

Sept. 21, 1965

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3,207,147

BASEBALL PITCHING MACHINE

Filed Nov. 21, 1960

2 Sheets-Sheet 1

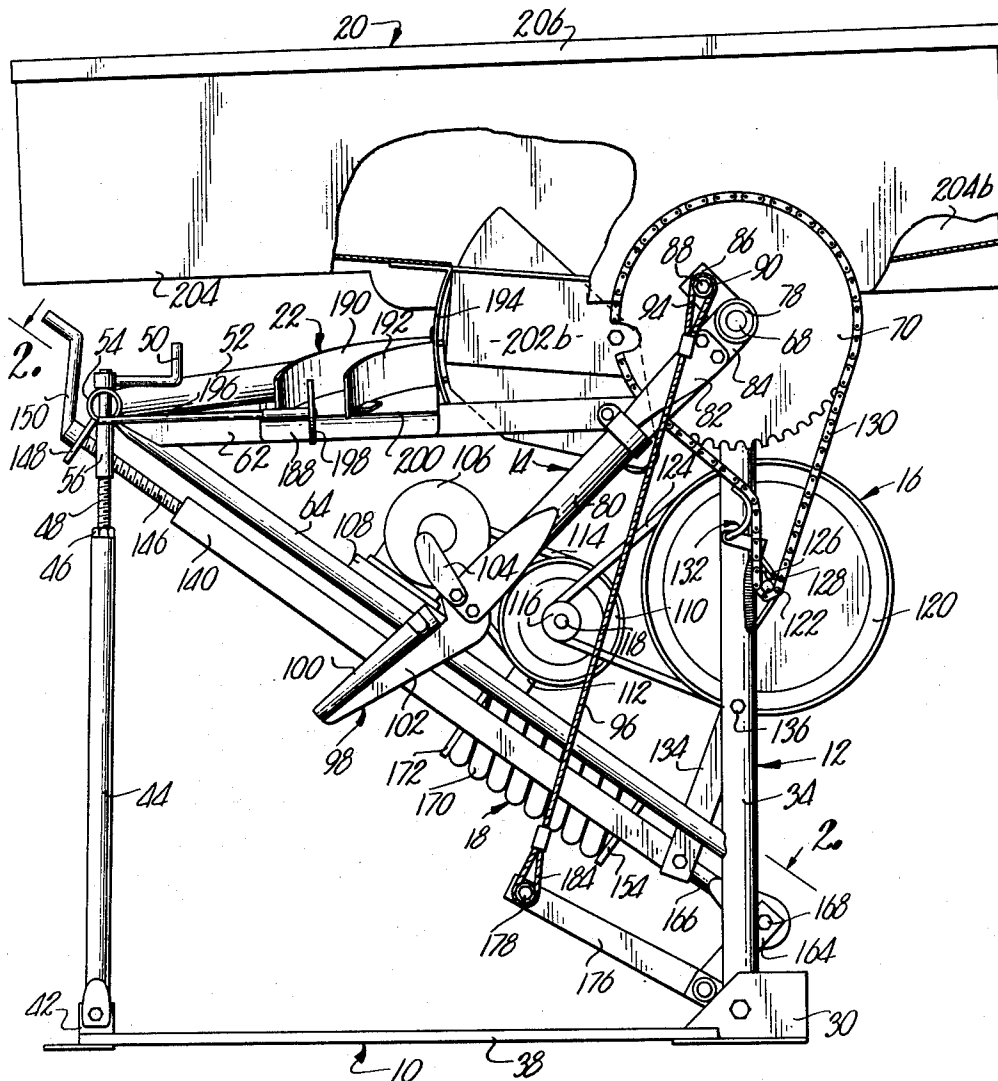


Fig. 1.

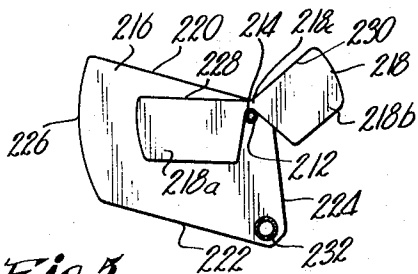


Fig. 5.

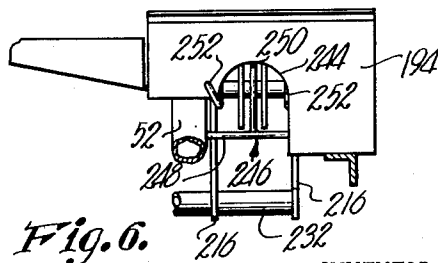


Fig. 6.

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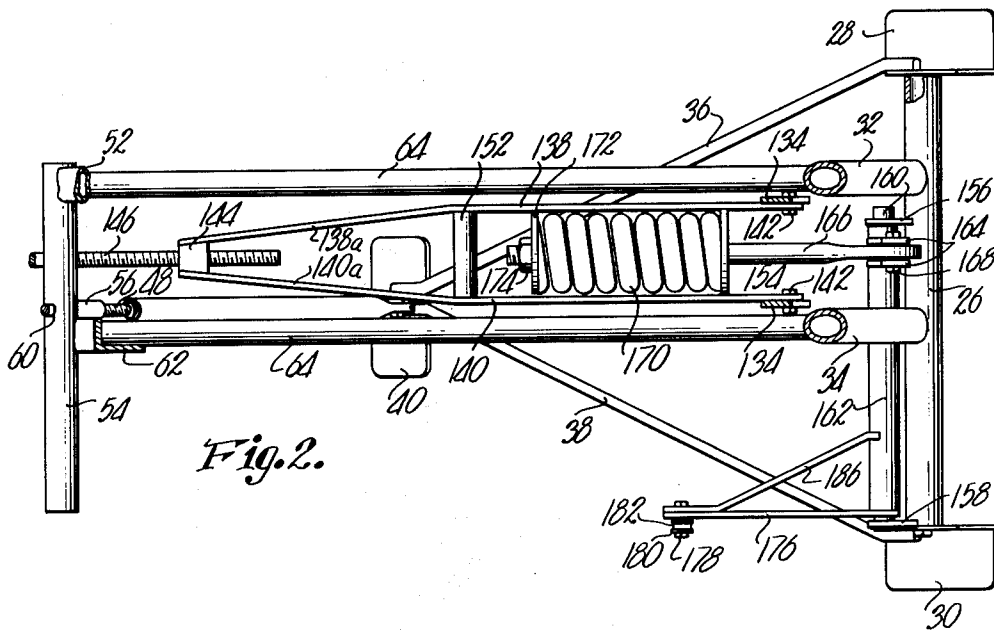


Fig. 2.

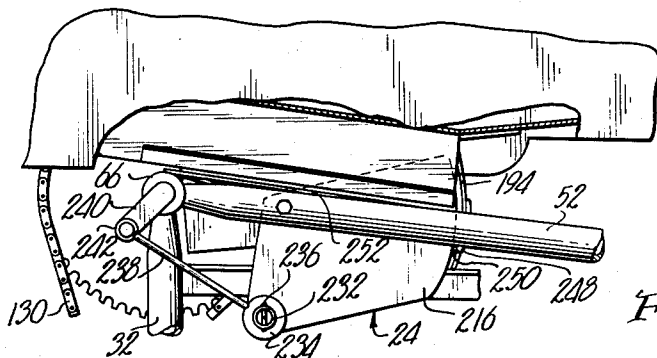


Fig.3.

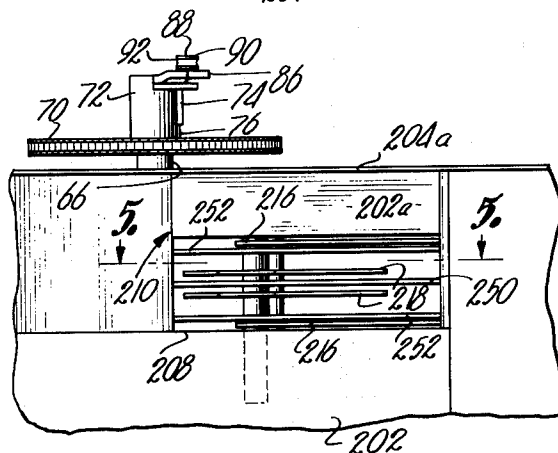


Fig. 4.

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BASEBALL PITCHING MACHINE
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This invention relates to a baseball pitching machine and has for its primary object, the provision of apparatus for automatically throwing baseballs wherein the components are designed to cause the baseballs to be pitched along successive, substantially uniform paths of travel, and without constant operator attention of the machine being required.

It is a further important object of the invention to provide a baseball pitching machine wherein novel spring means is included in the apparatus for acceleratively driving the ball throwing arm through a part of its path of travel whereby the balls are pitched through successive paths of substantially uniform trajectory, and thereby resulting in improved machine performance. It is another significant object in this respect to provide a machine wherein the spring means may be of a conventional, readily available type such as an automotive coil spring, thereby lowering the cost of the machine while at the same time providing maximum force for propelling the ball through the defined trajectory.

A still further important object of the invention is to provide a machine for automatically, successively throwing baseballs along paths of substantially uniform trajectory, wherein a ball hopper is provided on the machine for receiving a relatively large number of balls and with unique agitator mechanism being utilized in the hopper for preventing bridging of balls across the delivery opening in the bottom wall of the hopper, and thus precluding the necessity of an operator maintaining constant surveillance over the machine at all times during operation thereof. A similar important object is to provide agitator mechanism for the purpose described, including components for delivering balls directly into the ball track leading to the ball pickup station, whereby the balls are not only prevented from bridging across the delivery opening in the bottom of the hopper, but also are directed by mechanical means into the ball delivery track under all conditions of operation of the machine.

An additional important aim of the invention is to provide a baseball pitching machine wherein the tension on the coil spring providing motive power for acceleratively driving the pitching arm, may be adjusted without interfering with the point at which the arm structure 14 commences accelerated movement under the influence of the coil spring operably coupled thereto.

Other objects of the invention relate to the provision of a rugged, substantially maintenance-free, efficient machine for successively throwing baseballs along uniform paths of travel, and including components interconnected in a manner to permit rapid fabrication and disassembly of the unit as required for shipment and portability requirements, as well as to other objects which will become obvious or be explained in greater detail as the following specification progresses.

In the drawings:

FIGURE 1 is a side elevational view of a baseball pitching machine embodying the preferred concepts of the present invention, certain parts thereof being broken away to reveal details of the components therebehind;

FIG. 2 is a fragmentary cross-sectional view taken on line 2—2 of FIG. 1 and looking downwardly in the direction of the arrows;

FIG. 3 is a fragmentary, side elevational view from the opposite side of the machine as illustrated in FIG. 1, with portions of the parts being broken away and in

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section to reveal details of construction of the machine; FIG. 4 is a fragmentary, plan view of the machine and illustrating a part of the hopper and the ball agitating mechanism;

FIG. 5 is a fragmentary, vertical, cross-sectional view taken on line 5—5 of FIG. 4 and looking in the direction of the arrows; and

FIG. 6 is a fragmentary, end elevational view of that part of the mechanism serving to deliver balls from the hopper to the ball delivery track.

The baseball pitching machine illustrated in the drawings, is broadly numerated 10 and includes as basic components, an upright frame 12 adapted to be disposed on the ground, ball pitching arm means 14 rotatably carried by frame 12, power means 16 mounted on frame 12 and operably connected to arm means 14 for driving the latter through a portion of the normal arcuate path of travel of the same, spring motivated means 18 on frame 12 below power means 16 and operably joined to arm means 14 for acceleratively driving the latter through the remaining portion of the arcuate path of arm means 14, a hopper unit 20 on the upper part of frame 12 for receiving a relatively large number of baseballs to be thrown, ball delivery means 22 between the ball outlet in hopper 20 and the ball pickup station for delivering balls from the hopper to the pickup station, and improved ball agitator mechanism 24 in the ball outlet of hopper means 20 and driven by power means 16 for preventing bridging of balls across the ball outlet of the hopper means 20.

Frame 12 comprises a normally horizontal, tubular member 26 having a pair of L-shaped support plates 28 and 30 at opposed ends thereof and adapted to engage the ground as best shown in FIGS. 1 and 2. A pair of parallel, upright, horizontally spaced members 32 and 34 are secured to the upper surface of member 26 intermediate the plates 28 and 30, although as shown in FIG. 2, members 32 and 34 are in slightly closer proximity to plate 28 than plate 30.

A pair of connecting rods 36 and 38 welded to the horizontal portions of plates 28 and 30 and extending rearwardly therefrom, converge as the rearmost extremities of rods 36 and 38 are approached, with the latter being connected to a rear L-shaped plate 40 disposed in substantial alignment with upright member 34. Upright ear 42, secured to L-shaped plate 40 and lying in a vertical plane perpendicular to member 26, serves as the lower pivotal support for an upright, tubular member 44 which has an internally threaded nut 46 secured to the uppermost extremity thereof in coaxial relationship with member 44 and rotatably receiving an elongated, externally threaded rod 48 which is provided with a crank handle 50 on the uppermost end thereof for facilitating rotation of rod 48.

An elongated cross member 52, connected to the uppermost extremity of member 32 and extending rearwardly therefrom, is welded to a rear horizontal tube 54, which in turn has a vertical sleeve 56 welded to the underside thereof, it being noted that sleeve 56 is internally threaded to complementarily receive rod 48, while tube 54 has a pair of opposed, vertically aligned openings 60 therein for clearing the upper extremity of rod 48. An angle iron 62 also extends between tube 54 and the upper end of member 34 in equidistant spaced relationship from cross member 52, but at an angle with respect to the same horizontally of the machine 10. Additional rigidity is imparted to frame 12 by virtue of parallel, angularly disposed cross braces 64 extending from the lower portions of respective members 32 and 34 to the zones of juncture of cross member 52 and angle iron 62 with tube 54.

A horizontally disposed tubular member 66 spans the upper extremities of members 32 and 34 in parallelism with member 26, and rotatably carries a shaft 68 which

projects outwardly from opposed ends of tubular member 66. A relatively large sprocket wheel 70 is secured to shaft 68 adjacent tubular member 34, while arm means 14 is rotatably positioned on the outer end of shaft 68 in abutting relationship to sprocket wheel 70.

As illustrated in FIGS. 1 and 4, arm means 14 includes a sleeve 72 rotatable on the outer end of shaft 68, and provided with a radially extending lug 74 thereon, positioned to engage an outwardly projecting pin 76 secured to the outer surface of sprocket wheel 70 in spaced relationship to the axis thereof. A securing element 78 is located on the outer extremity of shaft 68 in engagement with sleeve 72 for preventing displacement of the latter and thereby, arm means 14 from shaft 68.

The elongated, tubular arm 80 of arm means 14, and which projects radially from sleeve 72, is secured to the latter by a connector 82 releasably secured to radial extension 84 on sleeve 72, while a relatively short arm 86 is also connected to sleeve 72 at substantially a right angle with respect to arm 80. Stud bolt 88 projecting outwardly from arm 86, carries a rotatable collar 90 having a circumferentially extending groove 92 therein for receiving the upper loop 94 of flexible cable 96. A throwing hand 98 on the outer extremity of arm 80, away from shaft 68, includes an elongated, transversely arcuate channel member 100 carried by bracket 102 which is in turn bolted to the outer extremity of arm 80. An upwardly extending support plate 104 joined to the outer end of arm 80 in proximity to channel 100 and disposed to support a ball while the latter is in channel 100, extends upwardly from bracket 102 in the normal direction of movement of arm 80.

Power means 16 includes an electric motor 106 mounted on base 108 which is in turn secured to, and supported by, cross braces 64 intermediate tube 54 and support members 32 and 34. A pulley 110 rotatably mounted on opposed vertical supports 112, secured to respective cross braces 64, is operably coupled to the pulley on the output shaft of motor 106, by V-belt 114. A relatively small pulley 116 secured to the shaft 118 carrying pulley 110, is operably joined to a very large pulley 120 on shaft 122 by a V-belt 124 trained over pulleys 116 and 120 respectively. It is to be noted that shaft 122 is carried by a horizontal, tubular member 126 welded to the support member 34 intermediate the ends thereof and in perpendicular relationship to the latter. A small sprocket wheel 128, connected to shaft 122, receives endless chain 130 trained over sprocket wheel 70, while idler means 132 carried by support member 34 and engaging endless chain 130 intermediate wheels 128 and 70, maintains proper tension on chain 130.

A pair of elongated straps 134 pivotally secured to the inner surfaces of support members 32 and 34 by respective pivot means 136, are in turn swingably joined to a pair of elongated elements 138 and 140 which are in substantial parallelism with cross braces 64. The connectors 142, pivotally joining the lower extremities of elements 138 and 140 to respective straps 134, permit relative pivoting of the parts during shifting of elements 138 and 140 longitudinally of cross braces 64. The upper extremities 138a and 140a of elements 138 and 140 respectively, are bent inwardly so that the outer extremities of the same converge as tube 54 is approached (FIG. 2) with a polygonal block 144 being interposed between, and secured to the outer ends of portions 138a and 140a.

Block 144 is internally threaded to receive an externally threaded rod 146 which passes through an angularly disposed plate 148 carried by, and depending from the under surface of tube 54. Crank 150 secured to the outer end of rod 146, facilitates rotation of the same to shift the frame presented by elements 138 and 140, longitudinally of cross braces 64. It is to be preferred that a cross member 152 be provided between elements 138 and 140 adjacent the zones at which the same are bent toward each other, while a circular disc 154 is likewise

welded to the inner surfaces of elements 138 and 140 in spanning relationship thereto, although as shown in FIG. 2, it can be seen that disc 154 is in proximal relationship to the lower extremities of straps 134.

A pair of upstanding lugs 156 and 158 welded to member 26, carry an elongated shaft 160, it being noted from FIG. 2 that lug 158 is adjacent support plate 30, while lug 156 is located in proximity to support member 32. A cylindrical sleeve 162, rotatable on shaft 160, has a pair of upright ears 164 thereon which receive the lowermost extremity of rod 166 therebetween, a pivot means 168 serving to swingably join rod 166 to ears 164. Disc 154 is provided with a central opening therein for clearing rod 166, and the latter extends upwardly in parallel relationship to elements 138 and 140, the terminal end of rod 166 being adjacent cross member 152. A relatively large coil spring 170 of the automotive type, is provided on rod 166 and engages the upper surface of disc 154, as well as a disc 172 provided with a central opening clearing rod 166 and located adjacent the terminal end of the latter. Nut 174, threaded onto the upper end of rod 166, retains disc 172 thereon, and thus coil spring 170 under predetermined compression.

An elongated arm 176 secured to sleeve 162 adjacent lug 158, extends radially from sleeve 162 and mounts a stud bolt 178 which in turn rotatably carries a collar 180 provided with a circumferentially extending groove 182 receiving a lower loop 184 of cable 96. Cross brace 186 extending between the outer end of arm 176 and cylindrical sleeve 162 in spaced relationship to arm 176, provides additional support for arm 176.

Ball delivery means 22 comprises an L-shaped plate 188 mounted on angle iron 62 and member 52 and spanning the distance therebetween, as well as a pair of elongated, longitudinally arcuate guide walls 190 and 192 which extend from the arcuate rear wall 194 forming a part of hopper unit 20, to the ball delivery station defined in part by elongated rod 196 connected to the underside of tube 54 outboard of angle iron 62 and projecting forwardly from tube 54 to a position in proximity to the outlet of guide walls 190 and 192. A ball stop disc 198 mounted on the forwardmost extremity of rod 196, is disposed in sufficient spaced relationship to plate 188 to clear channel member 100 of arm means 14, but insufficient to permit a ball to drop over the margin 200 of plate 188.

The hopper unit 20 includes a basket of relatively large size, capable of holding a considerable number of baseballs and comprises a bottom wall 202, a peripheral, transversely rectangular side wall 204, and if desired, a complementary rectangular lid 206 which is removable and precludes displacement of balls from the hopper unit 20 during operation of agitator mechanism 24.

Bottom 202 has a rectangular ball-delivery opening 208 therein which is in closer proximity to wall segment 204a of side wall 204 than to the opposed wall segment 204b. It is to be preferred that the various areas of wall 202 be inclined toward opening 208, so that the balls contained in unit 20 tend to gravitate toward the ball outlet. One segment of wall 202 is formed of an L-shaped member 210 having an upper inclined wall segment 202a and a vertical, downwardly projecting segment 202b. An elongated shaft 212 extends between member 52 and upright segment 202b, and rotatably receives a sleeve 214 which carries a pair of primary ball agitators 216 which are preferably of identical configuration, as well as a pair of horizontally spaced, identical secondary agitators 218, the configuration of agitators 216 and 218 being best illustrated in FIG. 5. It can, therefore, be seen that each of the agitators 216 has a pair of parallel, relatively straight margins 220 and 222 which are normally at an angle with respect to the horizontal, as well as an upright, straight margin 224 adjacent shaft 212, and an arcuate edge 226 remote from shaft 212. Each of the secondary agitators 218 has a pair of

spaced, generally rectangular sections 218a and 218b which are joined by a central segment 218c which rests on, and is secured to sleeve 214. It is to be noted that the upper margins 228 and 230 of sections 218a and 218b respectively, are disposed at an angle with respect to each other and are also at an angle with respect to upper margin 220 of each of the primary agitators 216.

An elongated, tubular element 232 (FIGS. 5 and 6) interconnecting the lower extremities of agitators 216 and extending below member 52, is provided with a collar 234 on the outer extremity thereof away from the proximal agitator 216, is maintained in position thereon by a crosspin 236 through tubular element 232, and mounts a radially extending arm 238. Crank 240, secured to the proximal extremity of shaft 68, is rotatably joined to rod 238 by connector 242 which permits crank 240 to rotate through a 360° arc while clearing arm 238.

The rear wall 194 of unit 20 has an upwardly extending notch 244 therein for clearing baseballs passing downwardly through opening 208, and wall guide structure, broadly designated 246, is provided in underlying relationship to opening 208 for directing balls therefrom into ball-delivery means 22. Structure 246 comprises an elongated cross rod 248 extending between cross member 52 and wall 194 and serving as means for mounting an angularly disposed bottom ball guide rod 250 which extends from tubular member 66 downwardly to rod 248. Secondary side guide rods 252 likewise extend downwardly from tubular member 66 and are secured to rear wall 194 as illustrated in FIG. 6. The notch 244 is in direct alignment with the space between walls 190 and 192 so that balls gravitating along rod 250, pass directly into ball delivery means 22.

OPERATION

Lid 206 is removed from hopper unit 20 and the latter is filled with baseballs, whereupon machine 10 is in condition for pitching of successive balls along substantially uniform paths of travel. Crank 50 is rotated in a direction to shift tube 54 up or down with respect to support member 44, whereby the attitude of members 32 and 34 may be varied with respect to the supporting surface for frame 12.

By adjusting the disposition of tube 54 with respect to support member 44, and thereby the angularity of cross member 52 and angle iron 62 with respect to the ground, the trajectory of the baseballs thrown from machine 10 may be changed as desired. Thus, increasing the angularity of the upper part of the frame presented by cross member 52, angle iron 62 and tubular member 66 with respect to the ground, increases the arcuate path of the ball and, therefore, the altitude of the same as the ball passes over the batter's box area, whereas decreasing the elevation of the pitching machine, lowers the level of the ball as the same enters the imaginary strike zone adjacent the plate area.

After proper adjustment of the elevation of the pitching apparatus, motor 106 is energized to thereby cause the drive pulley thereon to move V-belt 114, which in turn rotates pulley 110. The pulley 116 operably coupled to shaft 118, is rotated with pulley 110, whereby pulley 120 rotates under the influence of belt 124 operated by pulley 116. Inasmuch as shaft 122 is operably coupled to pulley 120, sprocket wheel 126 on shaft 122 is rotated therewith, thereby causing endless chain 130 to be moved and rotating large sprocket wheel 70.

During rotation of sprocket wheel 70, the pin 76 thereon eventually moves into engagement with lug 74, whereby sleeve 72 is rotated along with pin 76. Movement of lug 74 also causes sleeve 72 to be rotated therewith, whereby the pitching arm means 14 is caused to be rotated in a clockwise direction, viewing FIG. 1.

It is to be recognized that the balls in hopper unit 20 tend to gravitate toward opening 208, and that a certain number of such balls pass downwardly through opening

208 and are guided by structure 246 toward delivery means 22. The bottom rod 250 and side rods 252, cooperate to present the upper part of the ball path, while additional balls are disposed between walls 190 and 192 and rest on plate 188. The outermost ball engages margin 200 of plate 188 and the adjacent peripheral edge of disc 198, whereby such ball is in position to be picked up by hand 98 during rotation of arm means 14.

Therefore, as hand 98 moves upwardly during rotation of arm means 14, channel member 100 engages the ball between margin 200 of plate 188 and the edge of disc 198, with the ball then rolling downwardly along channel member 100 into engagement with plate 104 until the ball is ejected from arm means 14 during accelerated movement thereof under the influence of spring 170.

Compression of spring 170 during initial movement of arm means 14 under the influence of motor 106, occurs by virtue of the cable 96 being moved upwardly during rotation of arm 86 about the axis of shaft 68, whereby the crank presented by arm 176, sleeve 162 and ears 164, is caused to rotate about the axis of shaft 160. Disc 172 is shifted toward disc 154 during downward movement of rod 166, thereby causing spring 170 to be compressed between discs 172 and 154 and effecting a considerable build-up of kinetic energy in the compressed spring. As soon as arm 86, forming a part of arm means 14, has been moved over center with respect to the axis of shaft 68, and in relation to the disposition of cable 96, arm means 14 is acceleratively driven through the remaining portion of its arcuate path of travel by the coil spring 170. It can be seen that as soon as coil spring 170 is permitted to expand, the disc 172 is forced away from disc 154, thereby shifting rod 166 away from tubular member 26. The crank presented by ears 164, sleeve 162 and arm 176, is thereby rotated in a counterclockwise direction and effecting accelerated rotation of arm means 14. The baseball carried by hand 98 is ejected from the latter along channel member 100, whereby such balls follow a predetermined path of travel.

The machine continues to successively throw baseballs along a uniform path of travel, so long as motor 106 continues to operate. It is to be recognized that coin-actuated mechanism may be operably connected to motor 106 for causing the same to be energized for a predetermined period to pitch a selected number of balls toward a batting area. On the other hand, the machine may be permitted to operate so long as balls remain in ball delivery means 22.

The degree to which spring 170 is compressed during movement of arm means 14 under the influence of motor 106, may be varied by rotating rod 146 in block 144. For example, rotation of rod 146 in a direction to move elements 138 and 140 toward tube 54, causes straps 134 to pivot about pivot means 136, and thereby shifting spring 170 away from the crank presented by ears 164, sleeve 162 and arm 176. In this manner, the degree to which spring 170 may be compressed, is increased by virtue of the fact that the spring is placed under additional compression prior to the force exerted thereon by motor 106 during motor-powered movement of arm means 14. Alternatively, the degree of compression of spring 170 may be decreased by moving the frame presented by elements 138 and 140, as well as straps 134 toward member 26. The operating handle 150 facilitates adjustment of the tension on spring 170.

The agitator mechanism 24 is also continuously operated during energization of motor 106 and it can be seen that the powered rotation of shaft 68 causes crank 240, connected thereto, to be rotated about the axis of shaft 68 whereby the arm 238 is moved in a path of travel to effect reciprocatory movement of agitators 216 and 218. Oscillatory movement of arm 238 and thereby agitators 216 and 218, about the axis of shaft 212, assures that the balls in hopper unit 20 are jostled and absolute-

ly precluding bridging of balls across opening 208. Furthermore, the disposition and configuration of the agitators 216 and 218 aids in direction of balls into the ball guide delivery means 22. It should be pointed out for example, that when agitators 218 are the lowermost ends of their paths of travel during oscillatory movement thereof, the margins 228 of the same are in substantial horizontal alignment with the rod 250. It can thus be seen that the margins 230 of agitators 218, are disposed to direct balls toward the ball delivery chute during downward movement of sections 218a of agitators 218. Likewise, upward movement of agitators 216 above the level of that portion of bottom 202 defining opening 208, breaks up the disposition of the balls around the opening and thereby prevents bridging of such balls.

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

In a machine for automatically successively ejecting baseballs, a source of rotary motive power in said machine; a source of balls to be ejected on said machine including a container having a bottom provided with a ball exit opening permitting balls to be supplied to said machine and side walls; and ball-agitating means in said

bottom including a plurality of upright plates, a first shaft fixed to said plates and rotatably coupled to said machine, a second shaft rotatably coupled to said machine and operably coupled to said source of rotary power to be rotated by the later, and over center crank mechanism fixed to said second shaft at one extremity and to at least one of said upright plates whereby when said source of rotary power is operated, said plates are oscillated thereby agitating balls contained in said container.

References Cited by the Examiner

UNITED STATES PATENTS

1,657,694	1/28	Parker	-----	221—200	X
1,955,775	4/34	Schiltz	-----	221—183	X
2,618,254	11/52	Wells	-----	124—51	
2,716,973	9/55	Desi	-----	124—51	X
2,877,757	3/59	Giovagnoli	-----	124—7	
2,878,801	3/59	Patchin et al.	-----	124—7	
2,962,018	11/60	Tylle	-----	124—50	

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