

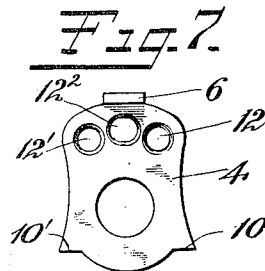
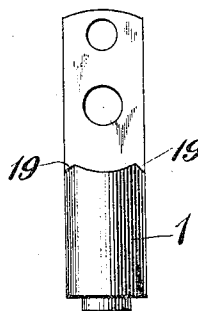
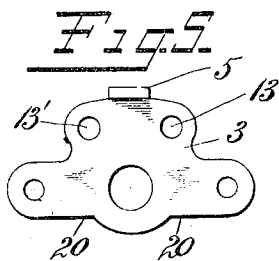
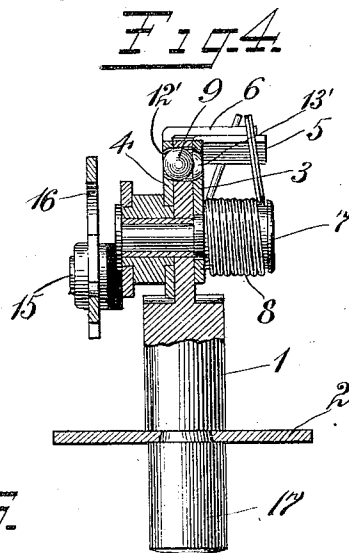
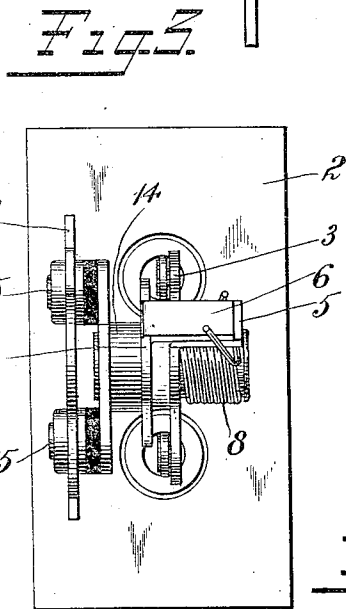
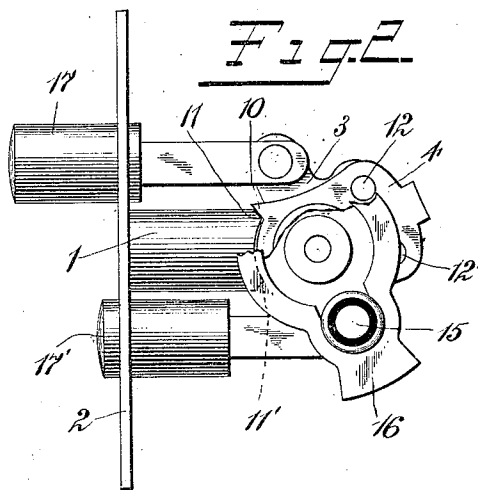
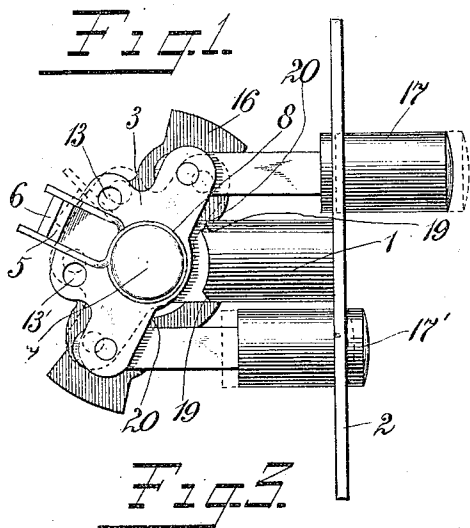
G. W. HART.

SWITCH.

APPLICATION FILED JULY 7, 1910.

988.094.

Patented Mar. 28, 1911.



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SWITCH.

988,094.

Specification of Letters Patent.

Patented Mar. 28, 1911.

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To all whom it may concern:

Be it known that I, GERALD W. HART, a citizen of the United States, residing at West Hartford, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Switches, of which the following is a full, clear, and exact description.

My invention relates to improvements in switches, and has for its object to provide a simple and durable mechanism for producing a double snap action of a switch arm.

It further has for its object to produce a new and improved switch having a vibrating actuating member.

The following is a description of my invention as embodied in a push button switch having an oscillating actuated member, reference being had to the accompanying drawings, in which—

Figure 1 shows a side elevation of the switch mechanism. Fig. 2 shows an elevation of the other side. Fig. 3 shows a bottom plan view of the same. Fig. 4 shows a transverse vertical section of the same. Figs. 5, 6 and 7 show details of the switch mechanism.

Referring more particularly to the drawings, 1 is a stationary member which in the present instance is shown as mounted upon a face plate 2. On one side of the stationary member is mounted an actuating member 3, the same in this embodiment being pivoted so as to have a movement of rotation about an axis, the pivot being preferably supported by the stationary member as shown. On the other side of the stationary member is a switch arm driving member 4 pivoted so as to have a movement of rotation about the axis of the actuating member 3, and being preferably as shown also supported by the stationary member 1. The actuating member is provided with the projection 5 and the driving member is provided with the projection 6, the same being of substantially equal width. About the hub 7, concentric with the axis of the members 3 and 4, is a coil spring 8, whose two ends bear on opposite sides of the projections 5 and 6, so that when the actuating member is moved the spring is put under tension and tends to cause the driving member to move in the same direction as the actuating member. Through a portion of the stationary member embraced by the actuating and driving

members a passage is formed, in which a detent 9 is located. This detent is preferably one having a surface of revolution, and I have found the most desirable form to be a spherical steel ball. The throw of the driving member in either direction is limited by stop faces 10—10' engaging stationary stops 11—11' upon the stationary member. The driving member is provided with two recesses 12—12', one of which is substantially opposite the pawl 9 when the stop faces 10 and 11 are in engagement, and the other of which is opposite said pawl when the stop faces 10' and 11' are in engagement. It also has an intermediate emergency recess 12². The actuating member 3 has two recesses 13—13', one of which moves into a position opposite the detent 9 when the actuating member is moved in one direction, and the other of which moves opposite the said detent when the actuating member is moved in the opposite direction. The distance between the recesses 13—13' is slightly greater than the distance between the recesses 12—12', with the result that when the actuating member is moved so as to bring its recesses opposite the detent, the projection 5 goes slightly beyond the projection 6. The result is that when the actuating member is released, the action of the spring brings the two projections into alignment, causing the recess in the actuating member which was last opposite the detent to move backward so as to be slightly out of register therewith, for the purpose hereinafter described.

Annexed to the driving member 4 I provide a hub 14, which at its expanded ends carries bushings 15, which bushings in turn carry the switch arm 16, insulating it from the switch mechanism in the ordinary manner.

In the particular embodiment shown, two push buttons 17—17' are pivotally connected to the actuating member and protrude through the face plate 2. The ordinary switch contacts for the terminals of the circuit controlled by the switch are not shown, since they form no part of this invention.

Where the actuating member and the driving member are pivoted so as to have movements of rotation, I have found that it is satisfactory to make the angular distance between the recesses in the driving member sixty de-

grees, and the angular distance between the recesses in the actuating member seventy degrees. The thickness of the portion of the supporting member 1 which contains the passage for the detent, relatively to the diameter of the detent 9 should be such that more than one-half of the detent will always lie within the passage in the stationary member 1, and the depth of the recesses in the actuating and driving members should be such that any one recess will contain all that portion of the detent which does not lie within the stationary member 1. The recesses in the form illustrated appear as holes extending entirely through the actuating and driving members. The fact that they extend through these members is simply the result of using flat metal of the thinness shown. I have found it satisfactory to have the proportions of the passage in the stationary member and the recesses such that the passage in the stationary member will contain three-fifths of the ball detent; while each of the recesses will contain two-fifths thereof.

The operation of the device is as follows: With the parts as shown in Fig. 1, the backward movement of the actuating member by which the projections 5 and 6 have been brought into line has been such as to bring the recess 13 out of alinement with the detent 9, resulting in holding the detent in the recess 12 of the driving member. If now the push button 17' is pressed, the actuating member is moved until the hole 13' exactly registers with the detent 9, at which time one pair of stop faces 19—20 engage. During this movement the driving member has been maintained stationary by reason of the engagement of the detent 9 with its recess 12, but the spring 8 has been put under tension by reason of the movement of the projection 5, which acts upon one end thereof, the other end being held stationary by the projection 6. When the recess 13' comes opposite the detent 9, the spring acts to move the projection 6, together with the driving member to which it is attached, into alinement with the projection 5. Such movement forces the detent 9 into the recess 13', which is now disposed so as to receive it. It therefore leaves the recess 12 and permits the driving member to move until the stop surfaces 10 and 11 engage. This engagement takes place before the projections 5 and 6 are in exact alinement so that upon releasing the actuating push button 17' the spring 8 moves the projection 5 backward slightly, thus causing the hole 13' to move out of register with the detent 9, forcing the detent into the recess 12' and locking the driving member to the stationary portion. If, with the parts in this position, the push button 17 is actuated, the same action takes place, the pivoted parts,

however, moving in the opposite direction. The action is a snap action in both directions, and the driving mechanism and switch arm are positively located at the end of each throw.

My invention permits of various modifications, as will be evident to those skilled in the art. I have shown it in connection with a push button switch, because it is well adapted to that type of switch, and as so embodied is capable of easy description and illustration.

What I claim is:

1. In a switch, the combination of a stationary member, a passage therein, a detent in said passage, an actuating member mounted to move adjacent to one end of said passage, a switch arm driving member mounted to move adjacent to the other end of said passage, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent.
2. In a switch, the combination of a stationary member, a passage therein, a detent in said passage, an actuating member mounted to move adjacent to one end of said passage, a switch arm driving member mounted to move adjacent to the other end of said passage, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent, the recesses in said actuating member being farther apart than the recesses in said driving member.
3. In a switch, the combination of a stationary member, a passage therein, a detent in said passage, an actuating member mounted to move adjacent to one end of said passage, a switch arm driving member mounted to move adjacent to the other end of said passage, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent, said actuating member and said driving member being pivoted so as to move about a common axis.
4. In a switch, the combination of a stationary member, a passage therethrough, a detent in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to

move opposite said detent, said actuating member and said driving member being pivoted so as to move about a common axis, the recesses in said actuating member being farther apart than the recesses in said driving member.

5. In a switch, the combination of a stationary member, a passage therethrough, a detent in said passage, an oscillating actuating member pivotally mounted on one side of said stationary member, an oscillating switch arm driving member pivotally mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent, said actuating member and said driving member being pivoted so as to move about a common axis, and means for oscillating said actuating member.

6. In a switch, the combination of a stationary member, a passage therethrough, a detent having a surface of revolution in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent.

7. In a switch, the combination of a stationary member, a passage therethrough, a ball detent in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said ball detent.

8. In a switch, the combination of a stationary member, a passage therethrough, a ball detent in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said ball

detent, the thickness of said stationary member being greater than one-half the diameter of said ball.

9. In a switch, the combination of a stationary member, a passage therethrough, a detent in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent, said stationary and driving members having stop surfaces adapted to be in engagement substantially when one of the recesses in the driving member registers with the passage in the stationary member.

10. In a switch, the combination of a stationary member, a passage therethrough, a detent in said passage, an actuating member mounted on one side of said stationary member, a switch arm driving member mounted on the other side of said stationary member, said actuating and driving members being free to move independently of one another, spring connections between said two movable members, each of said movable members having a plurality of recesses adapted to move opposite said detent, said actuating member and said driving member being pivoted so as to move about a common axis, the recesses in said actuating member being farther apart than the recesses in said driving member, said stationary and driving members having stop surfaces adapted to be in engagement substantially when one of the recesses in the driving member registers with the passage in the stationary member.

11. In a switch, the combination of a stationary member, two movable members mounted to move about a common axis, and a detent cooperating with said three members, two at a time, said three members arranged so that one of them is intermediate relatively to the others, said intermediate member having a passage therethrough partially containing said detent, the other members each having a recess adapted to partially receive said detent, together with a spring connecting said movable members, and a switch arm carried by one of said movable members, the other movable member constituting a releasing member for said detent.

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Witnesses:

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