United States Patent [19]

Betten

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[54] **BASEBALL PROJECTING MACHINE**

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[52] **U.S. Cl.** **124/1,** 242/154, 248/455

[51] **Int. Cl.** **F41b 3/04**

[58] **Field of Search**.... 89/37 R, 37 B, 37 BA, 40 R, 89/41 R; 242/154; 248/456, 455; 124/1, 29, 14, 8; 273/26 D; 56/11.7, 11.3, 11.6, DIG. 6, DIG. 15

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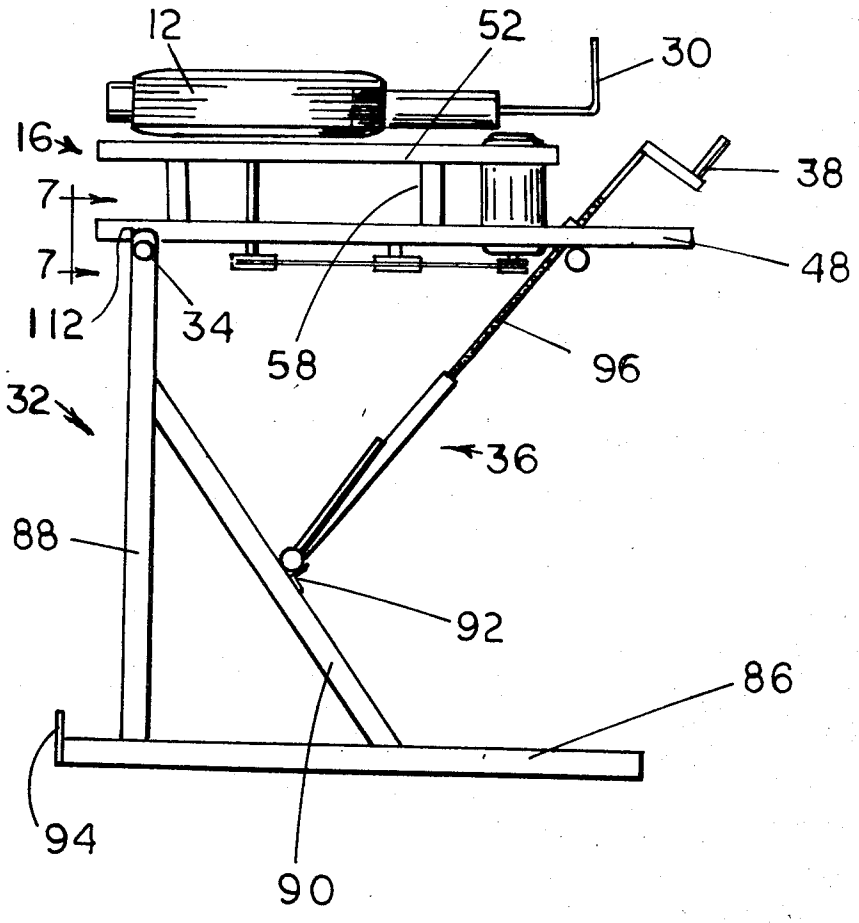
[57] **ABSTRACT**

A baseball training machine having a frame and a ball propelling assembly mounted on the frame for projecting balls therefrom. The frame is pivotably mounted at a front portion on a supporting base member. An adjustable brace releasably couples the rear portion of the base to the frame. The brace includes a threaded rod which, when rotated, changes the effective length of the brace to raise or lower the rear portion of the frame to adjust the angle of projection of the balls. Further, the base has a plurality of spaced retaining devices for receiving a lower portion of the brace in various adjusted positions so that the rear portion of the frame can be adjusted through a wide angle with respect to the base for projecting ground balls batting practise, fly balls, and pop flies. The propelling assembly includes a pair of wheels, each of which is independently driven by a constant speed motor through a variable drive mechanism including an idler pulley and a drive belt. The idler pulley is supported on the frame and adjusted by an adjusting rod to vary the tension of the belt and the speed of the wheel. A variable diameter pulley is also employed on the motor drive shaft or on the propelling wheel to change the speed of the belt as the tension of the belt is changed.

7 Claims, 8 Drawing Figures



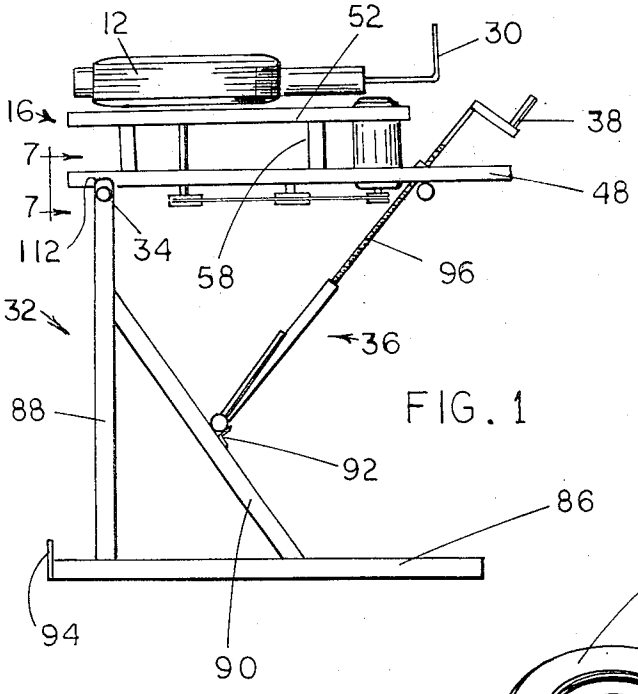


FIG. 1

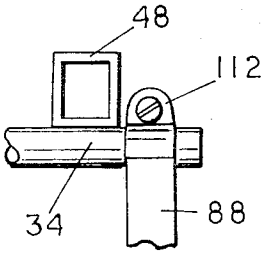


FIG. 7

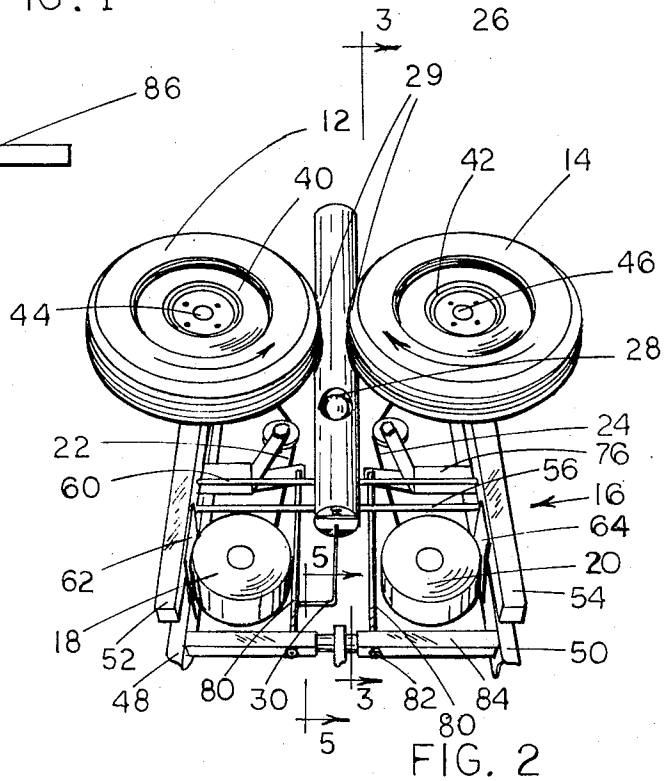
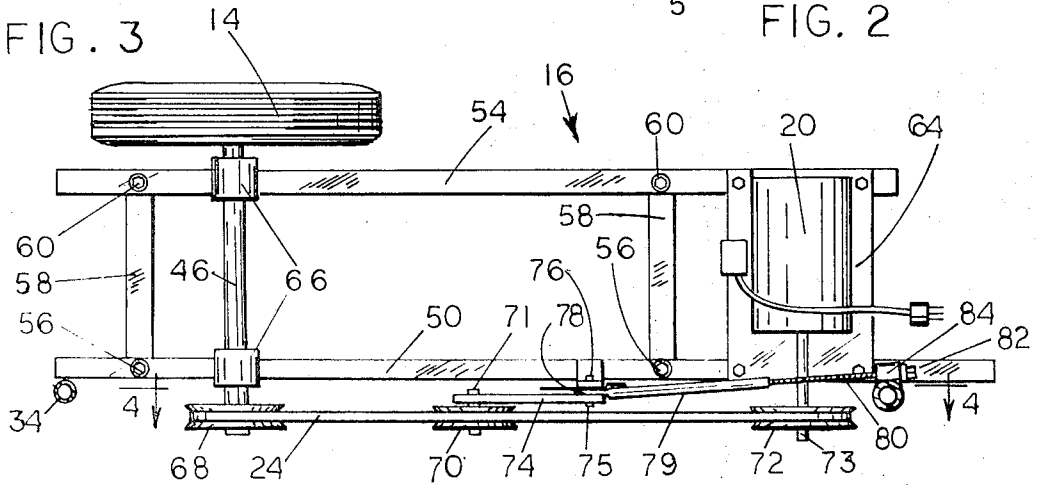


FIG. 2

FIG. 3



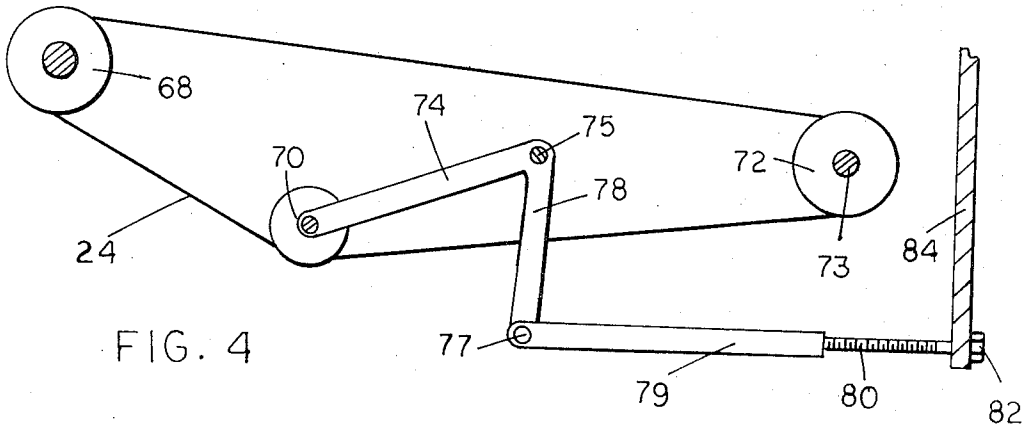


FIG. 4

FIG. 5

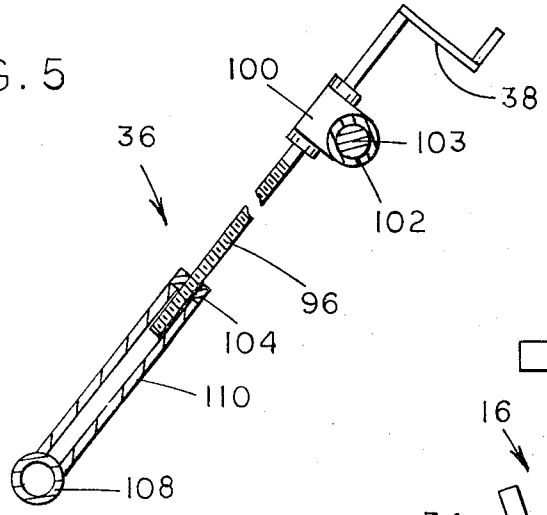


FIG. 8

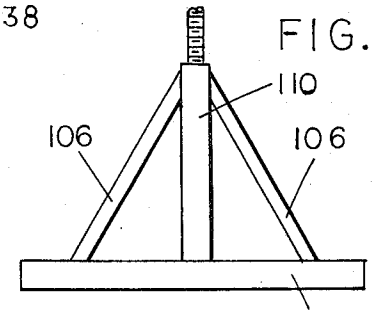
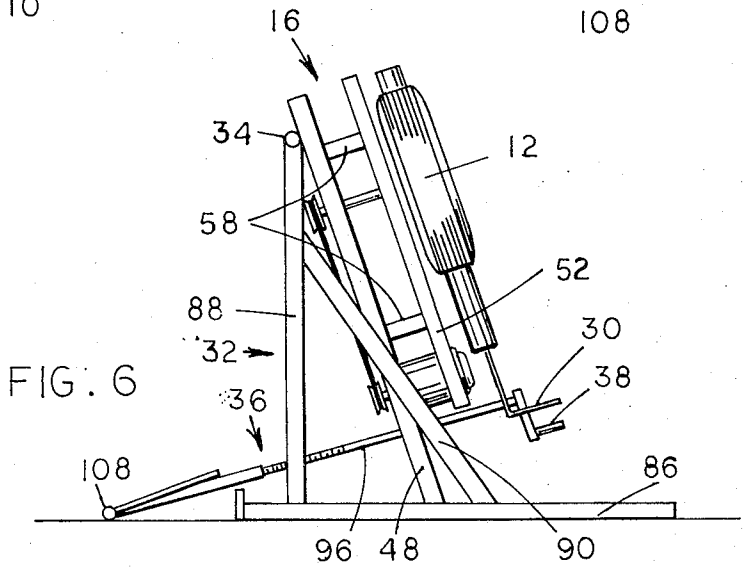


FIG. 6



BASEBALL PROJECTING MACHINE

BACKGROUND OF THE INVENTION

State of the Prior Art

Baseball pitching machines are well known and have been used heretofore primarily for batting practise. These machines employ a pair of oppositely driven wheels or belts which receive and grip a ball therebetween and project the ball out through a delivery tube. Some machines have driven wheels or belts disposed in a horizontal plane and others have driven wheels or belts disposed in a vertical plane.

Most attention has heretofore been directed to a mechanism for propelling the balls primarily for batting practise and little emphasis, if any, has been placed on utilization of the apparatus for other training functions, such as grounder practise, fly balls, or pop flies. Although the prior ball pitching machines could conceivably be used for these other training functions, the mountings of the machines do not readily lend themselves to adaptation for purposes other than batting practise.

In prior ball pitching machines, it is common practise to mount the driven wheels or belts for rotation in a common horizontal plane. It is further known that the speed of the wheels can be adjusted with respect to each other to cause curve balls to be thrown. To this end, separate variable speed motors have been provided to drive each wheel.

BRIEF STATEMENT OF THE INVENTION

According to the invention, a ball projecting apparatus has a frame member, a ball propelling means supported on the frame member for receiving, gripping and propelling a ball from a front portion of the frame, means for feeding balls to the ball propelling means, and means supporting the frame. The support means comprises a base member and means pivotably joining the base member about a horizontal axis generally perpendicular to the axis of projection of the balls from the propelling means so that the frame is free to rotate through a wide angle with respect to the base member. A brace is releasably coupled to a rear portion of the frame and to the base for fixing the frame in a predetermined position. The base has a plurality of spaced retaining means providing a plurality of adjusted positions for the brace so that the brace can be positioned in any one of the adjusted positions for different positions of the frame with respect to the horizontal. The brace further has a means for finely adjusting the position of the rear portion of the frame with respect to the base for accurate placement of balls propelled by the propelling means. To this end, the brace is extendable, including a threaded rod for the fine adjustment. The lower portion of the brace can be positioned at any of the retaining means on the base, or can be completely disassociated from the base to permit the frame to assume a substantially vertical position for vertical projection of balls.

Further, the ball propelling means comprises a pair of wheels supported in juxtaposed position on the frame and leaving a space between the peripheries thereof for receiving, gripping and propelling a ball fed thereto. A separate drive means drives each of the wheels in opposite directions. Each of the drive means includes a constant speed motor and means coupling

the constant speed motor to one of the wheels. At least one of the coupling means includes a drive belt and an idler pulley which is rotatably supported on a link pivotably mounted on the frame. Adjustable means secure the link in fixed position so that the link can be adjusted to loosen or tighten the tension on the pulley. Preferably, the coupling means also includes a pulley coupled to the motor or to the wheel, the pulley having a diameter which varies with the tension in the belt so that the speed of the wheel can be changed through adjustment of the tension in the belt by adjusting the position of the link. Preferably, the adjustable means comprises a threaded rod which threadably couples the link to the frame so that fine adjustment of the tension in the belt can be easily achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a side elevational view of a training machine according to the invention;

FIG. 2 is an enlarged plan view of the training machine;

FIG. 3 is a partial sectional view taken along lines 3—3 of FIG. 2;

FIG. 4 is a partial view along lines 4—4 of FIG. 3;

FIG. 5 is a partial side view in section along lines 5—5 of FIG. 1 illustrating the fine adjusting mechanism;

FIG. 6 is a side view like FIG. 2 illustrating the training machine in position for projecting pop ups;

FIG. 7 is a partial view along lines 7—7 of FIG. 1; and

FIG. 8 is a plan view of the bottom portion of the brace.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is illustrated an all-purpose baseball training machine comprising a pair of pneumatic tires **12** and **14** rotatably mounted on a frame **16** and driven in opposite directions by motors **18** and **20.** Pulley belts **22** and **24** are driven by motors **18** and **20,** respectively, and cause rotation of tires **12** and **14,** respectively, in opposing directions. A launch tube **26** is open at the front end and has a top opening **28** at the rear end. Arcuate side openings **29** at the central portion permit entrance of the tires **12** and **14** at the sides of the launch tube **26.** A spring loaded push rod **30** is mounted at the rear end of the launch tube **26** for forcing the balls dropped through the openings **28** forwardly to be engaged by the rotating tires **12** and **14.** The tires **12** and **14** thus engage and propel the balls fed therebetween by the push rod **30.**

The frame **16** has a pipe **34** welded to a bottom front portion thereof. A pair of base supports **32** rotatably support the frame **16** through the pipe **34** at the upper end of the base supports **32.** To this end, the base supports have pipe clamps welded to the top portions thereof. A brace **36** having a crank handle **38** is rotatably secured to a back portion of the frame **16** and, at the bottom portion thereof, releasably engages portions of the base supports **32** to determine the angular position of the frame **16** with respect to the base supports **32.**

The pneumatic tires **12** and **14** are mounted respectively on hubs **40** and **42,** which in turn are secured to

shafts 44 and 46 respectively. The shafts are journalled in bearings which are secured to the frame 16.

The frame 16 is formed from a pair of parallel base members 48 and 50 and a pair of top members 52 and 54. The base members 48 and 50 are secured together through threaded connecting rods 56. The top members 52 and 54 are secured together through connecting rods 60. A pair of links 58 are welded between base member 48 and top member 52. Similarly, a pair of links 58 are welded between base member 50 and top member 54.

The motors 18 and 20 are mounted onto the frame through mounting brackets 62 and 64 respectively. In particular, mounting bracket 62 is secured to the inside of frame members 48 and 52. Mounting bracket 64 is secured to the inside of base member 50 and top member 54 (see FIG. 3).

The drive system for the wheel is illustrated in FIGS. 3 and 4 to which reference is now specifically made. It is to be understood that the drive for the wheel 12 is identical with the drive for the wheel 14 except that the drive mechanism for the wheel 12 is a mirror image of that for wheel 14. For purpose of brevity and simplicity, the drive mechanism for wheel 14 only will be described.

The motor 20 has an output shaft 73 to which is secured a variable diameter pulley 72. The shaft 46 for the tire 14 is journalled in a pair of bearings 66, one of which being secured to the base member 50 and the other to the top member 54. A pulley wheel 68 is secured to the bottom of the shaft 46 and engages the pulley belt 24. An adjustable idler pulley 70 is rotatably supported on shaft 71 by a link 74 and also engages the pulley belt 24. A support member 76 is welded to the base member 50 and extends inwardly thereof. The link 74 and an adjusting link 78 are rigidly secured together and are pivotably mounted beneath the inner end of the support 76 by a pin 75. At its inner end, the adjusting link 78 is pivotably secured to a pipe 79. A threaded rod 80 threadably engages the other end of the pipe 78 through a suitable threaded aperture, such as a nut on the end of the pipe 79 and is journalled in a bracket 84 which is welded to the base member 50. A bolt 82 is secured to the end of the rod 84 for ease in turning the threaded rod 80 and adjusting the position of the link 74.

The drive mechanism illustrated in FIGS. 3 and 4 operates as follows: Motor 20 turns shaft 73 which rotates the pulley 72 to drive the belt 24. The pulley 68 is in turn driven to rotate the shaft 46 and the tire 14. As seen in FIGS. 3 and 4, the belt is driven about the idler pulley 70. The tension in the belt is set by adjusting the idler pulley 70. The belt tension is loosened by rotation of the link 74 in a clockwise direction about pin 75 as viewed in FIG. 2. Conversely, the tension in belt 24 is increased by rotation of link 74 in a counterclockwise direction about pin 75 as viewed in FIG. 2. Movement of the link 74 is effected by turning rod 80 by means of rod 82. The rotation of the rod 80 moves the pipe 79 in a lineal direction toward or away from the bracket 84, depending on the direction of rotation of the rod 80. Movement of the pipe 79 in turn causes movement of the adjusting link 78 about the pin 75 and a corresponding rotational movement of the link 74. As disclosed above, the pulley 72 has a variable effective diameter responsive to belt tightness. This type of pulley is a well known drive pulley which has inclined movable side flanges that respond to tightening of the belt by moving apart in such a manner as to reduce the effective diameter of the pulley. Thus, as the belt 24 is tightened, the effective diameter of the pulley 72 is reduced, thereby decreasing the speed of the belt 24. Pulley 68 could be a variable diameter in lieu of a variable diameter pulley for the pulley 72.

Reference is now made again to FIG. 1 for a more detailed description of the base supports 32. Each base support 32 is formed from a flat bottom member 86, an upright member 88 and a slanted member 90. Brackets 94 are positioned at a front portion of the bottom member 86 to receive the bottom portion of the brace 36. A pipe clamp 112 is secured to the upper portion of each of the upright members 88 for receiving and gripping the pipe 34 which is secured to the frame. Loosening of the pipe clamps 112 permits rapid dissembly of the frame 16 from the base supports 32. As illustrated in FIG. 7, the base supports 32 are positioned outside the sides of the frame 16 to permit rotation of the frame 16 with respect to the base supports 32 through a wide angle.

The brace 36 is best illustrated in FIGS. 1, 5, and 8. The brace comprises a threaded rod 96 having the crank handle 38 secured to an upper portion thereof. The threaded rod 96 is journalled in a collar 100 at its upper end and threadably engages a nut 104 in a pipe 110 at its lower end. A cross member 108 is welded at a central portion thereof to the bottom of the pipe 110. Side braces 106 extend from between the ends of the cross member 108 and the top portion of the pipe 110. The collar 100 is welded to a pipe 102 which pivotably mounts the brace 36 on the frame 16. To this end, a rod 103 extends through the pipe 102 between the base members 48 and 50.

The training machine operates as follows: Normally for batting practise, the machine is in the position illustrated in FIG. 1, with the cross member 108 of the brace 36 resting against the brackets 92 on the base supports 32. In this position, the frame is substantially horizontal. Electrical current is supplied to the motor 62 and 64 to cause rotation of the pneumatic tires 12 and 14 in opposite directions. As viewed in FIG. 2, the tire 14 will rotate in a clockwise direction and the tire 12 will rotate in a counterclockwise direction. A baseball is dropped into the opening 28 at the rear portion of the launch tube 26. The spring loaded push rod 30 is pulled back to permit the baseball to drop into the hole. The spring loaded push rod 30 is then released, causing the ball to move forward in the tube until it is engaged by the rotating tires 12 and 14. The tires grip the ball and propel the ball out of the front of the tube. The speed of the ball will depend on the speed of the tires 12. Any spin on the ball will depend on how the threads of the ball are gripped by the tires and will also depend on the relative speeds of the tires.

As indicated above, the speeds of the tires can be individually adjusted by turning the nut 82 of the threaded rod 80. When the tire speeds are different, a curve or slider will result and, in some instances, the ball will drop.

The training machine can be very accurately and simply adjusted by simply rotating the crank handle 38 which changes the back portion of the frame 16 in relation to the base supports 32, causing rotation of the frame about the axis of pipe 34. Adjustment of the frame upwardly by the brace 36 will tilt the frame so

that the launch tube projects downwardly for "grounder" practise.

The machine is easily adjustable to throw "fly balls" such as in outfielder's practise. This is achieved by lifting the cross member **108** from engagement with the brackets **92** and positioning the cross member **108** at the junction of brace **90** and bottom member **86.** In this position, the angle of projection of the balls can again be finely adjusted by rotating the crank handle **38.**

The angle of projection of the balls from the launch tube can be further increased by positioning the cross member at the junction of the upright member **88** and the bottom members **86.** To reach this position, the cross member **108** is merely rotated about the axis of the rod **96** so that the cross member fits between the braces **90** and then rotated back to a horizontal position to fit behind the upright members **88.**

Brackets **94** on the very front portion of the base members **86** permit a still higher angle of projection of the balls from the launch tube **26.** Once again the cross member **108** is rotated about the rod **86** so that it can pass between the upright members **88** and then rotated back for engagement with the brackets **94.**

A still further adjustment of the angle of projection of the balls is illustrated in FIG. **6** wherein the cross member is removed from engagement with the base and the frame is substantially vertical. This position of FIG. **6** can be used for "pop up" practise for infielders and catchers.

The novel arrangement between the frame and the base provide a plurality of adjusted positions for the frame. The base thus has a plurality of retaining means for reception of the bottom portion of the brace **36** for various adjusted positions of the frame **16.**

The ease of adjustability of the machine, and the wide latitude of adjustment permitted by the novel mounting provides a much more versatile machine than has been heretofore attained. The machine can be used for grounders, or the machine can be used for batting practise, fly balls, or very high pop flies. The distance of the pop flies, as well as the speed of the grounders, can be easily adjusted by adjustment of the speed of the drive belt for the tires. The adjustable drive mechanism provides a simple and accurate means for adjusting the speed of the tires. Exact positioning of the fly ball is achieved through fine adjustment of the movable brace **36** by rotation of threaded rod **96.** Further, the machine can be made portable by simply removing the base supports **32.** This is achieved by loosening of the pipe clamps **112** and simply removing the braces **32.**

Whereas the invention has been described with reference to a launch tube **26** having a spring loaded push rod **30,** it is within the scope of the invention to provide for an automatic ball feeder for the launch tube. Further, types of power other than electricity can be used. For example, gasoline motors can be used in lieu of electrical motors.

Reasonable variation and modification are possible within the scope of the foregoing disclosure, the drawings, and the appended claims without departing from the spirit of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A ball projecting apparatus comprising:

a frame member;

ball propelling means supported on said frame member for receiving, gripping and propelling a ball from a front portion of said frame member;

means for feeding balls to said ball propelling means;

means supporting said frame member for directing balls projected by said propelling means;

said support means including:

a base member;

means pivotably joining said base member to said frame member for movement of said frame member about a horizontal axis generally perpendicular to the direction of projection of balls from said propelling means, said means permitting the rotation of the frame member from a position wherein the apparatus projects ground balls to a position wherein the apparatus projects fly balls;

brace means adapted to support the frame member in a plurality of positions, said brace means being pivotably attached to the frame member for pivotal movement in a generally vertical plane, said brace means having a free lower end that is engageable with the base member in a plurality of positions so as to vary the ball projection angle of the ball propelling means;

a plurality of retaining means on said base member adapted to engage and hold the lower end of said brace means in any of a plurality of adjusted positions, each said adjusted position fixing the frame member at a different ball projection angle with respect to the base, said retaining means being adapted to hold the frame member in position to project ground balls, batting practice pitches, fly balls; and

fine adjustment means operatively associated with the brace means for varying the ball projection angle of the ball propelling means with respect to the base while the brace means is in any one of said adjusted positions.

2. A ball projecting apparatus according to claim **1** wherein the fine adjustment means adjusts the angle of projection of balls from said propelling means with respect to the horizontal by varying the effective length of the brace means.

3. A ball projecting apparatus according to claim **2** wherein said fine adjustment means comprises a threaded rod having a crank at an upper portion thereof, said rod forming a portion of said brace means and joining upper and lower portions of said brace means such that rotation of said rod serves to lengthen or shorten the effective length of said brace means.

4. A ball projecting apparatus according to claim **1** wherein the brace means is attached to a rear portion of the frame member and said means pivotably joining the base to the frame member is positioned at the front portion of the frame so as to permit movement of said frame member from a generally horizontal position for a generally horizontal projection of balls, to a nearly vertical position for generally vertical projection of balls.

5. A ball projecting apparatus as claimed in claim **1** wherein the ball propelling means comprises:

a pair of wheels rotatably mounted on the frame member in a common plane perpendicular to the plane of ball projection, said wheels being supported in juxtaposed position so as to leave a space

between the peripheries of said wheels for receiving, gripping, and projecting a ball therefrom;

first and second constant speed motors mounted on the frame member;

coupling means drivingly interconnecting each of said motors with a different wheel so as to drive the wheels in opposite directions;

at least one of said coupling means including:

first and second pulleys coupled to the motor of said coupling means and to the wheel driven by the coupling means, respectively, at least one of said first and second pulleys being an adjustable diameter pulley;

a drive belt wound around said first and second pulleys;

idler pulley means adapted to engage and maintain a predetermined tension on the drive belt; and

adjustment means for varying the position of the idler pulley means with respect to the drive belt in order to vary the tension on said drive belt and thereby change the diameter of the adjustable diameter pulley and the speed of the wheel driven by said coupling means relative to the speed of the other wheel, thus causing the projection of a curve ball.

6. An improvement as claimed in claim **5** wherein the adjustment means comprises:

a link pivotably mounted on the frame member and having the idler pulley mounted on an outstanding end thereof, the link being pivotable in the plane of the drive belt so that rotation of the link varies the pressure of the idler pulley on the drive belt;

a threaded rod means drivingly interconnecting the link and the frame member, said rod means being adapted, upon rotation, to cause the link to pivot; and

manual means for rotation of the threaded rod means.

7. A ball projecting apparatus comprising:

a frame member;

a ball propelling means supported on said frame member for receiving, gripping and propelling a ball from a front portion of said frame member;

means for feeding balls to said ball propelling means;

means supporting said frame member for directing balls, said support means including;

a base member comprising a bottom member resting on the ground, an upright member attached to a front portion of the bottom member and extending upwardly to an upper end thereof, and an angle brace extending between the bottom member and the upright member;

means pivotably joining the upper end of the upright member to a front portion of said frame member for permitting movement of said frame member about a horizontal axis through said last mentioned means, said axis being generally perpendicular to the axis of projection of balls from said propelling means, said means being also adapted to permit the rotation of the frame member from a horizontal position, wherein the apparatus projects balls in a horizontal direction, to a nearly vertical position, wherein the apparatus projects balls in a nearly vertical direction;

brace means pivotally attached to the generally rear portion of the frame member for permitting selective angular positioning of said ball propelling means through pivotal movement of said frame member about the axis through the means joining the upper end of the upright member and the frame member, said brace means having a free lower end that is engageable with the base member in a plurality of positions so as to vary the projection angle of the ball propelling means;

a plurality of retaining means on said base member adapted to engage and hold the free lower end of said brace in a plurality of adjusted positions, said adjusted positions fixing the frame member at different ball projection angles with respect to the base, at least one of said retaining means being mounted on the bottom member and one of said retaining means being mounted on the angle brace above the bottom member;

means for adjusting the effective length of said brace means so as to vary the position of said frame with respect to the horizontal, said means comprising a threaded rod rotatably mounted in one position of said brace and threadedly engaging the other portion of said brace;

means for rotating said rod with respect to said other portion of the brace in order to change the effective length of said rod.

* * * * *