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CENTRIFUGAL BALL-THROWING MACHINE

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2 Sheets-Sheet 1

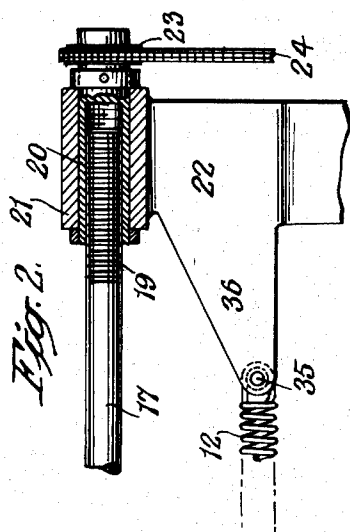
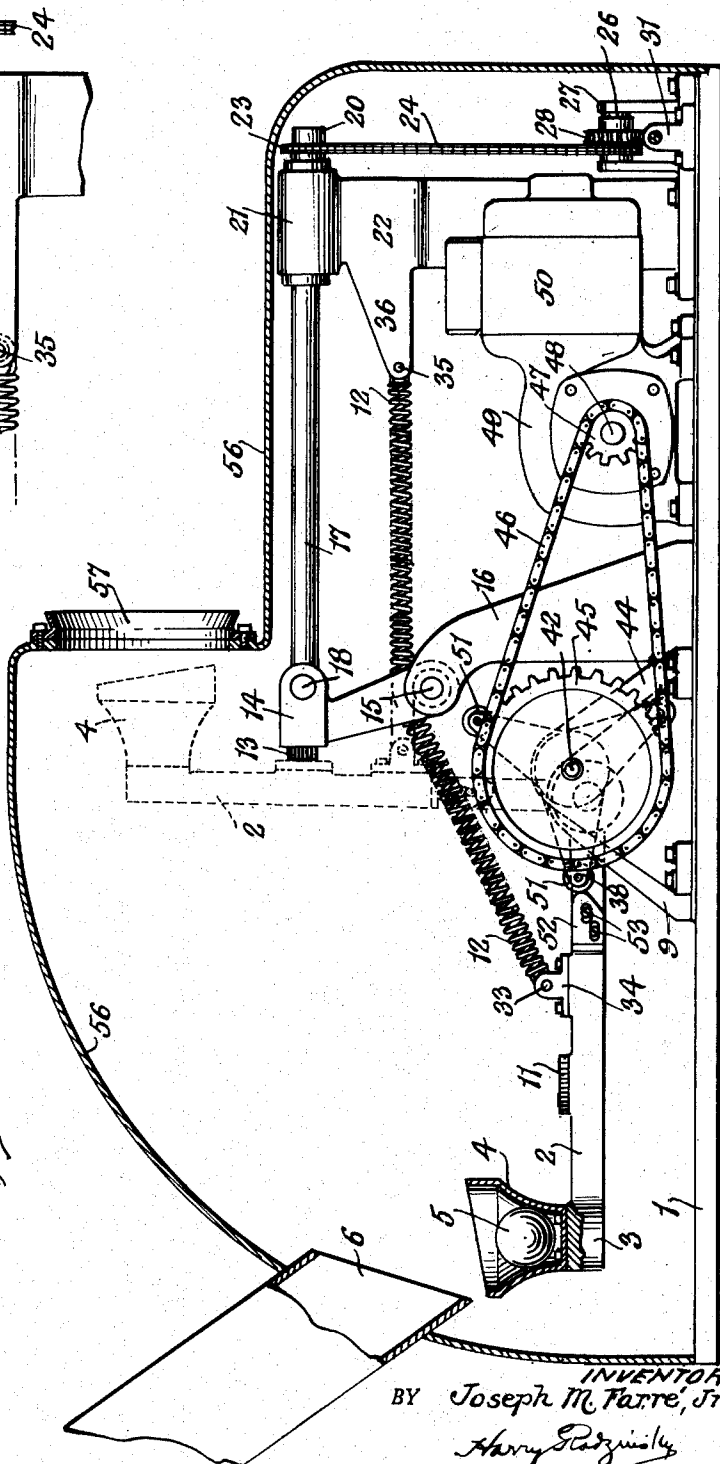


*Fig. 1.*



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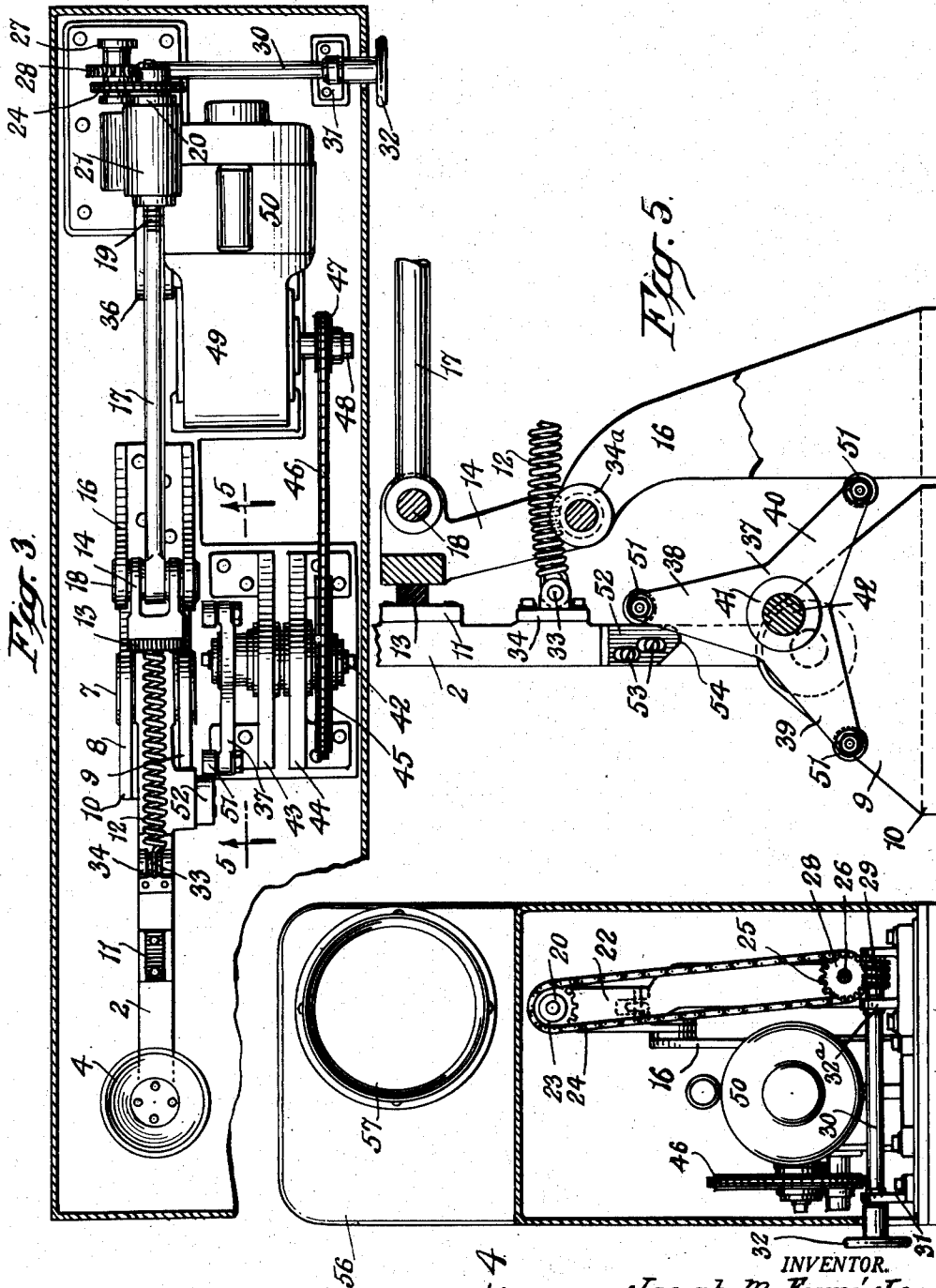
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## CENTRIFUGAL BALL-THROWING MACHINE

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1 Claim. (Cl. 124-7)

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This invention relates to ball-throwing machines, and particularly to an apparatus by which balls or other missiles are projected toward a batsman or other player to enable practice in batting or other play to be conveniently had.

An object of the invention is to provide an apparatus of this character in which balls are projected toward a player at predetermined intervals; in which the force and direction of the projection of the balls can be regulated, and by which practice batting is had by a single player since the machine is automatic in operation and requires no attendant.

The present invention has reference to an apparatus which can be used for throwing baseballs, tennis balls, or any other objects useful in games of the missile type.

More particularly, the invention contemplates the provision of a swinging or throwing arm pivoted at one end and carrying a ball-holding cup at its other end, said arm being urged to vertical or throwing position by spring means, and being retracted or cocked against the urge of the spring means by a multi-armed spider which forces the arm successively down to lowered or cocked position and then releases it, allowing it to be swung vigorously through an arc by the spring means and brought abruptly against a stop to thereby eject the ball.

These and other objects and features to be hereinafter disclosed are set forth in the following specifications and claim.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a side view of the improved ball-throwing machine, with the housing and other parts shown in section; Fig. 2 is a sectional view through the means for adjusting the stop for the throwing arm; Fig. 3 is a top plan view of the machine, with the housing shown in section; Fig. 4 is a front view of the machine, with a portion of the housing shown in section; and Fig. 5 is a sectional view taken on the line 5-5 of Fig. 3, looking in the direction of the arrows.

Referring to the drawings, 1 indicates the base plate of the machine, and which may constitute the top plate of a frame or other support adapted to place the machine at the proper throwing height and position for any particular game. The throwing arm of the machine is indicated at 2, and the same is provided at its outer or free end 3 with a ball-holding cup 4 for receiving balls 5 successively and throwing them in a manner to be described. The balls successively de-

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livered into the throwing cup 4 may be delivered thereinto by means of a chute or delivery tube 6 extending from a suitable hopper or other source of supply. Means may be utilized to deliver the balls through the chute or tube 6 at predetermined intervals so that each time the throwing arm 2 is retracted or cocked for throwing, a ball will be delivered into the cup 4 then positioned below the chute or tube 6 in readiness to receive it.

At its end remote from the cup 4, the throwing arm is pivotally mounted on shaft 7 disposed between the lugs or ears 8, 9 of the bracket 10 affixed to the base plate 1. Between its ends, the throwing arm 2 is provided with a pad 11 adapted, when the arm 2 is swung upwardly by the urge of a spring 12, to forcibly contact or impinge against a pad 13 constituting a stop member for the arm 2 and limiting the swinging movement thereof and causing the ejection of the ball 5 from the cup 4. The stop member 13 is fixed on the end of an arm 14 having its other arm pivoted at 15 between the sides and at the upper end of a fixed bracket or support 16 secured on and rising from the base plate 1.

The arm 14, and thus the stop member 13 carried thereby, is adjustable to locate the stop at any selected position, by means of a rod 17, having one end pivotally attached at 18 to the arm 14. The other end of the rod 17 is threaded as indicated at 19 in Fig. 2, and this threaded portion 19 is threadably adjustable through an internally-threaded sleeve 20 rotatively adjustable within a boss 21 provided on the upper end of a vertical post or standard 22. Secured on the sleeve 20 is a sprocket 23 over which a chain 24 extends, said chain extending downwardly and passing around a sprocket 25 (Fig. 4) secured on a shaft 26 rotative in the bracket 27 (Fig. 1) secured to the base plate 1. Also secured on the shaft 26 is a worm gear 28 in mesh with a worm 29 secured on an adjusting rod 30 rotatively supported in brackets 31 and 32a. A hand-wheel 32 is secured on the adjusting rod 30 and it will be apparent that when the hand wheel is turned, the rod 30 will be rotated, and through the worm 29, worm gear 28 and chain connection 24 between sprockets 23 and 25, the sleeve 20 will be rotated to cause longitudinal adjustment of the rod 17 and hence the selected position of the stop 13.

The spring 12 has one end attached at 33 to a bracket 34 fixed on the throwing arm 2, and said spring 12 extends over a roller 34a rotatively mounted at the upper end and between the sides

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of the fixed arm 16. The second end of the spring is attached at 35 to the end of a lug 36 formed on and projecting from the post 22, as clearly seen in Fig. 1. The pull of the spring 12 is such as to normally hold the throwing arm 2 in its raised or elevated position shown in Fig. 5 or in dotted lines in Fig. 1, at which time the pad 11 is in contact with the stop 13.

The means for lowering or cocking the throwing arm will now be described. Such means includes a multi-armed cocking spider 37 which in the form shown, has three radial arms, shown respectively at 38, 39 and 40. This spider has its hub 41 secured on a shaft 42 rotative in bearings mounted in the brackets 43 and 44 secured on the base plate 1. Fixed on the shaft 42 is a sprocket 45 around which a chain 46 extends, said chain passing around a sprocket 47 secured on a shaft 48 extending to a reducing-gear unit contained in the gear-box 49 connected to the electric motor 50 which drives the gearing within the gear-box in the known manner.

Mounted at the end of each of the arms 38, 39 and 40 of the cocking spider is a roller 51, and each of these rollers is adapted in turn to engage against a cam block 52 adjustably secured by the screws 53 to one side of the throwing arm 2. The disposition of the cam block 52 is such that when the throwing arm 2 is in its raised position, as indicated in Fig. 5, the arm or the spider which is forward or to the right of the throwing arm, such as the arm shown at 38 in Fig. 5, will have its roller 51 brought into contact with the cam block 52, and as the spider continues its rotation, the arm 38 will force the throwing arm 2 downwardly or counter-clockwise, as viewed in Fig. 5, to a lowered or cocked position against the pull of the spring 12.

When the throwing arm has been depressed to a required extent and to a nearly horizontal position, the arm will be cocked and the roller 51 on the arm of the spider that has been operative against the throwing arm then reaches a position where it passes around the rounded end or nose 54 of the cam block 52, as shown in Fig. 1, and the throwing arm, being then freed, will be vigorously swung upwardly by the spring 12 and brought forcibly into contact with the stop member 13. This abrupt halt of the arm 2 in its throwing arc by contact with the stop member, will dislodge the ball 5 from the cup 4 and cause it to be impelled or thrown with force toward the right, as viewed in Fig. 1. The apparatus may be enclosed in a suitable housing 56 provided with a front framed opening 57 through which the balls are thrown or ejected. The adjusting wheel 32 may be exposed exteriorly of the housing to permit of easy adjustment of the stop member 13. By adjustment of said stop member the throwing arm can be controlled to thereby regulate the upward or downward throw of the balls.

From the foregoing, the operation of the improved ball-throwing machine will be readily understood. The speed of rotation of the cocking spider may be regulated so that each arm of the spider will lower or cock the throwing arm at predetermined intervals, permitting a batter or other player toward whom the balls are suc-

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cessively thrown, to have sufficient time to prepare himself for each ball as it is thrown toward him. As each arm of the spider has its roller 51 brought into engagement with the cam block 52 on the throwing arm, it will depress or swing the throwing arm 2 downwardly until the proper point of descent or cocking of the throwing arm is reached, whereupon the roller 51 will move off the cam and the spring 12 will swing the throwing arm upwardly to bring it into forcible and abrupt contact with the stop 13, causing the ball held in the cup 4 to be thrown vigorously forward from the cup and through the opening 57 toward the player. As will be clearly seen in Fig. 5, the axis 42 of the cocking spider is eccentric or to one side and slightly elevated above the axis 7 of the throwing arm 2 and hence engagement of the throwing arm by the arms of the spider will occur when the throwing arm is raised and a release of the throwing arm obtained when the throwing arm is lowered or moved into cocked position.

The throwing device is useful in various capacities and in many games in which the propulsion of balls or other missiles is found useful or desirable.

While I have herein described one embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claim.

What I claim is:

A ball-throwing apparatus comprising, a base, a motor mounted on said base, a rotative shaft supported on the base, a chain drive from the motor to said shaft to thereby rotate the shaft, a multi-armed spider mounted on the shaft and rotated therewith, a pivoted throwing arm on the base, the pivot for said arm being located to one side of the axis of the rotative shaft whereby the arc of movement of the spider is eccentric to the swing of the throwing arm, a cam member carried by the arm and adjustable lengthwisely of the same, rollers at the ends of the several arms of the spider for successively engaging said cam and forcing the arm downwardly to a lowered position and then riding past the cam to release the arm, spring means connected to the throwing arm for swinging the same to a vertical position, a bumper against which the throwing arm impinges when swung by the spring means to a vertical position, and means for adjusting the position of said bumper.

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