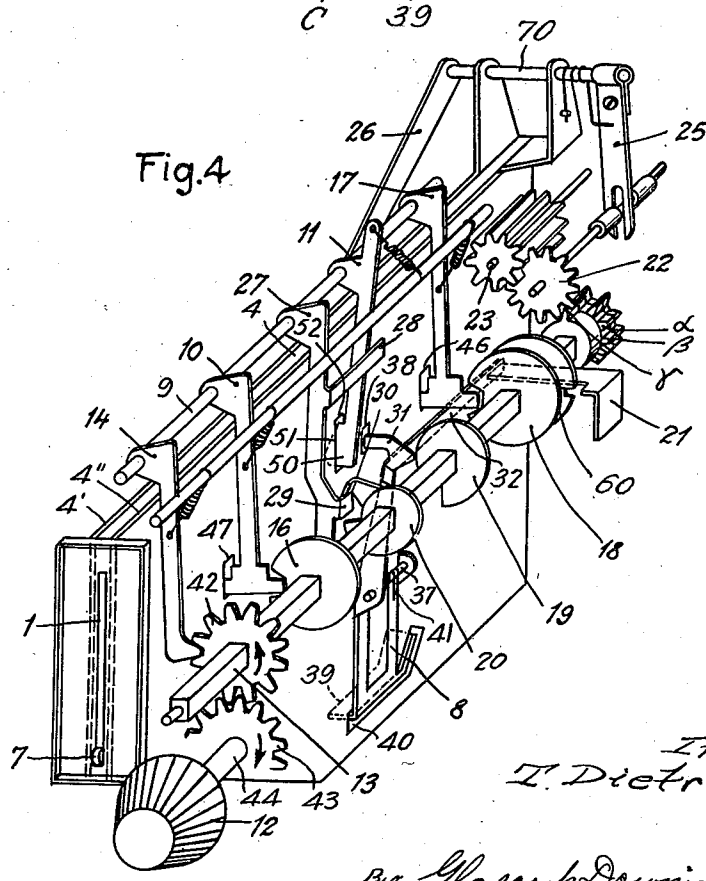


Fig.4



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CONTROL DEVICE OF PREPAYMENT METERS

Filed Aug. 11, 1939 4 Sheets-Sheet 3

Fig.5

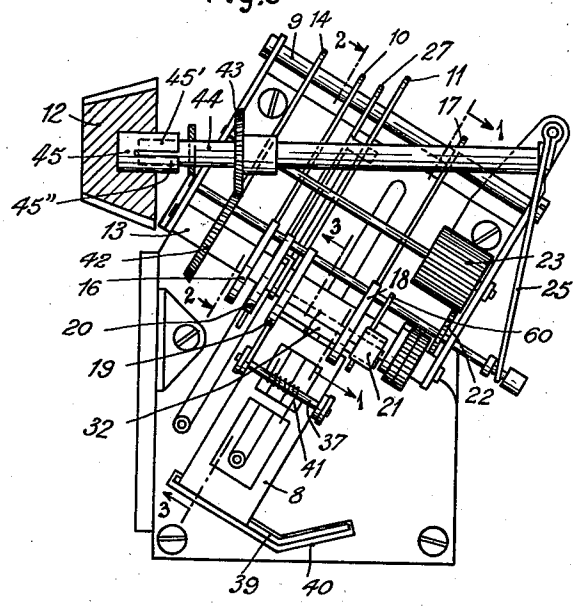
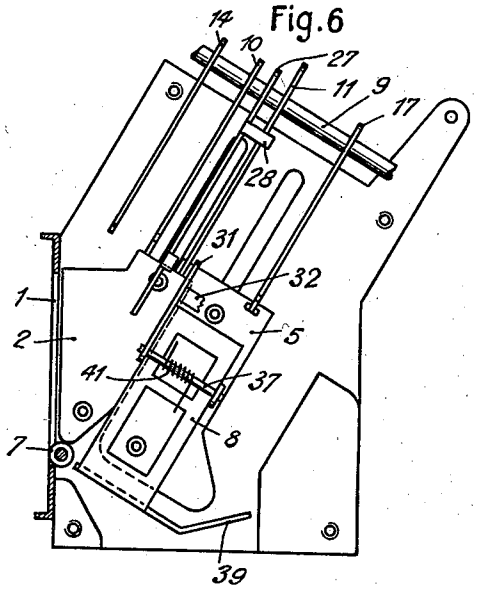


Fig.6



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CONTROL DEVICE OF PREPAYMENT METERS

Filed Aug. 11, 1939 4 Sheets-Sheet 4

Fig.7

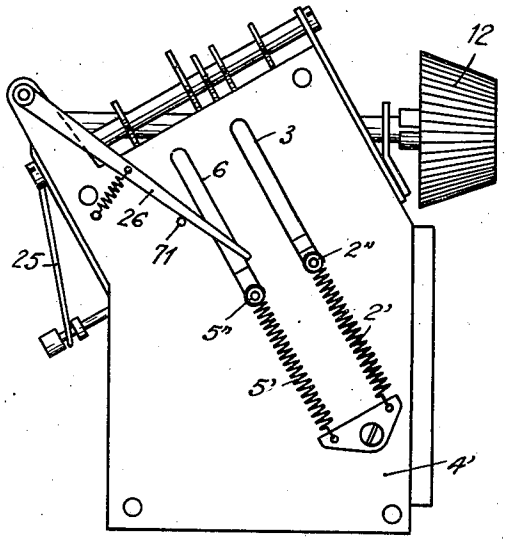


Fig.8

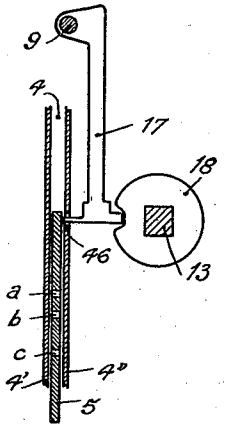


Fig.9

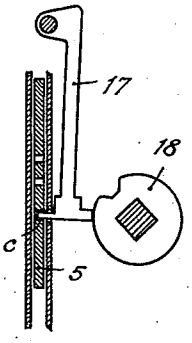


Fig.10

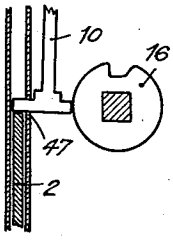


Fig.11

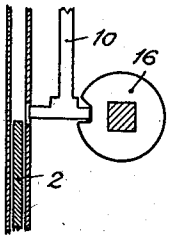
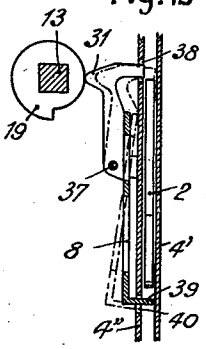


Fig.12



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Patented Dec. 30, 1941

2,267,857

UNITED STATES PATENT OFFICE

2,267,857

CONTROL DEVICE OF PREPAYMENT METERS

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Application August 11, 1939, Serial No. 289,641
In Switzerland August 20, 1938

4 Claims. (Cl. 194—72)

The present invention relates to useful improvements in prepayment mechanisms adapted for use with coins of different values, and it is directed more particularly to the novel construction of the coin actuated mechanism and the arrangement of means to avoid the possibility of fraudulent manipulation.

In prepayment mechanisms of the type permitting the insertion of coins of different values and, hence, of different diameters, the coin slot provided has to conform to the coin of largest size. In such mechanisms it is rather difficult to obviate fraudulent manipulation which is often attempted when inserting coins of intermediate size. It will be tried in like manner to introduce supple wires or thin spring members into the coin slot, or to fix the coins to be inserted to a wire with a view to withdrawing them when the prepayment mechanism has been set to work.

The object of the present invention is to eliminate the above and like defects of known arrangements and to provide a prepayment mechanism which can only be operated upon insertion of correct coins and which will remain inoperative so long as the coin slot has not been automatically closed after the insertion of such coins.

Another object of the invention is to provide simple and efficient means whereby the closing of the coin slot may be locked in different ways during operation of the prepayment mechanism.

A further object of the invention is to provide means adapted to prevent the mechanism from being operated twice or more times upon insertion of a coin.

A still further object of the invention is to provide a mechanism having relatively few and simple parts and which is inexpensive to manufacture and install and which is durable, reliable and efficient in use.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel features hereinafter set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which similar characters of reference indicate corresponding parts in all the views,

Figs. 1, 2 and 3 illustrate diagrammatically the arrangement of the coin actuated members and their successive positions when coins of different values are inserted into the coin holder.

Fig. 4 is a diagrammatic perspective view drawn to a longitudinally enlarged scale, showing the assembled parts of the mechanism.

Fig. 5 is a front side view of the coin holder and the locking device of the mechanism with parts thereof removed for clearness.

Fig. 6 is a like view, the fore-plate of the coin holder and the operating shaft of the mechanism being removed to show the position of the coin actuated members with respect to the levers of the locking device.

Fig. 7 is a rear side view of the coin holder.

Figs. 8 and 9 are transverse sections taken on the line 1—1 in Fig. 5, showing a detail in different operating positions, respectively.

Figs. 10 and 11 are transverse sections taken on the line 2—2 in Fig. 5, showing another detail in different operating positions.

Fig. 12 is a transverse section taken on the line 3—3 in Fig. 5, illustrating a third detail.

Referring in detail to the drawings, the improved prepayment mechanism comprising the present invention includes a coin holder which is formed with two side plates 4' and 4'' connected to each other by any suitable means not shown and bearing a space 4 between them adapted to receive any one of the different coins i. e. the coins A of small size, B of middle size, and C of large size for which the mechanism is intended. The coins are inserted into said holder through a vertical coin slot 1 which is normally closed by a wedge-shaped closing slide 2 disposed between the side plates 4' and 4'' and resting on a roller 7 fixed to said plates at the bottom of the coin slot. The closing slide 2 is displaceable in inclined guides 3 provided in the side plates 4' and 4'' and disposed at an obtuse angle of incidence with respect to the line of direction of the pressing force exerted upon said slide by the coins to be inserted. Behind the closing slide 2 is disposed a calibrating slide 5 displaceable parallelly to the former in inclined guides 6 of the side plates 4' and 4'' and presenting a projection 33 adapted to be engaged by the slide 2. Both the closing slide 2 and the calibrating slide 5 are urged downwards by springs 2' and 5', respectively, fixed at one end to the side plate 4' and at the other end to pins 2'' and 5'', respectively, projecting from said slides through the guides 3 and 6 as best seen in Fig. 7. Owing to the inclination or obtuse angle of incidence of the guides 3 and 6, the closing slide 2 when pressed upon by a coin (Fig. 1) moves upward in the direction of the arrow against its spring 2' and thereby

entrains the calibrating slide 5 against the action of spring 5'.

The calibrating slide 5 presents further three holes *a*, *b*, and *c* the positions of which conform to the diameters of the coins A, B and C, respectively. Said holes are intended to cooperate with the release lever 17 of a locking device (Fig. 4) which will be hereinafter described in detail.

At the bottom of the coin holder is disposed a tipping member 8 constructed in the form of a lever pivoted intermediate its length on a short axle 37 carried by the side plate 4''. The upper end of the tipping member affords a pointed cross head 31, the back of which projects through an aperture 38 of the side plate 4'' as best seen in Fig. 12, and the lower end or base of this member terminates in an inwardly directed offset portion 39 extending through a slot 40 of the side plate 4'' to bear against the other side plate 4' so as to form a tipping sole within the coin holder as shown in Figs. 4 and 12. A spring 41 fixed to the axle 37 acts upon the tipping member 8 and holds the said offset portion or sole in contact with the side plate 4' to retain the coins inserted into the holder as shown in Fig. 3. To the upper part of the tipping member 8 is secured an arm 32 which serves to engage hand control means as may later appear.

Referring now to Figs. 4, 5 and 6, the prepayment mechanism includes further, on the one hand, an operating shaft 13 carrying circular cams 16 and 18, each being provided with a similarly disposed notch, and, on the other hand, a locking device comprising a locking lever 10 and a release lever 17 pivoted at one end on a common axle 9 and presenting at their other ends an active T-shaped head. A pair of toothed wheels 42 and 43 connects the operating shaft 13 to a shaft 44 forming the live axle of the usual meter mechanism not represented and being itself operated by a button 12 having a friction clutch which may be in the form of a slotted sleeve 45 suitably secured to said button and providing two resilient semicircular branches 45' and 45'' adapted to frictionally engage the end of the shaft 44. A retaining lever 14 pivoted on the axle 9 is urged by spring action into engagement with the toothed wheel 42 to prevent return movement of the shafts 13 and 14 and to maintain said shafts, when at rest, in a stable position.

The release lever 17 cooperates with the cam 18 and the calibrating slide 5; its T-head bears, on the one side, under spring action against said cam and, on the other side, projects through an aperture 46 of the side plate 4'' into the space 4 of the coin holder to rest against a flank of the calibrating slide 5 or to engage a hole *a*, *b* or *c*, of the latter. As long as no coin has been inserted the calibrating slide 5 occupies the position shown in Fig. 1 wherein it bears against the T-head of the lever 17 which then engages the notch of cam 18 as best seen in Fig. 8. Cam 18 is thus held against rotation by the said lever so that the operation of the button 12 will have no effect on the shafts 13 and 44. When a correct coin has been inserted into the coin holder, the calibrating slide 5 assumes its raised position, shown in Fig. 3 wherein one of its holes *a*, *b* or *c* corresponding to the said coin is opposite the T-head of the release lever 17; when turning the button 12, the said head is pushed into the said aperture by the intermediary of cam 18, as shown in Fig. 9 and the shafts 13 and 44 are then free to rotate.

The locking lever 10 cooperates with cam 16 and the closing slide 2. The active T-head of said lever is placed between said cam and an aperture 47 provided in the side plate 4'' and which, when the slide 2 closes the coin slot 1, is in alignement with the upper rim of said slide so as to permit the lever head to overlap said rim. In the starting position of the mechanism, said lever head rests in the notch of cam 16 and upon raising of the closing slide 2 is beared upon by the flank of said slide so as to be held firmly in said notch. This prevents the cam 16 and, hence, the operating shaft 13 from being rotated. After the insertion of a coin, when the slide 2 has returned to its initial position wherein it closes the coin slot 1, the head of the lever 10 is free to project through the aperture 47 into the coin holder. Upon turning of the operating shaft 13 by means of the button 12, the cam 16 then pushes the lever head through said aperture to overlap the upper rim of the closing slide as shown in Fig. 10 thereby locking said slide in its initial or closing position during operation of the shaft 13 After a complete revolution of said shaft, the head of the lever 10 falls again into the notch of cam 16 and thereby releases the closing slide 2 as shown in Fig. 11.

The means for actuating the tipping member 8 comprise a cam 19 of increasing radius, mounted for rotation with the operating shaft 13. As clearly shown in Figs. 4 and 12, the cam 19 bears upon the cross head 31 of the tipping member 8 and, upon turning of the operating shaft 13 by means of the button 12, causes the said member to tip about its axle 37 so as to remove the offset portion or sole 39 from the side plates 4' and 4'' of the coin holder. Simultaneously the back of the cross head 31 which is then pushed through the aperture 38 of the side plate 4' into the coin holder comes to rest on the upper rim of the closing slide 2 and provokes a second locking of the latter during operation of the shaft 13. The tipping member 8 is also provided with hand control means comprising a slotted disk 60 rigid with the operating shaft 13 and a handle or push-member 21 adapted to engage the slot of said disk and to act upon the arm 32 of the tipping member 8. To operate the said arm, the push-member 21 has to engage the slot of the disk 60 which is only possible in the starting position of the operating shaft 13.

The operating shaft 13 carries further a cam 20 of increasing radius and a bent lever or stop 30. Moreover, on the axle 9 are also pivoted, on the one hand, a lever 11 subjected to the action of a spring and having a pointed head 50 with an inclined surface 51 adapted to project through an aperture 52 provided in the side plate 4'' opposite the projection 33 of the calibrating slide 5 and, on the other hand, a lever 27 provided with a cross arm 28 adapted to bear against the lever 11 and with a projecting head 29 adapted to cooperate with the cam 20 and the stop 30, respectively. The cam 20, the stop 30 and the levers 11 and 27 constitute the organs which serve to prevent the shaft 13 from being operated twice or more times after the insertion of a coin, the lever 11 being also adapted to provoke a further locking of the closing slide 2 as will hereinafter appear. In the starting or rest position of the slides 2 and 5 the projection 33 of the latter retains the head 50 of the lever 11 which in turn acts upon the arm 28 of the lever 27 to apply the head 29 of the latter against the portion of small radius of the cam 20. The lever 27 is then so

positioned that the bent stop 30 of the shaft 13 can freely pass behind the head 29 of said lever. After the insertion of a coin, when the closing slide 2 has returned to its position of rest and the calibrating slide 5 been engaged by the release lever 17 as shown in Fig. 3, the lever 11 will be allowed to tip under the action of its spring and shift its head 50 through the aperture 52 into the coin holder to overlap the upper rim of the closing slide 2 so as to provoke a third locking of the latter during operation of the shaft 13. During this action, the lever 27 which is not spring pressed will be maintained in its previous position and allow the shaft 13 to rotate. Upon rotation of the shaft 13 the lever 27 is gradually pushed back by the cam 20 acting upon the head 29, and after a complete revolution of said shaft the head 29 assumes a position in the path of travel of the bent stop 30 which is then arrested as best seen in Fig. 4. When the calibrating slide 5 returns to its position of rest the projection 33 of this slide falls on the inclined surface 51 of the lever 11 and again repels the same which in turn tips the lever 27 towards the shaft 13, thereby releasing the head 29 from engagement with the stop 30 of the said shaft. The rotation of the operating shaft 13 by means of the button 12 is thus limited to one revolution for each inserted coin and the operation cannot be recommenced as long as the calibrating slide has not returned to its position of rest wherein it is ready to be acted upon by another coin.

On the hind end of the operating shaft 13 are fixedly mounted three toothed wheels α, β and γ the numbers of teeth of which correspond to the value of the coins A, B and C for which the mechanism is intended. These numbers may be for instance of proportions equal to 10/10, 5/10 and 2/10 or 12/12, 6/12, and 1/12. The said wheels are arranged to mesh with a sliding pinion 22 which is controlled by a spring pressed lever 25 rigidly secured to one end of an axle 70 rotatably supported by the side plates 4' and 4'' of the coin holder. To the other end of the axle 70 is fixed a lever 26 resting on a peg 71 of the side plate 4' and adapted to be engaged by the pin 5'' of the calibrating slide 5 as shown in Fig. 7. The arrangement is such that when the calibrating slide 5 is in its rest or coin receiving position as in Fig. 1, the lever 26 rests on the peg 71 while the lever 25 holds the slidable pinion 22 away from the wheels α, β, γ. When the calibrating slide 5 is raised upon insertion of coins, the pin 5'' of said slide comes to abut against the lever 26 so as to turn the same together with the axle 70 thereby causing the lever 25 to bring the pinion 22 into engagement with one of the wheels α, β, or γ according as a coin A, B, or C has been entered.

As shown in Fig. 4, the mechanism comprises finally a pinion 23 which is constantly in gear with the sliding pinion 22 and which is intended to transmit the motion of the operating shaft 13 imparted to it by the intermediary of wheel α, or β or γ and pinion 22 to a release cam and a coin register of a usual meter mechanism not represented.

Having now described the construction of my invention, its operation is as follows:

Assuming that the slides 2 and 5 and the operating shaft 13 are in starting position as shown in Figs. 1 and 4, respectively, the latter being locked against rotation by the release lever 17 abutting against the flank of the slide 5 while engaging the notch of cam 18. In Fig. 1 a coin C is ready for insertion, to be pressed upon the closing slide 2 which will then be raised against spring action and entrain the calibrating slide 5 into the position shown in Fig. 2. When the coin has passed the closing slide 2 and been quoined between the calibrating slide 5 and the sole 39 of the tipping member 8, the slide 2 will return to its initial position and be locked by the lever 11 while the slide 5 assumes a position for gauging the size of the coin, as shown in Figs. 3 and 9. When the coin is of appropriate dimension the hole c of the slide 5 will aline with the aperture 46 of the side plate 4'' opposite the T-head of the release lever 17. The said lever is then free to engage the slide 5 and the operating shaft 13 as well as shaft 44 can be rotated by the button 12. At the same time the toothed wheel γ of the shaft 13 has been coupled with the pinion 23 by the intermediary of the sliding pinion 22 and the levers 25 and 26 acted upon by the calibrating slide 5. Upon starting the operation of the shaft 13 by means of the button 12 the closing slide 2 will be further locked by the lever 10 and the cross head 31 of the tipping member 8.

During operation of the shaft 13 the cam 19 which rotates in the direction of increasing radius removes the cross head 31 of the tipping member 8 and causes the latter to tip about its axle 37 so as to withdraw the sole 39 from the slot 40 thereby allowing the coin C to fall into a coin box not represented. After three quarters of a revolution of the shaft 13 the cross head 31 of the tipping member 8 falls into the notch of cam 19 whereby said member returns under spring action to its initial or coin receiving position. After a complete revolution of the shaft 13 the T-head of the lever 10 falls under spring action into the notch of cam 16 and releases the closing slide 2. At the same time the T-head of the release lever 17 falls into the notch of cam 18 to lock the shaft 13 against further rotation while allowing the calibrating slide 5 to return to its position of rest. The projection 33 of said slide thereby falls on the inclined surface 51 of the lever 11 which is then pushed back to release the last locking of the closing slide 2.

It will be observed from the foregoing description that the prepayment mechanism remains inoperative as long as the slide 2 has not completely closed the coin slot and been locked in this position. Moreover, the operation of the mechanism by means of the button 12 provokes automatically a further locking of the closing slide 2 which is thus held immovable as long as the sequence of actions for the inserted coin has not been completed. In this way withdrawal of coins which have passed the coin slot is rendered impossible.

It will also be appreciated that no operation of the mechanism and, hence, no supply of commodity can be obtained for coins of false size, because if any coin of size other than the coins A, B, or C is inserted into the coin holder, then neither of the holes *a*, *b* or *c* of the calibrating slide 5 will be opposite the T-head of the release lever 17, and on actuating the button 12 no rotation of the shafts 13 and 44 therefore takes place. False coins can, however, be thrown out by the operation of the handle or push-member 21 which in the starting or locked position of the shaft 13 is enabled to engage the disk 60 of said shaft for acting upon the arm 32 of the tipping member 8.

Finally, it may be noted that the mechanism can not be operated twice or more times after the insertion of a correct coin since the operating

shaft 13 is arrested at the end of a revolution by its stop 30 abutting the head 29 of the lever 27, and is not again movable until the calibrating slide 5 has returned to its initial position wherein it repels the lever 11 which in turn displaces the lever 27. In this way, a brisk turning of the button 12 with a view to overstep the starting position of shaft 13 without releasing the calibrating slide 5 from engagement with the release lever 17 is rendered ineffective.

From the foregoing, it is believed that the construction and advantages of the present invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claims.

What is claimed and desired to be secured by Letters Patent is:

1. Prepayment mechanism adapted for use with coins of different values, in combination a coin holder having a coin inlet slot, lateral apertures and two parallel guideways disposed at an obtuse angle of incidence with respect to the direction of insertion of coins, a closing slide seated in the coin holder to normally close said slot and being displaceable in one of said guideways for taking up a raised position when pressed upon by a coin, a calibrating slide seated in the coin holder behind the closing slide and being displaceable in the other of said guideways, said calibrating slide having holes disposed one above the other at distances equal to the differences of diameter of the different coins for which the mechanism is intended and a nose engageable by the closing slide so as to partake of the raising motion of this latter upon insertion of coins, an operating shaft extending alongside the coin holder, cams mounted on said shaft opposite the apertures of said holder, toothed wheels carried by said shaft, the numbers of teeth of said wheel corresponding to the values of the different coins, a sliding pinion mounted on the coin holder, levers pivoted to the coin holder and adapted to displace said pinion upon raising the calibrating slide and to bring it into engagement with any one of the toothed wheels on the operating shaft according to the size of the coin inserted, means for operating said shaft, a tipping member pivotally mounted on the coin holder and having a cross head on the top between one of said cams and apertures and a tipping sole at the bottom of the coin holder, adapted to temporarily retain the coin inserted through the slot and to cooperate with the calibrating slide for gauging the size of said coin, and a locking device comprising levers pivotally mounted on the coin holder and having each an active head between another of said cams and apertures, respectively, whereby said cross head and lever heads are adapted, on the one hand, to cooperate with said cams and, on the other hand, to project through said apertures into the coin holder for locking the closing slide against raising and for engaging one of the holes in the calibrating slide during calibration, substantially as described and as illustrated.

2. Prepayment mechanism as claimed in claim 1, one of the levers of the locking device being so disposed as to engage any one of the holes of the calibrating slide when said slide is in a raised position, and the cam cooperating with the head of said lever being provided with a notch, whereby said calibrating slide normally bears with its flank against said lever head to maintain the same in the notch of said cam for preventing the operating shaft from being rotated, while upon insertion of a correct coin said slide assumes a position permitting said lever head to penetrate into one of its holes and to free said shaft for rotation.

3. Prepayment mechanism as claimed in claim 1, another of the levers of the locking device being opposite the closing slide, and the cam cooperating with the head of said lever being provided with a notch, whereby upon rotation of the operating shaft, said cam causes said lever head to overlap the upper rim of the closing slide for locking said slide against raising during operation of said shaft, while after a complete revolution of said shaft, said lever head falls into the notch of said cam for releasing said slide.

4. Prepayment mechanism as claimed in claim 1, the tipping member having its cross head opposite the closing slide, and the cam cooperating with said cross head being formed with an increasing radius and provided with a notch, whereby upon rotation of the operating shaft, said cam causes said member to pivot for withdrawing its sole from the coin holder and for pushing its cross head over the upper rim of the closing slide so as to lock said slide against raising during operation of said shaft, while at the end of a revolution of said shaft, said cross head falls into the notch of said cam thereby allowing the tipping member to retake its initial position.

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