Dec. 20, 1949 F. J. LANDGRAF ET AL 2,491,817

ELECTRIC COIN METER AND CLOCK

Filed Sept. 16, 1949 2 Sheets-Sheet 1

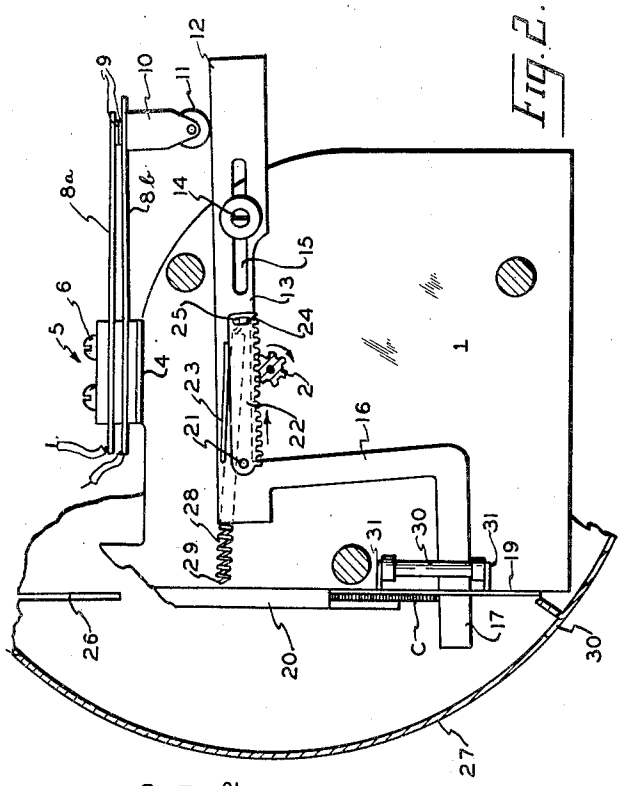


Fig. 2.

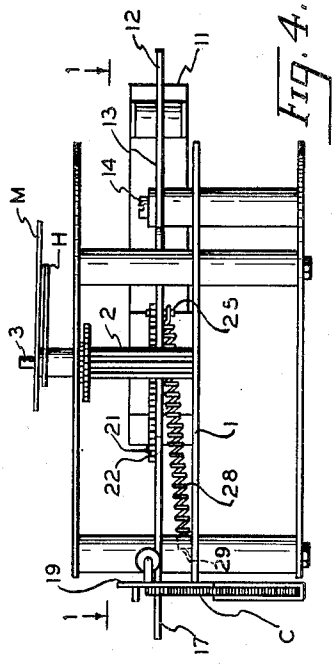


Fig. 4.

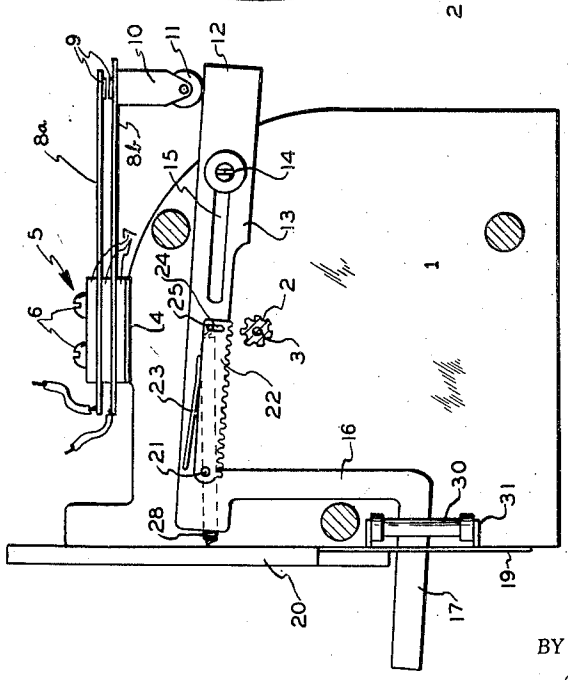


Fig. 1.

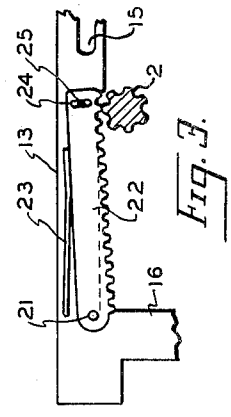


Fig. 3.

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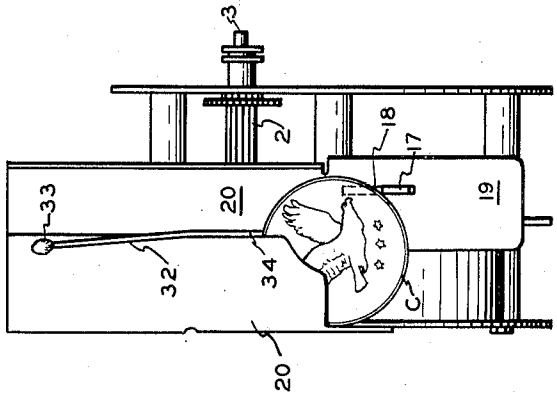


Fig. 6.

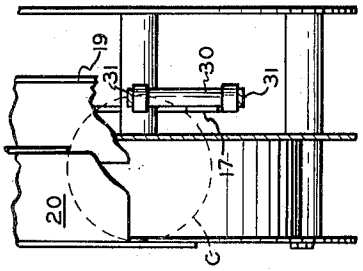


Fig. 7.

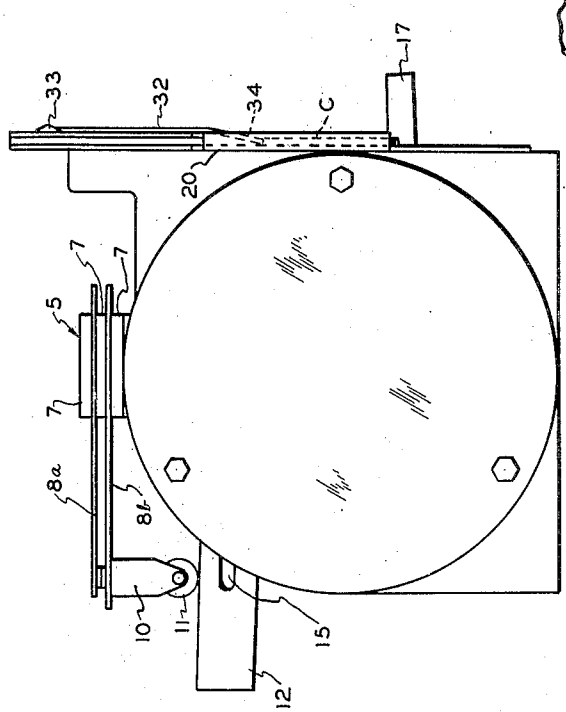


Fig. 5.

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ELECTRIC COIN METER AND CLOCK

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10 Claims. (Cl. 194—9)

1

The present invention relates generally to time controlling mechanisms, and more particularly to time controlling mechanisms operation of which is initiated in response to deposit of a check in a container.

It is an important object of the present invention to provide a mechanism for controlling the operative condition of an electrical switch for predetermined periods of time, and in response to deposit of a check or coin in a suitable receptacle.

It is another object of the present invention to provide a novel and simplified mechanism for measuring a predetermined time period in response to deposit of a check or coin in a suitable receptacle, and for automatically depositing the check or coin in a further receptacle at the termination of the predetermined time interval.

It is another broad object of the present invention to provide a mechanism capable of actuation by a conventional clock for measuring predetermined time intervals initiated by the deposit of a check or coin in a suitable receptacle.

It is a more specific object of the present invention to provide a device for closing an electrical circuit in response to deposit of a check or coin in a suitable receptacle, and for maintaining the circuit in closed condition for a predetermined time interval, and for automatically accomplishing transfer of the coin to a further receptacle at the termination of the predetermined time interval.

It is still another object of the present invention to provide mechanism for accomplishing the above stated objects which shall be of simpler character, and susceptible of more economical fabrication, than has hitherto been considered feasible in the pertinent art.

It is still a further object of the present invention to provide a time measuring device which may be driven from a continually running clock, and which is entirely mechanical in nature, the time measuring device being operatively coupled to the clock mechanism in response to insertion of a coin, and the operative connection being automatically destroyed at the termination of the predetermined time interval.

The above and still further features, advantages and objects of the present invention will become apparent upon consideration of the following detailed description of a specific embodiment thereof, especially when taken in conjunction with the accompanying drawings wherein:

2

Figure 1 is a view in side sectional elevation taken on the line 1—1 of Figure 4, of a structure arranged in accordance with the invention, before the insertion of a coin therein;

Figure 2 is a side section corresponding to Figure 1, and illustrating the position of the mechanical elements of Figure 1 after the insertion of a coin;

Figure 3 is a fragmentary side view corresponding with certain details of Figure 1 and Figure 2;

Figure 4 is a bottom view of structure arranged in accordance with the invention;

Figure 5 is a side view, taken in a direction opposite to that of Figure 1, of apparatus in accordance with the invention, showing particularly details of the coin slot thereof;

Figure 6 is a front elevation complementing Figure 5, and indicating particularly mechanism for retaining a coin in the coin slot during measurement of a time interval; and

Figure 7 is an enlarged view corresponding with a portion of Figure 6 with certain walls removed, better to indicate internal features of the structure.

Referring now more particularly to the drawings the reference numeral 1 identifies a thin metallic panel, which may be secured in any convenient fashion to a conventional clock mechanism, as by means of bent over lugs, bolts or the like. The reference numeral 2 identifies a pinion, comprised in the gear train of the clock mechanism, and the spindle 3 on which the pinion 2 is mounted may correspond with the spindle which drives the hour hand H of the clock, or the minute hand M of the clock, according as longer or shorter times are desired to be measured by the structure of the invention.

The wall structure 1 comprises at its upper edge a bent over horizontal shelf 4, which serves to support an electric switch 5, secured as by screws 6 to the shelf 4. The switch 5 comprises insulating spacers 7, which maintain in spaced relation two parallel metallic leaves 8a and 8b, having adjacent electrical contacts 9, which are normally separated. Depending from the lower one of the leaves 8b, is a bracket 10, which supports a roller 11 for rotation about suitable bearings.

The roller 11 bears on an end 12 of an arm 13, which is pivoted about a fixed pin 14 supported by the wall 1 in any convenient fashion, the pin 14 extending through a longitudinal slot 15 in the arm 13, to enable displacement of the pivotal point of the arm 13.

Integrally related to the arm 13 is a downwardly and vertically extending arm 16, which terminates in a further arm 17, extending forwardly and substantially horizontally, or is parallel to the arm 13. The arm 17 extends through a slot 18 provided in a wall section 19, which is secured in any convenient fashion to the wall 1, with the plane of the wall section 19 perpendicular to the plane of the wall 1. The wall section 19 is suitably bent and forms a coin slot 20 having a width and thickness adequate to permit entrance of a coin of predetermined denomination, as for example, a quarter of a dollar. The arm 17 extends through the slot 18 in the path of any coin, such as C, which might be inserted in the coin slot 20, the coin slot having such width as to accept any coin smaller in size than the size of the quarter dollar but not larger.

The lateral position of the arm 17 is such, however, that in the event a coin of denomination smaller than that selected, say a quarter dollar, should be inserted in the coin slot 20, it would fall through between the arm 17 and the side wall of the coin slot 20. Secured to the arm 13, at a point adjacent to the junction of the arms 13 and 16, and by means of a pivotal connection 21 is a rack bar 22 having a plurality of gear teeth in its under edge, which are adapted to mesh with the teeth of the gear 2, so that the rack 22 may be driven in response to rotation of the gear 2 when the rack 22 and the gear 2 mesh. The rack bar 22 is spring pressed downwardly by a spring 23, which tends to cause the rack bar 22 to rotate clockwise, as seen in Figure 1 of the drawings, about the pivot 21. Motion of the rack bar 22 is limited by means of a vertical slot 24 formed in the rack bar 22, through which extends a pin 25 which is secured to the arm 13. Accordingly, upper end of slot 24 normally rests on the pin 25 in response to the pressure applied by the spring 23.

When a coin as C is dropped into the coin slot 20, via an aperture 26 provided in a casing 27 containing the mechanism of the present invention, the weight of coin C depresses the arm 17, as illustrated in Figure 2 of the accompanying drawings, causing the arm 13 to pivot about the pin 14, raising the rearward edge 12 of the arm 13 against the roller 11, and thereby flexing the spring leaf 8b upwardly to bring the contacts 9 into contact. At the same time the rack bar 22 is carried downwardly by the arm 13 and into mesh with the gear 2. The latter may be assumed to be in process of rotation, and accordingly drives the arm 13 to the right, as viewed in Figures 1 and 2 of the drawings. As the arm 13 travels to the right, pressure on the roller 11 is maintained, so that the switch contacts 9 remain closed. At the same time the arm 17 is gradually withdrawn from under the coin C, against the tension of a restraining spring 28, which may be of helical form, and one end of which may be secured to the wall or panel 1 at the point 29, the other end being secured to the arm 13 as at the pin 25.

Motion of the arm 13 to the right, as viewed in Figure 2 of the drawings, continues until the arm 17 has been withdrawn entirely from under the coin C. When this occurs, the coin C is released from the coin slot 20, and falls through an aperture 30 in the casing 27. Simultaneously, since no downwardly exerted force is now available for depressing the arm 17, the latter rises,

being impelled to rise by the pressure exerted thereon by the roller 11 in response to the spring leaf 8b. The rack bar 22 is thus removed from meshing relation with the gear 2, and the spring 23 serves to draw the arm 13 into its original position, as illustrated in Figure 1 of the accompanying drawings, preparatory to a further operation of the mechanism.

It may occur that when the rack bar 22 is depressed in response to the weight of the coin C, applied to the arm 17, that the teeth of the rack bar 22 will not be in suitable position for proper meshing with the teeth of the gear 2, and that, on the other hand, the crowns of the representative teeth of the rack bar 22 and the gear 2 will be in immediately adjacent and opposing relation. In such case, the rack bar 22 pivots about the pivot point 21, the spring 23, giving, and the slot 24 riding up on the pin 25. Thereby the rearward end 12 of the arm 13 is enabled to rise to the same extent in response to the weight of the coin C, as if the teeth of the rack bar 22 and the gear 2 were in proper mesh, thereby to effect complete closure of the switch points 9. When this occurs, as illustrated in Figure 3 of the drawings, continued rotation of the gear 2 results almost immediately in proper alignment with the rack bar 22 to effect proper meshing of the teeth of the rack bar 22 with the teeth of the gear 2.

Referring to Figure 7 of the drawings, it will be seen that the coin C exerts a wedging effect on the arm 17, tending to cause the latter to move to the right as viewed in Figure 7. Since the arm 17 extends through slot 18 in the wall section 19, the wedging action of the coin C has a tendency to causing binding of the arm 17 against the wall of the slot. To eliminate this effect a roller bearing 30 is provided, which may be mounted between brackets 31 struck out from the wall section 19, and which serves to take the pressure of the arm 17, rotating as the arm 17 is withdrawn in response to rotation of the gear 2 while the rack bar 22 is in mesh therewith.

In order to prevent unauthorized removal of a coin C from the coin slot 20, once it has been inserted therein, a spring member 32 is provided, which is secured at one end 33 to the outer wall of the coin slot 20, and which at its lower end 34 extends slightly within the confines of the coin slot. When a coin is inserted in the coin slot it brushes by the end 34 of the spring rod 32, the latter being sufficiently resilient to give in response to the weight of the coin. After the coin C has passed the end 34 of the spring rod 32 the latter springs back into position with its end over the coin C, as shown in Figure 5 of the drawings, retaining the later against unauthorized removal from the coin slot 20, as by turning the mechanism upside down.

Various modes of application of the present invention will suggest themselves to those skilled in the art. For example, the switch 5 may be utilized to control times of operation of television or radio receivers, washing machines, refrigerators or the like, the clock running continuously, and the switch operation being timed by the clock. Alternatively, the clock may be an electric clock, and merely perform the functions of an electric motor, being connected in series with the switch contacts and with a power supply line. The clock hands, if utilized, will then measure elapsed time during which the circuit is closed, rather than true time. It will further be clear that for a clock, as a drive means, may be sub-

stituted other types of motive means, and running at uniform or non-uniform speed. While the invention finds its maximum application in conjunction with coin controlled devices, checks simulating coins may obviously be employed in place of coins. The structure may be employed to measure a variety of desired time intervals, by suitable selection of the physical dimensions of the arm 17 which extends into the coin chute, or by providing stops (not shown) to limit the extent of travel of the arm 17 into the coin chute.

While we have described a single specific and preferred embodiment of the invention, it will be evident to those skilled in the art that certain variations of detail and general arrangement thereof may be resorted to without departing from the true spirit and scope of the invention.

What we claim and desire to secure by Letters Patent of the United States is:

1. A time switch including, switch contacts, a coin chute for receiving a coin, an arm comprising an arm section extending into said coin chute for actuation by the weight of said coin, means supporting said arm for pivotal motion in response to said actuation of said arm section, means responsive to pivotal motion of said arm for operating said switch contacts, a motor, a pinion driven by said motor, a rack secured to said arm, said rack positioned normally out of actuable engagement with said pinion and to be engaged with said pinion in response to said pivotal motion, said rack arranged to withdraw said arm section from within said chute when driven by said pinion.

2. Coin controlled mechanism, including, a coin chute having a width between edges only adequate to receive a coin of first predetermined diameter, an arm extending into said coin chute adjacent one edge thereof, the distance between the other edge and said arm being sufficient to enable ready passage of coins of smaller predetermined diameters and to stop coins of said first predetermined diameter, and time controlled means for withdrawing said arm from said coin chute at a predetermined time after insertion into said coin chute of a coin of said first predetermined diameter, said last means comprising a pinion and means for driving said pinion at a uniform rate of rotation, a rack normally out of engagement with said pinion, means responsive to stoppage of said coin of predetermined diameter in said coin chute by said arm for effecting driving engagement of said rack and pinion, and means responsive to predetermined motion of said rack in response to said pinion for withdrawing said arm from said coin chute.

3. Coin controlled mechanism, including, a coin chute having a width between edges only adequate to receive a coin of first predetermined diameter, an arm extending into said coin chute adjacent one edge thereof, the distance between the other edge and said arm being sufficient to enable ready passage of coins of smaller predetermined diameters and to stop coins of said first predetermined diameter, time controlled means for withdrawing said arm from said coin chute at a predetermined time after insertion into said coin chute of a coin of said first predetermined diameter, said last means comprising a pinion and means for driving said pinion at a uniform rate of rotation, a rack normally out of engagement with said pinion, means responsive to stoppage of said coin of first predetermined diameter in said coin chute by said arm for effecting driving engagement of said rack and pinion, means responsive to predetermined motion of said rack in response to said pinion for withdrawing said arm from said coin chute, a switch having resilient means for normally biasing said rack out of engagement with said pinion, and means responsive to said engagement of said rack and pinion for overcoming said resilient means and operating said switch.

4. A coin controlled timer comprising a coin chute, an arm movable into and out of said coin chute, a spring normally urging said arm into said coin chute, a timing motor, a pinion rotated by said timing motor, a rack secured to said arm, means normally maintaining said rack out of geared engagement with said pinion, means mounting said rack for movement by said arm in response to the weight of a coin in said coin chute and resting on said arm, into geared engagement with said pinion, rotation of said pinion actuating said rack to move said arm out of said coin chute.

5. A check controlled device comprising a chute for a check, an arm normally extending into said chute in the path of a check and movable out of said chute to release said check, a motor, a pinion rotated by said motor, a rack secured to said arm, means normally maintaining said rack out of geared engagement with said pinion, means mounting said rack for movement in response to the weight of said check on said arm into geared engagement with said pinion, rotation of said pinion actuating said rack during said geared engagement to move said arm out of said chute, thereby to release said check.

6. A check controlled device comprising, a chute for a check, a pinion, means for rotating said pinion, a rack, means mounting said rack for movement into and out of geared engagement with said pinion, resilient means normally maintaining said rack and pinion out of geared engagement, and an arm secured to said rack for movement of said rack into said geared engagement in response to the weight of said check, said arm extending into said chute in the path of said check.

7. A check controlled device comprising, a chute for a check, a pinion, means for rotating said pinion, a rack, means mounting said rack for movement into and out of geared engagement with said pinion, resilient means normally maintaining said rack and pinion out of said geared engagement, means responsive only to the weight of said check for effecting and maintaining said geared engagement, said last means comprising an arm extending into said chute in the path of said check, and means responsive to motion of said rack in response to rotation of said pinion for withdrawing said arm from said chute.

8. A check controlled timer, comprising, a chute for a check, a pinion, clock means for rotating said pinion, a rack, means mounting said rack for movement into and out of geared engagement with said pinion, a resilient element normally in one operative condition and normally maintaining said rack and pinion out of geared engagement by its resilience, means responsive only to the weight of said check for overcoming said resilience and effecting and maintaining said geared engagement, said last means comprising an arm extending into said chute in the path of said check, and means responsive to predetermined motion of said rack in response to rotation of said pinion for withdrawing said arm from said chute.

9. In a switch operating mechanism, the com-

bination of a switch having a movable contact element in a first position, a rotary pinion, a movable rack adapted to effect a traverse from a starting position upon engagement with said rotary pinion during rotation of said pinion, check controlled mechanism for simultaneously moving said contact element to a second position and for shifting said rack into geared engagement with said pinion and for maintaining said rack in said geared engagement, and means for automatically restoring said rack to said starting position and for simultaneously restoring said movable contact element to said first position in response to predetermined movement of said rack from said starting position in response to rotation of said rotary pinion.

10. The combination in accordance with claim 9 wherein said check controlled mechanism is responsive solely to the weight of said check.

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