BASEBALL PITCHING APPARATUS
Paul S. Giovagnoli, 4200 Birmingham Road, Kansas City 16, Mo. Filed Nov. 21, 1960, Ser. NO. 70,532
3 Claims. (Cl. 124—7)

This invention relates to apparatus for automatically pitching baseballs, and particularly, to a machine which will successively throw the balls along a substantially uniformly trajectory without operator attention of the mechanism being required, and with the balls being ejected at substantially equally timed intervals.

In baseball pitching machines of the type referred to above, it is the usual practice to provide a relatively large hopper for receiving a number of baseballs which are permitted to gravitate successively through an opening in the bottom of the hopper onto a track for delivery to a station where the balls are picked up successively by a throwing arm, which then is acceleratively driven through a predetermined arc by power mechanism forming a part of the machine so that the balls are thrown toward a predetermined target in spaced relationship to the pitching apparatus.

One of the major problems associated with construction of machines for pitching baseballs, is the provision of mechanism for delivering the balls to the ball pickup delivery station without bridging of the baseballs across the opening in the bottom of the hopper, and which thereby normally necessitates that a person reach into the hopper and agitate the balls sufficiently to clear the opening for free movement of baseballs therethrough. It can be recognized that this substantially defeats the primary utility of the apparatus wherein it is desired that the baseballs be thrown successively from the unit without operator attention, and for extended periods without the requirement of putting new balls in the hopper. Thus, the hopper must be of relatively large capacity and trouble-free in operation, this being especially necessary with respect to coin-operated ball pitching machines. It can be recognized that, if clogging of the ball delivery opening occurs, the customer does not receive the predetermined number of balls upon deposit of a coin. Therefore, in order to prevent unfavorable customer reaction from malfunctioning of the machines caused by bridging of the balls across the ball delivery openings in the ball hoppers, it has been necessary to employ sufficient persons to maintain constant vigilance over the machines.

It is, therefore, the primary object of the present invention to provide a baseball pitching machine as described, wherein is included novel ball-agitating means within the ball-receiving hopper of the apparatus for preventing bridging of balls across the ball delivery opening in the bottom of the ball hopper, whereby constant operator attention over the machines is, for the most part, not required.

An additional important object of the invention is to provide ball-agitating mechanism for an automatic baseball pitching machine wherein the balls are stirred in the hopper therefor in a manner to keep those balls in proximity to the ball delivery opening in the bottom of the hopper, in constant motion, but without bouncing of the balls which could result in failure to be gravitated into the ball-delivery chute for direction to the ball pickup station, whereby possible operation of the machine without throwing of a baseball could occur.

A further significant object of the invention is to provide a baseball pitching machine as described, wherein the ball agitator includes an elongated, longitudinally arcurate finger disposed in an upright relationship and rotatable about a vertical axis through the ball delivery opening in the bottom of the ball-receiving hopper, with the finger being rotatable through a path to stir the balls and direct the same up and away from the ball opening to thereby maintain the balls adjacent the opening in constant agitation and assuring uniform delivery of baseballs to the ball pickup station, regardless of the number of balls which are contained in the hopper of the machine.

A still further important object of the invention is to provide novel components for connecting the ball-agitating finger referred to above, to the same power source for operating the ball throwing arm of the machine, whereby only one power source is required on the mechanism to effect complete operation thereof.

Also an important object of the invention is to provide ball-agitating mechanism for a baseball pitching machine wherein the agitator is of simple construction, effective in operation, requiring little or no maintenance during the normal life of the machine, and of such nature that the same can be placed on existing machines not having ball agitators to preclude bridging of baseballs across the ball-delivery opening in the bottom of the ball hopper forming a part of the ball pitching apparatus.

Other important objects and details of the present invention 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 and illustrating the novel ball-agitating apparatus, certain parts of the machine being broken away to reveal details of construction of the elements therebetween.

FIG. 2 is a plan view of the baseball pitching apparatus as illustrated in FIG. 1; and
FIGS. 3 and 4 are fragmentary, vertical, cross-sectional views taken on lines 3—3 and 4—4 respectively of FIG. 2 and looking in the direction of the corresponding arrows.

Ball pitching apparatus constructed in accordance with the preferred principles of the present invention, is numerated 10 in the drawings and includes, as basic components, a frame 12 adapted to be mounted in an upright position on the ground, ball throwing arm structure 14 rotatably carried by frame 12, force mechanism 16 for acceleratingly rotating the ball throwing structure 14 through a part of the normal path of travel thereof, prime mover means 18 mounted on frame 12 and operably coupled to structure 14 for rotating the latter through the remaining portion of the normal arc of movement thereof, ball delivery and pickup station means 20 secured to the upper part of frame 12 adjacent structure 14, ball hopper means 22 mounted on frame 12 and adapted to deliver balls to delivery means 20, and ball-agitating means 24 operated by prime mover means 18 for precluding bridging of baseballs within hopper means 22.

Frame 12 includes a lower tubular member 26 having a rearward extending member 28 secured thereto with L-shaped end plates 30 and 32 connected to opposed ends of member 26, and L-shaped plate 34 joined to the rearmost extremity of member 28 and adapted to engage the ground within a common plane and thereby support frame 12.

An upright support member 36 is welded to the member 26 intermediate the ends thereof and preferably in direct alignment with member 28, while a rear upright support 38 is joined to the rearmost extremity of member 28 adjacent plate 34, it being noted that the uppermost end of support 38 serves as means for mounting a horizontal cross member 40 extending forwardly from support 38 and suitably joined to support member 36 intermediate the extremities of the same.

A tubular element 42 secured to support member 26
in perpendicular relationship to the latter, as well as to cross member 40 and positioned immediately above the latter, rotatably receives an elongated power shaft 44 which extends outwardly from opposite ends of element 42. A relatively large sprocket wheel 46 is mounted on, and perpendicular to, the extremity of shaft 44, projecting outwardly from support member 36 away from hub member 10. A large pulley 106 is secured to shaft 106 in abutting relationship to the extremity of member 104 proximal to support member 36, while a small sprocket wheel 110 is mounted on the outer end of shaft 106 in engagement with pulley 106 for rotation therewith by the latter.

Prime mover means 18 includes a horizontal tubular member 104 secured to the uppermost extremity of support member 36 and rotatably receiving an elongated shaft 106 projecting outwardly from opposed ends of member 104. A large pulley 106 is secured to shaft 106 in abutting relationship to the extremity of member 104 proximal to support members 36, while a small sprocket wheel 110 is mounted on the outer end of shaft 106 in engagement with pulley 106 for rotation therewith by the latter.

Electric motor 112 carried by the upper surface of member 104, has an output shaft 114 carrying a small pulley 116. V-belt 118 trained over pulley 116, is also disposed over an intermediate pulley 120 rotatably mounted on a horizontally extending, vertically disposed plate 122 by shaft means 124. Plate 122 is supported at one end thereof by support member 36, and by an upright rod 126 which projects upwardly from, and is carried by cross member 40. A pulley 128 of substantially smaller diameter than pulley 126, and also connected thereto for rotation with the latter, receives a V-belt 130 which is in turn trained over pulley 132, a spring biased slider 134 in engagement therewith and carried by support member 36, for maintaining proper tension on the endless chain 132.

Hopper means 22 comprises a wire mesh side wall 136 of rectangular configuration horizontally thereof, and secured to the upper margin of a rectangular flange 138 joined to, and integral with bottom wall structure 140. As best shown in FIGS. 2 and 4, structure 140 is made up of four triangular sections 142 which present a segment of a pyramid with the apex thereof lying in a horizontal plane spaced below a plane of the peripheral margins of sections 142. Furthermore, the apices of sections 142 are provided with cutouts therein, cooperating to present a central ball-clearing opening 144 which is of a diameter just slightly larger than that of a conventional baseball of the so-called "hard ball" type.

Means for supporting hopper 22 includes the rod 126 which is connected to flange 138, as well as the wires of side wall 136, while the corner of flange 138 adjacent support member 36 is welded to the latter, and an upright rod 146 (FIG. 2) extending upwardly from member 26 serves as a support for another corner of the hopper 22 by virtue of the fact that rod 146 is joined to flange 138 and to side wall 136.

An elongated guide track 148, forming a part ofball-delivery structure 20, extends from below opening 144 in bottom wall 140 to a ball-delivery station plate 150 carried by cross member 40. Elongated guide rods 152 and 154, coextensive in length with track 148, substantially following the path thereof and spaced above the same, prevent balls from leaving track 148 as the same gravitate downwardly from hopper 22 to plate 150. An L-shaped rod 156, connected to the rear extremity of cross member 40 remote from support member 36, carries a circular disc 158 disposed at an angle located in proximity to the margin 160 of plate 150 so that balls passing over the edge of margin 160 are prevented from falling therefrom by virtue of engagement of the same with the outer edge of disc 158. As shown in FIG. 2, space is thereby presented between margin 160 and the proximal periphery of disc 158, which is sufficient to clear an elongated, transversely convex forming hand 162 secured to the outermost extremity of arm 50 by bracket 164.

Agitator means 24 includes a horizontal, tubular member 166 (FIG. 2) welded to the uppermost end of support member 36 and extending outwardly therefrom in an overlying relationship to bottom wall 140 and preferably lying in a vertical plane passing through the zone of merger of the triangular sections 142 proximal to sup-
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port member 36. A vertical sleeve 168 (FIG. 4) is carried by the outer extremity of member 166 and rotatably receives an upright shaft 170 having a pulley 172 secured to the upper end thereof and resting on sleeve 168. V-belt 174 trained over pulley 172 also passes around pulley 176 which is secured to the end of shaft 106 remote from pulley 108. Bracket arm 178 extending outwardly from member 166 mounts an upright shaft 180 which carries pulley 182 also engaging belt 174 to maintain the same taunt, notwithstanding the fact that such belt passes over pulleys rotatable about axes in perpendicular relationship to each other. A tubular component 184 telescoped over the lower end of shaft 170 below sleeve 168 and secured thereto by studs 186, serves as means for mounting an elongated, transversely circular agitator rod 188 of predetermined longitudinal configuration. As indicated in FIGS. 1 and 4, the upper section 188a of rod 188 is substantially vertical and is welded directly to the upper section 190 of bottom wall 140 and adjacent margin 190. Operation

Hopper means 22 is initially filled with baseballs, whereby a certain number of the same gravitate through opening 144 and down track 148 until the first ball rests on margin 160 and in engagement with disc 158. Additional balls fill track 148 and are maintained in proper alignment thereon by guide rods 152 and 154, motor 112 connected to a suitable source of power is then energized whereby drive shaft 114 is rotated at a predetermined speed to thereby cause pulley 116 to be turned and resulting in movement of pulley 120 in response to movement of belt 118.

Pulley 128 turns with pulley 120, thereby causing pulley 108 to be rotated under the influence of belt 130. Rotation of pulley 108 causes shaft 106 to rotate sprocket wheel 110, whereby endless chain 132 moves sprocket wheel 46. As pin 62, which is spaced from the axis of shaft 44, is rotated with sprocket wheel 46, such pin eventually engages the lug 64 on sleeve 48, to thereby cause sleeve 45 and the arm 50 connected therewith to be rotated in a clockwise direction viewing FIG. 1.

During such clockwise movement of arm 50, the arm 52 is moved therewith, thereby pulling cable 58 upwardly and placing a pressure on rod 88. The upward force component on the outer extremity of rod 88 causes lug 76 to be rotated about the axis of pin means 74, whereby rod 78 is shifted toward member 26, viewing FIG. 1, whereby spring 86 is placed under additional compression between plate 70 and disc 84.

As soon as arm 50 has been rotated to a substantially horizontal position, the same moves between margin 160 of plate 150 and the disc 158 to thereby cause the ball, positioned therebetween, to be picked up by hand 162 for purposes of being thrown forwardly from the machine along a substantially predetermined path. During continued upward movement of arm 50, the ball rests against abutment 192 of bracket 164 and thereby is in disposition to be thrown forwardly along a path defined in part by the trough of hand 162.

When arm 52 reaches an over-center disposition with respect to shaft 44, it can be seen that lug 64 may move away from pin 62 under the influence of cable 58 being biased downwardly by rod 88 operably connected to spring 86 under compression, and thus arm 50 is acceleratively moved along an additional portion of its arc by the force of spring 86. In this manner, the ball is projected away from the machine at a relatively high speed approximating that of a ball which has been thrown by a human pitcher.

During the pitching cycle described above, pulley 176 is also being rotated by shaft 106, whereby belt 174 trained over pulley 172 causes the same to be rotated, thereby resulting in rotational movement of shaft 170. The rod 188, connected directly to shaft 170, is rotated in a circular path of travel, whereby the various sections of rod 188 engage the balls in hopper means 22 and maintain the same in constant agitation without bouncing, which would tend to cause the balls to fall out of hopper means 22 or move away from the opening 144. By virtue of the configuration of rod 188 and the disposition of the same with respect to opening 144, the balls are continuously biased up and away from opening 144, while the transversely circular configuration of rod 188 permits the balls to roll over the same without violent bouncing or other undesirable agitational movements. It can be seen that rod 188 thereby prevents bridging of balls across opening 144 and assures delivery of such balls to track 148 so long as a quantity of balls remain in hopper means 22.

The force with which arm 50 is acceleratively driven under the influence of spring 86, may be adjusted as desired by shifting collar 89 longitudinally of rod 88. It can be recognized that the disposition of spring 86 with respect to a vertical line through the axis of shaft 44, changes the force with which cable 58 pulls downwardly on arm 52 inasmuch as the extent of compression of spring 86 is dependent upon the location of the collar 89 with respect to rod 88. Shifting of force mechanism 16 longitudinally of the machine and in response to rotation of the screw 98 changes the point at which throwing arm structure 14 comes in contact with the arm thereby permitting variation of the point of release of the ball from structure 50 during cyclic operation of the throwing mechanism.

The hopper 22 and associated agitating means 24 are of particular utility because the same may be constructed as an attachment for mounting on existing machines, or those mechanisms which do not have ball agitating structure thereon at the time of manufacture thereof.

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

1. In a machine for rotatively, successively ejecting baseballs, a source of balls to be ejected mounted on said machine and having a wall provided with a ball exit opening; a vertically disposed, rotatable ball agitating means on said machine including a rotatable, vertical shaft over said opening, a pulley fixed to said shaft, and a generally upright, curvilinear finger fixed to the shaft and extending therefrom into said source of balls, said finger having an upper section connected to the shaft and depending therefrom, an intermediate section depending from the upper section of a generally spiral configuration and of an effective diameter larger than the diameter of the opening, a generally upright lower section extending downwardly from the intermediate section and provided with a lower extremity terminating slightly above said wall outside of said opening and at a steeper angle than the angularity of said intermediate section; and a source of motive power on said machine operatively coupled to said pulley for causing said agitating means to agitate the balls in the source and prevent blocking of said exit opening.

2. The structure as set forth in claim 1 wherein said finger is curved to describe inwardly decreasing con- volutions as the lower extremity of the finger is approached when the finger rotates about the axis of said shaft.
3. The structure as set forth in claim 2, wherein said source of balls is a hollow, inverted pyramid segment hopper open at the top and having a single ball passing exit opening in the narrow bottom, said finger agitating balls in said hopper by stirring them and said inwardly decreasing convolutions directing balls up and away from said opening.

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