Dec. 23, 1941. B. W. MOSER 2,267,162

BALL-THROWING MACHINE

Filed Nov. 21, 1938 3 Sheets-Sheet 1

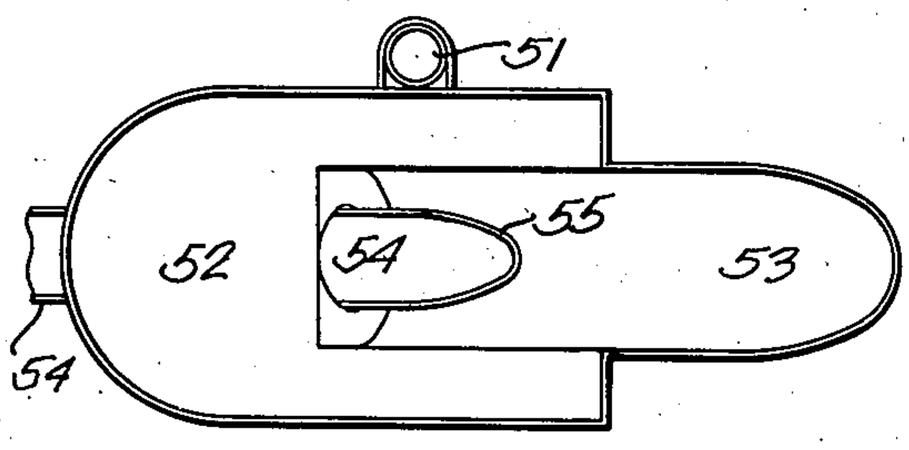

FIG. 2.

FIG. 1.

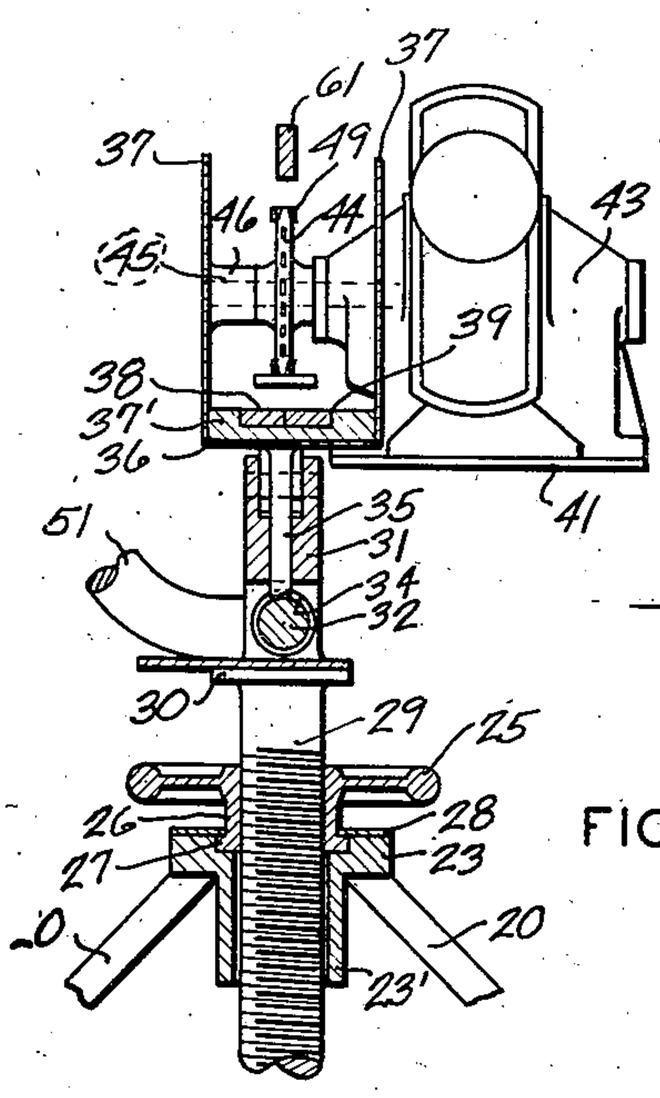

FIG. 3.

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FIG. 6.

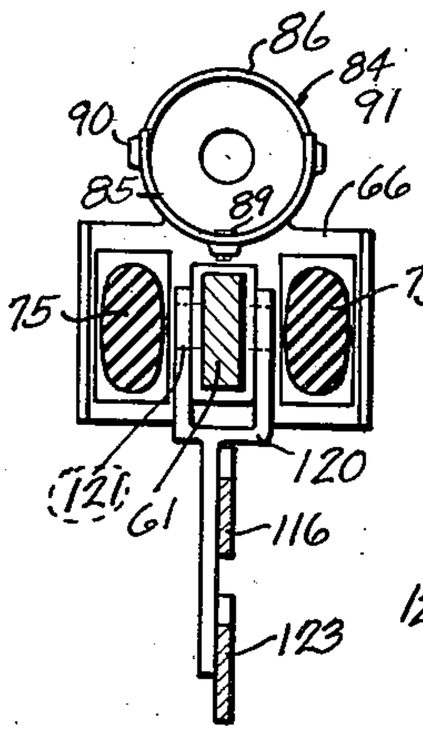
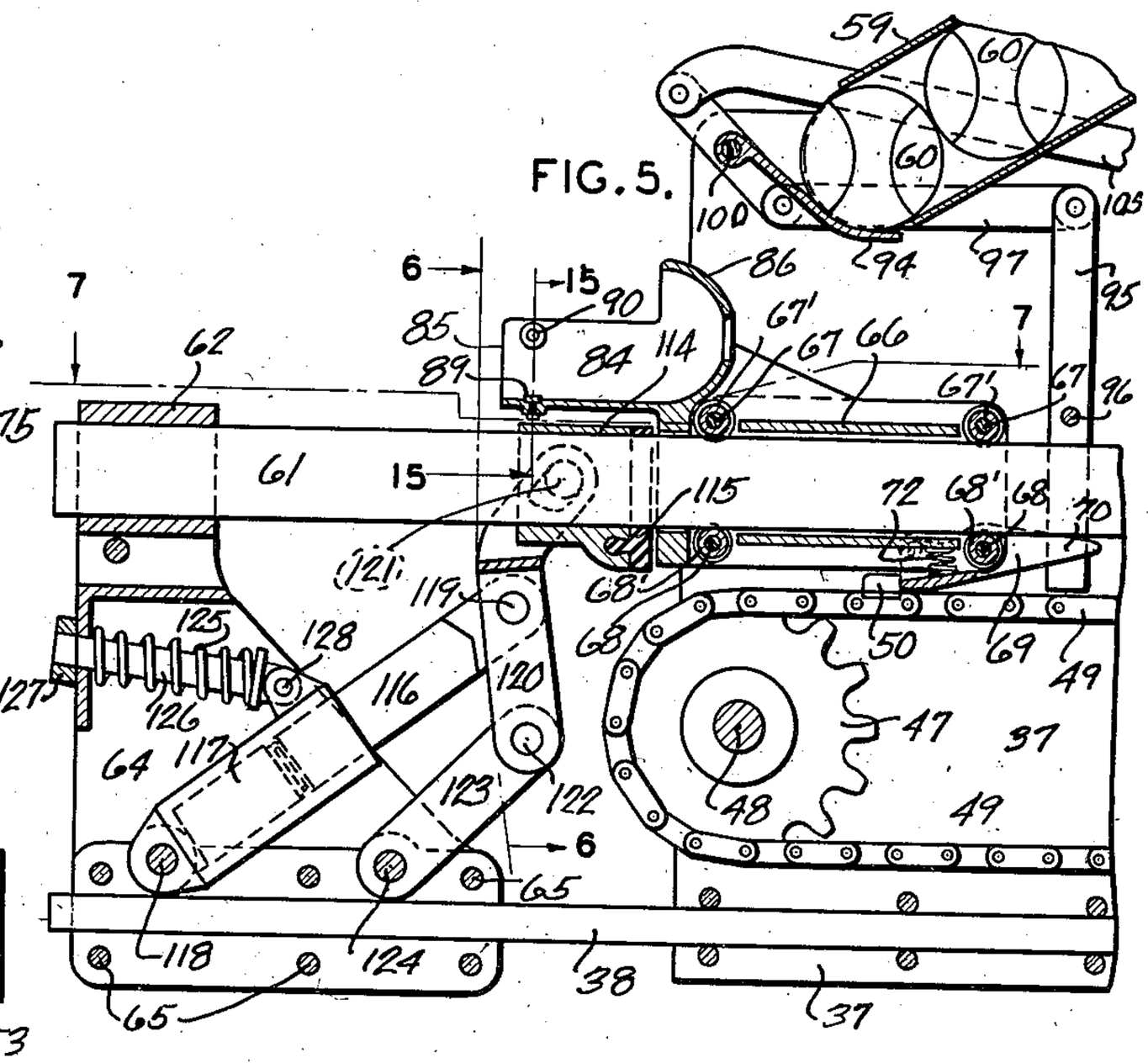


FIG. 5.



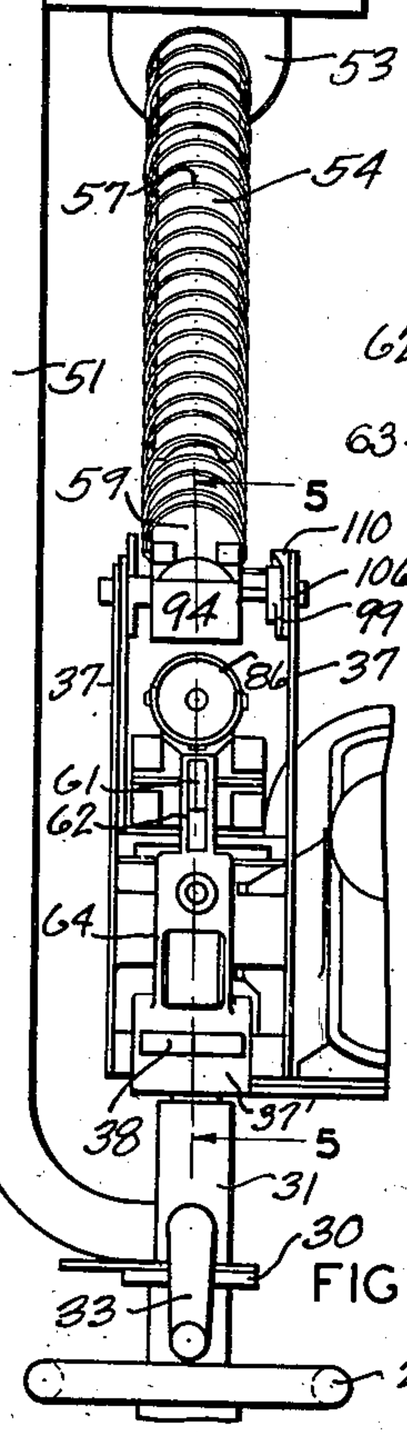


FIG. 4.

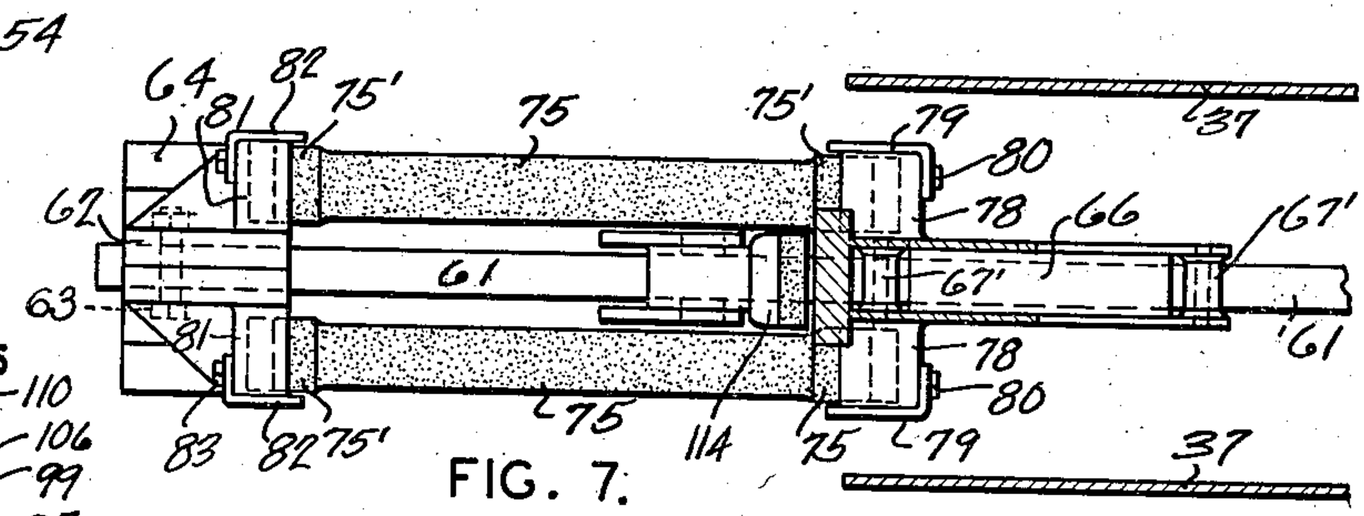


FIG. 7.

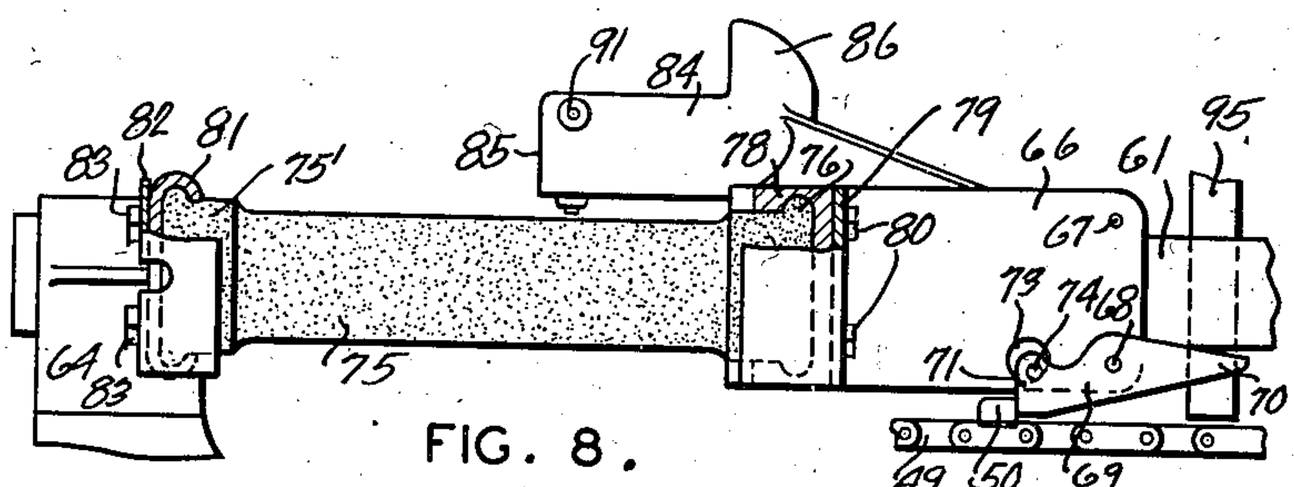


FIG. 8.

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BALL-THROWING MACHINE

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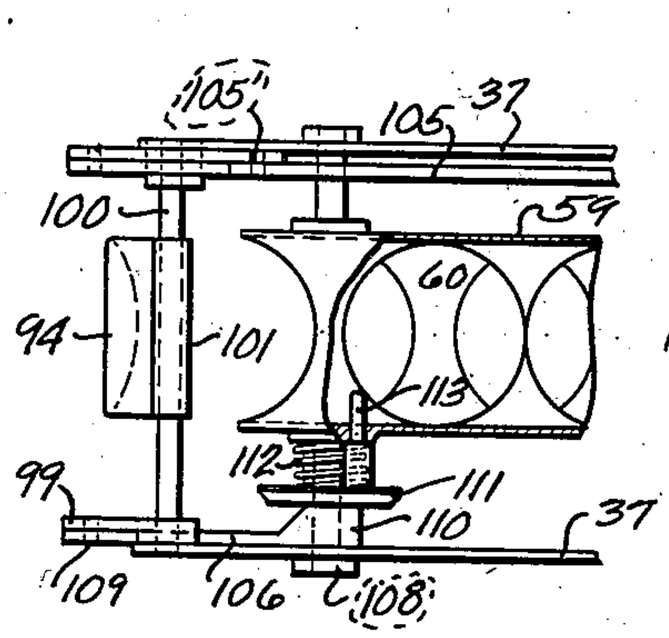

FIG. 10.

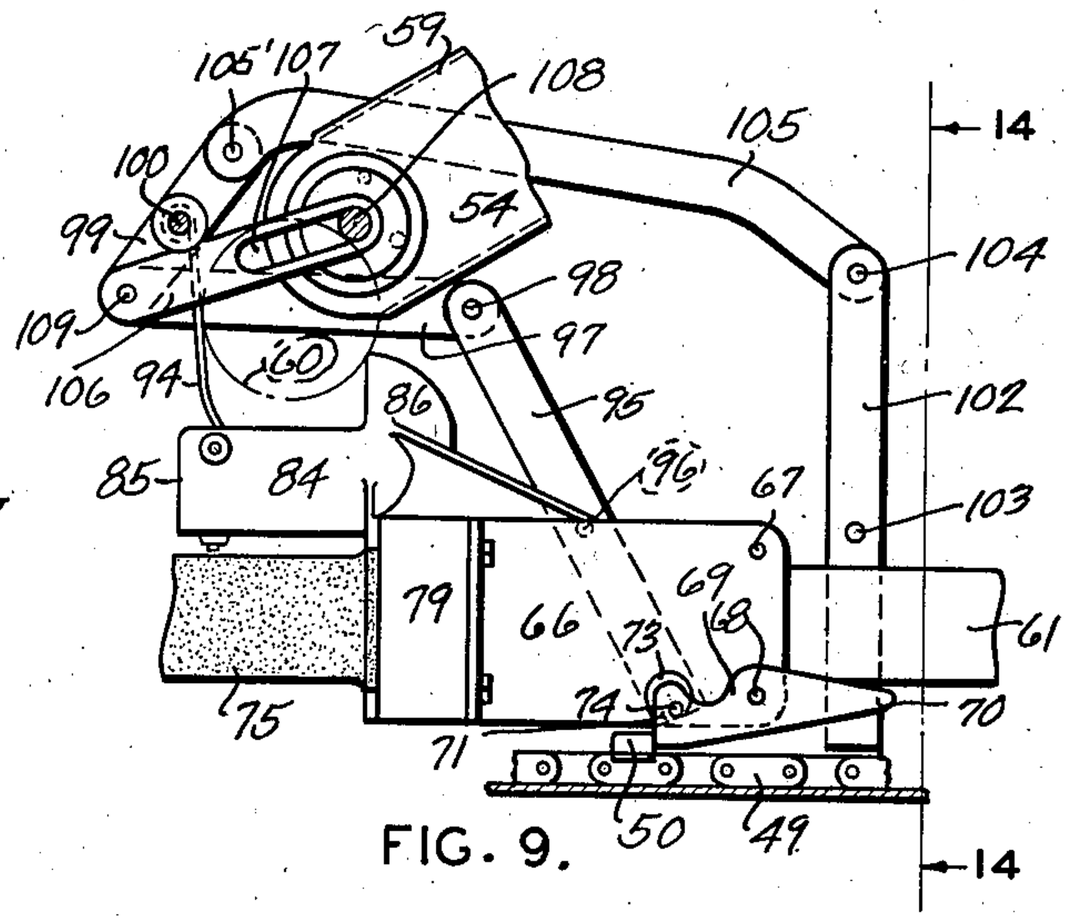

FIG. 9.

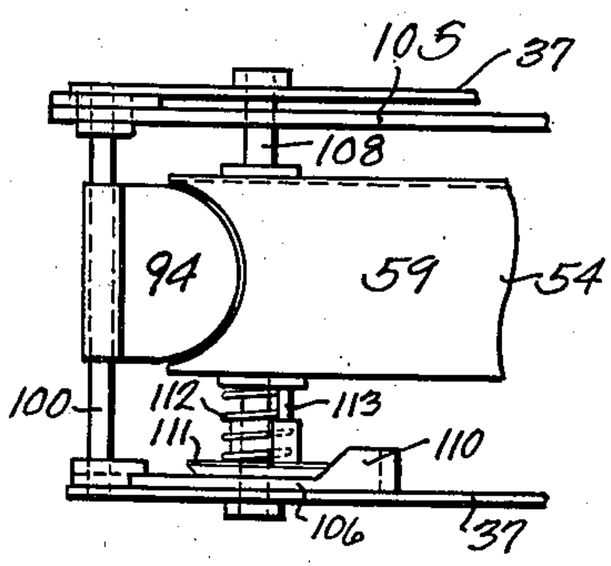

FIG. 12.

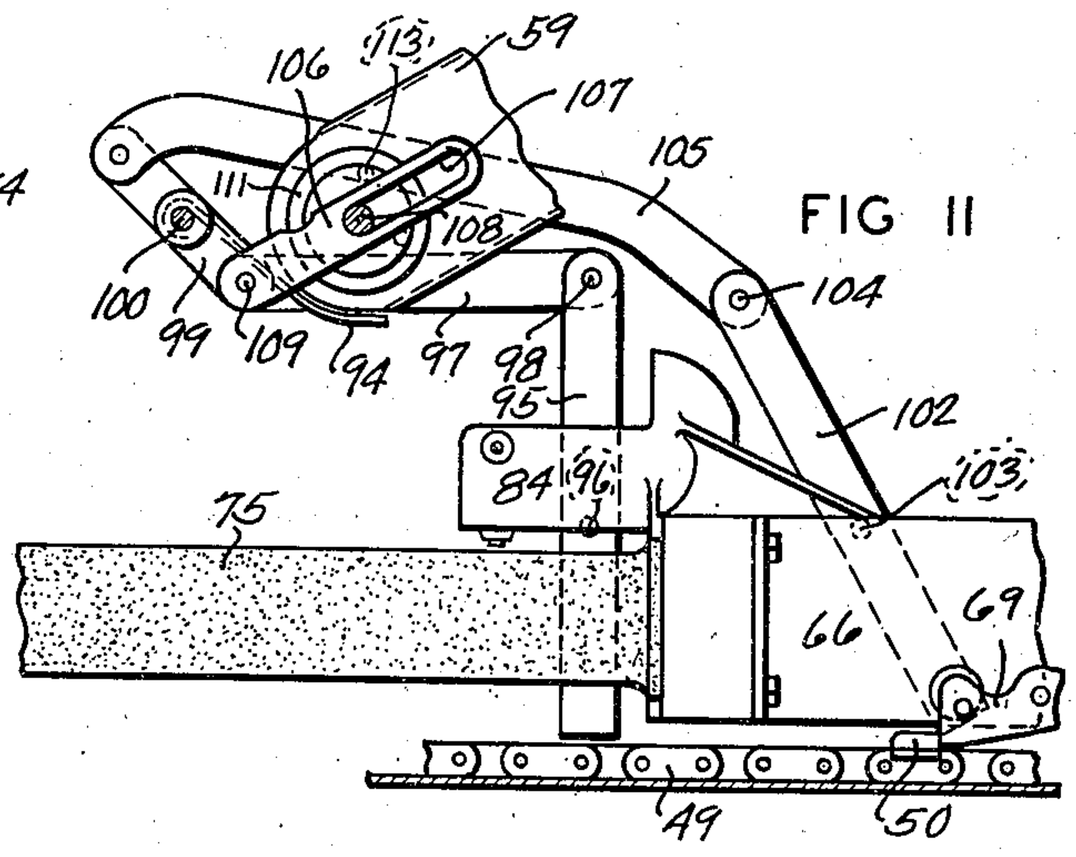

FIG 11

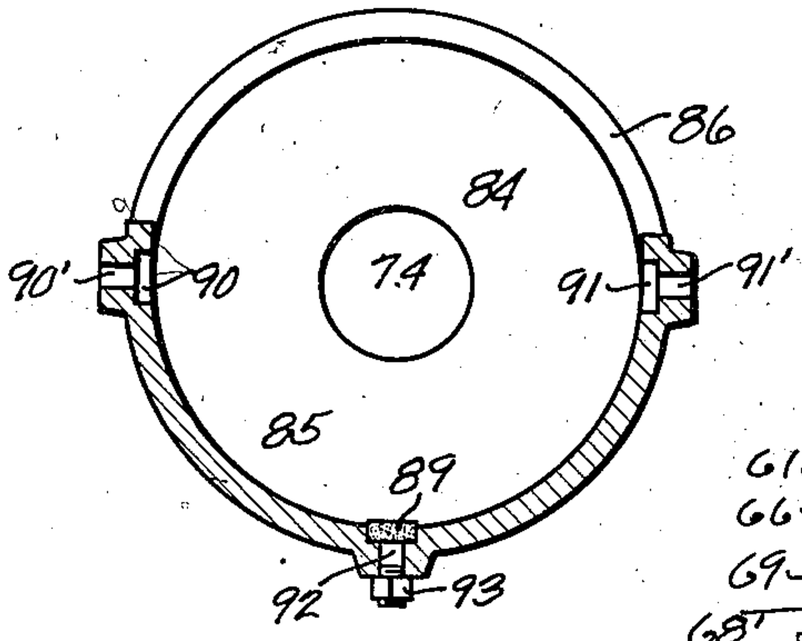

FIG. 15.

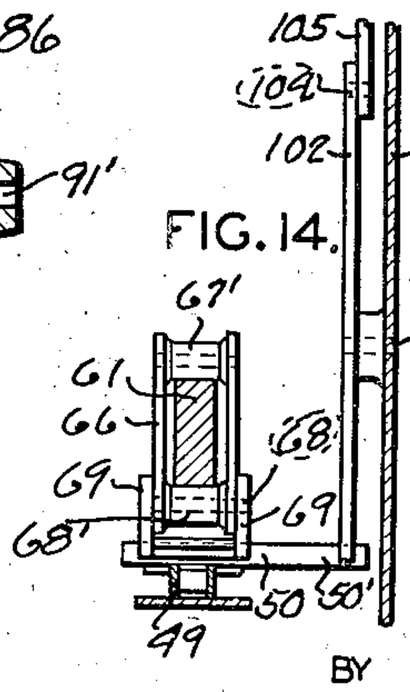

FIG. 14.

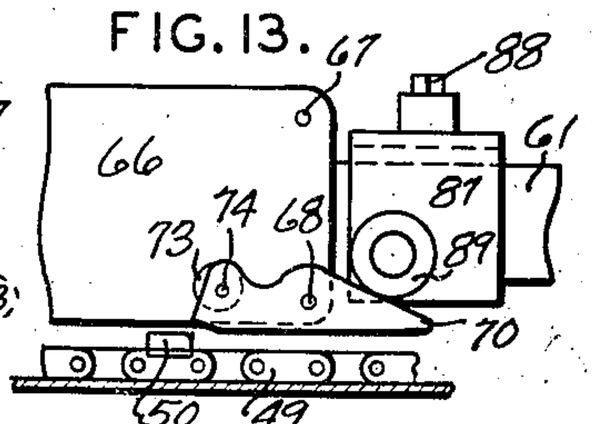

FIG. 13.

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Patented Dec. 23, 1941 2,267,162

UNITED STATES PATENT OFFICE

2,267,162

BALL-THROWING MACHINE

Byron W. Moser, St. Louis, Mo., assignor to Baseball Machines, Inc., St. Louis, Mo., a corporation of Missouri

Application November 21, 1938, Serial No. 241,533

2 Claims. (Cl. 124—17)

My invention relates to a ball-throwing machine, and has for its principal object to produce a mechanism that will throw a ball at a predetermined speed, which speed can be regulated by the operation of the apparatus, and at such height and in such horizontal direction as may be desired and operable to accomplish such results at the will of the operator, who only has to make certain simple manipulations to accomplish the desired adjustment. Another object is to provide elastic means which are subject to a straight pulling strain, without any bending strain incident to the throwing action; that is to say, the pull upon the elastic means in order to store up the propulsive power and the rapid contracting of such means is in a substantially straight, horizontal line, without any curves or bending distortions. By this means I increase very considerably the life and activity of my elastic means. Another object is to provide a device in which the ball magazine remains in the same plane, even when the device is tilted to elevate the forward end to an acute angle. The balls are always fed from a magazine which utilizes gravity to cause said balls to discharge from said magazine down the ball-receiving member to the throwing mechanism of my device. Another object is to cushion the impact of the throwing mechanism, but not until the ball has been projected forwardly by the throwing mechanism at the maximum rate of speed attained by such throwing mechanism; that is to say, almost instantaneously with the discharge of the ball from the throwing mechanism, I cushion the shock of the forwardly moving throwing mechanism so as to avoid possible harm to the device. Still another object is to provide shiftable means for contact with the propelled ball at one side or the other, or at the bottom of the ball as it is ejected from my device in order to impart a right or left curve to said ball, or a "drop," which is induced by a spin given such ball as it is forcefully propelled from my device. By my arrangement I mechanically impart to the forwardly moving ball substantially the same kind of twist, or spin, imparted to it by a human being pitching such a ball and throwing an "inshoot," an "outshoot," or a "drop." This is highly advantageous in a ball-throwing machine, as it makes it much more difficult for a batter to strike the pitched ball. A still further object is to provide for the accurate delivery of only one ball at the time to the throwing mechanism. A still further object is to provide an electric motor for operating the device and to effectuate automatically the functioning of the throwing mechanism and the ball delivery mechanism, so that only a single ball is delivered to said throwing mechanism from the ball magazine. A final object is to secure a delivery rack for the balls with a spiral, elastic guard surrounding said rack and said balls to prevent the balls from being displaced from said rack except at the point where said balls enter the throwing mechanism, said spiral guard being subject to contracting and expanding when the device is tilted upwardly or downwardly.

By my construction I have produced a rugged piece of mechanism, which is relatively simple and highly efficient in operation, and which is substantial and durable.

Fig. 1 is a side elevation of my improved ball-throwing device.

Fig. 2 is a plan view of the ball magazine.

Fig. 3 is a vertical section taken on line 3—3, Fig. 1.

Fig. 4 is an end elevation of my improved ball-throwing device.

Fig. 5 is an enlarged, longitudinal section taken on line 5—5, Fig. 4.

Fig. 6 is a cross-section taken on line 6—6, Fig. 5.

Fig. 7 is a horizontal section taken on line 7—7, Fig. 6.

Fig. 8 is a side elevation, partly in section, of the securing means for the elastic throwing elements.

Fig. 9 is a side elevation of the ball delivery means, showing parts in ball-feeding position.

Fig. 10 is a plan view, partly in section, of Fig. 9.

Fig. 11 is a side elevation of the ball-delivery means showing parts returned to normal.

Fig. 12 is a plan view of Fig. 11.

Fig. 13 is a partial side elevation of the releasing mechanism.

Fig. 14 is a cross-section taken on line 14—14, Fig. 9.

Fig. 15 is a cross-section taken on line 15—15, Fig. 5.

As illustrated in the drawings, I provide a base 20, preferably a tripod, which may be secured to the ground or any other support 21 by bolts 22. At the top of the tripod 20 is a circular member 23, which extends downwardly as at 23', between the three legs of the tripod. A locking latch 24 is carried by said tripod 20. A screw wheel 25 is rotatably mounted on the member 23. The wheel 25 has a downwardly projecting circular sleeve 26, internally threaded, and with an

out-turned flange 27 at the lower portion of said sleeve 26, by which it is rotatably secured to the circular member 23 by the disk 28. A threaded post 29 is vertically movable in the circular member 23 and its downwardly projecting extension 23'. By this means I can elevate or lower the throwing mechanism, as well as rotate said mechanism horizontally. The latch 24 is cone-shaped, as shown in Fig. 1, so as to impinge against the post 29 and lock it against undesirable movement. At the upper end of the post 29 I provide a disk-shaped cap 30 for the support of the principal operating portions of my ball-throwing mechanism.

A housing 31 is supported upon the cap 30, and appropriately secured thereto, and a rotatable rod 32 is journaled in said housing 31, a handle 33 being secured to the free end of said rod 32 for rotating said rod. Near the inner end of the rod 32 is a worm 34 on said rod, which meshes with a gear sector 35 carried by a plate 36. The walls of the housing 31 are bound together by a bolt or rivet 31' passing through the upper corner section of the same. The purpose of the worm 34 and the gear sector 35 is to change the vertical inclination of the forward end of my ball-throwing mechanism.

A larger housing 37 is mounted upon the plate 36 and secured thereto in any appropriate manner. On the lower wall 37' of the housing 37 are two flat bars 38, which preferably are seated in a recess 39 in said wall 37'. The bars 38 project forwardly beyond the end of the housing 37 to serve as a support for elements hereinafter to be described. A motor 30 is mounted upon a plate 41 by bolts 42. A gear reduction drive is in the housing 43. The motor and gear reduction drive are standard devices and no further description of them is deemed necessary. The plate 41 is mounted upon the plate 36 and is appropriately secured thereto. The housing 37 is carried upon and appropriately secured to said plate 41.

A sprocket wheel 44 is mounted on a shaft 45 extending from the gear reduction drive 43, the outer end of said shaft 45 being journaled at 46 on one of the side walls of the housing 37. Another sprocket wheel 47 is mounted loosely near the forward end of the housing 37 on the shaft 48, which shaft is appropriately journaled within said housing. A link chain belt 49 passes over the sprocket wheels 44 and 47, being driven by the sprocket wheel 44. To the belt 49 is secured a bar 50 which is longer than the width of the chain 49 for a purpose to be hereinafter described. There may be more than one bar 50 secured at appropriate intervals to the chain 49, depending on the number of throwing operations desired during the movement of said chain.

Secured to the base of the housing 31 is a standard 51, which supports at its upper end a ball magazine 52 provided with a lower section 53 adapted to receive the end of a chute 54. The said chute 54 is semi-circular in cross-section, with the end 55 tapered as shown in Figs. 1 and 2. The chute 54 receives the balls from the ball reservoir 52. A member 56 extends forwardly and downwardly from the lower section 53 and serves to support the chute 54 and an encircling elastic wire guard 57, which guard prevents the balls from being displaced from the chute 54. As will be noted in Fig. 1, the ends of the wire guard 57 abut against the inner edge of the section 53 and a shoulder 58 on the forward, lower end of the chute 54, which lower end is circular in cross-section as shown at 59 in Figs. 1 and 5, the diameter of the enclosed end being sufficient to allow the balls 60 to pass freely therethrough. When the machine is tilted upwardly or downwardly by means of the handle 33, worm 34, and gear section 35, the chute 54 slides upwardly or downwardly as the case may be, the end 55 moving in the section 53, and the wire guard 57 expands or contracts at the same time. The forward end 59 of the chute 54 is held by the housing 37.

In the housing 37 is mounted a bar 61 which is supported at its forward end by a split bearing 62 held together by a bolt 63. The bearing 62 is a part of a member 64 which is clamped onto the bars 38 near the forward ends by means of the bolts 65. This permits longitudinal adjustment of said member 64 when necessary. Slidable on the bar 61 is a carriage 66 which is preferably sectional and secured together by bolts or rivets 67 and 68, carrying rollers 67' and 68', near one end thereof, one of said rivets 68 serving as a pivot pin for a trigger 69, which is inclined toward the end 70, the other end 71 serving as an abutment against which the bar 50, carried by the chain or belt 49, is adapted to contact for the purpose of moving said carriage 66 rearwardly. A coil spring 72 is fastened in the larger end of the trigger 69, the upper end of said spring 72 resting against the bottom surface of the carriage 66 (Fig. 5). The purpose of the spring 72 is to tend to restore the trigger 69, after it has been tripped as hereinafter described, so that said trigger may be again engaged by the bar 50. Openings 73 are formed in each side wall of the carriage 66 (only one being shown in the drawings), through which opening passes a rod 74 which limits the downward movement of the inner end of the trigger 69. There are two triggers 69 exactly alike, one on each side of the carriage 66, and these two triggers are connected together by the rod 74. At the forward end of the carriage 66 are removably secured strong, rubber members 75 of oval shape, as shown in Fig. 6, one on each side of the carriage 66. The ends of these rubber members 75 are preferably thickened, as shown at 75', and said ends are preferably reinforced with some stiffening and strengthening material, such as fabric. The ends fastened to the carriage 66 are secured in recesses 76 by the rounded ends 77 on the rubber members 75 slipped into the enlarged ends 78 on the carriage 66 (see Fig. 8). These ends of the rubber members 75 are then secured in place by caps 79 fastened onto ends 78 by screws 80. The forward ends of the rubber members 75 are shaped similarly to the opposite ends of said members secured to the carriage 66, and such forward ends caught by the hook-shaped portion 81, into which said forward ends are slipped and fastened in place by the caps 82 held by screws 83 passing into the portion 81, which portion is preferably an integral part of the member 64. Thus the rubber members 75 are securely held in place and are readily removable and replaceable. Also at the upper, forward portion of the carriage 66 is mounted a ball-receiving member 84 into which a ball 60 is adapted to drop from the end 59 of the ball chute 54. This member 84 has a forwardly extending, semi-circular trough 85 and a rear hood 86 appropriately curved as shown, into which the ball 60 may move when the carriage 66 is rapidly projected forwardly by the rubber member 75 when such carriage has been carried rear-

wardly by the bar 50 on the belt 49 and the trigger 69 tripped by the tripping block 87, adjustably positioned on the bar 61 by the bolt 88, when the inclined end 70 of the trigger 69 passes beneath the roller 89 positioned near the bottom of the block 87. The power stored up in the rubber members 75 is very considerable when they are stretched, and the sudden releasing of the carriage when the trigger 69 is tripped by the roller 88 on the block 87 propels said carriage forwardly with considerable speed, the ball 60 resting against the inner curved hood 86 until the carriage 66 reaches its extreme forward position when said carriage is suddenly checked, sending the ball rapidly forward under the speed imparted to it through the contracting of the stretched rubber members 75. In order to impart a curve to the outwardly projected ball 60 I provide a frictional device 89 which may be positioned at some appropriate point in the trough 85, as shown in Fig. 15. This frictional device 89 is placed in the bottom of the trough 85, and tends, as the ball 60 passes over said device 89, to impart a rolling spin or twist to said ball in order to cause said ball to "drop" about the time it reaches the batter. In Fig. 15 I have shown two other recesses 90 and 91 with perforations 90' and 91' extending through the wall of the trough 85 through which passes the bolt 92 attached to the frictional device 89 and secured by a nut 93 on the outer end of the bolt 92. Thus, when the frictional device 89 is to be moved from the bottom of the trough 85 to either side thereof in order to supply the requisite right or left hand twist or spin to the ball 60 to cause it to make an "inshoot" or an "outshoot" before reaching the batter when projected toward him, I remove the nut 93 from the bolt 92 and slip said bolt through either perforation 90' or 91', as the case may be, and secure the frictional device 89 in the recess 90 or 91, as the case may be. It will be understood that I only employ one frictional device 89 to impart only one definite twist or spin to the ball 60. I may provide an opening 64 in the rear wall of the hood 86 to permit the free escape of air which might be entrapped when the ball 60 enters said hood 86.

I will now describe the mechanism by which the balls 60 are delivered to the trough 85 and hood 86 of the ball-receiving member 84 from the chute 54. The balls 60 slide down the chute 54 into the enclosed, circular, lower end 59 where the lowermost ball rests against a trap-door 94, which is normally closed as shown in Fig. 11. The carriage 66 moves rearwardly by reason of the bar 50 on the chain belt 49 striking the trigger 69 on the lower rear corner of the said carriage 66 (when the belt 50 is operated by the motor 40), and the carriage and bar move rearwardly together. The extension 50' on the bar 50, when it travels rearwardly a sufficient distance, strikes against a bar 95 at the downward end thereof, and moves the lower end of said bar 95 rearwardly. The bar 95 is pivoted at 96 to the housing 37. This causes the upper end of the bar 95 to move forwardly. A link 97 is pivoted at 98 to the bar 95 and to a second link 99, which link 99 is pivoted at 100 to the housing 37. The trap-door 94 is loosely mounted on the pivot pin 100 and rotates with the hub 101, of which the trap-door 94 may be an integral part. As the link 97 moves forwardly when propelled by the bar 95, it rocks the link 99 about its pivot 100, thus moving the lower end of said link 99 forwardly and rotating the hub 101 about said pivot 100 and causing the trap-door 94 to move downwardly a sufficient distance to permit a ball 60 to drop from the end 59 of the chute 54 into the trough 85 on the carriage 66, as illustrated in Fig. 9. The carriage 66 has been carried rearwardly by the bar 50, on the belt 49, contacting with the trigger 69 on said carriage 66, a sufficient distance so that the ball 60 dropping through the open trap-door 94 does not strike the rear hood 86 of the ball-receiving member 84, but just clears the same, as is clearly illustrated in Fig. 9. It will be understood that the speed of travel of the belt 49 is relatively slow. When the bar 50 has reached the position shown in Fig. 9 in its rearward travel, the said bar passes beneath the end of the bar 95. The bar 95 remains in the position shown in Fig. 9 until the bar 50 on the belt 49 has traveled rearwardly sufficiently to contact with the lower end of another bar 102, which is pivoted at 103 to the housing 37. The upper end of the bar 102 is pivoted at 104 to a curved link 105, the forward end of which link is pivoted at 105' to the upper end of the link 99. As the bar 50 continues its travel rearwardly with the moving belt 49, it propels the lower end of the bar 102 rearwardly and moves the upper end of said bar forwardly, as shown in Fig. 11, thus moving forwardly the curved link 105 and the upper end of link 99, and thereby restoring the trap-door 94 to its closed position, as shown in Fig. 11. A member 106 is slotted as at 107 so as to permit a rod 108 to pass through such slot, said rod 108 being mounted in the housing 37. The forward end of the member 106 is pivoted as at 109 to the links 97 and 99, the pivot 109 serving to secure the links 97, 99, and the member 106 together. On the inner, slotted end of the member 106 is a cam portion 110. A circular cam member 111 is loosely mounted on the rod 108 and pressed outwardly by a coil spring 112, surrounding said rod 108 and abutting against one face of the cam member 111 and one side of the portion 59 of the chute 54. Thus the cam member 111 is normally pressed outwardly against the member 106, as shown in Fig. 12. When the member 106 is moved forwardly, as shown in Figs. 9 and 10, the cam member 111 is caused to ride up on the inclined face of the cam portion 110 of the member 106 (see Fig. 10). A series of pins 113 are secured to one surface of the cam member 111 for the purpose, when the cam member 111 rides upon the cam portion 110 of the member 106 (as shown in Fig. 10), of causing said pins 113 to pass between the ball 60 which is being delivered through the trap-door 94, from the end 59 of the chute 54, and the next succeeding ball, thus restraining the row of balls still remaining in the chute 54 from dropping down and clogging the mechanism. When the trap-door 94 is returned to closed position, as shown in Fig. 12, the mechanism just described causes the cam member 111 to be released from the cam portion 110 of the member 106, and by virtue of the expansion of the coil spring 112 said cam member 111 is caused to return to normal position and the pins 113 removed from the path of downward travel of the balls 60.

As shown in Fig. 13, the trigger 69 is being tripped by passing under the roller 89 on the block 87. This permits the forward movement at relatively high velocity of the carriage 66, under the influence of the stretched rubber members 75, carrying a ball 60 in the ball-receiving member 84. The carriage 66 moves at relatively

high velocity toward the forward or delivery end of the mechanism until the forward end of said carriage 66 strikes against a member 114, which is slidably mounted on the bar 61, and which member has a rubber cushion 115 at the inner end thereof against which the carriage 66 is adapted to strike. This causes an instantaneous stopping of the carriage 66, but permits the ball 60 carried in the ball-receiving member 84 to be projected forwardly at the speed imparted to it by the forwardly projected carriage 66. When the carriage 66 is momentarily halted by the member 114, said member may, after the impact of the carriage 66, travel forwardly along the bar 61 against the action of plunger 116, contained in an air cylinder 117 pivoted at 118 to the housing 37. The plunger 116 is pivoted at 119 to a link 120, which in turn is pivoted at one end, as at 121, to the member 114 and at the other end, as at 122, to another link 123, which is pivoted as at 124 to the housing 37 (see Fig. 5). To assist the cushion 117 to absorb the impact of the carriage 66 against the member 114, I provide a coil spring 125 surrounding a pin 126, which is loosely journaled as at 127 in the housing 37. The inner end of the pin 126 is pivoted to the cushion member 117 as at 128. Thus, when the carriage 66 strikes against the member 114, it is momentarily halted, and then the member 114 and carriage 66 may continue to move along the bar 61 until the air cushion 117 and spring 125 stop the forward movement of said parts 66 and 114, thus cushioning the impact blow of the carriage 66 against the member 114.

The tripping block 87 is longitudinally adjustable along the rod 61. When it is desired to increase the tension in the rubber members 75 when the carriage 66, to which one end of said members are fastened, is moved rearwardly by the belt 49, the bolt 88 is loosened and the block 87 is moved rearwardly along the bar 61, thus increasing the stretching of the rubber members 75. If desired, indicia may be supplied to bar 61 to indicate the speed of travel of the projected ball 60, when thrown from the machine. As already noted, the machine is capable of vertical and horizontal adjustment, as well as the vertical adjustment of the delivery end of said machine.

I claim:

1. A ball-throwing machine comprising a support a motor, a belt operable by said motor, a slidable carriage mounted on said support and normally in a forward position, an abutment on said carriage, a member on said belt for engagement with said abutment at periodical intervals to cause said belt and said carriage to travel together to a predetermined point, a tripping member for engagement with the abutment releasing said carriage from said belt, means associated with said carriage for returning said carriage at relatively high velocity to its normal forward position when released from said belt, a ball-receiving member on said carriage, and means for cushioning the impact of said carriage when returned to its normal forward position without materially lessening the velocity of the ball as it is projected from said machine.

2. A ball-throwing machine comprising a support, a motor, a link belt operable by said motor, a bar transversely projecting from said belt, a slidable carriage mounted on said support and normally in a forward position, a trippable member on said carriage projecting into the path of travel of said bar on said belt for periodical engagement between said belt and said carriage to cause said belt and said carriage to travel together to a predetermined point, a slidably adjustable tripping member for tripping said trippable member to disengage said carriage from said belt, means associated with said carriage for returning said carriage at relatively high velocity to its normal forward position when disengaged from said belt, a ball-receiving member on said carriage, and means for cushioning the impact of said carriage when returned to its normal forward position without materially lessening the velocity of the ball as it is projected from said machine, said cushioning means being mounted in front of and on the same support as the slidable carriage.

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