D. D. GORDON.

MECHANICAL MOVEMENT.

APPLICATION FILED FEB. 12, 1916. RENEWED AUG. 31, 1918.

1,303,196.

Patented May 6, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

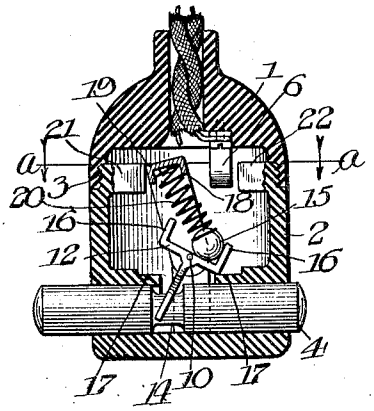


Fig. 2.

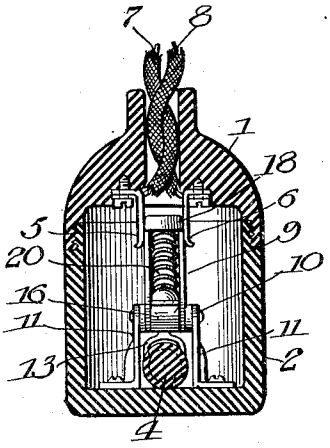


Fig. 3.

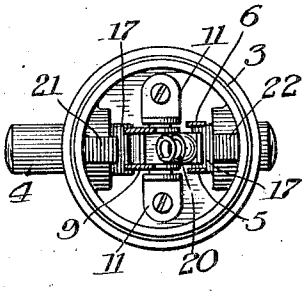
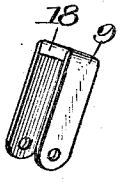


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

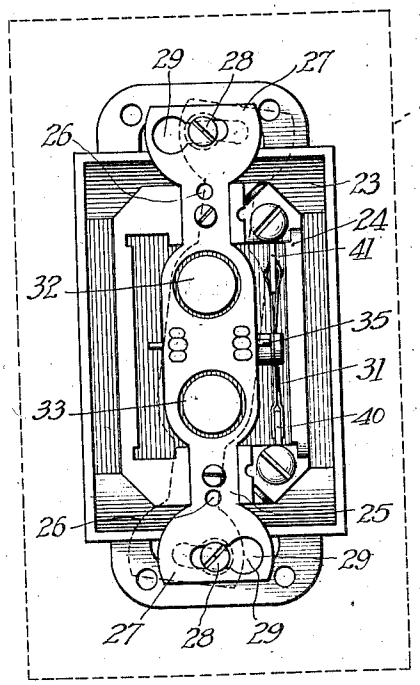


Fig. 6.

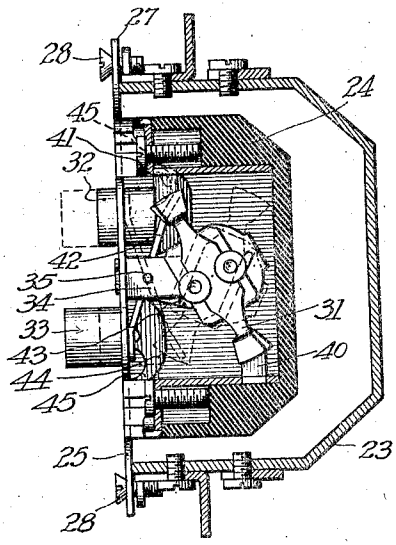


Fig. 7.

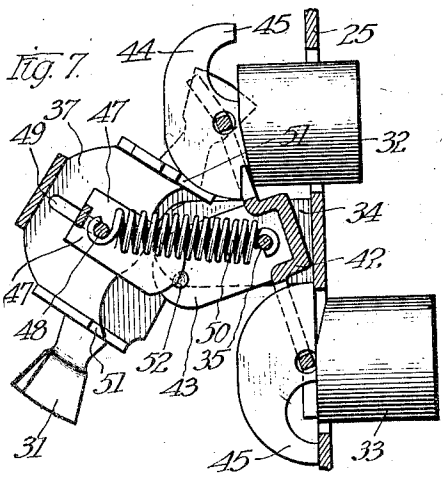


Fig. 8.

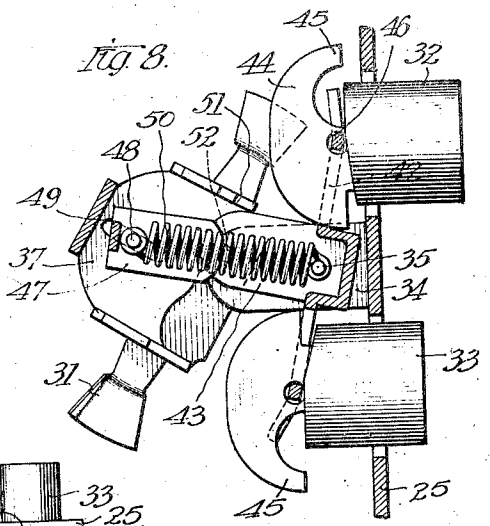
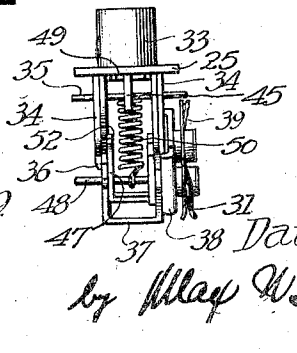


Fig. 9.



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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

1,303,196. Specification of Letters Patent. Patented May 6, 1919.

Application filed February 12, 1916, Serial No. 78,018. Renewed August 31, 1918. Serial No. 252,259.

To all whom it may concern:

Be it known that I, DAVID D. GORDON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Mechanical Movements, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to mechanical movements and has for its object the provision of a mechanism for performing a certain function which for instance is of particular utility in connection with switching devices.

In the application herein I will describe the movement more particularly as applied to switching devices and other applications of the device will suggest themselves. More specifically I have selected for illustrating my invention switching devices of the types generally known as pendant switches and wall switches. Adapting my invention for use as a pendant switch I utilize a movable contact element and control this contact element by means of a spring, which spring at its free extremity is controlled in a manner to shift the switch element from either of its alternative positions to the other. The spring may be of the coiled variety, the parts with which it coöperates being such that the opposite or free ends of the spring both have a shifting movement.

I will describe a form which my invention may take more particularly by referring to the accompanying drawings illustrating the same as applied to a pendant switch and a wall switch in which—

Figure 1 is a longitudinal sectional view of a pendant switch constructed in accordance with my invention;

Fig. 2 is a longitudinal sectional view taken at right angles to Fig. 1;

Fig. 3 is a sectional view on line *a*—*a* of Fig. 1;

Fig. 4 is a detail of construction;

Fig. 5 is a top view of a modified form;

Fig. 6 is a partial sectional view illustrating the form shown in Fig. 5;

Fig. 7 is an enlarged detail view of the moving parts;

Fig. 8 is a similar view showing the parts about to change their position by snap action, and

Fig. 9 is an end view of the switch movement removed from its containing insulating casing.

Referring more particularly to Fig. 1, I show a pendant switch consisting of the bell-shaped portion 1 and the lower cup shaped portion 2 which are adapted to be screw threadedly united as shown at 3. In the lower portion of the element 2 a plunger 4 is adapted to be reciprocated by hand, thus to make or break a certain circuit all as will presently be described. The means which I employ to change the circuit conditions consist of the two switch contacts 5 and 6 which are permanently mounted within the bell shaped portion 1 into which the circuit wires 7 and 8 are respectively connected. The plunger 4 is adapted through the agency of suitable mechanism presently to be described to move a movable switch element 9 into or out of engagement with the contact springs 5 and 6. When the device is in the position of Fig. 1 the circuit through the springs 5 and 6 is of course open, but when the element 9 occupies its alternative position, the same is between the springs 5 and 6 so that the circuit is established directly between these elements 5 and 6. The movable switch element 9 is pivoted upon a shaft 10 suitably mounted within brackets 11, 11 secured to the base portion 2. The shaft 10 likewise carries a tiltable framework 12 which is directly operable by the plunger 4. The tiltable framework 12 has a downwardly extending forked extremity 13 which coöperates with a restricted portion 14 of the plunger so that the plunger 4 in its movement carries with it the forked extension 13, thus to tilt the framework 12. The framework 12 carries a ball 15 which is movable from one end of this bracket to the other, being confined by the arms 16, 16.

It may also be well here to state that limit stops 17, 17 are provided to confine the movement of the framework 12. The ball 15 is of course suitably confined upon the framework so there is no danger of its leaving the same. The movable switch element 9 has downwardly extending aprons 18, 18 and also an abutment 19 which is inclosed by the aprons 18 and the downwardly extending arms of this element 9. A spring 20 is interposed between the ball and the spring element 12, the free extremity of this spring 20 being mounted in place above the abutment 19. The convolutions of this

spring should of course have a considerable diameter so that this spring will not be flexed transversely as it is being used. The spring of course should be capable of compression and expansion but must be prevented from any substantial transverse flexure. A limiting stop 21 is provided to confine the movement of the element 9 at its left extremity of movement and a stop 22 is provided to define the right hand limit of movement of said element 9.

Now assuming that the parts are in the position shown in Fig. 1 and it is desired to move the element 9 into engagement with the springs 5 and 6, then the plunger 4 must be moved (Fig. 1) to the right, whereupon the framework 12 is tilted contra-clockwise until the ball 15 and spring 20 are slightly beyond the center line of the element 9. At this time, the spring having been compressed during this movement, the spring is permitted to expand by reason of having passed the dead center and its tendency will be to rotate the element 9 clockwise and the element 12 contra-clockwise which it does, thus causing the element 9 to engage the springs 5 and 6 and helping to force the plunger 4 into its right hand limiting position. A snap action movement is of course occasioned by the movement just described. The reverse movement or circuit opening movement will of course be readily intelligible from what has been described.

Referring more particularly to Figs. 5 to 9 I show a modified form of the switch structure. In this device I provide the metallic outlet box 23 into which the switch structure carried within the insulating casing 24 is to be placed. A bridge or strap 25 carries the switch structure and is fastened to the casing 24 by the screws 26. This bridge is then utilized by means of its extremities 27 to secure the entire structure within the outlet box 23 by means of the screws 28. The extremities of the bridge 25 are provided with bayonet slots 29 as shown more clearly in Fig. 5 so that it is not necessary to remove the screws 28 in order to insert the switch structure in place. A very simple method is thus provided for inserting this switch movement into its position in the outlet box. A cover plate 30 is indicated in dotted lines to complete the entire structure.

The switch movement itself which is mounted within the casing 24 is designed to move by snap action a switch element 31 through the agency of the push buttons 32 and 33. This switch structure includes two arms 34, 34 riveted to the bridge piece 25, which arms support a rotatable spindle or shaft 35. The arms 34 also pivotally support by means of their hook extremities 36 a C-shaped oscillating element 37 to which is insulatingly fastened by means of the bracket 38 the double switch spring 39 so that this switch spring moves with the oscillating element 37. Suitable instrumentalities are interposed to effect a snap action movement of this element 37 and consequently the springs 39 first in one direction and then in the other in order that contact may be established between the terminals 40 and 41 or the contact therethrough broken, both by snap action. The buttons 32 and 33 are pivotally supported by an oscillating bridge piece 42 which is pivoted on the shaft 35, and which has arms 43 extending parallel to the arms 34. The buttons 32 and 33 which carry attaching elements 44 each have fingers 45 to limit their movement by their engagement with the bridge piece 25. The oscillating bridge piece 42 has projections 46 by means of which it is pivotally engaged between arms of the engaging elements 44. A shifting C-shaped element 47 is slidably mounted within the element 37 through the agency of a spindle or shaft 48 carried by the element 47 which slides in grooves 49 provided in the C-shaped element 37. A spring 50 is mounted between the spindles 35 and 48 and tends to draw them closer together. The element 37 has fingers 51 which at times are engaged by the arms 43, this engagement being just prior to the snap action movement of the element 37 from one alternative position to the other. The element 47 is pivoted to the element 43 as shown at 52, through the agency of fingers bent from the element 47 and engaging apertures in the arms 43.

It will be seen for instance by referring to Fig. 7 that as the button 33 is pushed inwardly to move the element 37 from one limiting position to the other that the swinging part or bridge piece 42 is rotated in a clockwise direction, thereby rotating its arms 43 about the shaft 35. This clockwise movement of the arms 43 swings the element 47 in a contra-clockwise direction on account of the pivotal engagement at 52, and this element 47 in being swung about its pivot 48 must also shift its position longitudinally by having the shaft 48 slide in the groove 49. This movement of course stretches the spring 50 and this stretching movement continues until the pivotal point 52 has passed beyond the center line of the shafts 35 and 48, at which time the spring 50 is permitted to contract, thereby drawing the element 47 with its shaft 48 toward the right along the slot 49 until the shaft 48 reaches the right hand extremity of this slot (Fig. 8). At the same time the rounded left hand extremity of the arm 43 has engaged the upper finger 51 of the element 37, thus pushing this element 37 in a contra-clockwise direction to move the shaft 48 slightly beyond the line joining the shaft 35 and the pivotal point of this element 37. The spring 50 is thereupon in a position to still further contract and

rapidly pull this element 37 in a contra-clockwise direction by snap action into its alternative position.

From what has been set forth the nature of my said invention will be readily apparent to those skilled in the art, and also that it is capable of a great variety of uses and modifications without departing from its spirit.

Having, however, thus described two forms which my invention may take, what I claim as new and desire to secure by Letters Patent is:

1. Apparatus of the character described having a movable element adapted to move from one alternative position to the other, a second movable element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with the said movable elements, and means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other movable element.

2. Apparatus of the character described having a movable element adapted to move from one alternative position to the other, a second movable element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with the said movable elements, means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other movable element, and a ball interposed between one free extremity of said spring and one of said movable elements

3. Apparatus of the character described having a movable element adapted to move from one alternative position to the other, a second movable element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with the said movable elements, means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other movable element, and means interposed between one free extremity of said spring and its coöperating movable element whereby the free extremity of said spring is shifted along said movable elements.

4. Apparatus of the character described having a pivoted element adapted to move from one alternative position to the other, a second pivoted element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with the said pivoted elements, and means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other pivoted element.

5. Apparatus of the character described having a pivoted element adapted to move from one alternative position to the other, a second pivoted element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with said pivoted elements, means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other pivoted element, and means interposed between one free extremity of said spring and its coöperating pivoted element whereby the free extremity of said spring is shifted along said pivoted elements.

6. Apparatus of the character described having a pivoted element adapted to move from one alternative position to the other, a second pivoted element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with the said pivoted elements, and means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other pivoted element, said elements being pivoted upon the same axis.

7. Apparatus of the character described having a pivoted element adapted to move from one alternative position to the other, a second pivoted element adapted to move from one alternative position to the other, a coiled spring having its free ends associated respectively with said pivoted elements, means for moving one of said elements to thereby shift one free extremity of said spring, thereby to pass the dead center so that the other free extremity of said spring shifts the other pivoted element, and means interposed between one free extremity of said spring and its coöperating pivoted element whereby the free extremity of said spring is shifted along said pivoted elements, said elements being pivoted upon the same axis.

8. The combination with a tiltable framework, of a slide operable along said framework, a pivoted element provided upon the same axis as said framework, and a spring interposed between said slide and said second pivoted element.

9. A device of the character described comprising a pivoted control member, a pivoted switch operating member, and means interposed between said control member and said switch operating member for controlling the snap action movement of said switch operating member in both directions when said control member is moved, said

control member and said switch operating member being both pivoted on the same axis.

10. A device of the character described comprising a pivoted control member, a pivoted switch operating member, and means interposed between said control member and said switch operating member for controlling the snap action movement of said switch operating member in both directions when said control member is moved, said means including a spring and a shifting element pivotally and shiftably associated with one of said members.

11. A device of the character described comprising a pivoted control member, a pivoted switch operating member, and means interposed between said control member and said switch operating member for controlling the snap action movement of said switch operating member in both directions when said control member is moved, said means having its control member extremity shiftable along said control member.

In witness whereof I hereunto subscribe my name this 10th day of February, A. D. 1916.

DAVID D. GORDON.

Witnesses:
HAZEL A. JONES,
MAX W. ZABEL.