

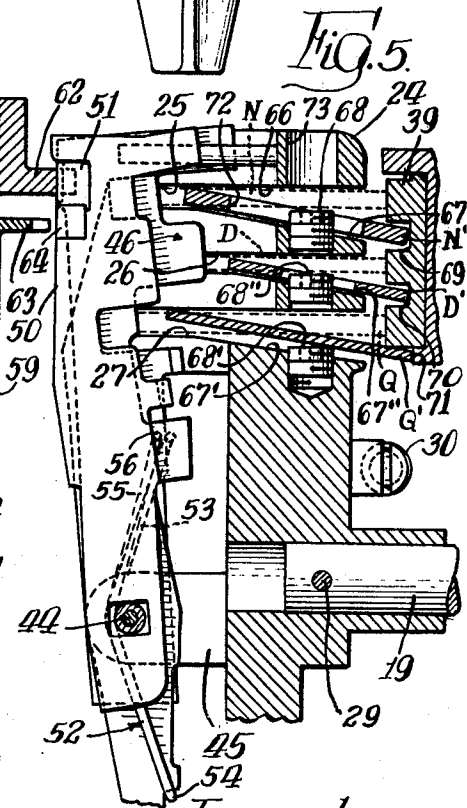
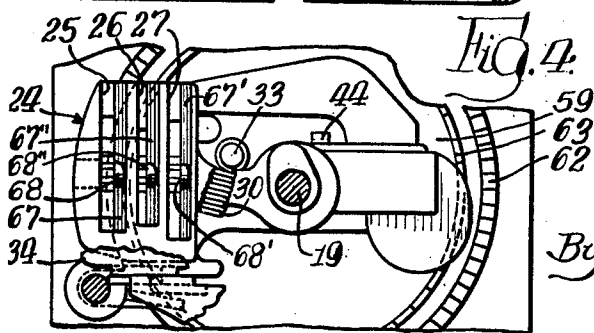
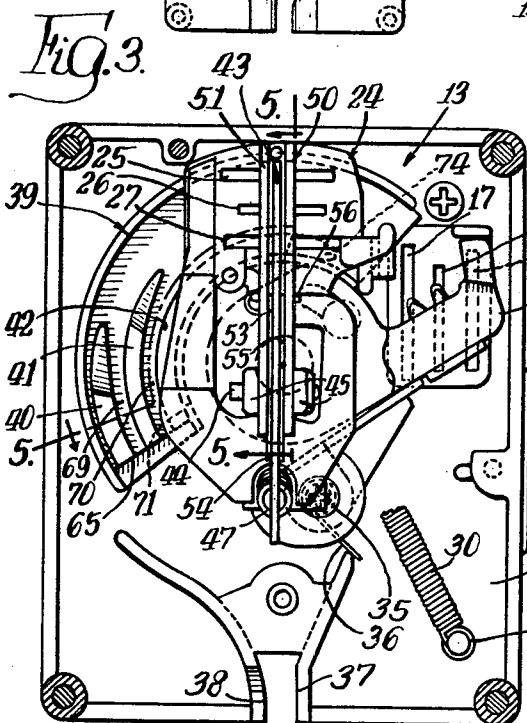
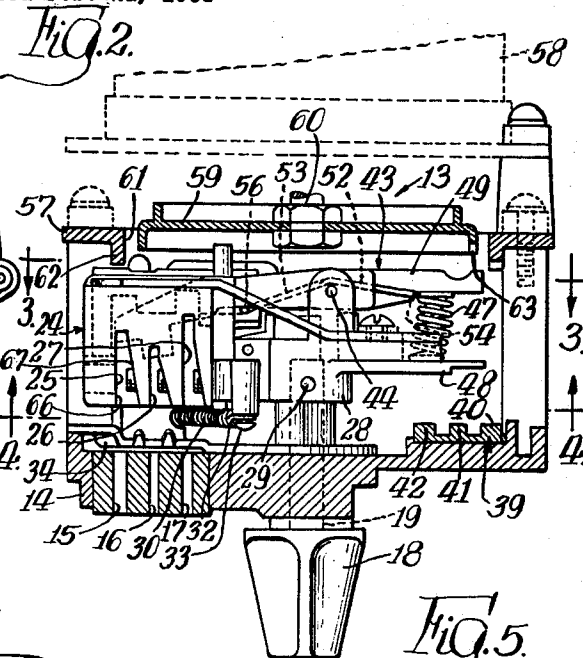
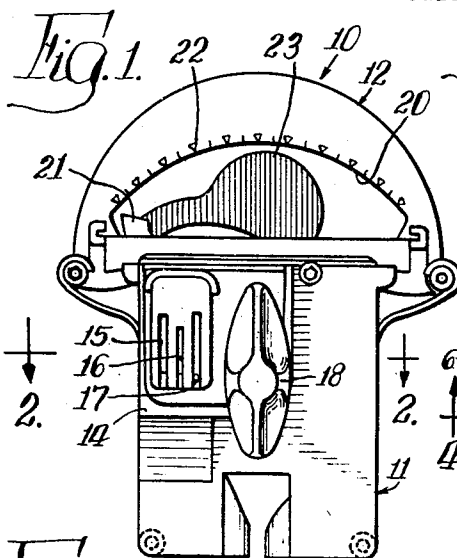
March 3, 1970

E. C. ARZIG

3,498,438

SPURIOUS COIN DETECTOR

Filed Feb. 21, 1968



Inventor:-
Edward C. Arzig,
By Hofgren, Wegner, Allen,
Stellman & McCord Attys.

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SPURIOUS COIN DETECTOR

Edward C. Arzig, Mundelein, Ill., assignor to Traffic Equipment Service Company, a corporation of Illinois
Filed Feb. 21, 1968, Ser. No. 707,053
Int. Cl. G07f 3/02

U.S. Cl. 194—102

13 Claims

ABSTRACT OF THE DISCLOSURE

Mechanism for detecting spurious coin-like elements and precluding their operation of a meter such as a parking meter. The mechanism detects a spurious coin-like element by permitting a displacement of the element in a coin slot whereby the element is in an inoperative arrangement relative to an indicating means normally responsive to the movement of a proper coin in the slot along a preselected path.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to methods of and devices for detecting spurious coins and in particular to such methods and devices for use in meters such as parking meters.

Description of the prior art

In automatic coin-operated devices, a serious problem arises in the unscrupulous use of spurious coin-like elements. As such automatic coin-operated devices are generally not under the direct surveillance of the owner, such constant attempts to utilize such spurious elements therein are extremely difficult to control. A number of devices have been developed for signalling the insertion of such spurious elements, such as raising flags, exposing the previously inserted elements in a window, etc. A more satisfactory method of coping with this problem has been to arrange the coin mechanism so as to be inoperable when such a spurious element is inserted. A disadvantage in the known devices of this type, however, is in the relative complexity thereof. The undesirable complexity is magnified where the coin mechanism is arranged to receive a number of different coins of different denominations. One such device is the conventional parking meter wherein combinations of pennies, nickels, dimes, quarters, etc., may be utilized. Another problem arising in the known coin-operated devices of this type is the difficulty of arranging such spurious-element detectors to prevent operation of the device as a result of one or more of a plurality of concurrently inserted coins being good while others of the plurality are spurious. Still another problem in the known coin-operated devices is the failure thereof to detect washers having masking tape or the like placed across the axial hole as the result of the inability of the device to detect the tape.

SUMMARY OF THE INVENTION

The present invention comprehends an improved spurious coin detector which eliminates the disadvantages of the above-described prior art devices in a novel and simple manner. More specifically, the present invention comprehends such a detector for use in a meter where the coin slot means is arranged to permit selective alternate dispositions of coin-like elements therein for selectively actuating or not actuating the meter depending upon whether the element is a proper coin or a spurious element. The invention further comprehends a method of

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urging the coin element to move edgewise along a guide while permitting the element to move away from the guide in the event that the element is a spurious element, and causing the edge of the element most remote from the guide to actuate a response means only in the event that the element is being moved edgewise along the guide.

BRIEF DESCRIPTION OF THE DRAWING

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIGURE 1 is a front elevation of a parking meter having a spurious coin detector embodying the invention;

FIGURE 2 is an enlarged transverse section taken substantially along the line 2—2 of FIGURE 1;

FIGURE 3 is a vertical section taken substantially along the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary vertical section taken substantially along the line 4—4 of FIGURE 2; and

FIGURE 5 is a fragmentary vertical section taken substantially along the line 5—5 of FIGURE 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the exemplary embodiment of the invention as disclosed in the drawing, a meter generally designated 10 is shown to comprise a parking meter having a housing structure 11, carrying a time indicator 12. The housing structure 11 carries a coin-operated mechanism generally designated 13. The front wall 14 of the housing structure 11 is provided with a plurality of coin passing slots illustratively including a nickel slot 15, a dime slot 16, and a quarter slot 17. An operating handle 18 is disposed in front of wall 14 and connected to the mechanism 13 by means of a shaft 19 extending through the wall as shown in FIGURE 2. The time indicator 12 includes a window 20 in which a pointer 21 is observable. The quantity of time set in the meter 10 is indicated by a scale 22. A violation flag 23 is similarly observable in the window 20.

In normal use of the meter, a coin is inserted through the appropriate slot 15, 16 or 17 to purchase the desired amount of time. After the coin is inserted, the handle 18 is rotated whereupon the coin mechanism 13 is actuated to move the pointer 21 to a position on the scale 22 corresponding to the time purchased by the coin. The present invention comprehends an improved structure in mechanism 13 for detecting spurious coins, or coin-like elements, and precluding the setting of time in the meter by such elements.

More specifically, mechanism 13 includes a carrier 24 having slots 25, 26 and 27 corresponding to slots 15, 16 and 17 in wall 14 and disposed in the normal position thereof, immediately rearwardly of slots 15, 16 and 17, to receive the corresponding coins inserted through slots 15, 16 and 17. Carrier 24 is fixedly mounted on shaft 19 so that rotation of handle 18 swings the carrier correspondingly in a circular path about the axis of shaft 19, as illustrated in FIGURE 3, wherein the carrier has been swung approximately 90° counterclockwise from its normal position rearwardly of slots 15, 16 and 17. As shown in FIGURE 2, the carrier includes a hub portion 28 secured to the shaft 19 as by a suitable pin 29. The carrier is biased in a counterclockwise direction to the normal position of FIGURE 2 by means of a coil spring 30 having one end connected to a post 31 on the rear of wall 14 and the opposite end 32 connected to the carrier by a suitable screw 33. A blocking plate apparatus 34 is pivotally mounted on the rear of wall 14 by

means of a pivot screw 35 and is biased to overlie the rear of the slots 15, 16 and 17 by a spring 36 engaging a coin return chute 37 carried on the rear of wall 14 and opening forwardly through an opening 38 in the front wall.

As shown in FIGURES 2, 3 and 4, a multiple track cam 39 is mounted on the rear surface of wall 14. The cam 39 includes an outer track 40, a middle track 41, and an inner track 42. As shown in FIGURE 2 the slots 25, 26 and 27 extend rearwardly through the carrier 24 to a different amount corresponding to the diameter of the respective coins they are adapted to receive. Thus, as shown in FIGURE 5, as the respective coins, such as nickel N, dime D, and quarter Q, are received in the slots 25, 26 and 27, they will ride on tracks 40, 41 and 42 respectively. The edge of the coin most remote from the cam 39 engages a coin pawl 43 pivotally mounted on a pin 44 extending between a pair of spaced ears 45 on the carrier to swing the outer end 46 away from the slots 25, 26 and 27 against the action of a coil spring 47 extending between an end portion 48 of the carrier 24 and end portion 49 of the coin pawl 43. A winding pawl 50 is similarly pivotally mounted on the pin 44 adjacent coin pawl 43 in a clockwise direction therefrom as seen in FIGURE 3, and a ratchet pawl 51 is similarly mounted on pin 44 adjacent coin pawl 43 in a counterclockwise direction therefrom as shown in FIGURE 3. Winding pawl 50 is biased to follow the movement of the coin pawl 43 by a bifurcated wire spring 52 carried on the pin 44 having one leg 53 engaging the underside of the coin pawl 43 and its bight 54 engaging the underside of the ratchet pawl 51 as shown in FIGURE 2. The leg 53 is disposed between the ratchet pawl 51 and the coin pawl 43. Wire spring 52 further includes a second leg 55 extending between the coin pawl 43 and the winding pawl 50 and having a distal end 56 underlying the winding pawl 50 to bias it also for movement with the coin pawl 43.

Thus, when a coin such as the nickel coin N is inserted in slot 25, it pivots the coin pawl 43 in a counterclockwise direction as shown in FIGURE 5 to similarly pivot the ratchet pawl 51 and winding pawl 50. The meter 10 further includes a rear wall 57 which carries a clock mechanism 58 rearwardly thereof and a winding wheel 59 on a shaft 60 of the mechanism 58 in an opening 61 of the wall 57. Circumjacent the winding wheel 59 is a fixed ratchet 62. The winding wheel 59 includes a peripheral forwardly turned ratchet tooth flange 63 adapted to be engaged by a tooth portion 64 of the winding pawl when the winding pawl is swung outwardly by the coin. Thus, rotation of handle 18 to move the carrier 24 along the cam 39 with the coin maintained along the tracks 40-42 maintains the tooth portion in contact with the ratchet tooth flange 63 of the winding pawl to wind the mechanism 58 and thereby set time in the meter. At the same time the ratchet pawl 51 rides over the fixed ratchet 62 to prevent return of the carrier 24 to the normal position of FIGURE 1 until a full movement thereof to the end 65 of the cam 39 where the coin will fall from the carrier and permit the ratchet pawl 51 to disengage from the ratchet 62 thereby permitting the spring 30 to return the carrier to the original position.

As the tracks 40, 41 and 42 have different arcuate lengths, the portion of the movement of the carrier during which the pawls are so raised differs for each of the different coins. Thus, the nickel track 40 commences most counterclockwise from the starting position of the carrier behind the slots 15-17 as shown in FIGURE 3 to provide the smallest amount of time. The dime track 41 extends somewhat further in a clockwise direction to provide a greater amount of time and the quarter track 42 extends still further to provide a still greater amount of time.

As indicated briefly above, the present invention com-

prehends an improved method of preventing such operation of the meter 10 where the element inserted into the coin slot is not a proper coin. Illustratively, slugs having a thickness smaller than the thickness of a proper coin are often employed by unscrupulous persons to fraudulently obtain operation of the device. Further illustratively slugs, such as washers having a center portion removed, are similarly used. To prevent operation of the meter by such spurious coin-like elements, new and improved means are provided in the form of a unique slot arrangement of the carrier 24 and a unique arrangement of the cam tracks 40, 41 and 42. The slot and track structures cooperate to permit a displacement of the spurious coin-like element in the slot, causing the spurious element to not ride on the corresponding track as the carrier is swung by the handle 18 and, therefore, not raise the coin pawl 43 so that time cannot be set in the meter by the spurious element. This functioning is best seen in FIGURE 5 where a spurious coin-like element N' is shown in slot 25, a spurious coin-like element D' is shown in slot 26 and a spurious coin-like element Q' is shown in slot 27. Each of the slots 25-27 includes a first side wall 66 extending generally perpendicular to the radius of the swinging of the carrier about the axis of the shaft 19 as shown in FIGURE 2 and an opposite side wall 67 which is skewed to the plane of side wall 66. Further, the side wall 67 includes a shoulder portion 68 spaced from the side wall 66 a distance slightly greater than the thickness of a proper coin such as nickel N in slot 25. Thus, normally the slot width is suitable to maintain the coin in centered relationship to the corresponding track of the cam 39. However, where a spurious coin-like element is inserted in the slot in lieu of the proper coin, with a thickness less than the thickness of the proper coin, the spacing of the shoulder from the opposite side wall is insufficient to maintain the element centered on the track but rather permits it to be displaced as by tilting, to be disposed laterally of the track and thereby ride on a depressed portion such as portion 69, 70 or 71 of the cam 39 as shown in FIGURE 5. Thus, illustratively, where the spurious element comprises a spurious quarter Q', the shoulder 68' permits the element Q' to tilt to fall from the track 42 into engagement with the depressed portion 71 of the cam 39. Similarly a spurious thin nickel or a spurious thin dime will be displaced from the tracks 40 and 41 to engage the depressed portions 69 and 70, respectively.

The shoulder 68 of slot 25, 68' of slot 26, and 68'' of slot 27, may define cylindrical projections from the corresponding inclined surfaces 67 of slot 25, 67' of slot 26 and 67'' of slot 27. Thus, the shoulders further permit such displacement, or tilting of spurious coin-like elements where the elements comprise washers or the like having a central opening. Thus, as shown in FIGURE 5 where the spurious coin comprises a washer N', the projecting shoulder 68 may extend into the opening 72 to permit the washer to be displaced from the track 40 and ride on the depressed portion 69 of cam 39. Thus, each of the shoulders 68, 68' and 68'' is further arranged to prevent the setting of time in meter 10 by cooperating with the inclined surfaces 67, 67' and 67'' to permit a tilting of washers sufficiently to remove the washers from the corresponding track and thereby prevent raising of the winding pawl 50 to engage the winding wheel ratchet 63.

To permit accurate control of the spacing of the shoulders from the opposite side wall surfaces of the slots, each of the shoulders may be defined by threaded cylindrical elements adjustably threaded in the carrier as shown in FIGURE 5. Thus, the structure of the present invention is adapted for universal usage such as where foreign coins or tokens may be employed. Still further, the adjustability of the shoulder 68 permits accurate control of the spacing for sensitive detection of the coin thicknesses. As shown in FIGURE 5, the shoulder ele-

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ments may be installed in series through an opening 73 at the outer end of the carrier by suitable means such as a screw driver (not shown).

To facilitate the tilting of the spurious coin-like elements in the slots, each of the tracks 40, 41 and 42 herein is provided with a leading end portion 74 which is inclined downwardly from the track both in a clockwise direction and in a radially inward direction as seen in FIGURE 3. Thus, for example, a spurious coin-like element N' in slot 25 would be guided by the inclined leading portion of track 40 away from the track and into the depressed portion 69 to effectively positively preclude the raising of the winding pawl into engagement with the ratchet 63 and thereby preclude setting of time in the meter. Similarly, the inclined leading portion 74 of each of the other tracks 41 and 42 would correspondingly effectively tilt a spurious coin-like element in either of the other slots 26 or 27.

Thus, the spurious coin detector of the present invention functions in a novel and simple manner to effectively and positively preclude operation of the meter by spurious thin or centrally apertured coin-like elements. In brief summary, the driven element of the meter, herein the winding wheel 59, is selectively driven by the handle 18 through a driver element, herein pawl portion 64, only when a proper coin is in carrier slot 25, 26 or 27. The carrier normally moves the proper coin along a preselected path with the coin projecting from the slot to be urged by a cam track to effect the engagement of the winding pawl portion 64 with the winding wheel ratchet 63 whereby time is set in the meter corresponding to the denomination of the coin. The carrier slots, however, are arranged to permit displacement, such as a tilting displacement, of the spurious coin-like element therein sufficiently to preclude the cam means from disposing the element as it moves along the path, in a disposition wherein it may effect operation of the winding wheel. Thus, in the disclosed structure such as spurious coin-like element cannot set time in the meter.

As the spurious coin detecting means hereof has no moving parts, it is extremely simple and economical of construction and has a long trouble-free life. Service of such meters is an extremely costly problem as the meter conventionally must be serviced either under environmental outdoor conditions or brought to a service station often quite remote from the meter installation. Thus, such maintenance-free operation is highly desirable. Further, as each coin is independent in its action on the coin pawl 43, placing of a small denomination proper coin and a larger denomination spurious coin-like element concurrently in the meter will provide only the time corresponding to the proper coin thereby precluding undesirable concurrent utilization of both proper and spurious coins to obtain time corresponding to the spurious coin as may be obtained in a number of known coin detecting devices. Still further, the effectively positive displacement of the spurious coin-like element effected by the cam tracks assures the detection of a washer notwithstanding the placement of tape, such as masking tape, across the axial opening as such tape will be forcibly deformed or torn by the lateral camming action in the tilting of the spurious coin-like element. The tilting displacement causes one portion of the respective shoulder elements 68, 68' or 68'' to be urged across the tape so as to provide a concentrated area of penetration or deformation whereby such effectively positive detection is effected.

While I have shown and described one embodiment of my invention, it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention.

I claim:

1. In a meter having a time setting means including a driven element, and a driver element selectively engageable with the driven element to set time in said time

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setting means, structure for operating the driven element by means of a proper coin and precluding operation thereof by means of a spurious coin-like element comprising: a coin carrier having a slot for movably receiving a coin; means for moving the carrier along a preselected path with the coin projecting from said slot; and cam means adjacent said path for disposing the coin as it moves along said path in an operative disposition to cause said driver element to engage said driven element and set time in said time setting means corresponding to the denomination of the coin, said slot being arranged to permit displacement of a spurious coin-like element in said slot sufficiently to preclude the cam means from disposing said element as it moves along said path in said operative disposition whereby said spurious coin-like element cannot set time in said meter.

2. The meter structure of claim 1 wherein said means are provided for directing a spurious coin-like element in said slot to laterally of said cam means as said element moves along said path.

3. The meter structure of claim 1 wherein said slot is arranged to permit tilting of said spurious coin-like element.

4. The meter structure of claim 1 wherein said carrier includes means for engaging the center portion of a proper coin in said slot for preventing said displacement and allowing said displacement of a spurious coin-like element having an axial hole.

5. The meter structure of claim 4 wherein said coin center engaging means defines means permitting said displacement of a coin-like element having a thickness less than a preselected thickness.

6. The meter structure of claim 1 wherein said carrier includes means for engaging one face of the coin in the slot, said engaging means being adjustably mounted on said carrier.

7. The meter structure of claim 6 wherein said coin engaging means comprises a shoulder element threadedly mounted on said carrier to project adjustably into said slot.

8. The meter structure of claim 1 wherein a deflector surface is provided at said leading portion of the cam means arranged to direct a spurious coin-like element in said slot to laterally of said cam means as said element moves along said path.

9. The meter structure of claim 1 wherein said slot is defined by a first side wall extending generally in the direction of said path and an opposite side wall extending transversely to said path.

10. The meter structure of claim 1 wherein said meter comprises a parking meter.

11. The meter structure of claim 1 wherein said carrier includes a second slot arranged for receiving a different coin of a denomination different from that of said first-named coin for movement of said different coin along a second path adjacent said first-named path, and said meter structure further includes a second cam means adjacent said second path for disposing said different coin as it moves along said different path in an operative disposition to cause said driver element to engage said driven element and set time in said time-setting means corresponding to the denomination of said different coin, said second slot being arranged to permit displacement of a spurious coin-like element in said second slot sufficiently to preclude said second cam means from disposing said element as it moves along said second path in said operative disposition whereby said different spurious coin-like element cannot set time in said meter.

12. The method of detecting whether a coin-like element comprises a proper coin or a spurious element, comprising the steps of: urging the element to move edgewise along a guide; permitting the element to move away from the guide prior to reaching the end of the guide only in the event that the element is a spurious element; and causing an edge portion of the element remote from the

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guide to actuate a response means only in the event that the element being moved edgewise along the guide comprises a proper coin.

13. The method of claim 12 wherein the element is caused to tilt in moving away from the guide in the event that the element is a spurious element.

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