Feb. 16, 1943. H. HEISS 2,311,392

RESILIENT CONTACT FOR BUMPER SWITCHES

Filed Feb. 19, 1941

Fig. 1.

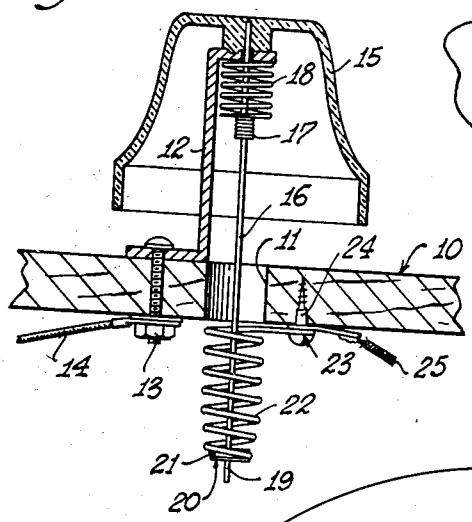


Fig. 2.

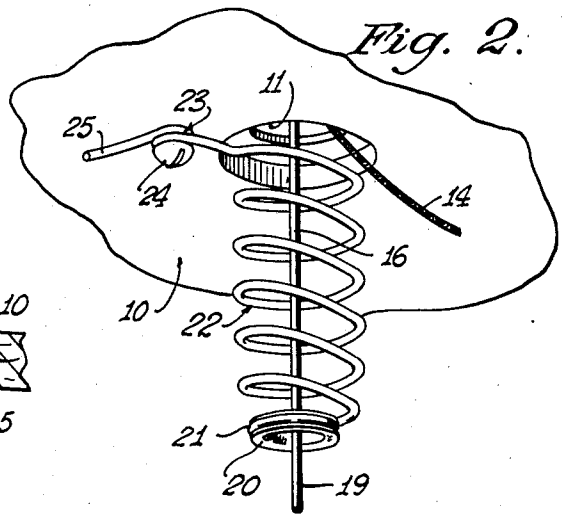
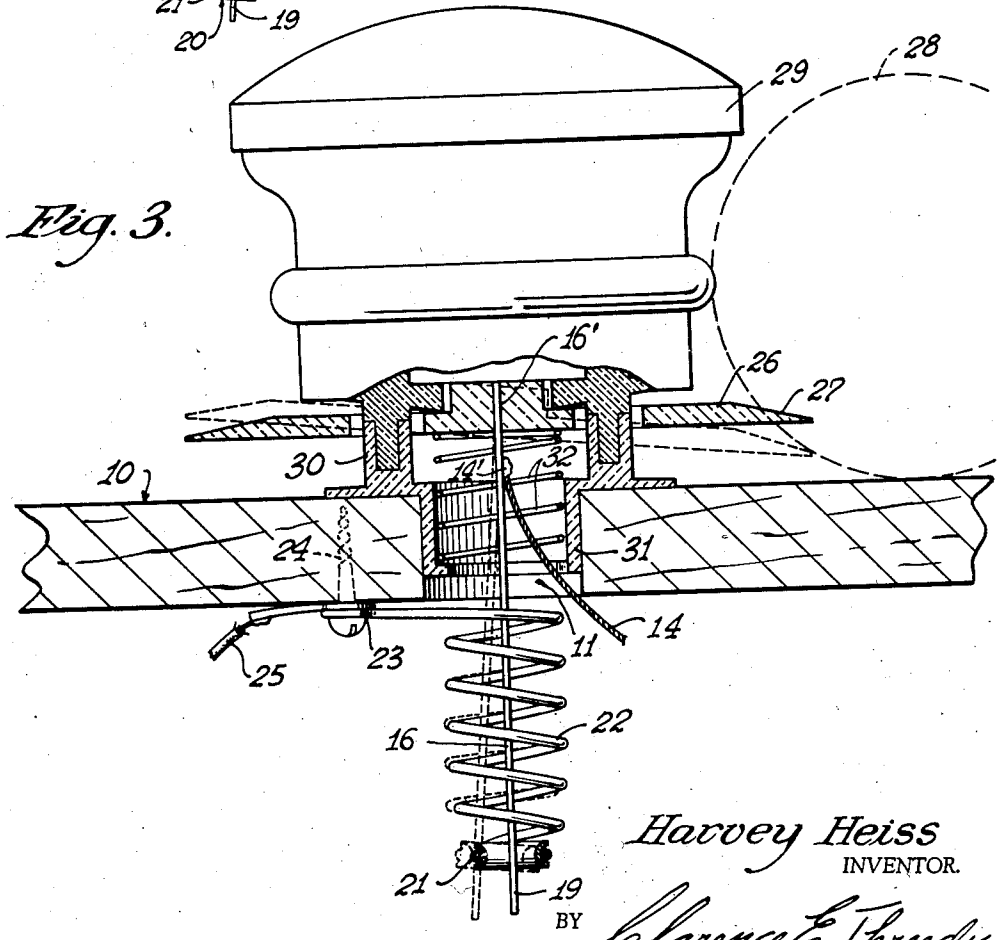


Fig. 3.



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RESILIENT CONTACT FOR BUMPER SWITCHES

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3 Claims. (Cl. 200—52)

This invention relates to certain novel improvements in contact switches for amusement game apparatuses in which a ball is projected upon a playboard for gravitation thereover into contact with bumper or target elements with which the switch is associated and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

In bumper contact switches of the type used in connection with amusement game apparatuses there is generally employed a substantially rigid or fixed contact member arranged to cooperate with a movable contact member to close a circuit when the movable contact member is caused to operate by the action of a ball against the bumper element with which it is associated. By virtue of this fixed or rigid contact element, whenever the movable contact element engages the latter there is a tendency upon the part of the movable contact element when coming into abrupt contact with the fixed contact element to bend or otherwise be distorted from its normal correct position, and as a result the contact between the contact elements is frequently imperfect or incomplete. Furthermore, by virtue of this abrupt contact of the movable contact element with the fixed contact element, there is a tendency by virtue of the constant engagement, of the fixed contact element's becoming worn or otherwise misshapen to the extent that the contact is incomplete or at times not completed at all. Furthermore, the abrupt contact between the movable contact element and the fixed contact element reduces substantially the flexibility of the bumper structure to the extent that a ball engaging the bumper structure and intended to be rebounded substantially therefrom is in fact caused to come to a substantially dead or slow movement, thus decreasing the appeal and activity of the ball upon the board.

It is one of the salient objects of this invention to overcome these disadvantages.

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 drawing showing the preferred form of construction, and in which:

Fig. 1 is a vertical cross sectional detail view of a playboard and bumper structure showing my improved contact switch associated therewith.

Fig. 2 is a perspective view of the same looking upwardly toward the underside of the board; and

Fig. 3 is an enlarged detail view partly in section of my improved contact switch showing a slightly modified form of bumper structure.

Referring now more particularly to the drawing, 10 indicates a substantially inclined board down which a ball is adapted to gravitate. This board is provided with one or more openings 11. Mounted on this board adjacent each of the openings is a Z-shaped bracket 12, one end of which is connected to the board by nut and bolt assembly 13. To this nut and bolt assembly is connected one side 14 of an electric circuit. The upper end portion of the bracket 12 supports a bumper hood or cap 15 mounted on the bracket 12 for oscillatory or tiltable movement and against which a ball gravitating down the board 10 is adapted to contact. Carried centrally by the cap or hood 15 is a substantially rigid contact finger or arm 16 carrying at its upper end, as at 17, a spring structure 18 serving to yieldingly maintain the hood or cap 15 in its normal position, such as shown in Fig. 1.

This contact arm or finger 16 extends through the opening 11 and terminates a substantial distance below the board 10. Surrounding the lower end portion 19 of the finger or arm 16 is a contact ring 20 adapted to engage the lower end portion 19 of the contact finger or arm 16 under certain conditions.

This ring 20 is carried by the lower convolution 21 of a coil spring 22 which likewise surrounds the lower end portion of the contact finger or arm 16. The upper end portion of the coil spring 22 is attached as at 23 to the board 10 by means of a screw element 24. This screw element connects the upper end portion or terminal of the coil spring with the opposite side 25 of an electric circuit.

In Fig. 3 my improved contact switch is associated with a bumper structure having a tiltable plate 26 providing an annular beveled periphery 27 adapted to be engaged by a ball 28.

This plate 26 is disposed beneath a fixed hood 29 and the plate surrounds the base 30 thereof, which base 30 has a reduced sleeve 31 fitting snugly into the opening 11. The plate 26 is returned to its normal position shown in full line, by a spring 32 confined in the sleeve 31 and engaging the underside of the plate 26. In this form of construction the conductor 14 of the one side of the electric circuit is connected directly to the contact finger or arm 16 as at 14', and this conductor finger or arm 16 is connected as

at 16' to the center portion of the plate or disc 26.

In the form shown in Fig. 3, parts corresponding to those shown in Figs. 1 and 2 are indicated by like reference numerals.

From the description herein, it is manifest that each time the contact finger or arm 16 is moved by the tilting action of either the plate 26 or the hood or cap 16, the lower end portion is brought into contact with the contact ring 20 and by reason of the flexibility of the spring 22 there is no sudden jolt transmitted to any of the moving parts of the contact switch or bumper, and the tendency to bend the parts or to become unduly worn by constant contact is reduced to a minimum. Thus, by the use of this flexible contact member 22, the rebound action of the ball 28 is in nowise deteriorated or interfered with.

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

1. In combination, a board, a conductor member, a spring member, carried by the board and supporting said conductor member and constituting one side of an electric circuit, and, a second conductor member movably carried by the board and adapted for movement into engagement with the first conductor member and being formed substantially rigid and constituting the other side of the electric circuit.

2. In combination, a board, a ring-like conductor member, a coil spring carrying said conductor member substantially below the board and having one end portion connected to the board and constituting one side of an electric circuit, and a substantially rigid conductor member carried by the board and adapted to be moved into contact with said ring-like conductor member.

3. In combination, a board, a ring-like conductor member, a coil spring carrying said conductor member substantially below the board and having one end portion connected to the board and constituting one side of an electric circuit, a substantially rigid conductor member movably carried by the board and adapted to be moved into contact with said ring-like conductor member, means supporting said rigid conductor member and engageable by a ball gravitating down said board for tilting said rigid conductor member into engagement with said first-mentioned conductor member, and a spring positioned to yieldingly maintain said supporting means in a normal non-tilting position.

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