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MARBLE SHOOTER

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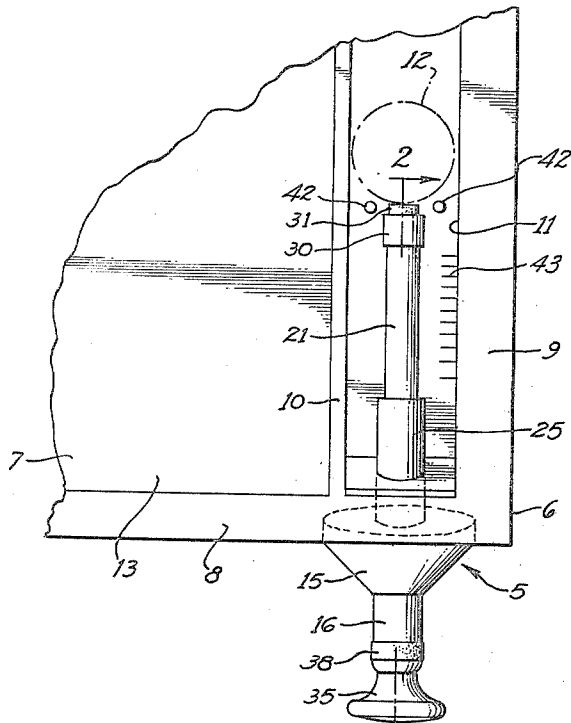


Fig. 1

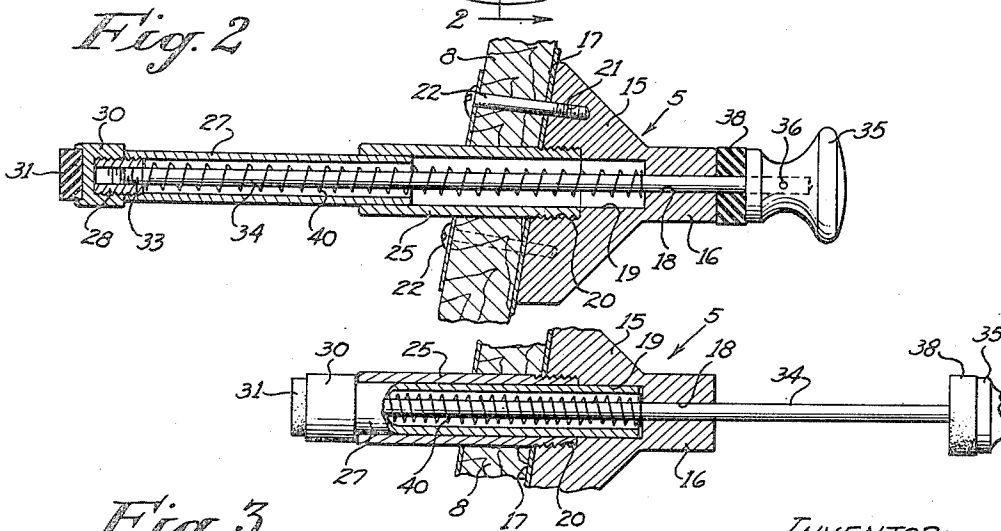


Fig. 3

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MARBLE SHOOTER

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1 Claim. (Cl. 273—129)

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My invention relates to amusement devices and particularly to a game of the so-called pin-ball type. Specifically, the invention pertains to spring-actuated ball-propelling devices for use in pin-ball and like games of skill and chance.

Pin-ball and similar games commonly employ a manually controlled actuating plunger for propelling balls along the playing area or pin-board, the inner end of the plunger being disposed in a guideway into which balls are advanced and from which the balls are driven by the plunger. The plunger is slidable in a bearing member on the casing of the game and is propelled rapidly in the guideway under the action of a spring compressed between the bearing member and the striker head of the plunger. The propelling force of the plunger and, consequently, the travel of the ball are dependent entirely upon the degree of compression of the spring. It has been determined that the inherent force per unit of length of the spring is relatively small during the initial contraction in the length of the spring but during the contraction of the spring to a length smaller than substantially one-half its original length the force or energy increases at a greater ratio. Since equal units of contraction of the spring produce unequal degrees of inherent force or stored up energy, it will be apparent that the propelling force of the spring is extremely difficult to estimate and control and consequently the ball is apt to over-drive or under-drive its objective on the pin-board.

It has also been found that conventional ball-propelling springs are usually compressed to their elastic limit when fully contracted and this results in gradual weakening and ultimate breaking of the springs. Because the resiliency of the spring is soon reduced when subjected to repeated contractions, it has heretofore been found necessary to provide adjusting means for periodically shortening the length of the spring to maintain its inherent force or energy substantially constant. It will be apparent that the amount of permissible adjustment is limited and consequently the resiliency of the spring will eventually be reduced to a value wherein the spring is no longer useful and must be replaced by a spring possessing the necessary characteristics. It is thus seen that the ball-propelling device of the game requires considerable servicing to maintain it in operative condition. In order to overcome this deficiency, an attempt has been made to utilize a spring having an inherent strength far in excess of that required to propel the ball but when such a spring is employed, accurate shooting of the ball is impossible.

It is the primary object of my invention to provide a ball-propelling device for use in pin-ball and like games, said device having means for regulating the contraction of the plunger-actuat-

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ing spring whereby to enable a player to control the travel of the ball along the playing board with precision.

Another object is to provide a ball-propelling device having means for limiting the contraction of the propelling spring to that portion of its possible contraction wherein the ratio between the inherent force of the spring and its length increases at a substantially uniform rate to enable a player to estimate the projection of the ball more accurately and avoid over-driving or under-driving a selected objective on the pin-board.

Another object is to provide a device of the character referred to which is simple in construction, being composed of a minimum number of parts adapted for economical manufacture and assembly.

A further object is to provide a device of the type indicated which requires very little servicing and one which may be readily substituted for devices of prior types now in use without changing the structure of the game.

Further objects of my invention will appear from the following specification and the drawing, which is intended for the purpose of illustration only, and in which:

Fig. 1 is a plan view of a portion of the casing of a pin-ball game, illustrating my improved ball-propelling device as applied to use therewith;

Fig. 2 is a longitudinal sectional view through the device, taken on line 2—2 of Fig. 1, and showing the ball-propelling plunger in extended position; and

Fig. 3 is a view similar to Fig. 2 showing the plunger in fully retracted position.

My improved ball-propelling device comprises, in general, a bearing member adapted for attachment to the side of the casing of a pin-ball game, said bearing member being provided with a bore and a tubular extension axially aligned with said bore, a tubular plunger slidable in the tubular extension and provided with a striker head at its outer end, a stem connected to said striker head and extending through the bore of the bearing member, an operating knob carried on the projecting end of the stem, and a compressible spring surrounding the stem between the striker head and the bearing member and operative to project the plunger into the ball guideway of the game casing to strike and propel a ball from said guideway onto the pin-board of the game. Sliding movement of the ball-propelling plunger to operative or extended position is limited by the engagement of the operating knob with the side of the bearing member while movement of the plunger to retracted position is limited by engagement of the striker head with the end of the tubular extension so that maximum contraction of the propelling spring is limited to

substantially one-half of the extended length of the spring.

Referring to the drawing in detail, the improved ball-propelling device 5 is shown as applied to use with a pin-ball game comprising a box-like casing 6 having a bottom wall 7 and side walls 8 and 9. A partition member 10 cooperates with the wall 9 in defining a guideway 11 into which playing balls 12 are advanced and from which they are propelled individually onto the pin-board 13 by the present device.

My device 5 comprises, essentially, a bearing member 15 of substantially frusto-conical shape and having a cylindrical boss or projection 16 at its outer end and a flat face 17 at its inner end. The bearing member has a bore 18, a counter-bore 19 and a threaded counterbore 20. The bearing member 15 is further provided with tapped holes 21 in its inner end for receiving attaching screws 22 which pass through holes in the side wall 8 to secure the bearing member in place. Screwed into the tapped counterbore 20 is one end of a tubular member or sleeve 25 which, in effect, constitutes an axial extension of the bearing member 15.

Adapted to slide in the extension sleeve 25 is a tubular plunger member 27. The projecting end of the member 27 is internally threaded to receive one end of a connector element 28 which is screwed thereto. The other end of the connector element 28 projects axially from the plunger member 27 for receiving a striker head 30 which is screwed thereon. The head 30 may be provided with a rubber pad 31 adapted to strike a playing ball when the plunger member 27 is slid to operative position in the manner to be explained hereinafter.

Screwed into a tapped hole 33 in the inner end of the connector element 28 is one end of a rod-like stem 34 which extends axially through the tubular plunger member 27 and extension 25, and which is slidable in the bore 18 of the bearing member 15. The stem 34 projects outwardly beyond the projection 16 to receive an operating knob 35 which is secured thereto by a pin 36. A rubber cushion or buffer ring 38 is disposed on the stem 34 between the knob 35 and the end of the projection 16.

Surrounding the stem 34 and entirely enclosed by the bearing member 15, sleeve 25 and plunger member 27 is a compression spring 40 having one of its ends abutting the end of the counterbore 19 and its other end engaging the inner end of the connector element 28. The spring 40 is normally compressed to a slight degree when the parts of the device assume the position illustrated in Fig. 2 of the drawing but further outward sliding movement of the plunger member 27 is prevented by the engagement of the operating knob 35 and its buffer ring 38 with the end of the boss or projection 16.

My improved ball-propelling device is operated in the following manner:

Assuming that the parts of the device are in the position shown in Figs. 1 and 2 and that a playing ball 12 is resting against the pad 31 of the striker head 30 within the guideway 11, to propel the ball from the guideway the player or contestant grasps the knob 35 and draws the plunger member 27 into the tubular extension 25. The guideway 11 is usually inclined slightly so that as the plunger member 27 is retracted into the extension 25 the ball 12 will tend to roll down the incline, movement of the ball in this direction being

limited by a pair of upstanding pins 42 in the guideway.

As the plunger member 27 is retracted into the extension sleeve 25, the spring 40 is compressed and thus its propelling force or energy is increased, the magnitude of the force being dependent upon the degree of contraction of the spring. It will be observed by reference to Fig. 3 that the inward sliding movement of the plunger member 27 into the extension sleeve 25 is limited by the engagement of the striker head 30 with the end of the sleeve. It will also be noted that complete retraction of the plunger member 27 causes the spring 40 to be contracted to substantially one-half of its normal or extended length. Through this novel and ingenious arrangement of parts, only one-half of the possible contraction of the spring 40 is utilized and because the strength of the spring increases in almost direct proportion to the reduction in length of the spring during this portion of its contraction, it is apparent that a player may readily estimate and regulate the strength of the spring to control its expansive force or energy.

After the spring 40 has been compressed to the desired degree, the knob 35 is released and the plunger member 27 is thus projected from the sleeve 25 at a relatively fast rate under the expansive force of the spring to eject the ball 12 from the guideway 11 and propel it onto the pin-board 13. If the ball 12 over-drives or under-drives a selected objective on the pin-board, the inaccuracy may be corrected when the next ball is driven by retracting the plunger member 27 to a greater or lesser extent to compress the spring 40 to the required degree. Longitudinally-spaced graduations 43 may be provided within the guideway 11, said graduations being adapted to register with the end of the striker head 30 to aid in determining the degree of compression of the spring 40 when the plunger member is retracted.

It will be observed from the foregoing that my invention provides an improved ball-propelling device adapted particularly for use in pin-ball and similar games of skill and chance. As a particular feature of improvement, the invention provides a ball-propelling device having means for accurately controlling the propelling force of the spring-actuated plunger whereby to enable the player or contestant to regulate the travel of the playing ball with greater precision. Specifically, the invention provides means for limiting the contraction of the propelling spring to substantially one-half of its possible contraction and since the strength of the spring increases in almost direct proportion to its reduction in length during this portion of its contraction, a player may readily estimate and regulate the strength of the spring to control its expansive force. By compressing the spring to only a portion of its elastic limit, the spring is not materially weakened during continuous use and thus will retain its inherent resiliency over a long period of time without breaking. It is apparent therefore that a ball-propelling device incorporating the features of improvement herein disclosed is highly efficient in performing its intended function and requires very little servicing. The improved device is simple in construction and may be manufactured at a comparatively low cost. Moreover, the device may be supplied as a replacement for similar devices now in use and may be incorporated in the game without altering the structure thereof.

While I have shown the improved ball-pro-

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5 pelling device as embodied in a preferred form of construction, by way of example, it will be understood that it may be modified in various particulars without departing from the spirit of the invention. Consequently, I do not desire to be limited by the foregoing specification, but desire to be afforded the full scope of the appended claim.

I claim as my invention:

A propelling device for use with a game structure having a wall provided with an aperture, comprising: a bearing member adapted to be secured against the outer side of said wall and provided with a bore, a counterbore and a tubular extension adapted to pass through said aperture into the game structure, said counterbore being of the same diameter as the inner diameter of said extension; a tubular plunger adapted to slide in said extension and said counterbore and having a screw-threaded connector element at its outer end; a striker head screwed onto said connector element; a stem connected to said connector element and extending through said plunger and said bore; a knob attached to the other end of said stem by which said plunger can be drawn into said bearing member; and a spring

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surrounding said stem between said connector element and the inner end of said counterbore, said spring being compressed when said plunger is drawn into said bearing member by said stem and adapted to propel said plunger in the opposite direction when said stem is released, said head being engageable with the inner end of said tubular extension when said plunger is slid into said extension so as to limit the extent of inward sliding movement of said plunger to that necessary to effect only partial compression of said spring.

GEORGE A. HATHERELL.

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