April 12, 1955 J. CAVALIER 2,705,945

BALL PITCHING MACHINE

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Fig. 1.

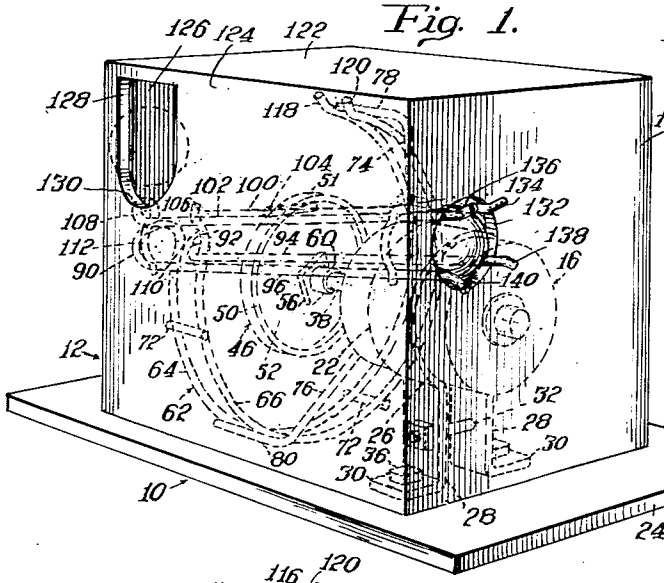


Fig. 3.

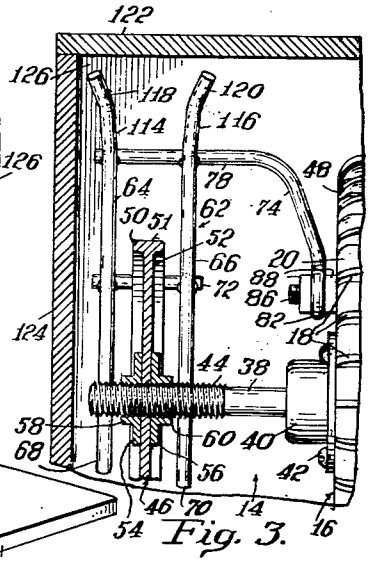
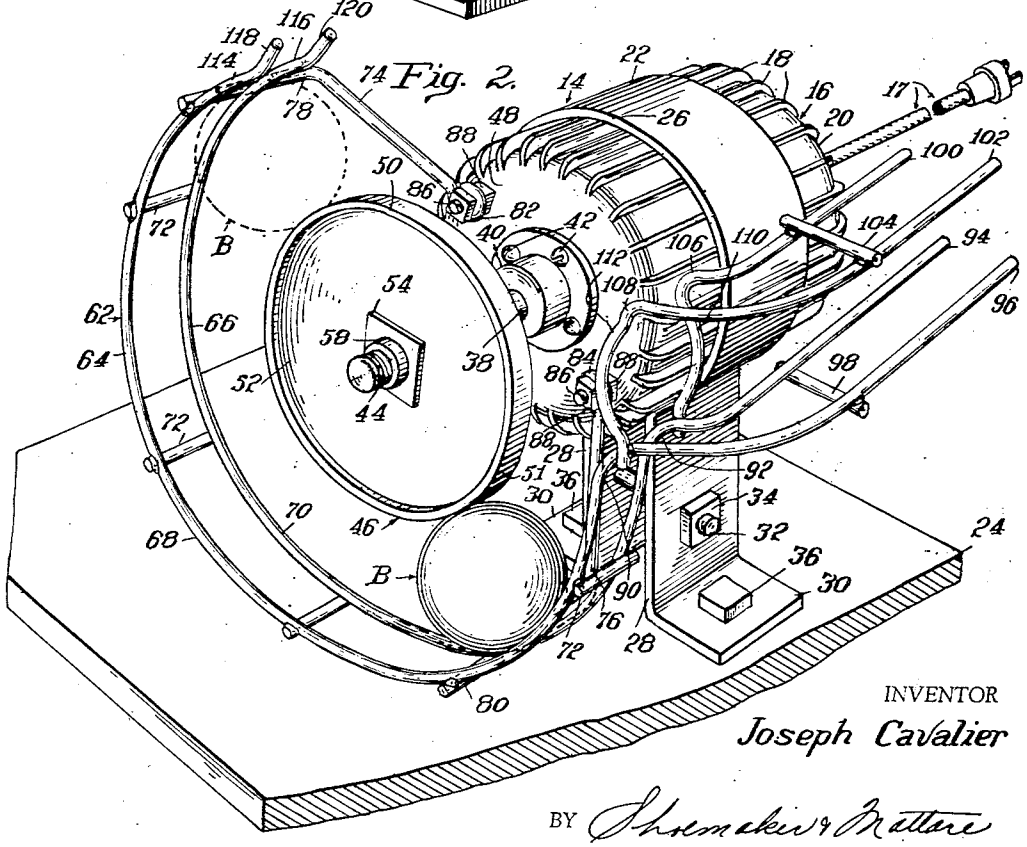


Fig. 2.



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BALL PITCHING MACHINE

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2 Claims. (Cl. 124—1)

The present invention relates to improvements in ball pitching machines and more particularly to the means for guiding the balls from the ball entry station of the pitching machines to the ball projection station of the machines and to the means for accelerating the balls over the path provided by the means guiding the balls, from a standstill to the projection velocity.

Heretofore, various machines have been provided for pitching balls for batting, tennis or other practice. The prior machines have employed relatively rigid propelling arms, resilient projecting arms, pairs of rotatable projection wheels, wheel and shoe combinations and various other means. Certain of the prior machines have embodied manikins with rotating arms for pitching balls in a manner simulating an actual baseball pitcher. The prior pitching machines have not, however, taught structural arrangements whereby the finger positioning of an actual pitcher throwing a ball can be simulated.

It is, therefore, a first object of the present invention to provide an improved pitching machine which is of simple construction but wherein means is provided for projecting balls, the means simulating the finger positioning of a pitcher at the instant the ball is to pass into free flight.

A further object of the present invention is to provide a guide track and disk combination with means for driving the disk, the guide track terminating in a pair of arcuated fingers and the disk being disposed medially of the fingers and simulating a pitcher's thumb whereby the path traversed by each ball will closely simulate a hand-pitched ball.

Another object of the present invention is to provide a ball pitching machine with an enclosing box having ball inlet and outlet openings whereby balls can be fed into the machine and projected thereby through the outlet opening, the machine including a guide track and driving disk arrangement and a guide track extension being provided for conveying balls inserted into the inlet opening to the inlet end of the guide track by utilizing gravitational pull.

A still further object of the present invention is to provide a ball pitching machine including a rotatable driving disk and a guide track in concentric relation to said disk whereby balls can be driven over the guide track by the driving disk, the guide track terminating at one end in an inlet station and at the other end in a projection station, the inlet station being immediately below the plane tangential to the driving disk at the point of discharge of the ball from the guide track so that the ball is in contact with the disk and track for substantially the maximum arcuate path about the disk so that slippage of the ball on the disk at the point of discharge is substantially at a minimum.

Various other objects and advantages will become apparent from the detailed description to follow.

The best form in which I have contemplated applying my invention is clearly illustrated in the accompanying drawings wherein:

Figure 1 is a perspective view of the ball pitching machine showing the inlet and outlet openings for the balls and the ball pitching mechanism within the box in phantom lines;

Figure 2 is an enlarged detailed perspective view of the ball pitching mechanism mounted on its base; and

Figure 3 is an enlarged sectional view showing the manner in which the disk is mounted on the drive shaft and also the configuration of the guide track, parts being broken away.

Referring more particularly to the drawings wherein like numerals designate like parts throughout, the numeral 10 designates generally the ball pitching machine which includes an enclosure 12 and the ball pitching mechanism 14 within the enclosure 12.

With initial reference to Figures 2 and 3, it will be seen that the ball pitching mechanism 14 includes the provision of the conventional electric motor 16 of the type having cooling fins 18 extending outwardly from the casing 20 of the motor. A clamp 22 embraces the electric motor and is secured to the base 24 of the enclosure 12.

The clamp 22 is formed from an elongated flat strap of steel which has an arcuate portion 26 adapted to embrace the fins 18 of the casing. The arcuate portion 26 has a pair of flat extension portions 28 in parallel relation to each other extending from the terminals of the arcuate portion 26. The lower ends of the flat extensions 28 are angulated at 30. A bolt 32 is extended through the pair of extensions 28 and has a nut 34 threadably engaged thereon for urging the two extensions together in order that the arcuate portion 26 can clampingly embrace the motor in its supported position. The angulated ends 30 are secured to the base 24 by means of the bolts 36.

The electric motor 16 has a drive shaft 38 extending axially therefrom and through the bearing casing 40 secured to the motor casing 20 by means of the screws 42. The drive shaft 38 has a substantial portion thereof exteriorly threaded at 44. A centrally apertured disk 46 is disposed on the drive shaft 38 in preselected spaced relation to the front face 48 of the motor casing 20. The disk 46 is of constant diameter, being formed of an annular peripheral ring 50 and a flat circular plate 52 integrally formed with the ring 50. The disk 46 is secured in position on the drive shaft 38 by means of the pair of clamping plates 54 and 56 which are disposed on opposite sides of the circular plate 52. The plates 54 and 56 are each formed with a boss 58 and 60 and an axially threaded bore therethrough. It will thus be seen that the clamping plates 54 and 56 can be engaged on the drive shaft 38 at the threaded portion thereof and clampingly engage the disk for maintaining the same in its selected position.

The ball pitching mechanism 14 further contemplates the provision of a guide track 62. The guide track is comprised of a pair of wire-like elements 64 and 66, the main portions 68 and 70 of which being arcuate and disposed substantially concentric with the driving disk 46. The wire-like elements 64 and 66 are jointed and maintain in preselected spaced relation to each other by means of the plurality of connecting struts 72, the wire-like elements and connecting struts being joined by weld or solder, other means being employed as desired.

The wire-like elements 64 and 66 have secured thereto at substantially diametrically opposing points, a pair of supporting arms 74 and 76. The supporting arms 74 and 76 are angulated at 78 and 80 and have their distal ends formed as eyelets at 82 and 84. Lugs 86 are extended through the casing 20 of the motor and through the eyelets 82 and 84, the supporting arms 74 and 76 being secured to the lugs 86 by means of the nuts 88. It will thus be seen that the guide track 62 will be maintained in preselected relation to the face 48 of the motor casing 20 and thus in selected relation to the annular ring 50 of the driving disk 46.

At one end of the arcuate portions 68 and 70, the wire-like elements 64 and 66 are arcuated as at 90 and 92. A guide track extension comprised of the wire-like elements 94 and 96 integrally extends from the arcuated portions 90 and 92 to constitute the inlet guide track. The wire-like elements 94 and 96 are maintained in preselected spaced relation by means of the connecting strut 98.

Overlying the inlet guide track elements 94 and 96 is a pair of wire-like elements 100 and 102 which are joined in spaced relation by the connecting strut 104. The ends 106 and 108 of the elements 100 and 102 have arcuately extending portions 110 and 112 extending downwardly therefrom and joined at their lower ends to the outer portions of the arcuate portions 90 and 92.

As seen best in Figure 3, the discharge ends of the wire-like elements 64 and 66 have extension portions 114

and **116** constituting arcuate extensions of the main arcuate portions **68** and **70**. However, the extensions **114** and **116** diverge slightly and have their free ends upwardly angulated at **118** and **120**. It will thus be seen that the extensions **114** and **116** and the upwardly diverging ends **118** and **120** are finger-like in nature.

For purposes of clarity, the area disposed between the periphery of the driving disk **46** and the adjacent portion of the guide track at the point at which the ball B has terminal contact with the guide track, is termed the projection station.

Looking now at Figure 1, it will be seen that the ball projecting mechanism **14**, which is mounted on the base **24**, has an enclosure **12** disposed thereover. The enclosure **12** includes a top wall **122**, front and rear walls **124** and side walls **126** joined to form a box-like enclosure. The front wall is formed with an opening at **128**, substantially rectangular but having its lower edges of substantially semi-circular form at **130**. One of the side walls is formed with a circular opening at **132** through which the distal ends of the wire-like elements **94**, **96**, **100** and **102** extend. The distal ends of the wire-like elements of the inlet guide track are outwardly angulated at **134**, **136**, **138** and **140**, in order to position the inlet guide track relative to the opening **132**.

It will be noted that the upper and lower wire-like elements of the inlet guide track are so spaced as to permit free passage of the ball B from the inlet opening **132** to the ball inlet station between the arcuate portions **110** and **112**. It is to be further noted that the arcuate portions **68** and **70** of the main guide track are so disposed relative to the periphery **51** of the driving disk **46** as to maintain a ball B disposed therebetween under a slight pressure.

In view of the foregoing description of the structural arrangement of elements, it is believed that the manner in which the ball projecting machine operates will be readily understood by one skilled in the art.

The electric motor **16** is connected to a source of electric power by means of the plug and conduit **17**, thereby effecting driving of the drive shaft **38** and driving disk **46**. A suitable ball is fed through the opening **132** and passes through the inlet guide track to the ball inlet station and thereupon passes into engagement with the arcuate elements **68** and **70** of the main guide track, and also contacts the peripheral surface **51** of the driving disk **46**. The contact between the driving disk **46** and ball B effects movement of the ball along the guide track to the ball projection station. At the ball projection station, the ball loses contact with the driving disk and thereafter gradually loses contact with the finger-like ends **114**, **118** and **116**, **120** in order that the ball will then pass into free flight. It will be seen that the balls fed into the machine will all assume substantially the same trajectory.

It is pointed out that with the finger-like arrangement at the terminal portions of the guide track and the peripheral surface of the driving disk, the terminal contact with the ball B simulates the contact that a ball will receive in the hands of an actual pitcher, the surface **51** simulating that of the thumb, while the wire-like elements of the guide track simulate a pair of the pitcher's fingers.

Inasmuch as initial contact between the ball and the surface **51** of the driving disk **46** will be accompanied by a high degree of slippage, it is desirable that the ball be in contact with the surface of the driving disk throughout a substantial arcuate path. Therefore, the ball inlet station is disposed immediately below the plane tangential to the disk **46** at the point the ball leaves the disk whereas the ball projection station is disposed immediately above that plane. The ball inlet station will, of course, present no obstruction to the flight of the ball from the projection station, thereby permitting the ball to be in contact with the driving disk throughout substantially a maximum arcuate path.

What I claim is:

1. A ball pitching apparatus comprising a motor having a driving shaft one end of which projects forwardly from the motor, a circular disk mounted about the forwardly projecting end of said shaft and rotating therewith, and a guide track disposed about said disk in spaced concentric relation thereto for at least one-half the circumference of the disk, the track consisting of elongated wire strands having arcuate portions spaced transversely from each other, ends of the strands at the discharge end of the guide track extending diagonally away from each other, the opposite end portions of said strands being bent away from the arcuate portions in spaced parallel relation to each other, and upper strands disposed over the said parallel end portions of the guide track forming strands and having inner end portions extending downwardly and constituting supports secured at the entrance end of the guide track, said track having said entrance end under a lower portion of said disk and said discharge end being over the upper portion of the disk, the track having continuous elongated ball-engaging portions spaced transversely from each other and disposed in spaced relation to opposite sides of the disk in position for engaging portions of a ball between them and preventing movement of the ball transversely off of the peripheral edge face of the disk.

2. A ball pitching apparatus comprising a motor having a driving shaft one end of which projects forwardly from the motor, a circular disk mounted about the forwardly projecting end of said shaft and rotating therewith, and a guide track disposed about said disk in spaced concentric relation thereto for at least one-half the circumference of the disk, said track having an entrance end under a lower portion of said disk and a discharge end over the upper portion of the disk, the track consisting of elongated wire strands having arcuate portions spaced transversely from each other, a chute for delivering balls to the entrance end of said guide track having lower ball-engaging members constituting continuations of said strands, and upper ball-engaging members spaced upwardly from the lower ball-engaging members and supported by downwardly extending arms secured to the lower ball-engaging members, and the track having continuous elongated ball-engaging portions spaced transversely from each other and being disposed in spaced relation to opposite sides of the disk in position for engaging portions of a ball between them and preventing movement of the ball transversely off of the peripheral edge face of the disk.

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