Sept. 15, 1953 L. A. DURANT ET AL 2,652,557

BOWLING PIN ELEVATING AND RESETTING MECHANISM

Filed May 11, 1953 2 Sheets-Sheet 1

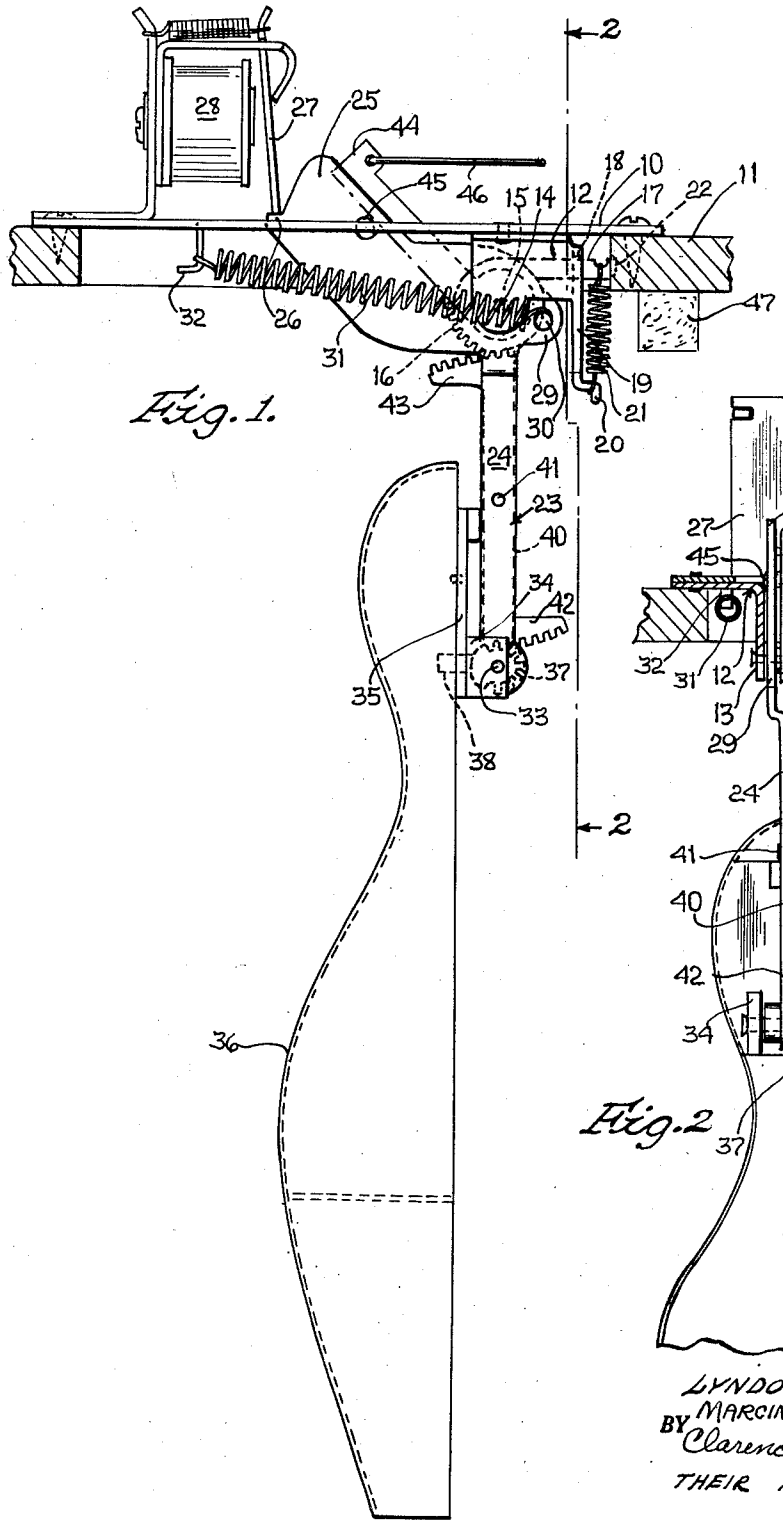


Fig. 1.

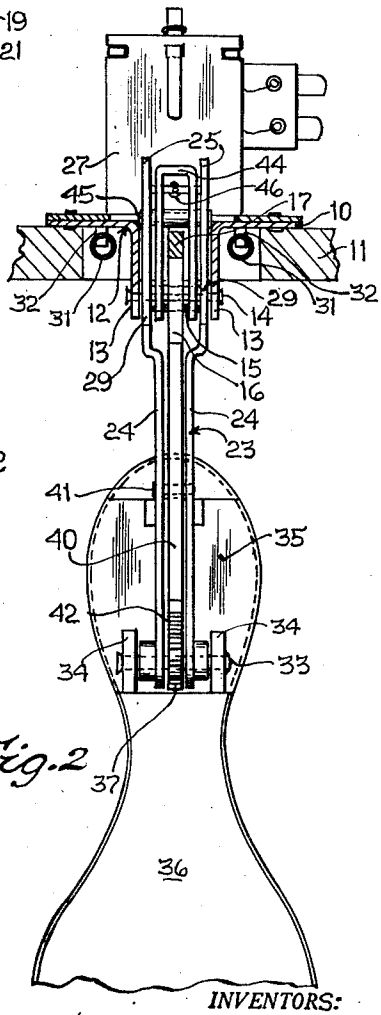


Fig. 2

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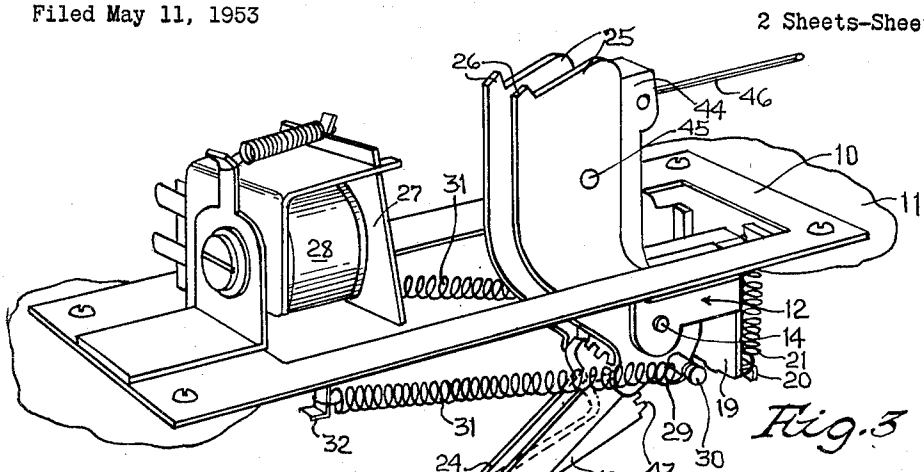


Fig. 3

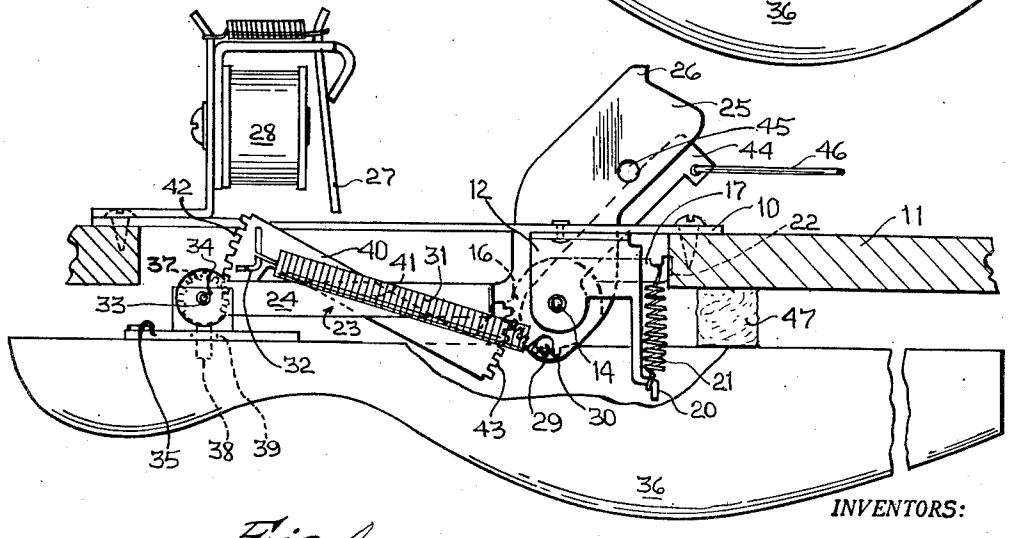


Fig. 4.

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BOWLING PIN ELEVATING AND RESETTING MECHANISM

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12 Claims. (Cl. 340—376)

1

Our invention relates to a bowling pin elevating and resetting mechanism and has for its principal object the provision of a novel arrangement for automatically moving each bowling pin from and into position upon a simulated bowling field or playing surface and for releasably latching each pin in an elevated position above the field or surface.

Other salient objects of our invention are to provide a mechanism of the character hereinafter described which is effective for elevating a bowling pin or other target from a simulated field or playing surface through a minimum of space; to provide a mechanism which is effective for rapidly elevating and resetting the simulated bowling pin or other target with respect to the bowling field or playing surface; to provide a mechanism for the purposes hereinafter described which requires a minimum of electric energy for its operation; to provide a mechanism which is simple and inexpensive in operation and construction; and to provide a mechanism for elevating and resetting bowling pins which permits the employment of simulated bowling pins larger than those now commercially in use without substantially enlarging the area occupied by the simulated pin or other target when in target position within such area.

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

Fig. 1 is a part sectional side elevational view of the invention;

Fig. 2 is a fragmentary sectional detail view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a perspective view of the invention but showing the parts in different positions; and

Fig. 4 is a side elevational view similar to that shown in Fig. 1 but showing the parts thereof in different positions.

Many attempts have been made in the amusement game industry to provide a simulated bowling game wherein relatively large simulated bowling pins may be employed and yet be individually elevated and reset within a relatively small area or space.

Such prior attempts have proven not only unsatisfactory but expensive due to the fact that no suitable mechanism had been provided for thus orienting the simulated bowling pin from the size of the area provided for the pins in simulated bowling games now in commercial use.

As will be presently apparent, we provide such a mechanism. In this connection such mechanism comprises a mounting plate 10. This plate 10 is generally carried by a supporting wall 11

2

constituting a part of a cabinet enclosing the mechanism. Secured to this plate 10 and extending downwardly therefrom is a substantially U-shaped bracket 12 providing spaced side wings 13 carrying therebetween a transversely extending pintle 14.

Mounted on this pintle 14 between the side wings 13 is a sleeve 15. Fixed to this sleeve 15 is a gear segment 16 having an integral tail portion 17 extending in a horizontal direction through a notch 18 formed in the bight portion 19 of the bracket 12 which integrally connects the side wings 13 together.

The lower end portion of the bight portion 19 provides a hook 20 to which one end portion of a spring 21 is attached, the opposite end portion of the spring being connected to a hook 22 provided by the tail portion 17.

Pivotally supported by the pintle 14 is a supporting arm 23 comprising two side plates 24 spaced from each other as shown. The upper end portion of the arm 23 terminates into a latch head 25 having a shoulder 26 adapted for latched engagement with a latch plate 27 carried by an electromagnetic coil 28 and actuated thereby.

The side plates 24, providing the supporting arm 23, have lateral extensions 29 carrying pins 30 to which corresponding end portions of springs 31 are connected, the opposite end portions of such springs 31 being connected to hooks 32 provided by the mounting plate 10.

Under the action of these springs 31, the arm 23 is adapted to be pivoted to a position beneath and substantially parallel to the plate 10 when the latch plate 27 is disengaged from the latch head 25, such disengagement resulting each time the coil 28 is energized in a manner well known in the art.

The lower end portion of the side plates 24 carry a pin 33. The ends of this pin 33 are journaled in lugs 34 provided by and extending substantially lateral from a back plate 35 formed as a part of a target 36. This target 36 in the present instance simulates a conventional bowling pin.

On this pin 33 is mounted a gear segment 37 having a tail portion 38 which projects through a slot 39 (Fig. 4) formed in the back plate 35.

This tail portion 38 prevents the gear 37 from rotating independently of the target 36. The tail portion 17 and spring 21, while holding the gear segment 16 against rotation, permit a limited rotation of the gear 16 in an anticlockwise direction as viewed in Fig. 1, for reasons which will be hereinafter made apparent.

An actuating bar 40 is arranged between the plates 24. Midway between the opposite end portions of such bar is a pivot pin 41 journaled in the medial portion of the side plates 24.

The opposite end portions of the actuating bar 40 provide gear segments 42 and 43 extending in opposite directions with respect to each other and

meshing respectively with the gear segments **37** and **16**.

To complete the invention there is pivotally carried by the pin **14** a resetting bar **44** which is adapted to bear against a pin **45** carried by the latch head **25**. To this reset bar **44** is connected a reset rod **46** which may be connected to suitable mechanism (not shown) for pivoting the bar **44** against the pin **45** for purposes hereinafter explained.

There may also be provided beneath the wall **11** a bumper or cushion pad **47** adapted to be engaged by the target to provide a shock absorber therefor.

In Fig. 1 the target **36** is illustrated in target position with respect to the bowling alley or playing field. In this position, the target **36** is held in vertical position by the action of the spring **21** pulling upon the tail **17** which tends to urge limited rotation to the gear **16** whereby to effect and hold through the bar **40**, such vertical position of the target **36**. In such position of the target **36** (Fig. 1) the latch head **25** is in engagement with the latch plate **27**. Upon energization of the coil **28** the latch plate **27** will be disengaged from the latch head **25** releasing the arm **23** for pivotal movement by the action of the springs **31** in a clockwise direction as viewed in Fig. 1. This pivotal movement of the arm **23** through medium of the gear, hereinbefore described, will in turn pivot the target in an anticlockwise direction to a position substantially parallel with and beneath the arm **23** and above the field or playing surface. It will be observed that this pivotal movement of the target took place through a relatively small space.

It is by reason of this confined movement that we are able to use larger simulated bowling pins than are now in use.

In its horizontal position, as seen in Fig. 4, the target **36** is yieldably held by the springs **31**.

To reset the target to its vertical position the arm **44** is pivoted in a direction to bear against the pin **45**. This pivotal movement of the arm **44** will impart pivotal movement of the supporting arm **23** in an anticlockwise direction, as viewed in Fig. 1. This pivotal movement of the supporting arm **23** through the gear connections between the arm **23** and the target **36** will pivot the target **36** in a clockwise direction or to a position which is substantially vertical, as shown in Fig. 1. The target **36** is releasably held in this position by engagement of the latch head **25** with the latch plate **27**.

It will be clearly obvious that the several objects of our invention are accomplished by a mechanism which comprises relatively few parts and one which is simple in construction and easy of operation.

While we have described the mechanism as functioning to elevate and reset a simulated bowling pin, it is clearly obvious that the form of the target may be changed without departing from the spirit of the invention.

While we have described and illustrated the preferred form of construction for carrying our invention into effect, this is capable of variation and modification without departing from the spirit of the invention. We, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a gear carried by the mounting plate, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and spring means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

2. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a substantially stationary gear carried by the mounting plate and having limited rotation in one direction, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and spring means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

3. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a gear carried by the mounting plate, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, electro-magnetic means for releasing said latch plate from said latch head, and spring means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

4. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a substantially stationary gear carried by the mounting plate and having limited rotation in one direction, means for rotating said gear in said one direction, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite end gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and spring means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

5. A mechanism of the class described comprising a mounting plate, a latch plate pivotally

supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a gear carried by the mounting plate, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

6. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a substantially stationary gear carried by the mounting plate and having limited rotation in one direction, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

7. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a gear carried by the mounting plate, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, electro-magnetic means for releasing said latch plate from said latch head, and means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

8. A mechanism of the class described comprising a mounting plate, a latch plate pivotally supported by the mounting plate, a supporting arm pivotally supported by the mounting plate and having a latch head adapted for engagement with the latch plate, a substantially stationary gear carried by the mounting plate and having limited rotation in one direction, spring means for rotating said gear in said one direction, a target element, a gear carried by the target element, an actuating bar pivoted midway between its end portions to the middle portion of the supporting arm and having at opposite ends gear segments operatively meshing with the gear carried by the plate and the gear carried by the target element, means for releasing said latch plate from said latch head, and spring means acting on said arm to pivot the same in one direction when said latch plate is disengaged from said latch head.

9. A mechanism for moving a simulated bowling pin comprising a mounting plate, an arm pivotally carried thereby, a target simulating a bowling pin pivotally carried by the arm at one end thereof, spring means for pivoting said arm in one direction with respect to the plate, and

means operably associated with said arm and said target for pivoting the target with respect to the arm in a direction opposite to the pivotal movement of the arm in said one direction.

10. A mechanism for moving a simulated bowling pin comprising a mounting plate, an arm pivotally carried thereby, a target simulating a bowling pin pivotally carried by the arm at one end thereof, spring means for pivoting said arm in one direction with respect to the plate, to a position substantially parallel with respect to the plate, and means operably associated with said arm and said target for pivoting the target with respect to the arm in a direction opposite to the pivotal movement of the arm in said one direction, and to a position in substantially parallel relation to the arm and beneath said mounting plate.

11. A simulated bowling pin elevating and resetting mechanism comprising a mounting plate, an arm having at one end thereof a latch plate, means pivotally connecting said end of the arm to said mounting plate, a target simulating a bowling pin, means connecting said target adjacent one end thereof to the opposite end of the arm for pivotal movement with respect thereto, means for pivoting said arm relative to the mounting plate, means for pivoting the target with respect to the arm, said target pivoting means effective to pivot said target with respect to said arm by the pivotal movement of said arm relative to said plate, a latch member carried by the mounting plate and adapted to have latched engagement with the latch plate, and means for releasing said latch member from the latch plate to free said arm and target for pivotal movement.

12. A simulated bowling pin elevating and resetting mechanism comprising a mounting plate, an arm having at one end thereof a latch plate, means pivotally connecting said end of the arm to said mounting plate for pivotal movement of the arm to and from a position beneath the mounting plate, a target simulating a bowling pin, means connecting said target at one end thereof to the opposite end of the arm for pivotal movement with respect to said arm from a position in extended relation to the arm to a position substantially parallel thereto, means for pivoting said arm to and from a position beneath the mounting plate, means for pivoting the target from and to said extended position with respect to the arm, said target pivoting means effective to pivot said target with respect to said arm by the pivotal movement of said arm, a latch member carried by the mounting plate for latched engagement with the latch plate when the arm and target are in extended relation with respect to each other, and electro-magnetic means for releasing said latch member from the latch plate to free said arm and target for pivotal movement from said extended relation with respect to each other.

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