

[54] **RESILIENT BOUNCER DEVICE FOR PIN TABLE BUMPERS**

[72] Inventor: **Claudio Cecchetti**, Via Verdi 50, Cernusco sul Naviglio, Province of Milan, Italy

[22] Filed: **Oct. 2, 1969**

[21] Appl. No.: **863,232**

[30] **Foreign Application Priority Data**

Nov. 30, 1968 Italy24445 A/68

[52] U.S. Cl.273/129

[51] Int. Cl.A63b 71/00

[58] Field of Search273/121, 122, 118 A, 127, 129, 273/119; 200/52, 61.11, 170

[56] **References Cited**

UNITED STATES PATENTS

2,219,898 10/1940 Hooker.....273/129

3,180,646 4/1965 Zale et al.273/118 A

Primary Examiner—Richard C. Pinkham

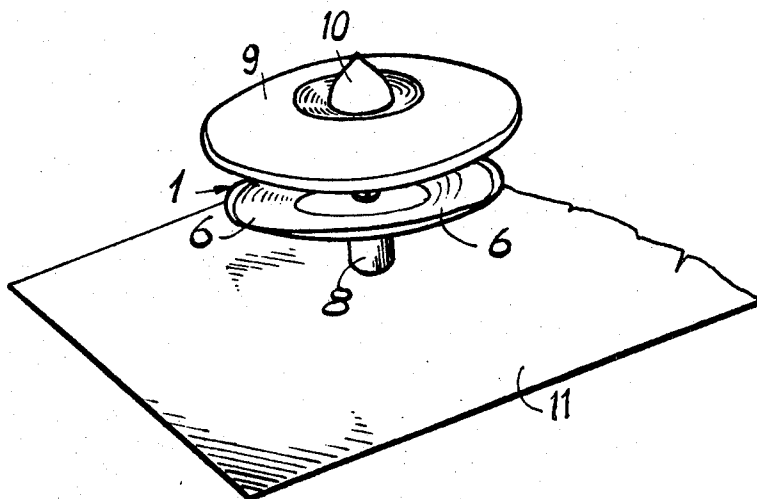
Assistant Examiner—Theatrice Brown

Attorney—Guido Modiano and Albert Josif

[57] **ABSTRACT**

This disclosure relates to a bouncer device for pin table bumpers and comprises a resilient metallic substantially concave or cup shaped plate having a plurality of equidistant peripheral slots and mounted with its axis substantially vertical on the stem of a pin table bumper, the peripheral edge of the metallic plate having a greater inclination than the other portions thereof. When struck by a ball, the cup shaped plate deforms elastically and causes the ball to bounce away from the bumper.

4 Claims, 4 Drawing Figures



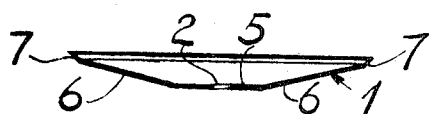


Fig. 1

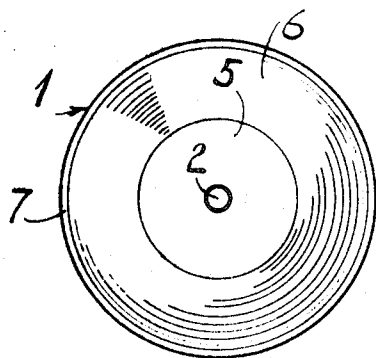


Fig. 2

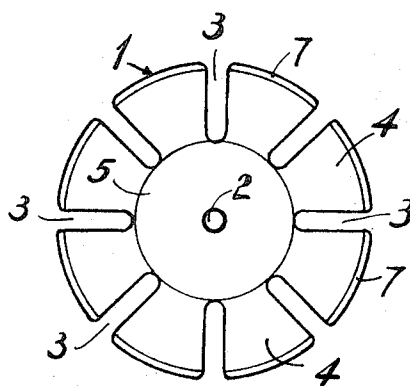


Fig. 4

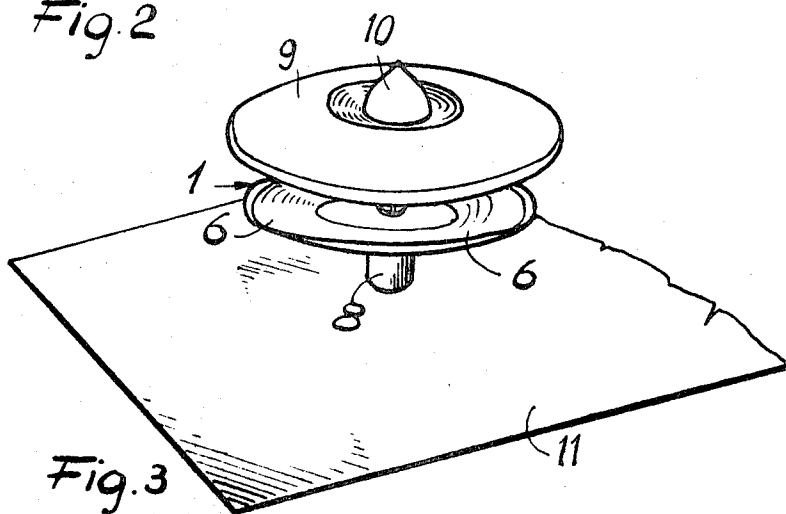


Fig. 3

INVENTOR
GLAUDIO CECCHETTI
BY 
AGENT

RESILIENT BOUNCER DEVICE FOR PIN TABLE BUMPERS

BACKGROUND OF THE INVENTION

The present invention relates to a resilient bouncer device for pin table bumpers and the like. It is known that such device at present used in pin tables, flippers and the like to ensure that the ball which strikes the bumpers determines the score obtained and is repelled in various directions, generally consist of a spiral spring wound on the stem of the bumper.

The devices of the described type are not completely satisfactory since they have the disadvantage of failing to return to the ball in play a relatively large quantity of the kinetic energy absorbed during the impact with the ball so that the ball tends to bounce away from the bumpers with a much slower speed than that with which it strikes them.

Another disadvantage of these devices is that during impact with the ball in play the spring tends to surround the ball and sometimes grips the latter, preventing the desired bounce and consequently suspending play.

Furthermore the spring does not always give back the kinetic energy possessed by the ball before the impact proportionally in the sense that, in general, a high incident kinetic energy corresponds to a much smaller kinetic energy returned. The possibility of the clamping of the ball in the spring is then much greater in the case of high speed of the ball than in the case of low speed.

The main object of the present invention is that of eliminating in most part the inconveniences indicated above of this known device by providing a resilient bouncer device designed to reduce the loss of kinetic energy at the moment of the bouncing of the ball to a minimum.

Another object of the invention is that of providing a resilient bouncer device designed to cause a progressive reaction with the increase of kinetic energy possessed by the ball at the moment of impact.

Another object of the invention is that of providing a resilient bouncer device of simple construction low cost and ready fitting.

SUMMARY OF INVENTION

According to the invention there is provided a resilient bouncer device for pin table bumpers and the like, comprising a substantially cup shaped element mounted with its axis substantially vertical on the stem of a bumper member, the arrangement being such that when the bouncer device is struck by a ball it deforms elastically and causes the ball to bounce away from the bumper.

BRIEF DESCRIPTION OF THE DRAWING

The invention will appear more clearly from the following detailed description of a preferred embodiment of a resilient bouncer device for mushroom shaped bumpers of pin tables and the like, illustrated by way of example in the accompanying drawing in which:

FIG. 1 is a diametral section of the resilient element of the device;

FIG. 2 is a view from above of the same element;

FIG. 3 is a perspective view of the resilient device according to the invention; and

FIG. 4 shows an alternative form of the element shown in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to such figures, the resilient bouncer device according to the embodiment comprises a metal element in the form of a substantially cup shaped sheet centrally bored at 2. Advantageously the sheet 2 has a plurality of radial peripheral slots 3 at regular intervals so that a plurality of petal portions or peripheral sectors 4 are formed (see FIG. 4).

As is clearly visible in the section of FIG. 1, the element 1 has a central flat portion 5 bounded by portions 6 which have

a slight upward inclination and which are peripherally bounded by short end portions 7 which are bent upwards with a greater inclination than the portions 6.

The resilient element 1 is provided with a central hole 2 so that it can be fixed onto the stem 8 of a mushroom shaped bumper of the kind commonly provided in pin tables and having a substantially circular upper disc-like portion 9. The element 1 is locked onto the stem 8 by means of a washer 10 (FIG. 3) and this stem is formed or covered in electrically insulating material. Electrical connection between the element 1 and the deck or table 11 of the pin table takes place upon impact of the ball with the element 1 in a conventional manner. When such impact occurs per se known signalling devices come into operation.

The resilient element 1 is fixed on the stem 8 so that its axis is substantially vertical and the petal or sector portions 4 are directed upward in order to enable the sectors to deform elastically upon impact between the ball and the bouncer device fitted on the bumper.

The working of the bouncer device according to the embodiment will now be described.

Under the impact of the ball in play against the resilient element 1, the peripheral sectors or petals 4 deform elastically and curve upward further according to the degree of kinetic energy possessed by the ball immediately prior to impact. The repelling action of each petal portion 4 increases in proportion to the increase in its upward curvature while the component of the reaction parallel to the pin table deck increases in the same way.

In fact one can consider that the reaction is directed normally to the surface of the element 1, in the point of impact of the ball, when, for example, a petal portion 4 is curved upward by the ball; the vertical component of the reaction will diminish (due to the greater curvature of the portion 4) while the component parallel to the pin table deck increases and it is this latter component which is important in causing the bouncing effect.

As may be noted the resilient bouncer device according to the invention ensures a reaction which is always proportional to the kinetic energy stored during the phase of elastic deformation, while the danger of the deadening or stoppage of the ball, as sometimes occurs in the known devices, is avoided.

Various modifications and variations are possible within the scope of the appended claims.

I claim

1. A bouncer device in combination with a pin table bumper adapted to cooperate with a ball, the bumper being mushroom shaped and including an upper disc-like portion and an upwardly extending stem supporting said disc-like portion and fixed on the pin table, wherein according to the improvement, the bouncer device comprises a resilient cup-shaped element centrally fixed on said pin at a distance from said table and adapted resiliently to deform when struck by the ball and cause the ball to bounce away from the bumper.

2. A bouncer device according to claim 1, from wherein said cup-shaped element has an upwardly bent peripheral portion.

3. A bouncer device according to claim 2 wherein said upwardly bent peripheral portion of said cup-shaped element has a greater inclination than the other portions thereof.

4. A bouncer device in combination with a pin table bumper adapted to cooperate with a ball, the bumper being mushroom shaped and including an upper disc-like portion and an upwardly extending stem supporting said disc-like portion and fixed on the pin table, wherein according to the improvement, the bouncer device comprises a resilient cup-shaped element centrally fixed on said pin at a distance from said table, said cup-shaped element being of resilient material and having a plurality of equidistant radially extending peripheral slots defining a plurality of resilient sector portions peripherally on said element adapted resiliently to deform when struck by the ball and cause the ball to bounce away from the bumper.

* * * * *