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ROTARY BALL PITCHING MACHINE

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Fig. 1.

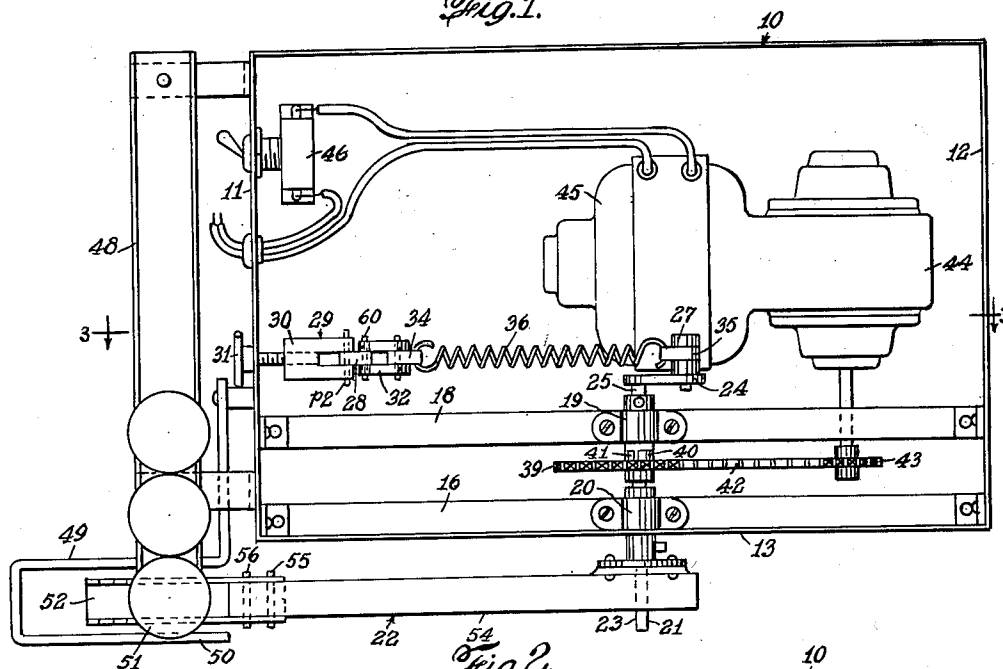


Fig. 2.

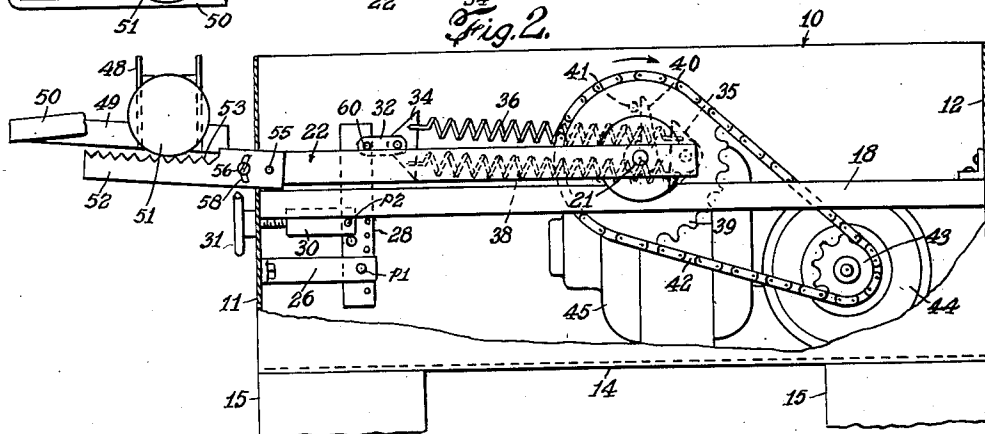
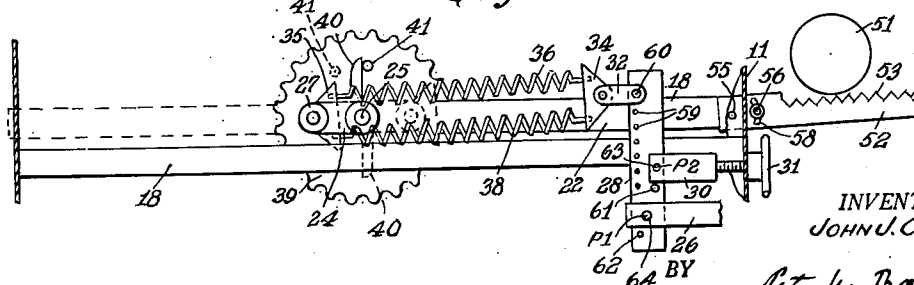


Fig. 3.



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ROTARY BALL PITCHING MACHINE

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This invention relates to a mechanical throwing device for balls, such as baseballs, tennis balls, and the like, or for similar objects to be hurled in a more or less uniform trajectory of a predetermined form.

Thus, one object is to provide a device of this type, which employs the potential energy of a stressed spring for throwing the object, but which will have a minimum tendency to oscillate when the energy of the spring is expended during the throwing action.

Other objects are to eliminate the maximum number of moving parts, which would cause rattling and excessive wear.

Still other objects are to provide a device which will impart a selected spin to the ball.

The attainment of these objects is shown in connection with a thrower, which briefly includes a throwing arm and crank mounted on a rotatably arranged shaft, springs to give the crank and arm a half revolution, and means for altering the dead-center position of the crank with respect to the arm.

In the accompanying drawing showing, by way of example, one of many possible embodiments of the invention,

Figure 1 is a plan view of the device.

Figure 2 is a side view of the device, while

Figure 3 is a vertical transverse sectional view of the device, taken substantially along the line 3-3 of Figure 1, and looking in the direction of the arrows of said line.

The invention comprises a rectangular housing 10, having rear and front ends 11 and 12 and a base 14 secured on legs, or standards 15 for anchorage to the ground, or suitable support (not shown).

A pair of spaced parallel beams 16 and 18 are mounted fast on the housing ends 11 and 12 near one side 13 of the housing and extend the length of the housing and carry at their respective mid-positions, aligned bearings 19 and 20. A shaft 21 is rotatably mounted in said bearings and projects outwardly through and perpendicularly to said side 13 for actuating a throwing arm, generally designated 22, outer of said side and secured fast on the outer end 23 of said shaft and free to revolve, as shown, in a substantially vertical plane. For rotating the shaft, at least in part, is a crank 24 secured fast on the inner end 25 of the shaft 21, the crank and arm being about 180 degrees apart so that when the arm is in rearmost position the crank is most remote from the rear.

For the purposes to be described below, a fulcrum piece 26 is mounted fast on the end 11 be-

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low the level of the shaft 21; the piece 26 projects toward said crank and substantially in the vertical plane of motion of the crank pin 27 and carries a post 28 pivotally mounted at the lower end thereof by pin *p'* on said piece 26 for motion of the upper end of the post toward and away from the crank. An adjustment device, generally designated 29, is provided for varying the distance between the upper end of the post and said shaft, and includes a yoke piece 30 pivotally linked at the pin *p*2 to the post above the fulcrum piece, and an adjusting screw 31 passing through the rear end 11 and threaded into the yoke piece. A clevis 32 is pivotally mounted, as by pin 33, on the upper end of the post and toward the crank, and about at the same height as the shaft 21.

Triangular whippetree members 34 and 35 are mounted in the clevis 32 and crank pin 27, respectively, so that the member 35 functions as a connecting rod head; the members are connected by a pair of tension springs 36 and 38 stretched between the respective ends of the whippetrees so that contraction of the springs will impart a half turn to the shaft.

For obtaining the remainder of the turn, a sprocket wheel 39 between the beams 16-18 is mounted for free rotation or turning on the shaft 21, for cooperation with a lever arm 40 fast on the shaft 21, and adjacent the sprocket wheel. The cooperation is achieved by a boss 41 on said wheel and projecting therefrom parallel to the axis thereof and adapted to engage the lever 40 to cause said lever arm 40 to rotate with the wheel when the boss engages the arm.

Means are provided for rotating the sprocket wheel 39, which include a chain 42, a driver 43, a speed reducer 44, motor 45, the latter being controlled by a switch 46, and all assembled in a conventional manner.

A channel rack 48 for a row of balls is provided on the rear end 11, sloping to said slide 13, where there is a hook member 49 at the lower end of the rack, the hook passing around the path of the throwing arm 22, the outer extremity 50 of the hook cooperating with the lower end of the rack to retain a ball 51 in the path of the arm. The outer end of the arm is preferably adjustable and in the form of an upwardly open trough member 52 (when the arm is in the position as shown in Figure 1) having serrated sides as at 53 and secured to the lever portion 54 of the arm 22 by a pivot pin 55 and clamping screw 56 passing through arc openings 58 in the trough member. The trough member partly engages around the lever portion at the pivot 55 and screws 58.

In operation, as the sprocket wheel 39 rotates,

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the boss 41 is brought into engagement with the lever 40, whereupon the wheel, lever and shaft 21 rotate together until a position as in Figure 2, or the position shown in solid lines in Figure 3, is reached. During this action the springs 36 and 38 have been stretched to approximately extreme positions, and the throwing arm 22 has begun to lift, slightly, the ball 51.

As the boss 41 carries the lever 40, and, of course, the crank 24, past the dead center for the crank, the springs quickly give the shaft and throwing arm about a half revolution to the position shown in dotted lines in Figure 3, and the ball is thrown by this action.

I have found that by use of a pair of springs to supply the energy, the whole device does not oscillate to the same extent as when a single stronger spring is used. The oscillation is also much less pronounced, if not completely eliminated, by the use of members 26, 28 and 30, which not only serve this useful purpose, but are used to alter the position of dead center by the provision of holes 59 in the post for the clevis pin 60. Adjustment for dead center as well as speed control may be made by use of the screw 31, since there is vertical as well as lateral movement of the upper part of the post. Raising or lowering the whippetree 34 by means of pin 59 changes the dead center, which, in turn, retards or advances the tripping point. The moment of inertia of the post may be changed by changing the positions of the posts, whereby the holes 61 and 62 therein are made pivoted points, instead of those pivot points 63 and 64. As indicated in the drawing, there is no collar on the shank of adjustment pin 31, so that immediately after the mechanism trips, the reaction force of the spring against the post is not adversely transmitted to the wall 11. The reaction forces are tempered by partial rotation of the post 28, whose moment of inertia may be altered as described.

Not only can the adjustment of the throwing arm at 56 provide a vertical adjustment for throwing the ball, but when employed in conjunction with the shift of the dead center on the crank, it causes wide variations in the spin of the ball without damaging sudden impact on the latter.

While I have, for purposes of illustration, shown my invention with the throwing arm moving in a vertical plane, it is to be noted that it may be greatly tilted, without loss of its advantages of adjustability, the only real requirement of position being that the trough 52 engages the ball long enough to produce the desired result.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is:

1. A throwing device for a ball throwing device comprising a lever member and a trough member pivotally mounted on one end of the lever member and partly engaging therearound, said trough member being provided with arc shaped openings near the pivoted point, a screw clamp passing through said openings and lever member to hold the lever member and trough member in a fixed relationship, said trough member being provided with serrations on the upper edges of the walls thereof.

2. In a throwing device, a mount, a shaft rotatably mounted on the mount and having a throwing arm at one end and a crank with crank pin on the other end, a post pivotally mounted at the lower end thereof on said mount for motion about an axis parallel to said shaft, an adjustment device for varying the distance between the

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upper end of the post and said shaft, and including a yoke piece pivotally linked to the post, and an adjusting screw passing through the mount and threaded into the yoke piece, a clevis pivotally mounted on the upper end of the post and toward the crank, whippetree members mounted on the clevis and crank pin, respectively, a pair of tension springs stretched between the respective ends of the whippetree members and attached thereto, a wheel mounted for free turning on the shaft, a lever arm fast on the shaft and adjacent the wheel, a boss on said wheel and projecting therefrom parallel to the axis thereof and adapted to engage the lever to cause the lever arm to rotate with the wheel when the boss engages the arm, and means for rotating said wheel.

3. A throwing device comprising a mount, a housing having rear and front ends and a side, a pair of spaced beams mounted fast on the housing ends near the side, aligned bearings on the mount, a shaft rotatably mounted in said bearings, a throwing arm secured fast on the outer end of said shaft and a crank with crank pin secured fast on the inner end of the shaft, a post pivotally mounted at the lower end thereof on said mount for motion of its upper end toward and away from the crank, and slight peripheral motion of same about the axis of the shaft, an adjustment device for holding said post in fixed selected position, a clevis pivotally mounted on the upper end of the post and toward the crank, whippetrees mounted on the clevis and crank pin, respectively, a pair of springs between the respective ends of the said whippetrees, and means for turning the shaft to stretch the springs.

4. In a throwing device, a mount, a shaft rotatably mounted on the mount and having a throwing arm fast on one end and a crank with a crank pin on the other end, the shaft and arm being free to rotate a complete revolution, a post pivotally mounted on an axis parallel to that of the shaft at the lower end thereof and on said mount for motion of the upper end portion thereof toward and away from and peripherally about the axis of the shaft, an adjustment device for holding the post in a selected fixed position, and a tension spring stretched between said upper end portion and said crank and having the respective ends of the spring attached to the crank and said upper portion.

5. In a throwing device, a mount, a shaft rotatably mounted on the mount and having a throwing arm fast on one end and a crank pin fast on the other end, a post pivotally mounted at the lower end thereof on said mount for motion of the upper end portion thereof toward and away from, and peripherally about, the axis of the shaft, an adjustment device for holding the post in a selected fixed position, a tension spring stretched between said upper end portion and said crank and having its respective ends attached thereto, a wheel mounted for free turning on the shaft, a radially projecting member fast on the shaft and adjacent the wheel, a projection on said wheel and projecting therefrom into the path of said member to engage the same to cause said member and shaft to rotate the wheel when the projection engages the member, and means to rotate the wheel.

6. In a throwing device, a mount, a shaft rotatably mounted on the mount and having a throwing arm fast on one end and a crank with a crank pin fast on the other end, the shaft and arm being free to rotate a plurality of revolutions,

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a post pivotally mounted on an axis parallel to that of the shaft at the lower end thereof on said mount, an adjustment device for holding the post in a selected position, a tension spring stretched between the upper end portion of the post and said crank pin and having its respective ends attached thereto, a wheel mounted for free turning on the shaft, a lever arm fast on the shaft and adjacent the wheel, a stud on said wheel and projecting therefrom parallel to the axis thereof and across the path of said lever arm to engage the lever to cause the lever arm to rotate with the wheel, when the stud engages the arm, and means to rotate the wheel.

7. In a ball throwing device, a shaft and a radial arm thereon mounted for a plurality of revolutions, the arm being constrained to move in a substantially vertical plane, said arm including a trough portion at the outer end thereof and provided with serrations at the upper edge thereof, an inclined ball channel rack having the lower end portion thereof about on a level with the shaft and projecting nearly to the path

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of the trough, the rack being free from structure to allow a ball to roll down the rack and into the path of the trough, retaining means out of the path of the trough cooperating with the end of the rack for holding a ball in said path and against an end of the rack, said trough being upwardly open as it passes the end of the rack.

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