M. S. MORSE.

ELECTRIC SWITCH.

APPLICATION FILED JULY 19, 1919.

1,356,875.

Patented Oct. 26, 1920.

Fig. 2.

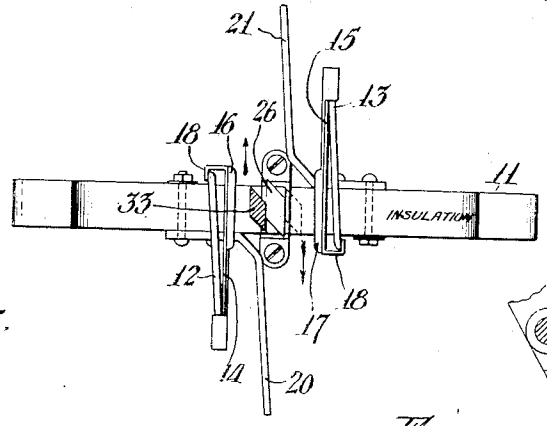


Fig. 5.

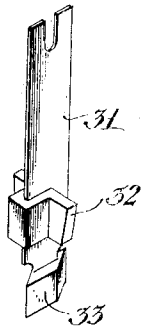


Fig. 3.

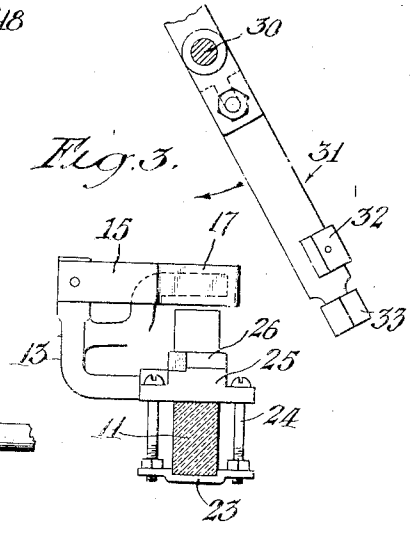


Fig. 1.

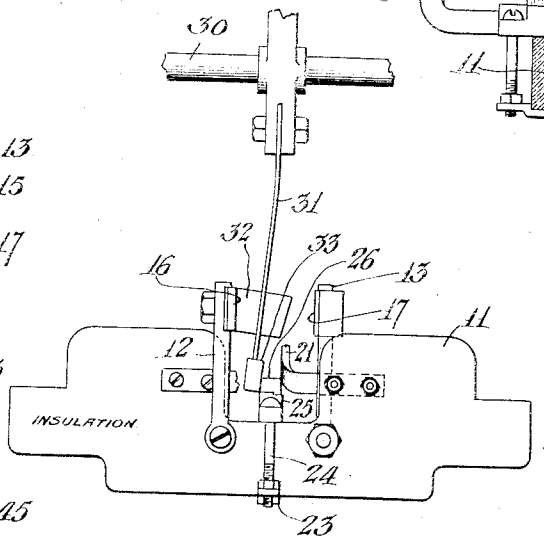


Fig. 4.

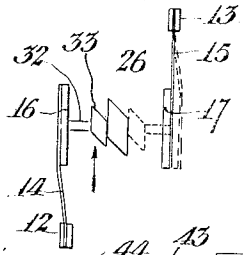
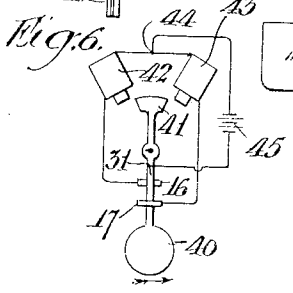


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,356,875. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed July 19, 1919. Serial No. 312,082.

To all whom it may concern:

Be it known that I, MARK S. MORSE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

My invention relates to contact making and breaking devices, and more particularly to a device which may be used in connection with an electromagnetic pendulum, to impart impulses to this pendulum at the proper time and in the proper sequence, to maintain an oscillation of the pendulum.

Further objects and advantages will be made evident hereinafter.

Referring to the drawings, which are for illustrative purposes only,

Figure 1 is a side elevation of my invention.

Fig. 2 is a plan view.

Fig. 3 is a side view partly in section.

Fig. 4 is a diagrammatic plan view.

Fig. 5 is a perspective view of the moving member.

Fig. 6 is a diagrammatic view showing the method of applying the switch to a magnetic pendulum.

In the form of my invention illustrated in these drawings, a porcelain block 11 is provided, to which are secured two brackets 12 and 13. The bracket 12 carries a flexible strip 14, and the bracket 13 carries a flexible strip 15, each of which carries a movable contact 16 or 17 respectively at its outer end, the strips 14 and 15 being bent around as shown at 18 to limit the inward movement of these movable contacts 16 and 17, and to allow the flexible strips 14 and 15 to be placed under some initial tension. Also secured in the block 11 and insulated thereby from all the other parts are damping members 20 and 21. Clamped to the center of the block 11 by means of a strap 23 and bolts 24 is a saddle 25, which carries an island 26, this island being formed of hardened steel and having beveled faces and parallel sides as shown in Fig. 4. Mounted to swing about a stationary shaft 30 is an elastic strip 31, which carries a moving contact 32 and a shoe 33. The shoe 33 is formed of hardened steel and has a similar shape to the island 26. The island 26 is placed in the center of the line of travel of the shoe 33, for the purpose of deflecting it to one side or the other as shown in dotted lines in Fig. 4.

The switch described above may be used for many purposes, one purpose being to give impulses to the pendulum shown diagrammatically in Fig. 6, in which the shaft 30 is provided with a pendulum 40 and has an armature 41 secured thereto. This armature is acted upon by inclined coils 42 and 43, which are connected together at 44 to one terminal of a battery 45, the other terminal of the battery being connected to the flexible strip 31. The stationary contact 16 is connected to the other terminal of the coil 42, the stationary contact 17 is connected to the other terminal of the coil 43. The pendulum 40 tends to hold the flexible strip 31 vertical and when so held it is bent as shown in Fig. 1, to one side or the other by the shoe 33, which is forced aside by the island 26. When forced to one side, as for example as shown in Fig. 4, the moving contact 32 makes contact with the stationary contact 16. This completes the circuit through the coil 42, the circuit through the coil 43 being opened due to the fact that the moving contact 32 is pressed away from the stationary contact 17, as shown in Fig. 1. With the parts in this position the armature 41 is attracted by the coil 42 and the pendulum 40 is swung into the direction of the arrow in Fig. 6 and in the direction of the arrow shown in Fig. 4. The moving contact 32 continues to make contact with the stationary contact 16 until the armature 41 is drawn into a position of maximum pull with relation to the coil 42, the pendulum being swung through a considerable arc to accomplish this. As soon, however, as the armature 41 reaches its position of maximum pull the circuit is broken between the stationary contact 32 and the moving contact 16, due to the fact that the shoe 33 passes beyond the island 26 in the direction of the arrow shown in Fig. 4, thus allowing the shoe to snap back into the center position and open the circuit between the stationary contact 32 and the moving contact 16. The pendulum continues to swing, due to its inertia, through a still further arc, finally coming to rest under the action of gravity and swinging back in a direction contrary to the arrow in Fig. 4, the shoe 33 being deflected to the

right hand side of the island 26 as shown in dotted lines in that figure. This establishes a circuit through the moving contact 32 and the stationary contact 17, energizing the magnet 43, which exerts a pull upon the armature 41, thus causing the pendulum to continue to swing in the same direction under this force until the circuit is broken by the shoe 33 passing beyond the island 26, thus snapping back into the central position.

It will be seen that the direction in which the pendulum starts depends upon which side of the island 26 the shoe 33 lies, but that it will be always started regardless of which side of the island it lies, upon the application of current thereto. The dampers 20 and 21 are provided to prevent oscillation of the shoe 33, due to its sudden release from the island 26, these dampers bringing the shoe to rest in the center line, so that there is no danger of the shoe 33 not properly engaging the island 26.

I claim as my invention:

1. A switching device comprising a stationary structure; a member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

2. A switching device comprising a stationary structure; a member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; resilient means for so supporting said stationary contacts; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

3. A switching device comprising a stationary structure; a resiliently supported member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

4. A switching device comprising a stationary structure; a resiliently supported member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; resilient means for so supporting said stationary contacts; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

5. A switching device comprising a stationary structure; a member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; guide members secured to said structure and so placed as to guide said shoe against said island; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

6. A switching device comprising a stationary structure; a member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having

beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; resilient means for so supporting said stationary contacts; guide members secured to said structure and so placed as to guide said shoe against said island; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

7. A switching device comprising a stationary structure; a resiliently supported member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; guide members secured to said structure and so placed as to guide said shoe against said island; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

8. A switching device comprising a stationary structure; a resiliently supported member moving back and forth in a path near said structure; an island secured to said structure in the natural line of motion of said member and having beveled faces at each end thereof; a shoe carried by said member and having beveled faces at each end thereof so shaped as to coöperate with the beveled faces on said island to deflect said shoe to one side or the other of said island, depending upon the direction of motion of said shoe; a pair of stationary contacts each secured to said structure and on opposite sides of the path of said member; resilient means for so supporting said stationary contacts; guide members secured to said structure and so placed as to guide said shoe against said island; and a moving contact actuated by said shoe to make contact with one of said stationary contacts or the other, depending upon which side of said island said shoe passes.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 10th day of July, 1919.

MARK S. MORSE.