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2,800,650

BOWLING PIN MECHANISM

Filed Nov. 9, 1953

2 Sheets-Sheet 1

FIG. 1.

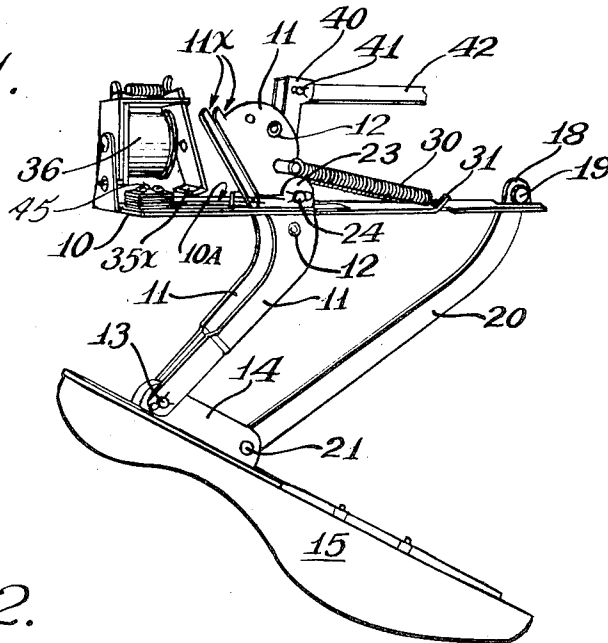
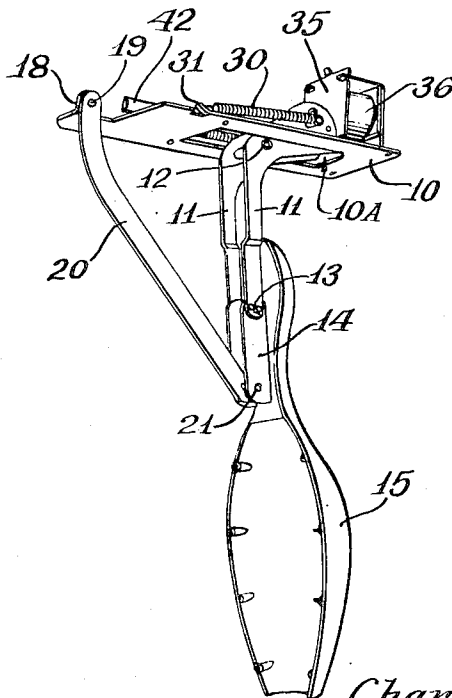


FIG. 2.



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2 Sheets-Sheet 2

FIG. 3.

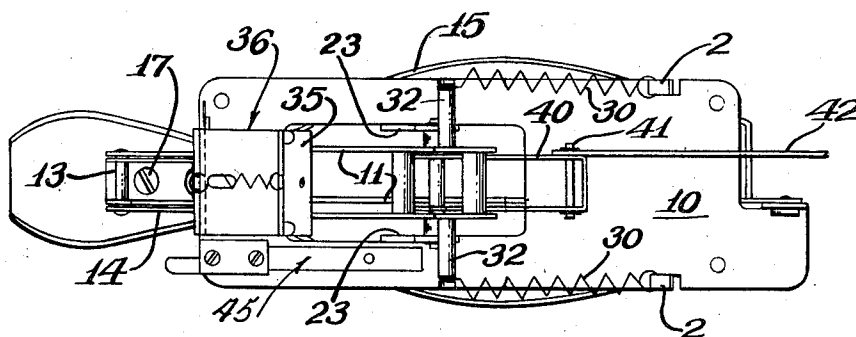
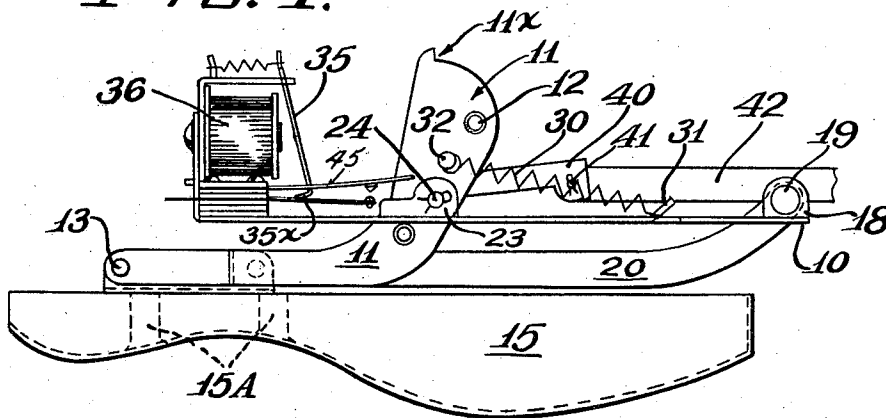


FIG. 4.



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BOWLING PIN MECHANISM

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1 Claim. (Cl. 340—373)

This invention pertains to amusement apparatus, particularly bowling games and the like, and has as its principal object the provision of a simulated bowling pin which is pivotally mounted to be raised and lowered and adapted to be latched in a pendant playing position by an electromagnetically released latch means, and to be unlatched as a result of successful scoring in playing the game to elevate the simulated pin while simultaneously folding the same into a horizontal position for the purpose of reducing the space which would be otherwise required were the pin to be elevated solely by a simple pivoting thereof from a pendant to a raised position.

Viewed from another aspect, the improvements provide a simulated, retractable, bowling pin mounted on a base for compound pivotal and folding motion by means of an especially contrived differential lever mechanism consisting of a short and a long lever pivotally mounted at spaced points on a base, and also at spaced points at the head of the simulated bowling pin, such that pivoting of the shorter lever elevates the pin bodily, and this motion produces a simultaneous turning or folding of the pin into a horizontal position, so that less room is required to withdraw the pin from the playing field.

Additional objects and aspects of novelty relate to details of the construction and operation of the embodiment disclosed, all of which will appear as the following specification proceeds in view of the annexed drawings, in which:

Fig. 1 is a side perspective of the pin mechanism with the pin in partially folded or retracted condition;

Fig. 2 is a rearward perspective view of the simulated bowling pin in pendant condition;

Fig. 3 is a top plan view of the pin mechanism looking down upon the mounting plate thereof;

Fig. 4 is a side elevation of the pin mechanism with the pin in fully folded or elevated condition.

Referring to Fig. 1, the pin mechanism consists of a mounting plate 10 having a central cut-out 10A through which projects the upper, offset latching extremities of a first pin lever means comprising a pair of spaced twin arms 11 rigidly joined together by stud 12 near the plate and both pivotally attached by pin means 13 to a bracket 14 on the rear of a simulated bowling pin member 15, which is preferably a half-shell of a suitable molded thermoplastic material.

The bracket 14 is a channel-shaped member and is attached to the pin by means of screws threaded into bosses 15A (Fig. 4) provided in the rearward cavity of the pin, one of these screws 17 being apparent in Fig. 3.

At one end of the plate 10 (Figs. 3 and 4) a lug 18 is offset and has attached thereto on pivot 19 one end of a second long pin lever means 20, the opposite end of which lever is pivotally connected by a stud 21 to the bracket 14.

Upset from the base plate are a pair of lugs 23 in which is seated a pivot stud 24 to support the upper end region of the twin lever arms 11 which comprise the first or shorter pin lever.

2

It will be seen from a comparison of Figs. 1, 2, and 4, that the dual or compound lever means 11, 20 by reason of differential length and spaced-apart pivotal attachments 19 and 24, and 13 and 21, constitutes a differential lever system attaching the simulated bowling pin 15 to the mounting plate 10 in such manner that the permitted pivotal movement of the pin is characterized by a compound or dual motion having the resultant effect of elevating the pin while simultaneously turning it from a vertical attitude, as in Fig. 1, into a horizontal attitude, as depicted in Figs. 2 and 4, and vice versa.

Means yieldingly urging the pin upwardly into the folded condition of Fig. 4 includes a pair of springs 30 respectively anchored on the base plate by lugs 31 and each connecting at its opposite end to one of the lateral pins 32 (Fig. 3) staked into each of the upwardly-projecting latching extensions of the first or twin levers 11.

Thus, the spring means 30 tends to pivot the first or shorter lever-arm structure clockwise into the pin-elevating position shown in Fig. 4.

At the upper extremities of the twin lever members are latching projections 11X positioned to bear against the armature 35 of a releasing or tripping electromagnet 36 to become latched beneath the offset free edge 35X of said armature when the short or twin lever is pivoted counterclockwise to its limit of travel with the pin in the pendant condition of Fig. 1.

The electromagnet 36 is adapted to be energized by any suitable score-circuit means (not shown) to attract the armature 35 out of latching engagement with projections 11X, whereupon the spring means 30 will return the pin 15 and associated differential lever means 11, 20 to the retracted or folded condition of Fig. 4.

From the folded condition of Fig. 4 the pin will be reset by means of a reset link or lever 40 which is pivoted at one end on the twin-lever pivot stud 24, and has a pivoted connection 41 at its other end to a reset stroke lever 42 adapted to be reciprocated by any suitable resetting mechanism (not shown) associated with the game apparatus in which the novel pin mechanism may be used, it being understood of course that ten of the pin units 10, 11, 15, 20, 36, etc. will commonly be employed in a conventional bowling game, and in such cases the practice is to have all reset stroke levers, such as the instant lever 42, reciprocated in unison by some form of motor crank means (not shown).

Thus, referring to Fig. 1, it may be assumed for purposes of illustration that the reset stroke arm 42 is being advanced in the direction of the arrow, right to left, by any suitable drive means, and it will be noted that the reset link 40 is at this time pivoted to a counterclockwise position from the condition shown in Fig. 4, and in the condition of Fig. 1 the link 40 bears against the upper one of the tie studs 12 which join the twin levers 11 together so that said short or twin lever means is likewise urged in a counterclockwise direction to erect or restore the pin member 15 to the set or pendant condition of Fig. 2, in which it will be automatically latched by the armature means 35, 35X cooperatively with the latching formations 11X on the short lever means, it being intended that the reset stroke arm 42 will complete a full reciprocatory stroke and be returned along with link 40 to the position of Fig. 4, after restoring the pin 15 to the set or pendant condition of Fig. 2, so that the twin-lever tie stud 12 cannot be obstructed by the link 40 when the electromagnetic latch means is next tripped out.

A supervisory switch 45 is mounted on the base for engagement and closure by a pin 32 projecting from the short or twin-lever means when the latter is in latched condition. This switch is adapted to be connected in series with the release coil 36 and the actuating circuit

3

means therefor (not shown) so that said coil can be energized only when said supervisory switch is closed.

I claim:

A simulated bowling pin structure including a base member, a first lever means comprising a pair of curved twin levers attached to each other in spaced-apart, side by side relation; first pivot means engaging said levers at a point between the ends thereof and pivotally supporting the same on said base member with a portion above the latter and another portion below the same; a second lever means, longer than the first lever means and having an upper portion pivoted on said base member; a simulated bowling pin pivotally attached near its head by a second pivot means to a lower end region of the first lever means and also pivotally attached by a third pivot means to a lower end region of the second lever means, the said last-mentioned second and third pivotal attachments to the pin being spaced apart lengthwise of the bowling pin; spring means connecting to the upper portions of said first lever means at one particular side of the pivotal axis thereof to urge the same pivotally in a certain direction to draw the bowling pin upwardly toward the base member about the axis of said pivot

4

means, said second lever means acting concurrently to pivot the pin about the axis of said first pivot means to fold the same up beneath the base member; said first lever means having a latching formation on said upper portion thereof which is on the same particular side of the first pivot means as aforesaid; and electromagnetically releasable latch means on said base member automatically cooperable with said formation to latch the first lever means against movement by the spring means, as aforesaid, when the first lever means is pivoted a certain distance opposite to said certain direction; and reset means including a reset lever pivoted between the twin levers coaxially with the pivotal mounting thereof and movable in said opposite direction against a connecting means joining the twin levers as aforesaid whereby to urge the first lever means into latched condition.

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