

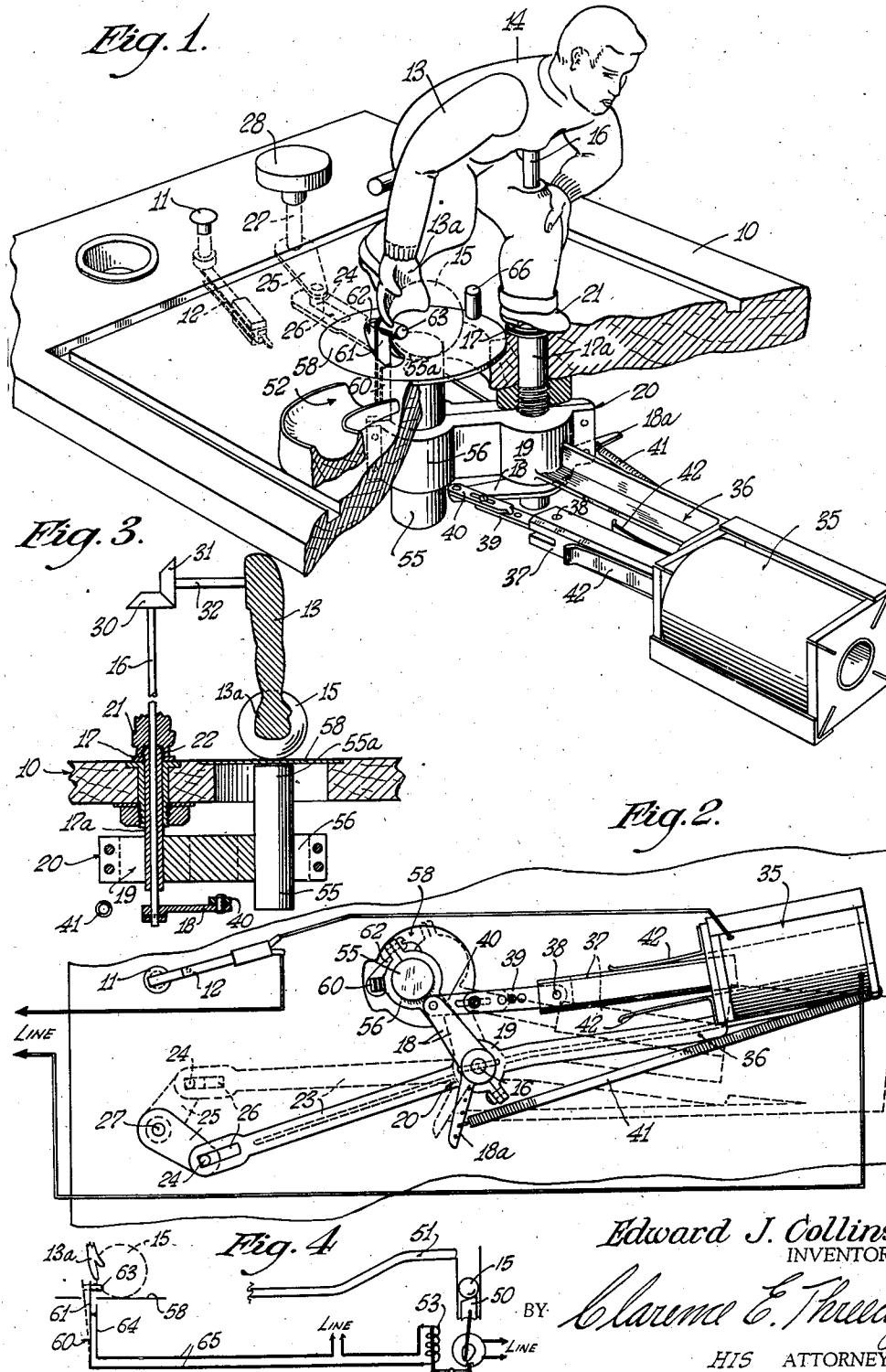
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MANIKIN FOR BOWLING GAME

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MANIKIN FOR BOWLING GAME

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This invention relates to amusement apparatus and has as its principal object the provision of improvements in a coin-controlled bowling game, said improvements being in the nature of a manikin and mechanism for actuating the same to bowl a ball at tenpins.

A more particular object is the construction of the manikin, means for adjusting the position of the same, and mechanism for moving the arm which bowls the ball, all as a unit.

A further object is the provision of improved means mounted for movement with the manikin assembly for attracting and holding a bowling ball in position before the hand of the manikin prior to bowling action of the latter.

A further object is the provision of improved switch means mounted with the manikin assembly and actuated by the ball positioned as aforesaid for controlling certain circuit connections in the game.

Viewed from another aspect, it is a principal object of the invention to provide a manikin assembly for a miniature bowling game, said assembly including a swivel bracket adapted to be mounted on the underside of the bowling alley, a manikin carried by said bracket on the upper side of the alley and pivotable with the bracket into adjustable bowling positions, a manikin having a pivoted arm which engages a bowling ball, electromagnetic means carried with the bracket for pivoting the manikin's arm to bowl the ball, magnetic means, preferably in the form of a permanent magnet, carried by the bracket on the underside of the board or alley for positioning a magnetic bowling ball, a control switch carried with the bracket beneath the alley and operated by the bowling ball when in bowling position, and manually controlled means for pivoting the manikin, the entire bracket assembly and associated parts pivoting with the manikin.

Other objects, advantages and novel aspects of the invention reside in certain details of construction as well as the cooperative relationship of the component parts of the illustrative embodiment described hereinafter in view of the annexed drawing, in which:

Fig. 1 is a fragmentary perspective of the front end of a miniature bowling alley, showing the manikin assembly;

Fig. 2 is a bottom plan view of said assembly;

Fig. 3 is a fragmentary vertical section through the bowling arm of the manikin and the ball positioning means; while

Fig. 4 is a circuit diagram.

The improvements of the present disclosure

relate to the type of amusement apparatus disclosed in U. S. Patent 2,181,984, Serial No. 289,153, filed August 9, 1939, by J. H. Warner. In that application there is an adjustable manikin with a pivoted bowling arm and magnetic means for attracting and holding a magnetic bowling ball in bowling position before the hand of the bowling arm; said application also discloses circuit control means actuated by the bowling ball when attracted into bowling position. The principal improvement of the present invention resides in the arrangement and means whereby the manikin, the ball attracting means, the control means, and the manikin actuating mechanism are all assembled as a unit so that the player of the game may pivot the manikin to project the bowling ball variously, and all of the mechanism for actuating the manikin will be correspondingly moved.

Referring to Fig. 1, the front end portion of a miniature bowling alley 10 is illustrated and includes a control button 11 which actuates some form of switch 12 to energize electrical means which causes the pivoted arm 13 of a manikin 14 to move forward and project a magnetically attractable ball 15 toward tenpins (not shown) at the opposite end of the alley.

The manikin is mounted on a vertically extending rod 16 which passes through one leg and the foot of the manikin and a bushing 17, which extends through a second bushing 17a in the board, to a level beneath the board for engagement with a crank arm 18 (Figs. 2 and 3).

The inner bushing 17 is clamped in the hub portion 19 of a bracket assembly generally indicated at 20. The upright shaft 16 is free in the bushing 17 so that the latter may pivot thereabout; however, the foot portion 21 is threaded or otherwise attached as at 22 (Fig. 3) to the bushing 17 so that pivotal movement of the latter in the outer bushing 17a will effect pivotal movement of the manikin independently of shaft 16.

To pivot the manikin into positions of adjustment, the bracket assembly is provided with a rocking arm 23 extending from the hub portion 19 and linked by means of a pin 24 to crank arm 25, the pin working in an elongated slot 26 in the end of the rocking arm. Crank arm 25 (Fig. 1) is fixed to a stud shaft 27 mounted in the front end of the alley and secured to an adjusting knob 28 for actuation by the patron. Thus, by turning knob 28, the entire bracket assembly 20 may be swung in the bushing 17a to pivot the manikin into a desired position.

Mechanism for swinging the arm 13 to simu-

late bowling action, includes the provision of a beveled gear 30 (Fig. 3) at the upper end of the shaft 16 interiorly of the manikin, which gear meshes with a companion gear 31 on a stud shaft 32 fixed to the bowling arm 13. By oscillating lever arm 18, shaft 16 will be rocked, with a consequent oscillation of the arm 13.

The means for actuating the bowling arm includes an electromagnetic device in the nature of a solenoid 35 mounted on a supporting arm 36 which extends from the hub portion 19 of the bracket assembly. An elongated plunger 37 is pivotally connected at 38 with a pair of links 39 and 40 drivingly connected with the lever 18. The lever arm 18 is provided with an offset 18a to which is attached one end of an elongated coil spring 41 anchored at its opposite end to the solenoid frame, this spring normally rocking lever 18 to withdraw the plunger or armature 37 from the bore of the solenoid.

Attention is called to the fact that the plunger 37 is somewhat smaller in diameter or cross section than the bore of the solenoid to provide sufficient play laterally in movements into and out of the solenoid to assure smooth positive action without elaborately centered and located pivotal connections between the driving and driven parts. Buffer springs 42 are arranged on opposite sides of the plunger to limit lateral play when the plunger is drawn to the limit of its outward movement.

Thus, energization of the solenoid 35 will attract the armature 37, swinging lever 18, which in turn pivots shaft 16 and moves the bowling arm 13 forward in simulated bowling action. Since the pull on the armature increases up to a certain point as the armature moves into the bore of the solenoid from its retracted position, the leverage arrangement is calculated, through the links 39 and 40 and the arrangement of the lever arm 18, to provide a slow, as distinguished from abrupt, initial movement of the arm 13 which results in closer similitude of bowling action and smooth propulsion of the bowling ball. It is intended that the operating switch means 11-12 be connected in a circuit (Fig. 2) which will cause energization of the solenoid.

The bowling ball 15 is magnetically attractable and through operation of an elevating device schematically indicated at 50 in Fig. 4, is delivered into a runway 51 which has a discharge end 52 (Fig. 1) disposed in the alley opposite the bowling hand of the manikin, and the operation of the game is such that the ball 15 will be raised by the elevator 50 responsive to automatic actuation of certain control means including an electromagnet 53 (Fig. 4), so that the ball runs down the chute 51 into position opposite the hand portion 13a on the manikin. In order to assure movement of the ball into a proper bowling position and to hold the ball in such position, there is provided magnetic means in the form of a bar magnet 55 clamped in split arm portions 56 extending from the hub portion 19 on the swivel bracket, one of the polar ends 55a of the magnet being disposed immediately beneath the hand portion 13a to attract the ball into proper position. The arm 13, as well as the hand portion 13a, are preferably constructed of iron or other magnetic composition to concentrate the flux from the end of the magnet to increase the strength of the pull on the ball.

It will be noted that when the manikin assembly is pivoted by manipulation of handle 28, the

ball positioning means or magnet 55 moves in unison therewith.

A smooth non-magnetic plate in the nature of a Celluloid disc 58 is seated in a large opening beneath the hand of the manikin so as to lie flush with the upper surface of the alley and provide a gliding surface for the ball as well as a support therefor of such thinness that the upper polar end 55a of the magnet may be disposed in close proximity to the ball for increased efficiency. As the bowling arm 13 is actuated to project the ball, the latter may glide easily on the smooth surface of the disc 58 to minimize the negative effort of the magnet in restraining the ball.

Supervisory control means movable with the assembly includes the provision of a spring switch 60 attached to one of the clamp arms 56 with one of the ends 61 of one of the switch springs projecting up through an arcuate slot 62 in disc 58 just behind the hand 13a. A pin 63 projects from the switch arm beneath the hand and a little forward of the latter so as to be engaged by the ball 15 when in attracted position, to move the contact arm 61 away from the companion arm 64, thus opening a circuit 65 with the elevator control magnet 53 (Fig. 4) so that the latter cannot be operated while there is a ball in bowling position. A stop pin 66 is mounted on the disc 58 on the far side opposite the discharge end 52 of the runway to prevent possible escape of the ball beyond the field of the magnet in some abnormal operation of the device.

While the projecting means herein has been described in detail as a manikin, it is contemplated that the projector may take other forms.

Operation

In the use of the improved manikin assembly, assuming the machine of Fig. 1 as otherwise in condition for operation by the player, the knob 28 may be turned to pivot the rocking arm 23, thus moving the whole bracket swivel about a center through the bushing 17a, and in consequence pivoting the manikin to direct the ball 15 in a desired manner, automatic mechanism having delivered the ball down the runway 51 at the initiation of the game; thereafter the button 11 is pushed to close a control circuit through switch 12 (circuit connections of which are shown in Fig. 2), which ultimately results in the energization of the solenoid 35 attracting armature 37 and rocking the shaft 16 through lever 18 and the pinions 30-31 and shaft 32, so that the previously positioned ball will be propelled by the hand portion 13a from its attracted position on disc 58. Usually the player gets ten balls, constituting five "frames" of two balls each. The next ball will therefore be automatically elevated into the runway 51 and attracted by the magnet 55 into proper position against the hand and the switch operating pin 63 for the next operation.

Since the game is intended for coin operation, the manikin is enclosed in a glass housing and it is important therefore that the ball delivering, positioning and projecting means function with absolute precision, for the escape of one of the balls would very likely interfere with the proper operation of the device, and moreover only two balls are usually supplied with the machine. The office of the supervisory switch 60 is to prevent delivery of a second ball should the first ball still be positioned on the seat or plate 58.

The various advantages and objects of the invention may be accomplished by modifications

c² the particular embodiment specifically described herein, and it is intended that the appended claims shall include all equivalent arrangements fairly coming within their call.

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

1. In an amusement device of the class described, a manikin assembly including a swivel bracket and means mounting the same for movement about a vertical axis beneath a bowling alley, a manikin mounted on the upper side of said alley for pivotal movement coaxially with said swivel bracket, manually controlled means for pivoting said swivel bracket to adjust the positions of the manikin, said manikin having a bowling arm arranged for movement to propel a bowling ball on said alley, and mechanism carried by said swivel bracket for movement therewith and operatively connected with said bowling arm for actuation to move the latter in bowling action, and means for positioning a magnetic bowling ball in a predetermined bowling position relative to said bowling arm and including a magnet mounted on said swivel bracket for movement therewith and positioned beneath said alley and said bowling arm to attract and hold said ball in said position, and means for delivering said ball into a position substantially opposite said arm for operation as aforesaid.

2. In a bowling game including a manikin assembly comprising a swivel bracket adapted to be mounted beneath said alley for movement about a vertical axis, a manikin disposed on the upper side of said alley and supported for pivotal movement coaxially of said axis by means carried by said swivel bracket, mechanism for pivoting said bracket to move the manikin into adjusted positions, said manikin having a pivoted arm and hand portion thereon arranged to propel a bowling ball on said alley, electromagnetic means mounted on said bracket and drivingly connected with said arm to pivot the latter for propulsion of said ball, and means movable with said bracket for effecting movement of a bowling ball into bowling position opposite said hand portion of the manikin.

3. In a bowling game including an alley, a manikin assembly comprising a swivel bracket mounted on the underside of said alley for rocking movement about a vertical axis, a manikin movably mounted on the upper side of said alley, means connecting said manikin and bracket for joint pivotal movement, means drivingly connected with said bracket for pivoting the latter, said manikin having a pivoted bowling arm with a hand portion arranged adjacent said alley to engage a bowling ball thereon and propel said ball when said arm is pivoted from a normal position, means for pivoting said bowling arm including a solenoid carried by said bracket for movement therewith and including an armature drivingly connected with a shaft, means extending coaxially of the aforesaid axis and drivingly connected with said arm to pivot the latter when the armature is attracted from a normal position corresponding to normal position of said arm, means yieldingly urging said armature into normal position, means for effecting movement of a bowling ball into position opposite said hand portion for propulsion by the latter when said solenoid is energized, and a control device mounted on said bracket and including an operating member projecting above said alley adjacent said hand for engagement

and movement by said bowling ball when in bowling position.

4. In a bowling game including an alley, a manikin assembly comprising a swivel bracket mounted on the underside of said alley for rocking movement about a vertical axis, a manikin mounted on the upper side of said alley on means disposed coaxially of said axis, means connecting said manikin and bracket for joint pivotal movement, means drivingly connected with said bracket for pivoting the latter, said manikin having a pivoted bowling arm with a hand portion arranged adjacent said alley to engage a bowling ball thereon and propel said ball when said arm is pivoted from a normal position, means for pivoting said bowling arm including a solenoid carried by said bracket for movement therewith and including an armature drivingly connected with a shaft means extending coaxially of the aforesaid axis and drivingly connected with said arm to pivot the latter when the armature is attracted from a normal position corresponding to normal position of said arm, means yieldingly urging said armature into normal position, means for delivering a magnetic bowling ball to a position closely adjacent said hand portion, and means for attracting and holding said ball in said position and including a magnetic device mounted on said bracket for movement therewith with a polar portion disposed beneath said hand portion and propagating a field of force which will attract and hold said ball releasably.

5. In a bowling device including an alley and means for delivering a magnetic ball to a certain position in said alley, a manikin assembly comprising, in combination, a supporting device mounted beneath said alley for pivotal movement about a vertical axis, a manikin carried by said device on the upper side of said alley for pivotal movement into adjusted positions by pivotal movement of said supporting device, means for pivoting said supporting device, said manikin having a pivoted bowling arm with a hand portion disposed to engage said ball at said certain position to propel the ball when the arm is pivoted from a normal position, electromagnetic means mounted for movement with said supporting device and operatively linked with said arm to pivot the latter when energized, means yieldingly urging said arm into said normal position, and means for attracting and holding the ball in said bowling position and including the provision in said alley of an opening beneath said hand portion, a thin non-magnetic plate disposed in said opening flush with said alley, a magnet mounted for movement with said supporting device and arranged to propagate a field of force through said plate beneath said hand to attract and hold said ball when delivered to said certain position, said ball being propelled from said position by operation of the bowling arm as aforesaid.

6. The device of claim 5 further characterized by the provision of supervisory control means in the nature of a switch carried by said supporting device and having an operating element projecting through said plate adjacent said hand for engagement and movement by said ball when the latter is attracted by said magnet.

7. In an amusement device, a ball projecting unit for use with magnetically attractable balls to be propelled on a playboard, said unit comprising, in combination, a swivel bracket mounted beneath said board for movement about a verti-

cal axis, a projecting device mounted on the upper side of said board for movement jointly with said bracket, mechanism for effecting joint movement of the projecting device and bracket, said projecting device including a movable projecting element arranged to engage said ball and propel the same when said element is pivoted from a normal position, means yieldingly urging said projecting element into said normal position, a solenoid mounted on said swivel bracket beneath said board and including an armature operatively linked with said projecting element through an operating shaft extending coaxially of the pivotal axis of the bracket and projecting device, a permanent magnet mounted on said bracket and having a polar portion disposed closely beneath said pivoted projecting element to attract and hold said magnetic ball in position for engagement and propulsion as aforesaid, and means for delivering said magnetic ball to a position substantially opposite said projecting element for attraction by the magnet as aforesaid.

8. In an amusement device of the class described, ball projecting means comprising, in combination, a manikin, means supporting said manikin for adjustable movement, mechanism for moving said supporting means into adjusted positions, said manikin having a ball projecting arm, a solenoid carried by said supporting means and operatively linked with said arm for actuation of the latter in projecting action, said arm having a hand portion to engage a ball for propulsion of the latter when the solenoid is energized, means for delivering a magnetic ball toward said hand, and magnetic means carried by said supporting means for attracting said ball into a position for engagement and propulsion by said hand when the arm is pivoted as aforesaid.

9. The device of claim 8 further characterized by the provision of a smooth ball supporting platform of non-magnetic material and of adequate minimized thinness to support said ball and disposed beneath said hand portion above said magnetic means, said magnetic means being disposed in close proximity to said platform so as to exert its maximum magnetic attraction upon said ball.

10. The device of claim 8 further characterized by the provision of supervisory control means in the form of a switch carried by said supporting means and including an operating element disposed adjacent said hand portion for engagement and movement by the ball when attracted as aforesaid, said supervisory control means being adapted to control mechanism associated with said amusement device.

11. A ball projecting unit for use in amusement apparatus including a ball playing board, said unit comprising a bracket, means for mounting said bracket to move about an axis normal to the plane of said board, a figure mounted on said bracket for pivotal movement coaxially with the bracket, said figure including a ball projecting member adapted to be moved to engage and project a ball on said board, a solenoid mounted on said bracket for movement therewith and including an armature drivingly linked with said ball projecting member for actuation of the latter when the solenoid is energized, a magnetic ball to be projected as aforesaid, means for delivering said ball toward said projecting member, and

means for attracting and holding said ball in a position for engagement by said projecting member when the ball is delivered as aforesaid, said means comprising a magnetic device mounted on said bracket for movement therewith and arranged adjacent said projecting member to attract said ball and hold the same yieldably to permit projection thereof by subsequent actuation of the projecting member.

12. In a ball game of the type including a ball playing board and means for delivering a magnetically attractable ball to a projector, projecting means comprising: a carriage mounted for movement about a vertical axis beneath said board, projecting means mounted on the top side of said board for pivotal movement coaxially of said carriage, said projecting means including a ball projecting member movable from a normal position to project a ball delivered thereto as aforesaid, means mounted for movement with said carriage to actuate said projecting member, and magnetic means also mounted for movement with said carriage and arranged to attract and hold said magnetically attractable ball in a certain position relative to said projecting member when the ball is delivered as aforesaid.

13. In a dirigible ball projector, a carriage, a projecting member mounted on said carriage and movable from a normal position to propel a magnetically attractable ball relative to a playing field, means for delivering a magnetically attractable ball toward said projector, and magnetic means mounted for movement with said carriage and arranged to attract a ball delivered as aforesaid and hold said ball in a certain position relative to said projecting member for propulsion as aforesaid.

14. In an amusement device of the class described, ball projecting means comprising, in combination, a manikin, said manikin having a ball projecting arm, means supporting said manikin for adjustable movement, mechanism for moving said supporting means to adjust the position of the manikin, electromagnetic means carried by said supporting means and operatively linked with said arm for actuation of the arm in projecting action, said arm having a hand portion adapted to engage a ball for propulsion of the latter when the electromagnetic means is energized, means for delivering a ball toward said hand, and means carried by said supporting means for receiving and holding said ball in a position for engagement and propulsion by said hand when the arm is pivoted as aforesaid.

15. In an amusement device of the class described, ball projecting means comprising, in combination, a manikin, said manikin having a ball projecting arm, means supporting said manikin for adjustable movement, mechanism for moving said supporting means to adjust the position of the manikin, electromagnetic means operatively linked with said arm for actuation of the arm in projecting action, said arm having a hand portion adapted to engage a ball for propulsion of the latter when the electromagnetic means is energized, means for delivering a ball toward said hand, and means carried by said supporting means for receiving and holding said ball in a position for engagement and propulsion by said hand when the arm is pivoted as aforesaid.

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