Dec. 4, 1951 E. CARLSON 2,577,307

MECHANISM FOR CONTROLLING THE ACTUATION OF ELECTROMAGNETIC COILS

Filed Nov. 18, 1949 2 SHEETS—SHEET 1

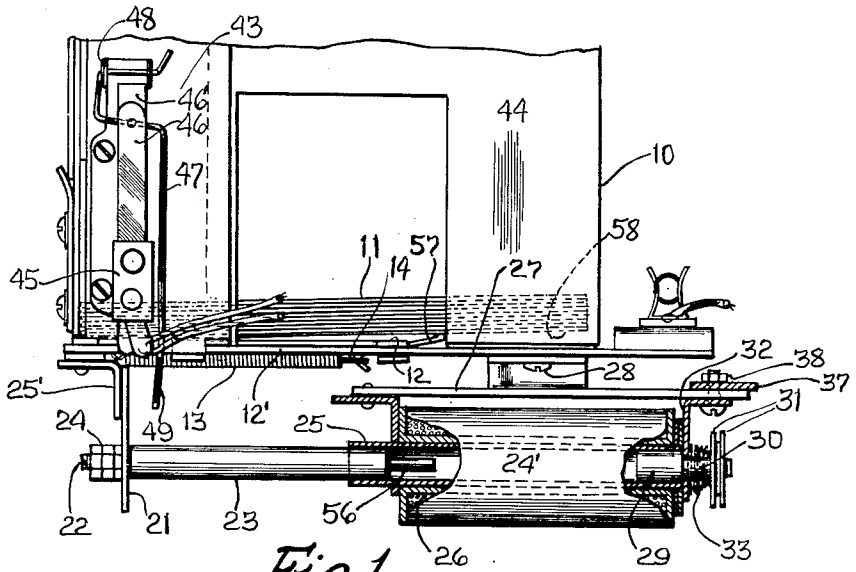


Fig. 1.

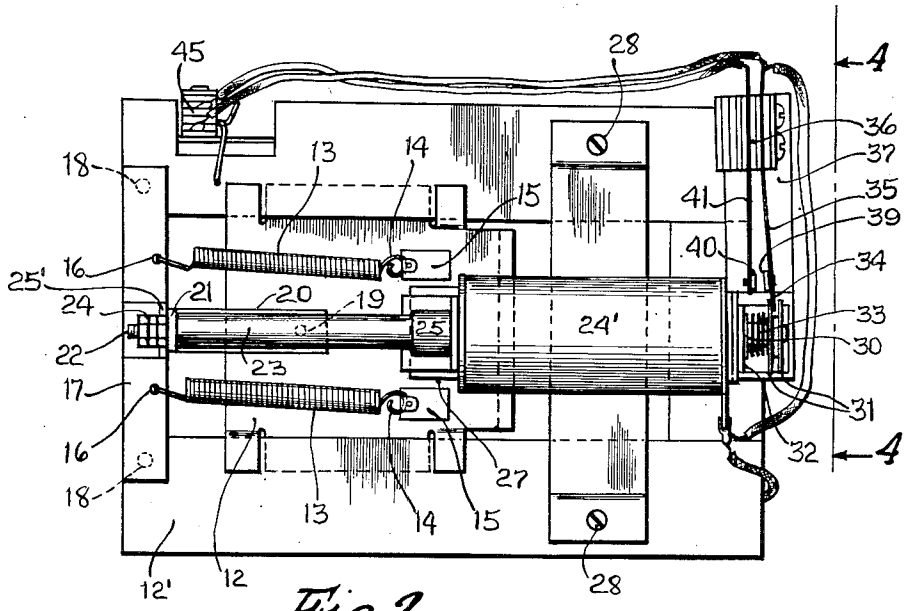


Fig. 2.

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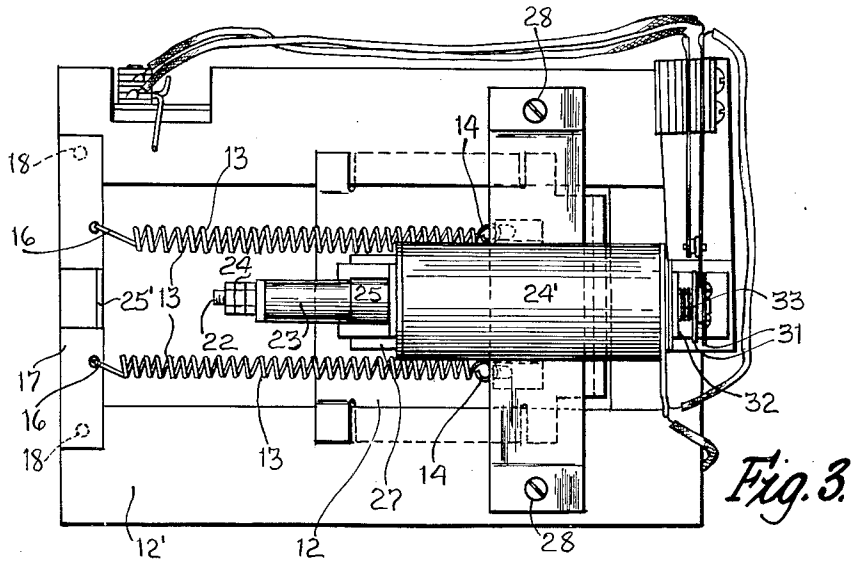


Fig. 3.

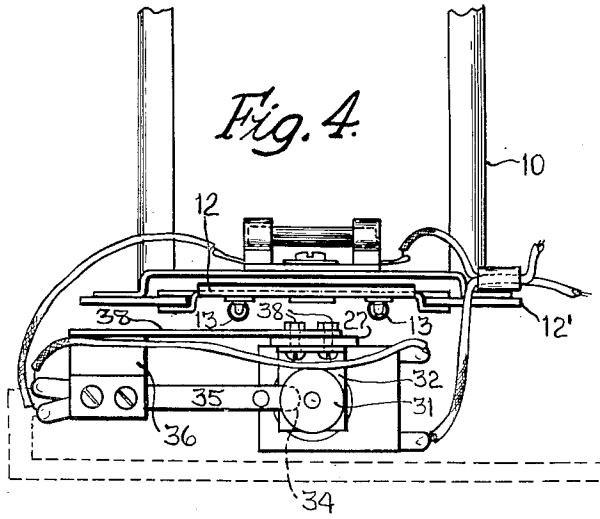


Fig. 4.

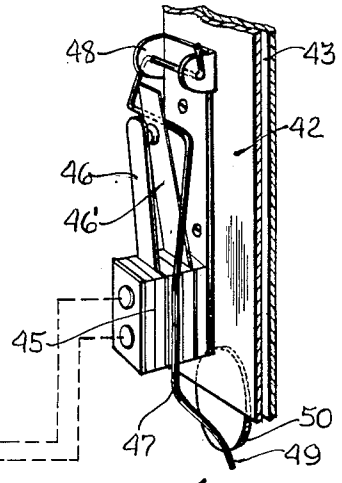


Fig. 5.

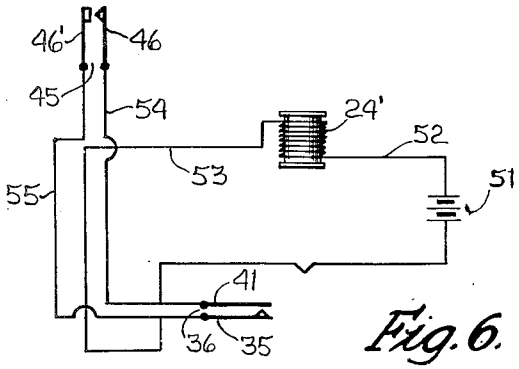


Fig. 6.

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UNITED STATES PATENT OFFICE

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MECHANISM FOR CONTROLLING THE ACTUATION OF ELECTROMAGNETIC COILS

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2 Claims. (Cl. 175—335)

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More specifically an important object of the invention is to provide an electromagnetic coil, the electric circuit of which is in the first instance controlled by a coin-actuated switch and thereafter controlled by a holding switch associated with the plunger of the coil in a manner such that the coil maintains the holding switch in closed position to energize the coil until opened by engagement with the movable ejecting plunger of the coil.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a part sectional, fragmentary, side elevational view of a card vending device showing my invention associated therewith;

Fig. 2 is a bottom plan view of the same;

Fig. 3 is a view similar to Fig. 1 but showing the parts thereof in card ejecting position;

Fig. 4 is a fragmentary side elevational view taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a coin-actuated switch embodied in the invention; and

Fig. 6 is a schematic view of a circuit embodied in the invention.

While I have shown my invention associated with a card vending device it is to be understood that such showing is merely for the purpose of understanding the application of the invention and the invention is not to be limited to a card vending device. In this connection the card vending device comprises a hopper 10 within which a stack of cards 11 is arranged for successive vending from the bottom of the stack. This vending of the cards successively from the stack is accomplished by an ejector plate 12. It may be of any approved construction slidably supported by the bottom wall 12' of the hopper in the manner shown in Figs. 2 and 3. In its normal inoperative position, as shown in Fig. 2, this plate is retained in a retracted position by means of a pair of springs 13 having corresponding end portions 14 connected to lugs 15 of the ejector plate and opposite end portions 16 to a cross bar 17. This cross bar 17 is secured as at 18 to the bottom wall 12'. Secured to this ejector plate, as at 19, is an arm 20 having an angled end portion 21 extending downwardly from the plate as shown in Fig. 1. Projecting through this depending arm portion 21 is a reduced thread-bearing stud 22 of a plunger 23.

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Threaded upon this stud is a nut 24 which connects the plunger 23 to the arm 21.

This plunger 23 constitutes a plunger of a magnetic solenoid 24', the plunger being formed of iron and operating in a brass sleeve 25 arranged in the core 26 of the coil 24'.

The coil 24' is supported from a bracket structure 27 suspended from and attached to the bottom wall 12' as at 28. Operating in the brass sleeve 25 is an auxiliary plunger 29. The auxiliary plunger 29 has a reduced stud 30, and fixed to the outer end portion of this stud 30 are spaced disks 31. Between the inner of these disks 31 and the depending bracket arm 32 of the bracket structure 27 is arranged an expansion spring 33 which normally projects the plunger 29 outwardly of the coil 24', the plunger being limited in this outward movement by the arm 32.

Positioned between the disks 31 is the end portion 34 of a leaf spring 35 of a switch structure 36 supported by a mounting plate 37 carried by the bracket structure 27 as at 38. This switch leaf has a contact head 39 which is adapted to engage a contact head 40 of a confronting switch leaf 41.

Mounted on an adjacent wall 42 of a coin chute 43 which extends parallel with the adjacent side wall 44 of the hopper 10, is a coin-actuated switch 45. This switch comprises confronting spring leafs 46 and 46' having contact heads adapted to engage with each other. The spring leaf 46' is moved into engagement with the leaf 46 by an actuating wire 47. This wire is preferably supported at one end by a bracket 48 secured to the wall 42 by screw elements or the like. This wire extends downwardly from this bracket 48 and has an angled end portion 49 disposed in the path of coins 50 dropping through the coin chute 43.

In Fig. 6, I have disclosed the circuit for the coil 24'. In this circuit there is incorporated a power source 51, one side of which is connected to one side of the coil 24 by a conductor wire 52. The other side of the power source 51 is connected to the switch leaf 41 of the switch 36. This switch 36 constitutes a holding switch. The other switch leaf 35 of this switch 36 by a conductor 53 is connected to the other side of the coil 24'. The switch leaf 46 of the switch 45 is connected by a conductor 54 to the switch leaf 41 of the switch 36. The switch leaf 46' of the switch 45, which switch is an initiating switch, is connected by a conductor 55 to the switch leaf 35 of the switch 36.

The arrangement is such that when the switch 45 is closed by the action of a coin 50 operating upon the actuating wire portion 49, an initiating circuit will be set up in the circuit to initially energize the coil 24'. This initiating circuit will move the plunger 29 either slightly before or simultaneously with the movement of the plunger 23 whereby to effect closing of the holding switch 36, which switch 36, at this point of the operation takes over the function of maintaining a circuit to the coil 24'. As the plunger 23 approaches the end of its movement into the coil 24', the reduced shaft portion 56 thereof will engage the plunger 29 and move the same outwardly of the coil 24, thereby to open the switch 36 to effect deenergization of the coil 24'. In this operation of the plunger 23 it will be noted that the ejector plate 12 is moved in a direction to dispose a shoulder 57 thereof to the rear edge of the lowermost card 58 of the stack of cards 11. This movement of the ejector plate 12 is against the action of the springs 13. Consequently, when the coil 24' is deenergized the ejector plate 12 is driven by the springs 13 back to its normal inoperative position. The return movement of the plunger 23 is limited by a stop 25' carried by the cross bar 17 and adapted to engage the arm 21 as shown in Fig. 1.

The foregoing construction provides a simple and effective arrangement for controlling the energization of an electromagnetic coil in its operation of ejecting a card or other articles from a hopper.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described by invention, what I claim as new and desire to protect by Letters Patent is:

1. For a combination, an electromagnetic coil, oppositely arranged aligned plungers adapted for movement in one direction toward each other within and under the influence of said coil, a power circuit for the coil, spring means for moving said plungers in opposite directions with respect to each other, a coin-actuated switch in said circuit for initially controlling energization of said coil by said power circuit, said switch comprising an actuating wire having an angled end portion disposed in the path of said coin, a holding switch in said circuit in parallel with said initiating switch and having means providing operative connection with one of said plungers for maintainng energization of the coil by said power circuit when said coin-actuated switch is opened, the other of said plungers having a reduced end portion adapted to engage said one plunger to move said one plunger in a direction to open said holding switch to deenergize said coil, said means providing said operative connection between said holding switch and said one plunger comprising a pair of disks mounted on said one plunger in spaced relation with respect to each other, and a switch leaf of said holding switch having an end portion adjacent its contact head disposed between said disks.

2. For a combination: an elec.romagnetic coil oppositely arranged aligned plungers adapted for movement in one direction toward each other within and under the influence of said coil, a power circuit for the coil, spring means for moving said plungers in opposite directions with respect to each other, a coin-actuated switch in said circuit for initially controlling energization of said coil by said power circuit, said switch comprising an actuating wire having an angled end portion disposed in the path of said coin and adapted to be actuated thereby, a holding switch structure having switch leaves in said circuit in parallel with said coin-actuated switch and having means providing operative connection with one of said plungers for maintaining energization of the coil by said power circuit when said coin-actuated switch is opened, the other of said plungers having a reduced end portion within said coil which is adapted to engage said one plunger to move said one plunger in a direction to open said holding switch to deenergize said coil, said operative connection between said one plunger and said holding switch comprising a groove-providing structure on said one plunger within the groove of which the end portion of one of said switch leaves adjacent its contact head projects.

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