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P. S. GIOVAGNOLI

2,806,461

BASEBALL PITCHING APPARATUS

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Fig. 1.

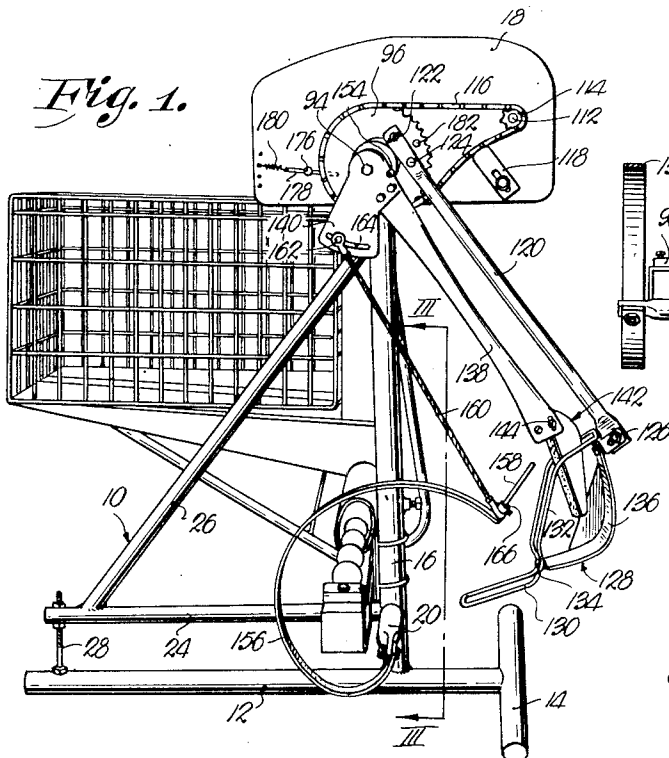
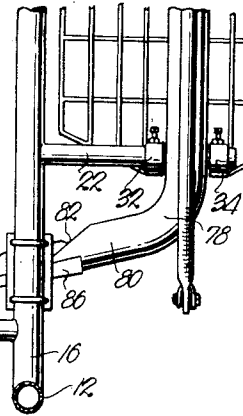


Fig. 3.

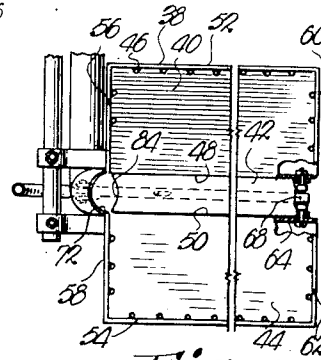


Fig. 4.

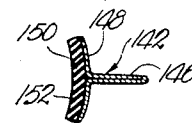


Fig. 5.

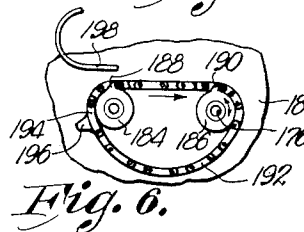
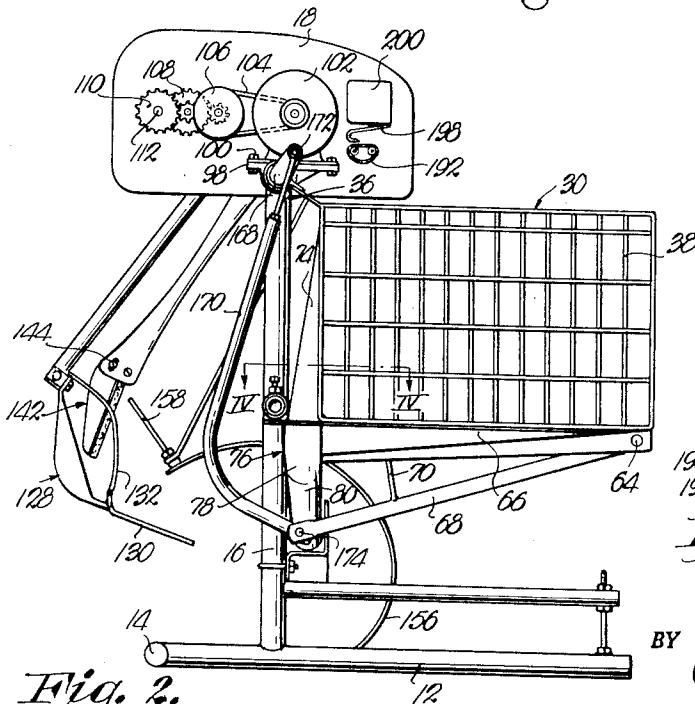
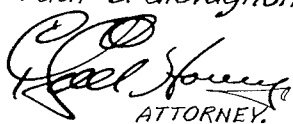


Fig. 6.

Fig. 2.



INVENTOR.
Paul S. Giovagnoli
BY  ATTORNEY.

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2,806,461

BASEBALL PITCHING APPARATUS

Paul S. Giovagnoli, Kansas City, Mo.

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7 Claims. (Cl. 124—7)

This invention relates to the field of sporting goods apparatus and, more particularly, to an improved machine for throwing or pitching baseballs or the like.

Baseball teams have long found it a nuisance to require human pitchers to throw practice balls to the other players during the batting practice or the "warm up" period prior to a game.

Accordingly, it is one of the important objects of this invention to provide a machine adapted for automatically and reliably pitching baseballs to a batter during practice or the like in fashion closely simulating the manner in which a baseball would be pitched by a human thrower.

It has also been found that many persons not regularly engaged in playing baseball enjoy attempting to bat baseballs thrown in a manner simulating that in which they would be pitched during a baseball game as an amusement or recreational activity. To provide for such healthful recreation, concessions or stands somewhat similar to golf practice driving ranges, have been established. The factors of cost and safety have, however, rendered the use of human pitchers at such concessions disadvantageous if not entirely impractical.

It is, therefore, another important object of this invention to provide baseball pitching apparatus adapted for use at such recreational facilities.

It is another important object of this invention to provide baseball pitching apparatus which will automatically and successively throw a plurality of baseballs in predetermined fashion and at preselected time intervals.

It is another important object of the invention to provide such apparatus which includes improved counting means adapting the apparatus for automatically deactivating itself after pitching a predetermined number of baseballs.

It is another important object of this invention to provide improved, mechanical, throwing hand structure including a sponge rubber ball-carrying pad adapted to release a baseball in fashion causing the latter to follow a trajectory equivalent to that of a baseball when thrown by a professional human pitcher, which trajectory is substantially uniform for every ball thrown despite wetness, softness, tears or other irregularities in the condition of the balls.

It is another important object of this invention to provide means for successively feeding baseballs to the throwing arm portion of the apparatus in manner assuring a continuous flow thereof without jamming.

It is still another important object of this invention to provide such apparatus which is of simple nature minimizing initial manufacturing costs, necessity for maintenance, difficulty in installation and malfunctions during operation.

Many other important objects of this invention, including certain important details of construction, will be made clear or become apparent as the following description of the invention progresses.

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In the accompanying drawing:

Figure 1 is a perspective view of a baseball pitching machine made in accordance with this invention taken from slightly above and to one side of the apparatus.

Fig. 2 is a side sectional view of the machine taken from the opposite side of the apparatus.

Fig. 3 is a fragmentary, cross-sectional view taken on line III—III of Fig. 1.

Fig. 4 is a fragmentary, cross-sectional view taken on line IV—IV of Fig. 2.

Fig. 5 is a cross-sectional view taken through the throwing hand assembly per se; and

Fig. 6 is an enlarged, fragmentary, side elevational view particularly showing the counting means employed for accomplishing automatic shut-off of the machine after a predetermined number of baseballs have been thrown thereby.

Referring now to the accompanying drawing, the numeral 10 generally designates a base assembly forming a part of the contemplated machine. In the illustrated embodiment, base assembly 10 includes a T-shaped, ground-engaging member 12 having a cross part 14, an upright post 16 rigidly mounted upon member 12, a vertical plate 18 rigidly secured to the uppermost extremity of post 16, a laterally-extending element 20 slightly above, but adjacent the member 12, an oppositely-extending lateral element 22 upon post 16 and spaced above the zone of juncture of element 20 with post 16, a rearwardly-extending element 24 on post 16, a diagonal bracing element 26 interconnecting element 24 and the upper extremity of post 16, and a spacing and fastening element 28 interconnecting element 24 with member 12 in spaced relation to post 16.

As will be apparent from the drawing, each of the parts of base assembly 10 except plate 18 and element 28 (which is preferably adjustable) may be constructed of metal pipe welded or otherwise suitably interconnected to present a rigid base assembly adapted for mounting the other structure hereinafter to be identified and described.

A baseball-receiving receptacle, generally designated 30, is rigidly mounted upon the base assembly 10 in any suitable manner as by clamps 32 and 34 upon element 22 of base assembly 10 and a clamp 36 attached to post 16 adjacent the uppermost end of the latter.

Receptacle 30 includes an open top cage 38 which may be of wire mesh side and end wall construction. Cage 38 is provided with a bottom wall comprised of three side-by-side elongated sections 40, 42 and 44, section 42 being disposed between sections 40 and 44. Sections 40 and 44 are rigidly mounted as a stationary part of the cage 38 by any suitable fastening means such as at 46. The proximate edges 48 and 50 of sections 40 and 44 are disposed in spaced parallelism and are lower than the remote edges 52 and 54 of sections 40 and 44 respectively. In other words, sections 40 and 44 slope downwardly as their proximate edges 48 and 50 are approached. Sections 40 and 44 are also so disposed within cage 38 that the ends 56 and 58 respectively thereof adjacent the post 16 are lower than the ends 60 and 62 thereof remote from post 16, whereby the sections 40 and 44 slope downwardly toward the post 16, as well as downwardly as their adjacent edges 48 and 50 are approached.

The section 42 is pivotally mounted adjacent one end thereof by hinge means 64 mounted upon a lower frame portion 66 of cage 38. Section 42 extends between edges 48 and 50 of sections 40 and 44 respectively and is adapted to swing about hinge 64 through an arc extending above and below the plane of edges 48 and 50.

An elongated member 68 is also pivoted upon cage 38

by hinge means 64 and extends downwardly from the latter toward post 16. An interconnecting element 70 rigidly secured to the top of member 68 and the bottom of section 42 attaches the section 42 to member 68 for swinging with the latter.

The cage 38 is provided with a vertical outlet opening as at 72, which is covered by a vertically disposed semi-tubular portion 74 external to cage 38 of a ball carrying tube generally designated 76 and also including a right angle bend portion 78 and a downwardly sloping portion 80 terminating in an open end 82. The extremity of bottom section 42 of receptacle 30 adjacent opening 72 is concavely cut away as at 84 to permit the passage of a baseball into portion 74 of carrying tube 76 and downwardly past extremity 84 into portion 78 and thence portion 80 of the carrying tube 76.

A downwardly sloping channel member 86 is mounted upon element 20 and has its uppermost extremity disposed beneath the open end 82 of carrying tube 76 to receive baseballs 88 emerging from the latter and carry same toward a stop element 90 mounted upon base element 20. It is significant that the stop 90 is spaced from the lowermost extremity 92 of channel 86 a distance sufficient to clear structure hereinafter to be described, but insufficient to permit a baseball 88 to drop between the channel 86 and the stop 90. When one baseball 88 is disposed in opposite engagement with the stop 90 and the lowermost extremity 92 of channel 86, the other baseballs 88 will be held in position upon channel 86 and within carrying tube 76 as best illustrated in Fig. 3.

Rotatably mounted upon plate 18 is a horizontal shaft 94 having a sprocket wheel 96 rigidly secured thereon. Secured to plate 18 by means of a bracket 98 and suitable fastening means 100, is an electric motor 102, which is coupled by a belt 104 with the first of a series of reduction gears 106, 108 and 110 rotatably supported upon plate 18, the last gear 110 being upon a shaft 112 extending through plate 18 and having a drive sprocket 114 mounted thereon on the side of plate 18 opposite motor 102. Drive sprocket 114 is operably coupled by a chain 116 with sprocket wheel 96 on shaft 94, chain tightening means as at 118 preferably being provided.

An elongated pick-up arm 120 is adjustably, but rigidly, mounted adjacent one end thereof upon sprocket wheel 96 by fastening means 122 and 124. Adjustably mounted by fastening means 126 upon the extremity of arm 120 remote from sprocket wheel 96 is a baseball pick-up device broadly designated 128, which includes a first, elongated, rigid loop 130, preferably formed of heavy wire rod and a second elongated loop 132, which curves from the portion thereof adjacent loop 130 from a generally perpendicular relationship between loops 130 and 132 to a generally parallel relationship as the extremity of loop 132 remote from loop 130 is approached. The loop 130 includes a narrow, laterally bent portion 134 adapted to pass between the lower extremity 92 of channel 86 and the stop 90. Suitable bracing structure designated 136 is provided for mounting the loops 130 and 132 upon arm 120 and for retaining same in their desired relative dispositions.

Although the operation of the device will be hereinafter more fully described, it should now be understood that the loop 130 is adapted to pass under a ball 88 resting between stop 90 and extremity 92 of channel 86 with loop portion 134 passing between stop 90 and extremity 92 so that a ball 88 is picked up on loop 130 each time the sprocket wheel 96 is rotated through that portion of its arc swinging arm 120 to move loop portion 134 between stop 90 and extremity 92.

Rotatably mounted upon the shaft 94 is an elongated throwing arm 138 having an angularly extending crank extension 140 at the end thereof mounted upon shaft 94 and a throwing hand assembly generally designated 142 upon the opposite end thereof.

It will be noted that throwing hand assembly 142 is

preferably adjustably mounted upon arm 138 by slot and fastening means 144 or other suitable structure. The throwing hand assembly 142 is formed of a cross-sectionally T-shaped, elongated element 146 having a concavely faced crosspiece 148 upon which is secured a ball-engaging pad 150 of sponge rubber or other similar resilient material. The outermost face 152 of pad 150 is concavely curved transversely thereof and, as will be clear in Figs. 1 and 2, the outermost end of arm 138 extends beyond the plane of face 152 so that a ball 88 may be reliably supported upon the hand assembly 142 by virtue of the curvature of face 152 and the engagement of the ball 88 with the free end of arm 138. It will also be observed that the throwing hand assembly 142 is of dimension adapted to freely pass between the sides of loop 132 of pick-up assembly 128.

The provision of pad 150 of the particular material and form mentioned is extremely significant. If a hard, smooth or less resilient material is used for pad 150, cuts, wetness, softness and other irregularities are found to have a very material effect on the point of release of balls 88 from face 152 and, therefore, the balls' trajectories. However, with the pad 150 made of sponge rubber, the principal resistance to departure of a ball 88 from face 152 is provided by the nature of pad 150 and its face 152, and the effects of irregularities in the balls 88 are minimized to a point of substantial elimination.

A laterally extending pin 154 rigidly mounted upon sprocket wheel 96 is adapted to engage the arm 138 adjacent the end of the latter mounted upon shaft 94 for swinging the arm 138 through a portion of its arc of rotation. It is significant that the pin 154 is so disposed that when arm 138 is in engagement therewith, the throwing hand assembly 142 is disposed within the loop 132 as illustrated in Figs. 1 and 2.

A strong metallic leaf spring 156 in the general shape of a C, is rigidly attached at its lowermost end to the base element 20 and has a rod 158 rigidly secured to its opposite end and extending laterally therefrom. A flexible, preferably metallic cable 160, is adjustably coupled with the crank extension 140 by fastening means 162 within a slot 164 of extension 140 and with rod 158 by adjustable retaining means 166.

A crank 168 is provided upon shaft 94 and rigidly attached thereto on the same side of plate 18 as motor 102. A link 170 is pivotally connected as at 172 with crank 168 and pivotally connected as at 174 with the lowermost extremity of member 68, it being evident that, as shaft 96 and crank 168 are rotated, the link 170 will operate to swing member 68 and cage section 42 about the line of hinge 64.

Rotatably mounted on plate 18 and passing therethrough adjacent the sprocket wheel 96 is a stub shaft 176 having rigidly mounted thereon an elongated rod 178. One end of rod 178 extends between sprocket wheel 96 and plate 18 and the other end thereof has connected thereto a spring 180 which is oppositely mounted upon plate 18. The sprocket wheel 96 has a laterally extending pin 182 rigidly mounted thereon and extending toward plate 18, the disposition of the pin 182 being such that it will engage the end of rod 178 extending between sprocket 96 and plate 18 each time the sprocket 96 makes one revolution, thereby swinging the rod 178 against the action of spring 180 to rock or oscillate the shaft 176.

On the opposite side of plate 18, which is the same side as motor 102 is located on, is provided a pair of one-toothed sprockets 184 and 186. Sprocket 184 is rigidly mounted on plate 18 with its single tooth 188 extending upwardly. Sprocket 186 is rigidly mounted on shaft 176 with its single tooth 190 normally extending upwardly when the rod 178 is in the position to which it is normally biased by the spring 180. Trained over sprockets 184 and 186 is a link chain 192.

It is significant to note that the configuration of each of teeth 188 and 190 of sprockets 184 and 186 respectively,

is of saw-tooth form presenting a sloping surface over which the cross elements of chain 192 may advance and with a radial face for engaging such cross elements to hold or move the chain.

As will hereinafter be more fully explained, each time the rod 178 is swung by the pin 182, sprocket 186 is oscillated in a clockwise direction as illustrated in Fig. 6 to advance the chain 192 one link. Chain 192 is provided with a predetermined number of links each of which corresponds to one revolution of the sprocket wheel 96. Mounted upon one link 194 of chain 192 is an outwardly extending dog 196 adapted to engage and operate an arm 198 of an electrical control or switching device 200. Device 200 may constitute either an electrical switch adapted to be associated with electrical circuitry (not shown) for giving an indication of when the machine has been operated to throw a predetermined number of balls 88 corresponding to the number of links in chain 192, although it preferably comprises a latching relay associated with coin-operated electrical energizing circuitry (not shown) for motor 102 wherein the deposit of a coin will result in energization of motor 102 and such energization will be continued until the dog 196 has operably engaged arm 198 to unlatch the relay 200.

In operation, the machine is actuated by completing an electrical circuit (not shown) to energize motor 102. As just noted, the device 200 will preferably be coupled with such electrical circuit for breaking the same after a predetermined number of balls 88 have been thrown. Energization of motor 102 drives reduction gears 104, 108 and 110 to rotate shaft 112 and drive sprocket 114, which in turn, through chain 116, rotates sprocket wheel 96 at a predetermined, relatively low speed. The throwing arm 138 will, until it is engaged by the pin 154 on sprocket wheel 96, normally be disposed with its longitudinal axis approximately horizontal or at three o'clock as illustrated in Fig. 1 by virtue of the pulling action of spring 156 upon cable 160 and extension 140.

As the sprocket wheel 96 is rotated to a position bringing pin 154 in engagement with throwing arm 138, the pick-up arm 120 will move into the position relative to throwing arm 138 illustrated in Figs. 1 and 2. As the motor 102 continues the rotation of sprocket wheel 96, the pick-up arm 120 and throwing arm 138 will rotate together in such relative position downwardly toward the lowermost portion of their arcs of rotation, it being noted that rotation of the throwing arm 138 is necessarily attended by a yielding of spring 156 as extension 140 is rotated to exert an increased pull upon cable 160.

As arms 120 and 138 approach their lowermost positions of rotation, the loop 130 passes under the ball 88 supported between stop 90 and channel extremity 92 and, as the rotation continues, the loop portion 134 passes between stop 90 and channel extremity 92 picking up a single ball 88 upon the loop 130. As the arms further continue their rotation to a position approaching seven o'clock, as illustrated in Fig. 1, the ball 88 picked up on loop 130 will move by gravity toward the zone of juncture of loops 130 and 132, and will eventually move onto the loop 132 as the rotation is continued to an eight o'clock position.

With the rotation continuing, as the arms 120 and 138 approach a nine o'clock position, the ball 88 on loop 132 will roll by gravity onto the throwing hand assembly 142 of throwing arm 138, which is then extending between the sides of loop 132.

After the ball 88 has been moved by gravity onto the throwing hand assembly 142, the throwing arm 138 will be approaching a position moving the extension 140 toward a past center position with respect to the axis of rotation provided by shaft 94 and the interconnection with spring 156 provided by cable 160.

It should be observed that the connection of cable 160 with extension 140 effected by means 162, is pivotal. When the centered position in which cable 160 intersects

the axis of shaft 94 is passed, the force stored in spring 156 and coupled with throwing arm 138 through cable 160 and extension 140, will take over and acceleratingly rotate the throwing arm 138 upon shaft 94 ahead of the movement of pin 154 and sprocket 96, through a portion of the arc of rotation of arm 138, approximately commencing at the nine o'clock position and ending at the three o'clock position, as illustrated in Fig. 1.

The ball 88 upon throwing hand assembly 142 will be thrown from the latter during this accelerated rotation of arm 138 under the influence of spring 156, the ball 88 normally leaving the assembly 142 when the throwing arm 138 is disposed approximately at a twelve o'clock position. The throwing arm 138 will then be held at its three o'clock position by the action of spring 156 until the sprocket wheel 96 has continued its rotation to a point again bringing pin 154 into engagement with arm 138.

During such throwing of the first ball 88, another ball 88 will have moved into ready position between the stop 90 and the channel extremity 92, and the pin 182 will have oscillated rod 178 to rotate the sprocket 186 through an arc equivalent to the length of one link of chain 192. After the pin 182 has released rod 178, the cross element of the next link of chain 192 will have been advanced over tooth 188 of stationary sprocket 184 and sprocket 186 will have been released for counterclockwise rotation (as illustrated in Fig. 6) so that tooth 190 thereof will have slid under and engaged the cross element of the corresponding next link adjacent thereto. It is significant that the sprockets 184 and 186 are so formed as to retain the chain 192 thereon while the latter is being advanced over the teeth 188 and 190.

Also during the throwing of the first ball 88, the crank 168 upon shaft 94, will have reciprocated the link 170 to swing the member 68 and the cage bottom section 42 about the axis of hinge 64. Such swinging movement of bottom section 42 will jostle the balls remaining within cage 38 to prevent jamming thereof and assure their continued successive flow into the ball-carrying means 76 through the outlet opening 72.

Such operating cycle of the machine is repeated until the dog 196 upon chain 192 has been moved to a position operating arm 198 of control device 200, whereupon a predetermined number of balls 88 corresponding to the number of links in chain 192 will have been thrown, and the device 200 will operate to make an indication of such fact, or preferably, will interrupt energizing circuitry (not shown) for motor 102.

It will now be clear that the machine contemplated by this invention is advantageous in many ways over any apparatus known to have been previously proposed for such purpose. It will also be evident that the machine is ideally suited for accomplishing all of the above-mentioned and other objectives of the invention.

Manifestly, however, many minor changes and modifications could be made from the exact construction disclosed for purposes of illustration without departing from the true spirit or intention of the invention.

Accordingly, it is to be understood that the invention shall be deemed limited only by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a machine for throwing baseballs, a base assembly; a shaft mounted on the assembly for rotation about a substantially horizontal axis; a prime mover on the assembly; means operably coupling the prime mover with the shaft for rotation of the latter; an elongated throwing arm substantially radial to the shaft and having one end thereof rotatably mounted on the shaft; a throwing hand structure mounted on the opposite end of the arm, said structure being adapted for receiving and supporting a ball until the latter is thrown; a device on the shaft and rotatable therewith, said device being

releasably engageable with the arm for rotating the latter in one direction through a first portion of a circular arc around the shaft; past-center actuating mechanism coupled with the assembly and the arm for acceleratingly rotating the latter through a second portion of said arc; apparatus on the assembly adapted for delivering a ball to a given location on the assembly during the rotation of the arm through said first portion of said arc; and an elongated ball pick-up arm, one end of the pick-up arm being secured to said device for rotation therewith, there being parts mounted on the opposite end of the pick-up arm adapted to pick up a single ball from said location and deliver the ball to said structure during rotation of the pick-up arm through said first portion of the arc, said structure being accelerated ahead of the pick-up arm during rotation thereof through the second portion of said arc.

2. In a machine as set forth in claim 1, wherein said structure includes an elongated element adjustably mounted on the arm and having a transversely curved, channel-like, concave face, said face extending the entire length of the element, there being a resilient pad secured to and covering said face, the longitudinal axis of said element being generally radial to said shaft, a portion of the throwing arm extending above the face to support the ball while the latter is disposed on the face during the first portion of said arc.

3. In a machine as set forth in claim 1, wherein said apparatus includes a ball-receiving receptacle mounted on the assembly and having an outlet therein; means adapted for gravity feeding balls from said receptacle successively to said given location; and wherein said ball pickup arm is secured to the device adjacent said shaft for rotation therewith, said pick-up arm having a ball-receiving track extending substantially laterally therefrom and adapted to pick up a single ball from said location and deliver the same onto said structure during each complete revolution of the shaft.

4. In a machine as set forth in claim 3, wherein said receptacle includes a sectioned bottom wall having a pair of substantially horizontal slopping outer sections and a central section disposed therebelow, said central section being hingedly mounted for swinging movement relative to said outer sections, and wherein is provided means operably coupling the central section with the shaft for swinging oscillation of said central section as the shaft revolves.

5. In a machine as set forth in claim 1, wherein is provided a control mechanism operably coupled with said prime mover for controlling activation and deactivation of the latter, said mechanism being mounted on said assembly and having an operating arm, and counting means mechanically responsive to the number of rotations made by said shaft, said counting means having parts adapted for engagement with said operating arm for operating the mechanism to deactivate the prime mover when the shaft has been rotated a predetermined number of times.

6. In a machine as set forth in claim 5, wherein said

counting means includes a stub shaft rotatably mounted on the assembly; a radial element rigidly mounted on said stub shaft; resilient means yieldably biasing said stub shaft toward a predetermined rotational position; means on said first-mentioned shaft engageable with said radial element for oscillating said stub shaft during each revolution of the first-mentioned shaft; an endless chain of predetermined length; said parts of said counting means comprising means on said chain adapted to engage the operating arm to deactivate said prime mover upon rotation of the first-mentioned shaft said predetermined number of times; means on said assembly shiftably supporting said chain; means operably coupling said stub shaft with said chain for advancing the chain a predetermined distance in one direction each time the stub shaft is oscillated; and means operably coupled with the chain for preventing retrograde movement thereof in an opposite direction.

7. In a machine for throwing baseballs, a base assembly; a shaft mounted on the assembly for rotation about a substantially horizontal axis; a prime mover on the assembly; means operably coupling the prime mover with the shaft for rotation of the latter; an elongated throwing arm substantially radial to the shaft and having one end thereof rotatably mounted on the shaft; a throwing hand structure mounted on the opposite end of the arm, said structure being adapted for receiving and supporting a ball until the latter is thrown; a device on the shaft and rotatable therewith, said device being releasably engageable with the arm for rotating the latter in one direction through a first portion of a circular arc around the shaft; past-center actuating mechanism coupled with the assembly and the arm for acceleratingly rotating the latter through a second portion of said arc; apparatus on the assembly adapted for delivering a ball to a given location on the assembly during the rotation of the arm through said first portion of said arc; and an elongated ball pickup arm, one end of the pick-up arm being secured to said device adjacent said shaft for rotation therewith, there being a ball-receiving track adjustably mounted on the opposite end of the pick-up arm, said track extending substantially laterally from the pick-up arm and including a first elongated loop and a second elongated loop, said first loop being substantially perpendicular to the pick-up arm and adapted to pick up a single ball from said location, and the second loop being oblique to said pick-up arm and adapted to deliver the ball to said structure during rotation of the pick-up arm through said first portion of the arc, said structure being accelerated ahead of the pick-up arm during rotation thereof through the second portion of said arc.

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