March 3, 1942. G. MICHAELSON 2,275,084

COIN-FREED MECHANISM

Filed April 1, 1940

Fig. 1.

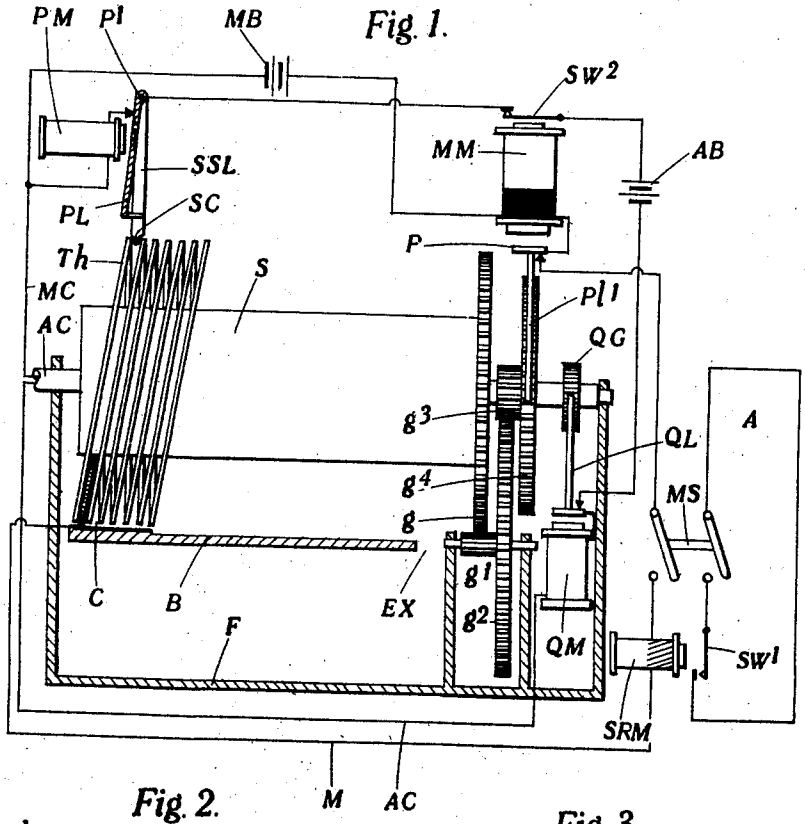


Fig. 2.

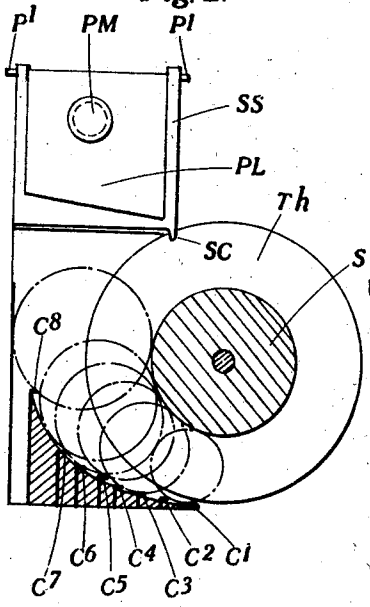
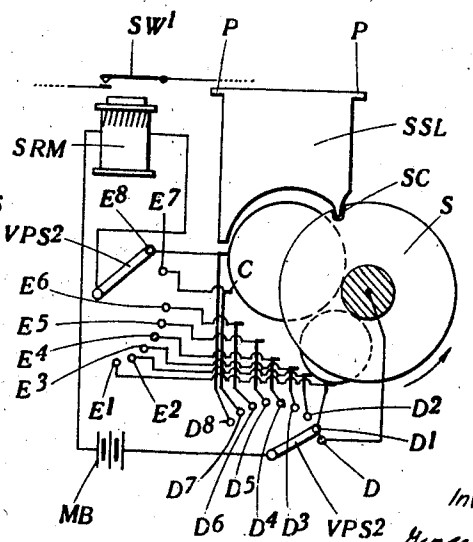


Fig. 3.



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COIN-FREED MECHANISM

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10 Claims. (Cl. 194—6)

This invention relates to coin-freed mechanisms and has for its chief object the provision of a simple and economical apparatus that can serve a variety of purposes and that can be adapted for use with articles or various forms whether for domestic or public utility services or for sale, hire, purchase or servicing purposes.

According to one feature of the invention the coin-freed mechanism is provided with a chute, pocket or slot for the reception of coins or tokens of various denominations and with a plurality of selectively engageable electric contact members, the arrangement being such that the position which a coin or token assumes or is permitted to assume and the contact engaged are dependent upon the value or dimensions of the coin or token received.

According to another feature of the invention the coin freed mechanism is provided with a chute for the reception of coins or tokens of various denominations and with a plurality of selectively engageable electric contact members disposed beneath said chute and along a tapering or convergent coin-receiving zone, the arrangement being such that the position which a coin or token assumes or is permitted to assume in the coin-receiving zone and the particular contact engaged are dependent upon the value or dimensions of the coin or token received.

According to another feature of the invention the coin-freed mechanism is provided with a chute for the reception of coins or tokens of various denominations and means for displacing the coin or token relatively to the chute or a part thereof so that the amount of, or the time occupied by, the displacement is dependent upon the characteristics or value of the coin or token and is predetermined by means associated with or disposed beneath the said chute.

According to another feature of the invention the coin-freed mechanism is provided with a chute for the reception of coins or tokens of various denominations and with a plurality of selectively engageable electric contact members disposed beneath said chute so that they form one boundary of a tapering or convergent coin-receiving zone the other boundary of which is formed by a helical member between the convolutions of which the coins or tokens are received.

According to another feature of the invention, the coin-freed mechanism is provided with a chute for the reception of coins or tokens of various denominations and with a plurality of selectively engageable electric contact members, means for displacing a coin laterally while engaging a contact member and means brought into operation by the insertion of a coin for actuating the displacing means.

Further features of the invention are concerned with the manner in which a coin or token received by the chute is utilised to control the actuation of the mechanism brought into operation by the insertion of the coin or token.

In its preferred form, the invention comprises a helical member rotatable in relation to the coin or token, a part of the helix functioning as a holder for the coin or token. Associated with the helix is a support or supports forming another part of the coin-holder.

The support or supports and the helix or parts thereof, may together form parts of an electric circuit and may be insulated from one another so that a coin resting partly in the helix and partly in or on the support forms a connector and so long as the coin engages its appropriate contact the circuit is closed but when the coin leaves the contact even though it may still be in the holder, the circuit is broken. After a coin has been deposited in the holder, the helix may be rotated so that the coin becomes displaced, e. g. laterally, the circuit being maintained closed for a predetermined period of time or for the whole or a part of such displacement. In this connection, it may be mentioned that a plurality of contact members of different lengths may be used and the holder may be formed and the contact members positioned so that coins of different denominations or sizes occupy different positions and engage different contacts and thereby serve to control the operation of mechanism to be leased for different periods predetermined according to the lengths of the contacts.

The invention may be applied to a variety of purposes as for instance, the control of wireless sets, television sets, radiograms, telephones, refrigerators, teleprinters, telegraphic equipment, motor vehicles, vacuum cleaners, vending machines, sport and game machines, ticket vending and printing and/or change giving and coin sorting machines. It can also be applied to mechanically operating machines and devices such as, for instance, to the control and/or actuation of taps, valves, to display or advertising devices.

In order that the said invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to the accompanying drawing in which:

Fig. 1 is a view showing diagrammatically a part of a coin-freed mechanism incorporating the invention;

Fig. 2 is a sectional view showing diagrammatically the arrangement of the contact members in the tapering or convergent coin-receiving zone; and

Figs. 3 and 4 are detail views showing diagrammatically modified modes of carrying the invention into effect.

As may be seen from Fig. 1 of the accompanying drawing the improved form of coin-freed mechanism comprises a helical member arranged for rotation in a frame F about a horizontal axis and made up of a central core or cylindrical part S and a helical part Th extending outwardly therefrom. The aforesaid helical part is preferably in the form of a continuous deeply-cut helix and may be formed by a continuous and substantially flat strip of metal wound helically upon the core so as to form relatively deep threads, although it may be formed by a series of metal rings placed side by side in an inclined or oblique position on the core and cut radially and interconnected so that the end of one is connected with the end of the next to form a continuous helix, the pitch of the helix being such that a coin or any one of a number of coins can be placed edgewise in position between two convolutions of the screw with a part of its edge bearing against the core S or bottom of the thread and with another part of its edge extending beyond the peripheral or outer edge of the helix.

Beneath or to one side of the said helical member is arranged a set of electrical contact members which correspond in number with or exceed the number of the denomination of coins for which the apparatus is to be used, said contact members being disposed at varying distances from the axis of the helical member. For example, if the apparatus is required to be used with coins of the following denominations; one-farthing, one three-penny piece, one six-penny piece, one shilling, one half-penny piece, one florin, one penny and one half-crown piece, at least eight contact members are provided and arranged so that they are spaced from one another around a part of the peripheral or outer edge of the helical member and so that they are disposed at distances from the axis of the helical member which progressively increase in magnitude, the arrangement being such that the contact member c' for the coin of the smallest diameter, say the six-penny piece, is disposed only a short distance from the peripheral or outer edge of the helical member while the contact member c^2 for the coin which is next to the smallest in diameter, say the farthing, is disposed at a slightly greater distance from the axis or peripheral or outer edge of the helical member, the contact member c^3 for the next size coin, say the three-penny piece, is disposed at a still greater distance from the axis or peripheral or outer edge of the helical member and so on with the contact members c^4, c^5, c^6, c^7 and c^8 provided respectively for the other coins of progressively increasing diameters, viz. the shilling, the half-penny, the florin, the penny and the half-crown. Thus as may be seen from Fig. 2, there is formed between the helical member and the set of contact members what may be termed an arcuate or curved tapering or convergent coin receiving zone and, when a coin of any of the denominations provided for is, while lying in a plane substantially at right angles to the axis of the helical member, introduced into that zone, it can advance along the zone by an amount which is dependent upon its characteristics, e. g. its diameter, and when it comes to rest, it will bear against one only of the contact members, namely that contact member which has been allocated for that denomination of coin.

The aforesaid contact members are preferably parallel with one another and extend in directions parallel with the axis of the helical member. Also, for certain purposes, e. g. in apparatus required for use with appliances which are to be released or leased for varying periods of time, the said contact members may be formed so that they are of varying lengths or so that the electrically conducting portions of the same are of varying lengths, the arrangement being such that, when a coin in position in the said tapering or convergent coin-receiving zone is displaced laterally by a rotary movement of the spiral or helical member, it will move along the contact member and be effective for maintaining an electrical circuit or circuits closed or open or for the selective operation of one or more relays or other apparatus for a period dependent upon the length or effective length of the contact member. That is to say, upon a rotary movement of the helical member, the coin-freed mechanism or the apparatus adapted to be brought into operation by the actuation of the coin-freed mechanism, may be actuated for a period dependent upon the duration of the contact established between the coin and its associated contact member which will, in turn, depend upon the length or effective length of the contact member and/or the speed of rotation of the helical member.

The means for rotating the helical member may take various forms. For example, a pawl and ratchet device may be provided and controlled by an electro-magnetic device which may be coupled with the pawl to operate the helical member in a step-by-step manner, the electro-magnetic device being adapted to be brought into operation when a coin closes the circuit. For example, as is shown in Fig. 1, the helical member S may have connected or secured thereto a gear wheel g forming part of a set of reduction gearing consisting, for instance, of a pinion g' engaging with g, a larger pinion g^2 secured to g' meshing with a smaller pinion g^3 which is, in turn, secured to a relatively large pinion g^4, and a one-way flexible pawl PL1 may be provided for engagement with the last mentioned pinion, the arrangement being such that the pawl is coupled with a displaceable armature P associated with an electro-magnetic device MM one end of which is slow-to-release and forms with P a make-and-break arrangement. The other end of the electro-magnetic device may be arranged so that it is adapted, when actuated, to open a normally closed switch SW2 arranged in an auxiliary circuit which includes an auxiliary electric battery AB. The switch SW2 is arranged in series with a coin chute disposed above one end of the aforesaid convergent coin-receiving zone or with means for controlling the passage of coins from the chute to the convolutions of the helix. For reasons which will hereinafter appear, the coin chute SSL is preferably pivotally mounted and the switch SW2 is electrically connected with the pivot P' of the chute. Also, the chute is preferably composed of electrically conducting material and is provided at its lower end with a contact member SC extending between the outer edges of two convolutions of the helical member.

Associated with the coin chute is a coin gate or

platform adapted to control the passage of the coins to the helical member and to open and close the passage at the appropriate times. As illustrated, the coin gate comprises an L-shaped member PL which is arranged for angular displacement about the pivot P' of the chute but which is insulated from the pivot and the chute, said gate being adapted to be moved relatively to the chute by an electro-magnetic device PM and being arranged so that the lower end thereof opens or closes the passage through the chute and, when closed, forms a platform on which a coin can rest, and, while so resting, bridges or establishes electrical contact between the chute SSL and the gate PL for the purpose of closing a part of the said auxiliary circuit. The windings of the electro-magnetic device PM are included in said auxiliary circuit which is indicated at AC and which also includes the windings of the quick make-and-break electromagnetic device or motor shown at QM. The latter has associated therewith a displaceable armature terminating in a pawl device QL engaging with a pinion QG on the shaft of the helical member. Also, QM is electrically connected with the auxiliary battery AB to complete the said auxiliary circuit.

The arrangement illustrated also includes a main battery MB for supplying current to a main circuit MC which includes the windings of the electro-magnetic device MM, a main switch MS, the windings of a slow-to-release electromagnetic device SRM, the contact members c', c^2, c^3, c^4, c^5, c^6, c^7 and c^8 and the helical member when connected with a contact member by a coin.

The apparatus required to be controlled by the coin-freed mechanism may, as mentioned above, be of any desired form and is indicated diagrammatically at A. In instances in which the latter is of an electrical character, e. g. a wireless set or other apparatus necessitating an electrical supply circuit, the switch SW1 therefor may be controlled by the slow-to-release electromagnetic device SRM.

From the foregoing, it will be seen that when the chute SSL is in its normal position, the contact SC is disposed between two convolutions of the helical member without necessarily contacting therewith. When, however, a coin is inserted in the chute, it rests momentarily on the lower end of the chute gate or platform PL and closes the said auxiliary circuit, i. e. current can flow from one side of the battery AB, through the closed switch SW2, the chute SSL, the coin, the chute gate PL, the coil of the electro-magnetic device PM, a part of the circuit MC, the shaft of the helical member, conductor AC, coil of electromagnet QM, device QL and back to the battery AB. The electromagnetic device PM is quicker to operate than the electromagnetic device QM with the result that the former is actuated to swing the chute gate PL relatively to the chute SSL and to thereby allow the coin to drop down between the two convolutions of the helical member and into the convergent coin-receiving zone until brought to rest with one part of its edge bearing against the core of the helical member or the bottom or sides of its thread and another part bearing against the particular contact member allocated to the denomination or dimensions of the coin used. Upon the actuation of the electromagnetic device PM, the circuit is interrupted and the chute gate PL is immediately returned to its former position. The coin has now completed the main circuit which may be traced from one side of the battery MB, through conductor MC, the shaft of the helical member, the coin, the contact with which the coin engages, conductor M, the coil of the slow-to-release electromagnetic device SRM, the closed main switch MS, the device PL1 and the coil of the electromagnetic device MM to the other side of the battery MB. The electromagnetic device MM is thereupon actuated with the result that the switch SW2 is opened and the device PL1 is operated intermittently so that the helical member is rotated about its horizontal axis and the coin is displaced laterally along the length of the contact member with which it is in engagement until it falls through a slot EX into a suitable receptacle or compartment.

In instances in which the coin-freed mechanism is required to control or lease for use an appliance, such as a wireless set, for variable periods of time dependent in value upon the denomination of the coin inserted, the aforesaid contact members and/or the speed of rotation of the helical member may be adjusted or predetermined according to the durations of the periods of control or lease required. Thus, for example, the contact members may each be of different lengths so that a coin of small value, for example, one-half penny, will be advanced along a relatively short contact member whereas a coin of greater value, for example, a sixpence, will be advanced along a relatively long contact member and the periods of control, actuation or lease will be regulated accordingly.

It will be seen that, if the angular position of the helical member, after the coin has left its contact member, is such that the contact SC at the lower end of the chute is still contacting with a part of the peripheral surface of the spiral or helical member, a circuit will be established from one side of the battery AB, through the switch SW2 (now closed), chute SSL, convolution T*h*, the bearing of the helical member, conductors AC, electromagnetic device QM and device QL to the other side of the battery AB. The device QM is thereupon brought into operation so that QG is actuated to rotate the helical member quickly to return the contact SC to its original or normal position out of contact with the helical member and ready for the reception of the next coin.

It will be appreciated that it is not essential that the means for displacing the coin or coins or for rotating the helical member should be actuated automatically or by mechanical or electrical means brought into operation by the insertion of the coin. In some instances, the coin displacing helical member may be adapted to be actuated by manually operable means such as a push button or lever. Such an arrangement may be employed, for instance, when applying the invention to a coin-freed teleprinting apparatus or to other coin-freed impulse actuated appliances such as telegraphic equipment or apparatus for transmitting telegraphic messages or codes.

In some instances, the circuits may be arranged for operation with one denomination of coin only or with a plurality of coins of more than one denomination. For example, as is shown in Fig. 3, the helical member S may be connected to one terminal D and each of a plurality of contact members corresponding in number with the number of denominations of coins to be used may be connected with one of a set of terminals D1, D2, D3, D4, D5, D6, D7 and D8 each adapted

to be connected by a movable switch VPS1 with one side of a source of current shown as a battery MB. Also, a second movable switch VPS2 may be provided and arranged so that it is connected through the slow-to-release electromagnetic device SRM to the other side of the battery and is capable of being moved into contact with any of a second set of terminals E1, E2, E3, E4, E5, E6, E7 and E8 each of which is also connected with one of the said contact members. If now, the switch VPS1 is moved to contact with D and the switch VPS2 is moved to contact with the terminal connected with the contact allocated to a half-crown piece, then the mechanism will operate with a half-crown coin but with no other. If, however, the switch VPS1 is moved into contact with the terminal allocated to a sixpenny piece, e. g. the terminal D1, the arrangement will require another coin, other than a sixpenny piece, to be inserted before the circuits will be completed and the mechanism actuated. For instance, if the switch VPS2 is moved to establish contact with the terminal allocated to one penny, then it is clear that to cause the mechanism to be actuated a penny coin in addition to a sixpence will be needed in order to complete the circuit from switch VPS2 through the slow-to-release magnet SRM, battery MB, switch VPS1, terminal allocated to sixpenny-piece, e. g. terminal D1, the sixpence, the helical member, the penny coin and the contact allocated to the penny coin back to switch VPS2. Similarly, with other positions of the switches VPS1 and VPS2, various combinations of pairs of coins of different denominations will be needed in order to complete the circuits and set the mechanism in operation. Thus, by the employment of a set of eight contact members, there may be obtained a mechanism capable of handling or releasing eight differently priced articles or services for each of which it is necessary to insert only a single coin, and, by associating with the contact members, terminals and switches of the nature above referred to, each terminal in the D series may be connected through two coins and the helical member with each terminal in the E series, whereby a total of 28 additional circuits may be established. In the Fig. 3 illustration, the terminal D1 is connected, through the two coins indicated and the helical member, with the terminal E8.

Having thus described this invention what I claim as new therein and desire to secure by Letters Patent is:

1. A coin-freed mechanism provided with a chute for the reception of coins of various denominations, a plurality of selectively engageable electric contact members disposed beneath said chute so that they form one boundary of a tapering or convergent coin-receiving zone, and a helical member adapted to receive the coins between the convolutions thereof and forming the opposite boundary of said zone.

2. A coin-freed mechanism as claimed in claim 1 provided with means for controlling the passage of a coin through the chute.

3. A coin-freed mechanism as claimed in claim 1 in which the selectively engageable electric contact members are disposed at progressively increasing distances from the axis and surface of the helical member.

4. A coin-freed mechanism as claimed in claim 1 in which the selectively engageable electric contact members are disposed at progressively increasing distances from the axis and surface of the helical member and in which the helical member is disposed beneath the chute so that a coin can be received edgewise in position between two convolutions of the helical member with one part of its edge bearing against the bottom of the thread and another part of its edge engaging a contact member.

5. A coin-freed mechanism as claimed in claim 1 in which the coins are adapted to be propelled or displaced along the contact member by means brought into operation by the insertion of a coin.

6. A coin-freed mechanism as claimed in claim 1 in which the selectively engageable contact members are arranged and connected in circuit so that a plurality of coins of different denominations must be inserted to complete the circuits required to actuate the releasing mechanism.

7. A coin-freed mechanism as claimed in claim 1 in which the selectively engageably contact members are connected in circuit so that a plurality of coins of different denominations must be inserted to complete the circuits required to actuate the releasing mechanism and provided with switching means for predetermining the coins and selecting the circuits required to initiate the actuation of the releasing mechanism.

8. A coin freed mechanism comprising a coin chute, a coin receiving device disposed beneath said chute, said device being provided with a plurality of selectively engageable electric contact members spaced along a coin receiving zone of tapering form so that the contact engaged by any inserted coin is dependent upon the dimensions of the coin, and means for displacing a coin laterally with respect to said zone so that the displacement effected is dependent upon the contact engaged.

9. A coin freed mechanism comprising a coin chute, a coin receiving device disposed beneath said chute, said device being provided with a plurality of selectively engageable contact members with one of which an inserted coin engages, the contact engaged being dependent upon the value of the inserted coin, means for displacing a coin laterally with respect to the coin receiving device while engaging the contact member, and means brought into operation by the insertion of a coin for actuating the displacing means.

10. A coin freed mechanism comprising a coin chute capable of receiving coins of various denominations, a coin receiving device disposed beneath said chute, said device comprising a helical member arranged for rotation about a horizontal axis and for the reception of a coin edgewise between two convolutions of the helix and further comprising a plurality of selectively engageable contact members disposed adjacent the helical member so that the position of a coin in the helix and the contact engaged is dependent upon the value of the coin inserted, and means for rotating the helical member to effect lateral displacement of the coin along the engaged contact member.

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