April 11, 1950 H. GESSWEIN 2,503,383

SWITCH

Filed Jan. 15, 1949

Fig. 1

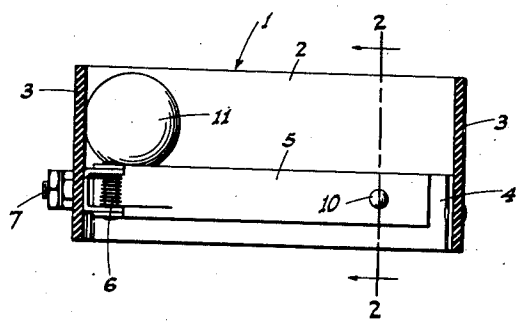


Fig. 2

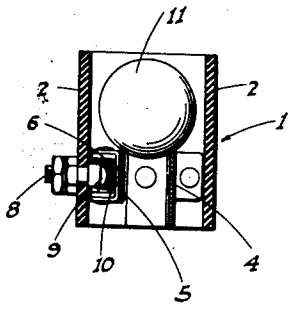


Fig. 3

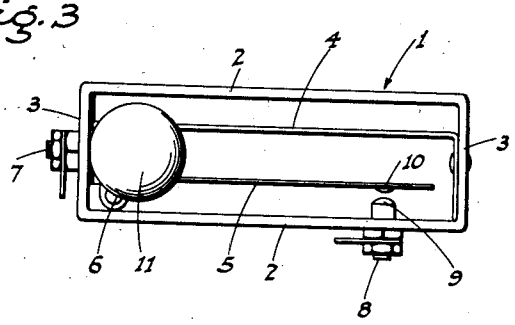


Fig. 4

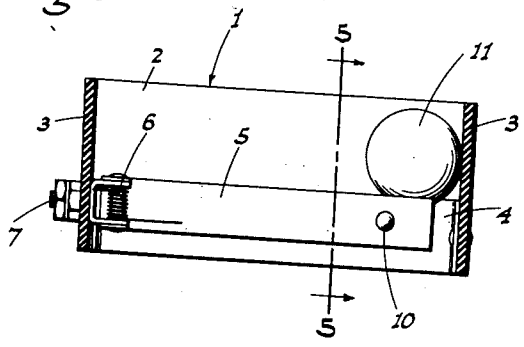
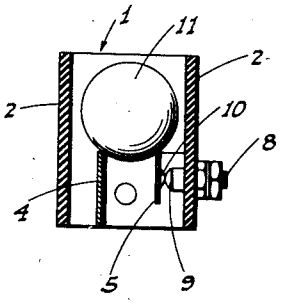


Fig. 5



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SWITCH

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13 Claims. (Cl. 200—52)

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This invention relates generally to an electric switch.

In certain coin controlled, electrically operated amusement devices—such as so-called "pin-ball" machines—a tilt actuated switch is interposed in the circuit for the purpose of automatically breaking said circuit and stopping operation of the amusement device when a person manually tilts the device attempting to accomplish improper playing thereof.

It is one object of the present invention to provide a tilt actuated switch which is especially adaptable, but not limited, for use in an amusement device as above.

Another object of the invention is to provide a tilt actuated switch, as above, wherein a gravity displaced ball serves as the switch control medium.

A further object of the invention is to provide a tilt actuated switch, as in the preceding paragraph, wherein said gravity displaced ball is disposed to run on a pair of spaced but side by side longitudinal supporting fingers; one of said fingers being movable laterally upon the ball running in a predetermined direction along said fingers, and such lateral movement of said one finger controlling the switch.

A further object of the invention is to provide a switch designed for ease and economy of manufacture.

A still further object of the invention is to provide a practical and reliable switch, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the switch, with the housing or frame in section, showing the parts of said switch in their normal positions.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a plan view of the switch, with the parts in normal position, as in Fig. 1.

Fig. 4 is a view similar to Fig. 1, but shows the switch with the parts in the positions occupied thereby when said switch is open under the influence of the gravity displaced ball.

Fig. 5 is a cross section on line 5—5 of Fig. 4.

Referring now more particularly to the characters of reference on the drawings, the switch comprises an upstanding housing or frame, indicated generally at 1, which frame is of elongated, rectangular configuration, including sides 2 and ends 3. The frame 1 is preferably formed of

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dielectric material and is adapted to be mounted on a supporting structure by any suitable means (not shown).

Within the frame 1, and extending lengthwise thereof, the switch includes a pair of longitudinal supporting fingers 4 and 5 disposed in side by side but spaced apart relation. The supporting fingers 4 and 5 are of flat strip metal disposed vertically edgewise; the finger 4 being fixed to the frame 1 by attachment at opposite ends of said finger to the ends 3 of the frame. The upper edges of the fingers 4 and 5 lie in substantially the same horizontal plane.

The finger 5 is free at one end with respect to the frame 1 and is mounted at its other end to the corresponding end of the frame by a spring hinge 6 for lateral outward swinging motion relative to the fixed finger 4. The spring hinge 6 normally but yieldably maintains the finger 5 substantially parallel to the finger 4. (See Fig. 3.)

A terminal 7 is mounted on the end 3 of the frame 1 which corresponds to the spring hinge 6; said terminal 7 being an electrical connection with the laterally outwardly movable finger 5.

Another terminal 8 is mounted in connection with the side 2 of the frame directly laterally out from the free end portion of the finger 5; said terminal 8 including an inwardly projecting switch point 9 which extends through the adjacent side 2 and terminates adjacent but short of a cooperating switch point 10 on the near side of said finger 5. When the finger 5 is in its normal position, as in Fig. 3, the switch points 9 and 10 are separated. In other words, the switch is normally open.

While the present switch is designed for use in a circuit wherein closing of the switch causes the breaking of such circuit, as through a relay, it is obvious that such switch could be designed to open rather than close upon lateral swinging of the finger 5 relative to the finger 4.

Such lateral swinging of the finger 5 to close the switch is caused by a gravity displaced ball 11. This ball 11 is preferably of metal, of substantial weight, and of a diameter greater than the spacing of the fingers 4 and 5.

The frame 1 is mounted within the cabinet of the amusement device, or other device being controlled, with a very slight tilt toward the spring hinge end of the frame 1 whereby the ball 11 normally rests on the fingers 4 and 5 at the end portions thereof adjacent said spring hinge. However, if the amusement device is tilted by a person in an attempt to accomplish improper playing of such device, the frame 1 will be tilted down-

wardly toward the end opposite the spring hinge 6, as in Fig. 4, whereupon the ball 11 is gravitationally displaced from its normal position, as in Fig. 1, to a position at the other end of the frame, as in Fig. 4. When the ball 11 moves to this latter position its weight causes the finger 5 to shift laterally outwardly, closing the switch points 9 and 10, and thus closing the switch. As previously described, this results in breaking of the circuit of the amusement device, and prevents unauthorized play thereof by manual tilting.

The switch is automatically resetting for the reason that when the device is returned to its normal position, the ball 11 will have return travel on the fingers 4 and 5 to its initial or starting position.

While the switch is simple in its structure, and designed for ready and inexpensive manufacture, nevertheless it provides a very practical and reliable control for the circuit of any device which may be subject to tilting, and wherein it is desired to break the circuit when such tilt occurs.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers mounted in connection with the support for relative lateral separating motion at one end, a ball on the fingers for gravitational displacement therealong toward said one end from a normal position adjacent the opposite end, such gravitational displacement of the ball causing relative lateral separation of the fingers, and switch contacts mounted for relative actuation by such separation of the fingers.

2. A tilt actuate dswitch comprising a support, a pair of spaced but side by side longitudinal fingers mounted in connection with the support for relative lateral separating motion at one end, a ball on the fingers for gravitational displacement therealong toward said one end from a normal position adjacent the opposite end, such gravitational displacement of the ball causing relative lateral separation of the fingers, and switch contacts mounted for relative actuation by such separation of the fingers; there being means normally but yieldably resisting such separation of the fingers.

3. A switch, as in claim 2, in which said means comprises a spring.

4. A switch, as in claim 3, in which said spring is included in a spring hinge; the latter hinging one finger, at said opposite end, to the support for said relative lateral separation of the fingers.

5. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers mounted in connection with the support for relative lateral separating motion at one end, a ball on the fingers for gravitational displacement therealong toward said one end from a normal position adjacent the opposite end, such gravitational displacement of the ball causing relative lateral separation of the fingers, and switch contacts mounted for relative actuation by such separation of the fingers; there being one switch contact mounted on the support, and another cooperating switch contact mounted on one of said relatively laterally separable fingers.

6. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers, means mounting one finger in a fixed position on the support, other means securing the other finger at one end on the support for laterally outward swinging motion, yieldable force exerting means normally resisting laterally outward swinging motion of said other finger, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the force of said yieldable force exerting means, and switch contacts mounted for relative actuation by such swinging of said other finger.

7. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers, means mounting one finger in a fixed position on the support, other means securing the other finger at one end on the support for laterally outward swinging motion, yieldable force exerting means normally resisting laterally outward swinging motion of said other finger, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the force of said yieldable force exerting means, and switch contacts mounted for relative actuation by such swinging of said other finger; said other means being a spring hinge, the included spring comprising said yieldable force exerting means.

8. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers, means mounting one finger in a fixed position on the support, other means securing the other finger at one end on the support for laterally outward swinging motion, yieldable force exerting means normally resisting laterally outward swinging motion of said other finger, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the force of said yieldable force exerting means, and switch contacts mounted for relative actuation by such swinging of said other fingers; said other means being a hinge.

9. A tilt actuated switch comprising a support, a pair of spaced but side by side longitudinal fingers, means mounting one finger in a fixed position on the support, other means securing the other finger at one end on the support for laterally outward swinging motion, yieldable force exerting means normally resisting laterally outward swinging motion of said other finger, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the force of said yieldable force exerting means, a switch contact on said other finger, and a cooperating contact on the support, said contacts engaging upon laterally outward swinging of said other finger.

10. A tilt actuated switch comprising an open rectangular frame of elongated configuration, a pair of spaced but side by side longitudinal fin-

gers in the frame, one finger extending between and being secured to opposite ends of the frame, a spring hinge connecting the other finger at one end to the adjacent end of the frame, the opposite end of said other finger terminating short of the opposite end of the frame for laterally outward motion of said other finger against the tension of the spring hinge, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the tension of said spring hinge, and switch contacts mounted for relative actuation by such swinging of said other finger.

11. A switch, as in claim 10, in which the frame is of dielectric material; there being a pair of terminals on the frame in electrical connection with said other finger and one of said contacts, respectively.

12. A tilt actuated switch comprising an open rectangular frame of elongated configuration, a pair of spaced but side by side longitudinal fingers in the frame, one finger extending between and being secured to opposite ends of the frame, a spring hinge connecting the other finger at one end to the adjacent end of the frame, the opposite end of said other finger terminating short of the opposite end of the frame for laterally outward motion of said other finger against the tension of the spring hinge, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position

adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the tension of said spring hinge, a contact on said other finger, and a cooperating contact on the frame, said contacts closing upon laterally outward swinging of said other finger.

13. A tilt actuated switch comprising an open rectangular frame of elongated configuration, a pair of spaced but side by side longitudinal fingers in the frame, one finger extending between and being secured to opposite ends of the frame, a spring hinge connecting the other finger at one end to the adjacent end of the frame, the opposite end of said other finger terminating short of the opposite end of the frame for laterally outward motion of said other finger against the tension of the spring hinge, a relatively heavy ball on said fingers for gravitational displacement therealong from a normal position adjacent said one end to a position adjacent the opposite end whereby to cause said other finger to swing laterally outward against the tension of said spring hinge, a contact on said other finger, and a cooperating contact on the frame, said contacts closing upon laterally outward swinging of said other finger; there being a pair of terminals on the support, one terminal connecting to said other finger, and the other terminal connecting to the contact on the frame.

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No references cited.