Dec. 10, 1957 M. E. BRUNDERMAN 2,815,743

BALL THROWING DEVICE

Filed Aug. 9, 1954 3 Sheets-Sheet 1

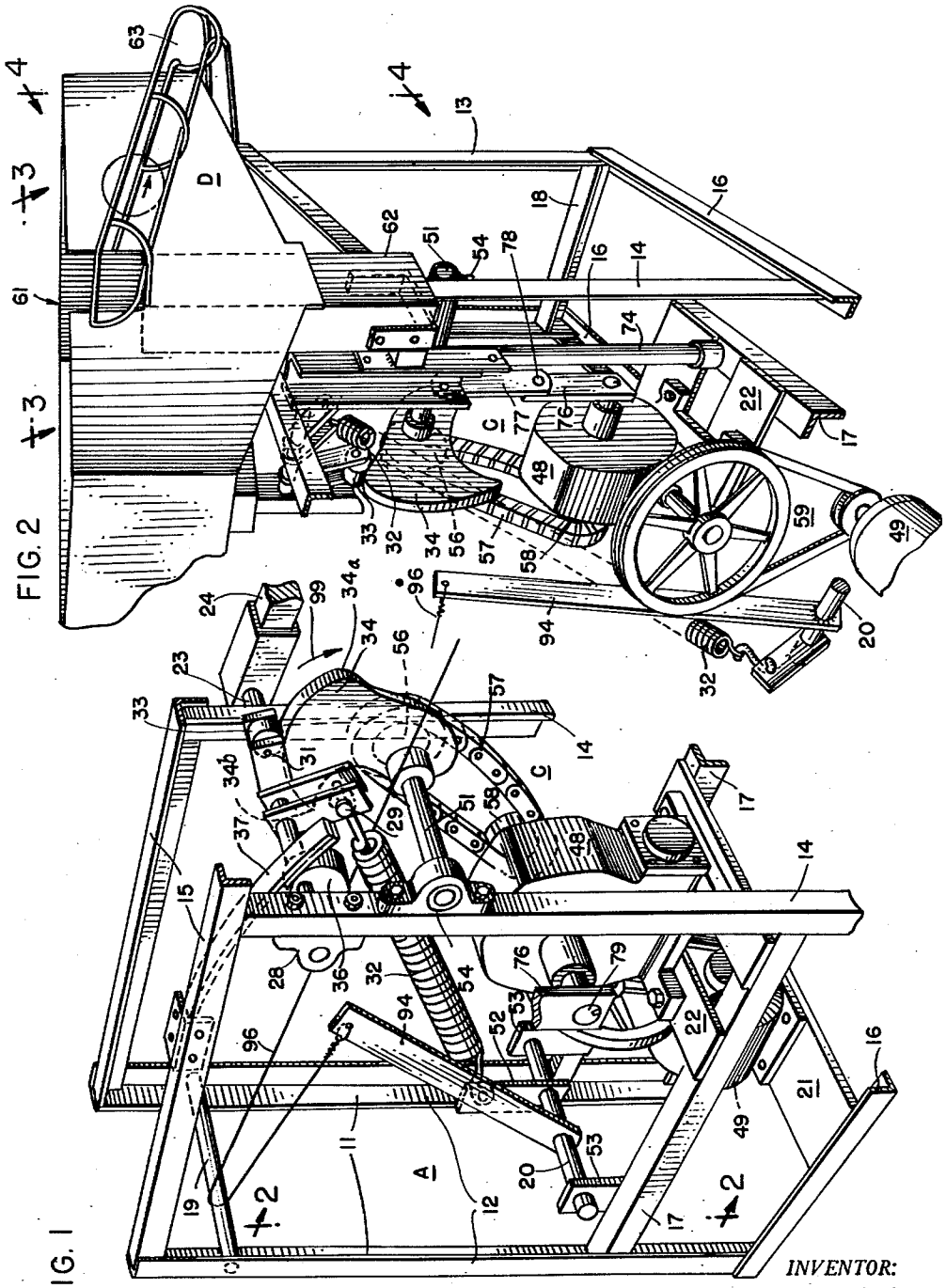


FIG. 2

FIG. 1

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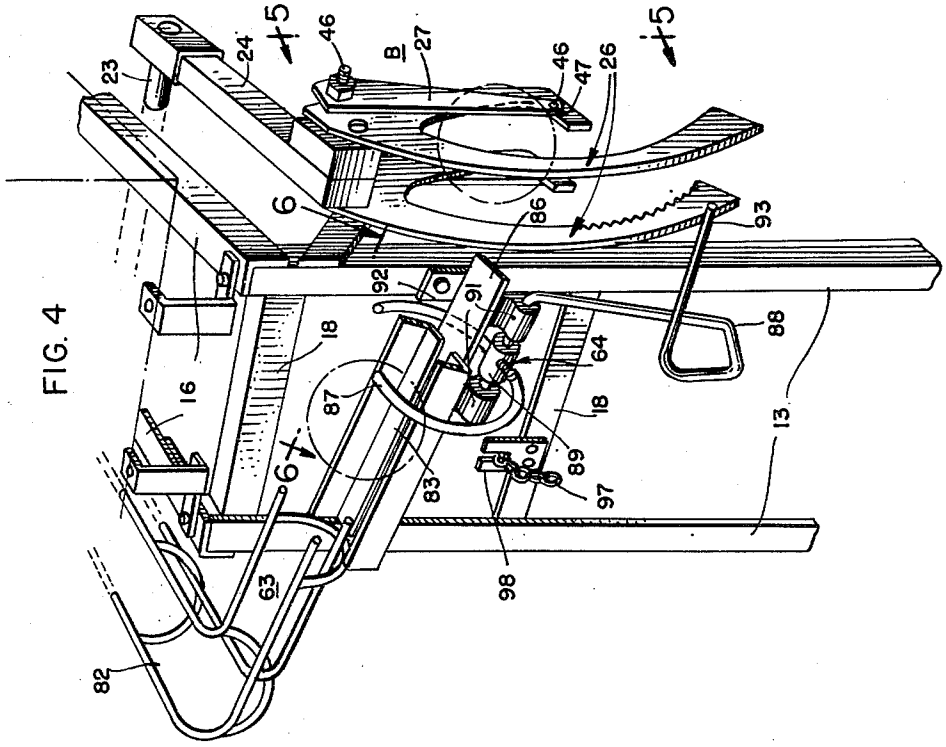


FIG. 4

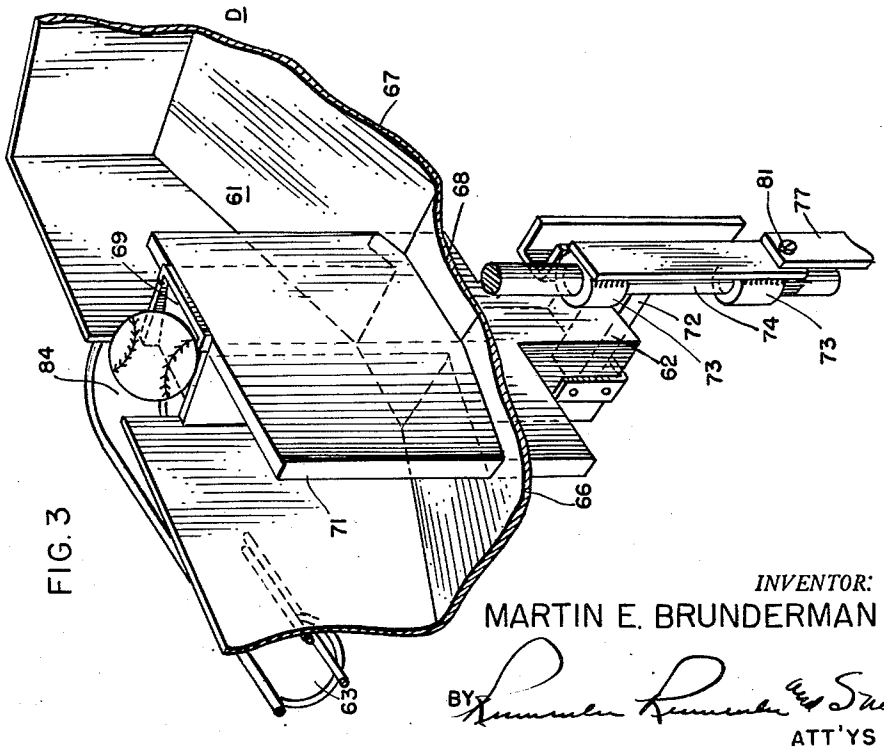


FIG. 3

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BALL THROWING DEVICE

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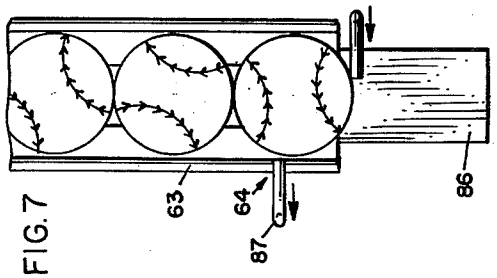


FIG. 7

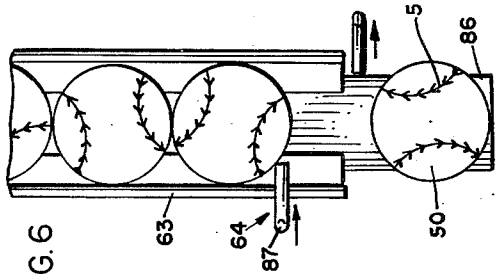


FIG. 6

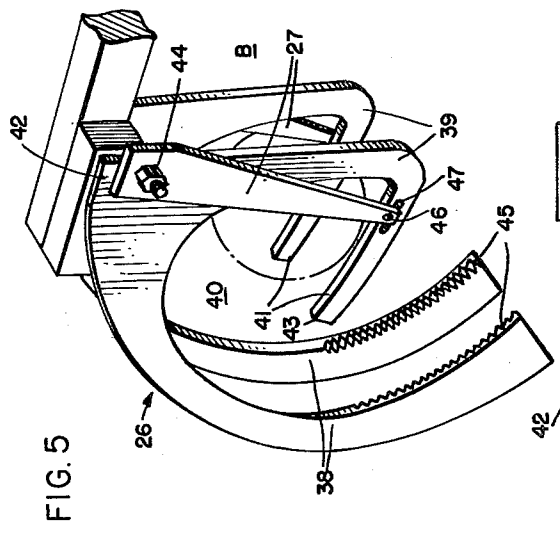


FIG. 5

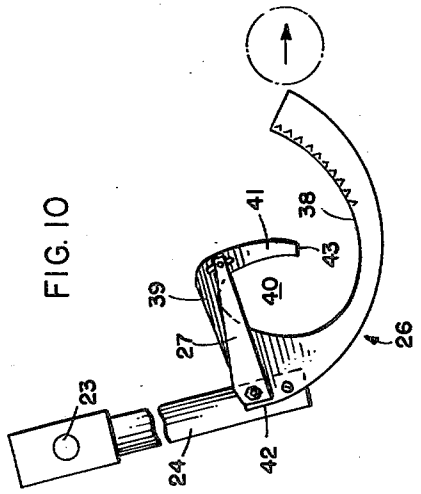


FIG. 10

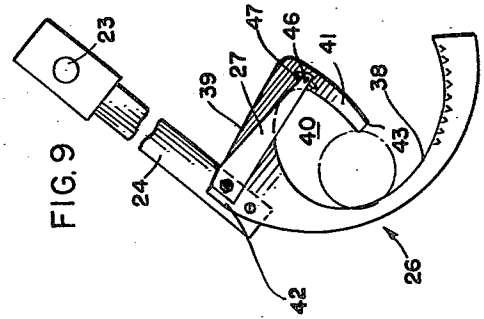


FIG. 9

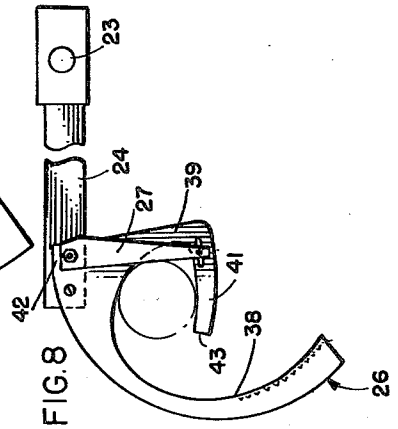


FIG. 8

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United States Patent Office 2,815,743
Patented Dec. 10, 1957

2,815,743

BALL THROWING DEVICE

Martin E. Brunderman, Chicago, Ill.

Application August 9, 1954, Serial No. 448,569

4 Claims. (Cl. 124—7)

This invention relates to baseball pitching machines for the mechanical throwing of balls to players and simulating an underhand style of delivery, whereby such players may enhance their batting skill.

The main objects of this invention are to provide an improved form of ball pitching machine particularly adapted for throwing balls in an underhand style of delivery; to provide an improved combination of a ball grip and throwing arm for such underhand pitching; to provide improved means for regulating the trajectory of the ball after its release from the throwing arm; to provide improved means for tensioning and releasing the ball throwing arm; and to provide an improved machine of this kind which is particularly adapted for throwing balls in an underhand style of delivery, of the soft and/or playground type as distinct from the usual hard or major league type of baseball.

One specific embodiment of my invention is shown in the accompanying drawings in which:

Figure 1 is a fragmentary perspective view of the rear portion of the machine showing the motor driven operating parts of the machine.

Fig. 2 is a fragmentary perspective view from the same side but at the opposite end of the machine.

Fig. 3 is a fragmentary perspective view of the ball selecting means for discharging the balls one at a time from the hopper.

Fig. 4 is a fragmentary perspective view of the opposite side of the machine as shown in Fig. 1 and showing the combination ball grip and throwing arm and the ball release means.

Fig. 5 is an enlarged perspective of the ball throwing arm showing the ball grip and trajectory regulating trigger.

Figs. 6 and 7 are fragmeentary details of the ball releasing end of the ball trough showing, in Fig. 6, a ball released for transfer to the ball throwing arm and, in Fig. 7, the retention of the balls in the trough pending the next operation of the ball releasing means, and

Figs. 8, 9 and 10 successively show the throwing arm just before release, in an advanced position just before the ball leaves the pocket, and in its completed forward swing as the ball is propelled from the distal end of the ball grip.

The essential concept of this invention involves a vertically swinging arm mounting a ball grip, equipped with means for regulating the trajectory of the propelled ball, in association with a motor driven spring tensioning and releasing mechanism, for actuating the throwing arm to pitch the ball in an underhand style of delivery.

A ball pitching machine embodying the foregoing concept comprises a supporting frame A, mounting a vertically reciprocating combination ball gripping and throwing arm B actuated by a motor driven spring tensioning and releasing mechanism C, and to which balls are delivered one at a time by a ball selecting means D.

The supporting frame A, as is most clear from Figs. 1, 2, and 4, is formed of a pair of sides here shown made

up primarily of angle iron, end and intermediate posts **12**, **13**, and **14**, top and bottom and intermediate rails **15**, **16**, and **17** respectively, secured in spaced vertical, parallel relationship by cross pieces **18** and shaft bars **19** and **20**. Platforms **21** and **22** cross span and are secured to the opposite bottom side rails **16** and intermediate side rails **17** respectively to afford support for the power units of the hereinafter described motor driven spring tensioning and release mechanism C.

The ball grip and throwing arm B comprises a crank shaft **23**, ball grip supporting bar **24**, and a pair of C-shaped plates **26** with which is associated a trajectory regulating trigger **27**.

The crank shaft **23** is journaled in bearings **29** (Fig. 1) on the intermediate posts **14** of the frame A. The two crank pins **29** and **31** are circumferentially offset from each other about 90 degrees. The pin **29** is attached to one end of a tensioning spring **32** for the throwing arm B. The other pin **31** mounts a roller **33** coacting with a cam **34** which is a part of spring tensioning and release mechanism C.

The crank shaft **23** also mounts another cam **36** coacting with a brake shoe **37**, on the frame A, for holding the crank shaft **23**, and its attached ball throwing arm B, against free swinging at those times when there is no tension on the spring **32**.

The bar **24** may be of any suitable material and of practically any cross sectional form. It is so fixed at the end of the crank shaft **23**, outwardly of the frame A, as to swing in a vertical arc. The angular positioning of the bar **24** with respect to the crank pins **29** and **31** is such that the swing of the arm is below a horizontal plane through the axis of the crank shaft **23**, thereby casting the ball forwardly underhand to simulate an underhand style of pitching such as particularly characterizes soft, "kitten," or playground baseball.

The C-shaped plates **26** are of identical form, each comprising a claw section **38** extending in an arc from an integral arm **39** about a transverse integral finger **41**. A pair of such plates here are shown secured at their bases **42** to the outer end of the bar **24** in spaced parallel relationship, with the arm parts **39** nearly at right angles to the bar **24**. These several portions of the plates are so related as to form a ball pocket **40** at the bases **42** of these plates between the opposite edges thereof and inwardly of the fingers **41**. The ends **43** of the fingers **41** are spaced from the edges of these claws **38** so that a ball of the appropriate diameter can pass between the finger ends and the claw edges.

The trajectory regulating trigger **27** here is shown as a pair of elements secured to a common bolt **44** and extending along the arms **39** with the free ends of these trigger elements adjustably connected to the plate fingers **41** by winged nut bolts **46** slidable in slots **47**. It is the positioning of these trigger elements **27** towards and away from the members **39** that regulates the trajectory of the ball as it is propelled from the distal ends of the claws **38**.

Along the inner opposed corners of the claw sections **38** of the plates **26**, serrations **45** are formed inwardly from the distal ends (Figs. 5 and 8–10). Obviously, these serrations will variously contact the seams **50'** of each ball **50** and tend to effect the rotation thereof as it is discharged from the distal ends of the plates **26**. There is, therefore, a further varying of the trajectory of the ball with an inclination to curve in one direction or another as it approaches the batter.

The motor driven spring tensioning and release mechanism C comprises the spring **32** and the cam **34** which latter is driven from a reduction gear unit **48** interposed between a motor **49**, and a sprocket and chain driven jack-shaft **51**.

The spring 32, as already noted, has one end secured to the crank pin 29. The other end is secured to a bracket 52 anchored to the shaft bar 20 rotatably supported in bearings 53 on the frame intermediate side rails 17. This tensioned spring provides the force for snapping the ball grip and throwing arm B to propel the ball.

The cam 34 is secured to rotate with the jack-shaft 51 journaled in bearings 54 on the intermediate frame posts 14, just below the crank shaft 23. The jack-shaft 51 mounts a sprocket 56 connected by chain belt 57 to a sprocket 58 on the reduction gear unit 48.

The cam 34 is a type of "fly" cam with an approach and a recession from a high section such that the crank shaft 23 is rocked, first, to simultaneously create an extreme tension in the spring 32 and swing the ball grip and throwing arm B in a clockwise direction, from a pendent position at the side of the frame A, into a cocked and ball receiving position, and then subsequently to suddenly free the crank shaft 23 so that the tensioned spring 32 will snap the ball grip and throwing arm B in a counterclockwise direction to project the ball toward the waiting batter.

The gear reduction unit 48 is a standard piece of machinery commonly used for securing a greatly reduced R. P. M. from a high R. P. M. motor. The unit 48 is secured to the platform 22 and connected by belt and pulley drive 59 to a standard electric motor 49 mounted on the platform 21.

The ball selecting means D, as most clearly illustrated in Figs. 3 and 4, comprises a ball hopper 61 in which is mounted a reciprocating ball selecting elevator 62 and from which hopper leads a trough 63 to a point adjacent the ball grip pocket 40 when the throwing arm is in its "cocked" position, and at which point is arranged a ball release element 64.

The hopper 61 is a cubicle-like structure mounted atop of the frame A with the bottom sections 66 and 67 of the hopper inclined inwardly downward toward a narrow flat middle section 68 (see Fig. 3) at one end of which middle section 68 is located the elevator 62.

The elevator 62 is a hollow rectangular box-like affair with an inclined top plate 69 and a wing extension 71. The elevator 62 is mounted on a bracket 72 having bearings 73 slidably supported on a post 74 secured to the platform 22 (Fig. 2). The elevator 62 and the wing extension 71 reciprocate in appropriate openings in the bottom sections 66, 67, and 68 of the hopper 61.

The reciprocal movement of the elevator 62 is effected by a crank arm 76 and link 77 pivoted together at 78. The arm 76 is rigidly connected to the shaft 79 (Fig. 1) of the reduction gear unit 48. The link 77 is hinged at 81 to the bracket supporting the bearings 73.

The trough 63, as here shown most clearly in Figs. 3 and 4, includes a wire section 82 and an angle bar section 83. The wire section 82 extends downwardly inclined around the corner of the hopper 61 from a slot 84, through which balls are discharged from the elevator 62, to join the downwardly inclining section 83 at the back of the hopper 61. The section 83 continues downwardly to a point adjacent where the ball grip pocket 40, of the throwing arm B, is disposed when the motor driven spring tensioning and release mechanism C is in the process of "cocking" the spring 32. A bottom plate 86 extends beyond the angle bar sides of the trough section 83 to dispose the plate end closely contiguous to the fingers 41 in the retracted position of the bar 24.

The ball release element 64 is shown here of wire formation, comprising the arcuate-shaped loop 87 and a depending tripping arm 88. These parts are arranged transversely of each other and secured to a hub 89 so that they swing as a unit in the bearings 91 forming a part of a bracket 92 secured to an adjacent post 13 of the frame A.

The tripper arm 88 extends quite some distance below the bearings 91 so that gravity normally positions the loop 87 to hold balls in the delivery end of the trough section 83 (Fig. 7) and normally disposes the finger 93 in the path of one of the ball grip plates 26, as the throwing arm B is swinging back into cocked position.

As will be most clear from Figs. 6 and 7, the opposed free ends of the loop 87 are spaced apart both circumferentially and axially a distance that permits the holding of a line of balls by the normally positioned loop 87 and a releasing of them one at a time when the loop 87 is swung on the bearings 91 through contact of the tripper finger 93 with a plate 26.

In order to adjust the tensioning of the spring 32, and to thereby accommodate the throwing force of the arm B to the conditions required for batting practice, an arm 94 (Fig. 1) is rigidly anchored to the shaft bar 20 and connected by cable 96 to a chain 97 (Fig. 4) adjustably positionable in a slotted plate 98 located on cross bar 18.

The operation of this improved ball pitching machine is as follows:

The machine is set up at a point approximately the normal distance from that at which a batter stands for batting practice as a pitcher would stand. A quantity of balls is placed in the hopper 61 and two or three are set in the trough section 83 (Fig. 7).

The motor 49 is started and, through the action of the reduction gear unit 48 and the chain and sprocket (57, 56, 58) mechanism, the cam 34 is given a continuous rotation at a predetermined speed in the direction of the arrow 99 (Fig. 1).

As the roller 33 begins to ride up onto the high point 34*a* of the cam 34 (Fig. 2) the crank shaft 23 is rocked to swing the ball grip and throwing arm B clockwise (Fig. 4) from a position where the bar 24 is pendent at the side of the frame A (Fig. 10) to the "cocked" position, as shown in Figs. 4 and 8. During this movement the shaft 23 is rotating, shifting the crank pin upwardly to tension the spring 32.

As the ball grip and throwing arm B moves toward its cocked position the lower portion of the plate 26 nearest the frame contacts the tripper finger 93 (Fig. 4) to actuate the ball release loop 87 and permit the first ball on the frame 83 (the position shown in Fig. 7) to be released (Fig. 6) to roll into the ball grip pocket 40 (Figs. 4, 5 and 8).

As the roller 33 passes over the extremity 34*b* (Fig. 1) of the cam 34 the now highly tensioned spring 32 is suddenly released. It snaps the crank shaft 23 in a counterclockwise direction with a consequent similar swing of the ball grip and throwing arm B. From the position shown in Fig. 8, the arm moves through an underhand arc, as illustrated in Figs. 9 and 10 and propels the ball off the distal end of the claws 38 toward the waiting batter.

As the throwing arm B reaches its ball discharging position, and the force of the spring 32 is spent, the brake shoe 37, acting on the cam 36, holds the throwing arm B under tension allowing it to gradually drop back to a normal pendent position at the side of the frame more quickly and without the plates and arm 24 swinging in long back and forward arcs, pending another cocking operation.

During the travel of the roller 39 over the cam 34, the arm 76 and link 77 successively effect a lowering of the ball selecting elevator 62 to pick up a ball on the top plate 69 and then a raising of the elevator 62 to bring the selected ball up to the slot 84 to permit it to roll out onto the wire section 82 of the trough 63.

During the lowering and raising of the elevator 62 the wing extension 71 serves to so shift the balls collected around the elevator 62 as to guide them one at a time down the bottom incline 66 and/or 67 into position to settle on the top plate 69 of the elevator 62.

Adjusting the position of the trigger 27, by means of the wing nut bolts 46, so as to alter the depth of the pocket 40, results in changes in the trajectory of the ball as

propelled from the distal end of the claws **38**. The accidental positioning of the seams of a ball on the serrations **45** of the claws **38** serves to vary the rotary effect on the propelled ball and consequently the curving tendencies of the ball between its discharge from the claws **38** and the passing of the batter.

By adjusting the position of the chain **97**, in the slotted plate **98**, the throwing force of the spring **32** may be varied somewhat to accommodate conditions that may be required for the appropriate use of the machine.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. An underhand style ball pitching machine comprising, a supporting frame, a ball throwing arm journaled thereon for reciprocation in a vertical arc, a ball grip secured to the end of said arm, said ball grip comprising a pair of arcuate-shaped axially spaced parallel claws and a pair of radially disposed fingers having the ends thereof spaced from the claws a distance not less than the diameter of the ball to be thrown and thereby forming a ball receiving pocket between the opposed faces of said claws and fingers; spring tensioned means for actuating the arm to discharge the ball, and motor driven mechanism for tensioning and predeterminedly releasing the spring means to swing the arm in a downwardly and forwardly direction to propel the ball from the machine at a point below said arm journal axis.

2. An underhand style ball pitching machine comprising, a supporting frame, a ball throwing arm journaled thereon for reciprocation in a vertical arc below a horizontal plane through the axis of the arm journal, a ball grip secured to the end of said arm; said ball grip comprising a pair of arcuate-shaped axially spaced parallel claws and a pair of radially disposed fingers having the ends thereof spaced from the claws a distance not less than the diameter of the ball to be thrown and thereby forming a ball receiving pocket between the opposed faces of said claws and fingers; spring means for swinging said arm in a downwardly and forwardly direction to discharge the ball from said claws at a point below the axis of said arm journal, and motor driven cam means retracting the arm and tensioning and predeterminedly releasing the spring means.

3. In an underhand style ball pitching machine comprising, a supporting frame, a ball throwing arm journaled thereon for reciprocation in a vertical arc, a ball grip secured to the end of said arm; said ball grip comprising a pair of arcuate-shaped axially spaced parallel claws and a pair of radially disposed fingers having the ends thereof spaced from said claws a distance not less than the diameter of the ball to be thrown and thereby forming a ball receiving pocket between the opposed faces of said claws and fingers, a trigger adjustable on said grip for altering the positioning of a ball in the pocket so as to regulate the trajectory of the thrown ball; spring means for actuating said arm to discharge the ball, and motor driven mechanism for tensioning and predeterminedly releasing the spring means to swing the arm in a downwardly and forwardly direction to propel the ball, and release the ball from said claws at a point below the axis of said arm journal.

4. In an underhand style ball pitching machine comprising, a supporting frame, a ball throwing arm journaled thereon for reciprocation in a vertical arc, a ball grip secured to the end of the arm and being in the form of a pair of arcuate-shaped axially spaced parallel claws and a pair of radially disposed fingers having the ends thereof spaced from the claws a distance not less than the diameter of the ball to be thrown and thereby forming a ball receiving pocket between the opposed faces of the claws and fingers, spring means for actuating the arm to discharge the ball, motor driven mechanism for tensioning and predeterminedly releasing the spring means to swing the arm in a counterclockwise direction to propel the ball, and serrations formed on the ball contacting edges of the claws to so engage the ball seams as to influence the rotative tendencies of the ball when discharged from the claws.

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