United States Patent

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[54] **BALL PROJECTING MACHINE WITH DIRECTION CONTROL MECHANISM**
9 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** ..... **124/1,** 273/26 D, 242/75.5
[51] **Int. Cl.** **F41b 15/00**
[50] **Field of Search** ..... 124/10, 1, 41, 49; 242/75.5; 74/230.17 B; 273/26 D

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ABSTRACT: A baseball-pitching machine having two horizontal, oppositely rotating wheels for engaging a baseball and pitching it to a batter. The wheels are driven through variable drive pulleys, and to curve the ball, the pulleys are adjusted to rotate one wheel faster than the other. To vary the speed of the ball being pitched the motor bracket is adjustable to be shifted toward or away from the wheels. The direction of throw, both horizontal and vertical, are controlled by manually operated levers connected to pivotally mounted platforms. The machine is mounted on a portable stand which is exceptionally stable.

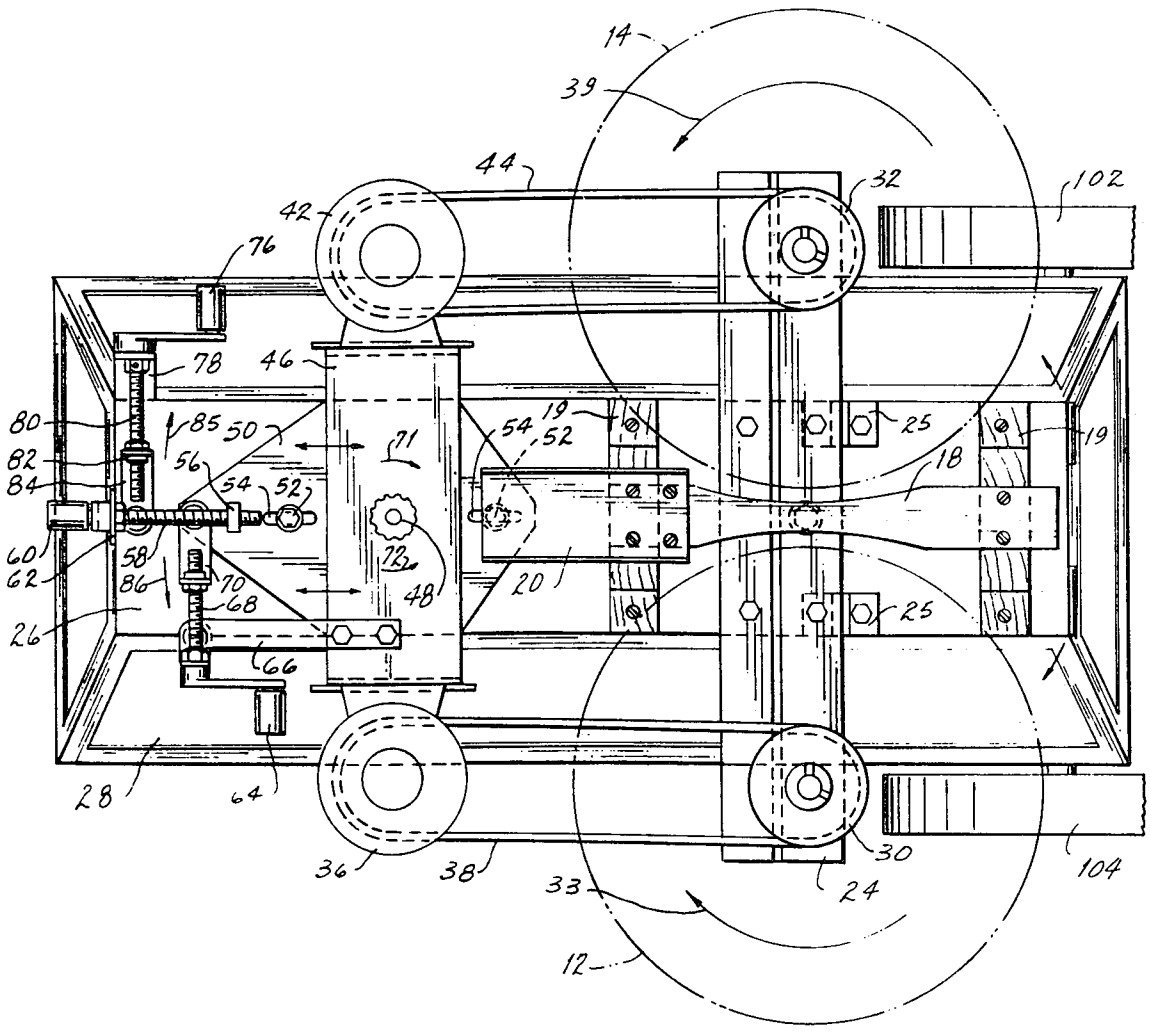


Fig. 1

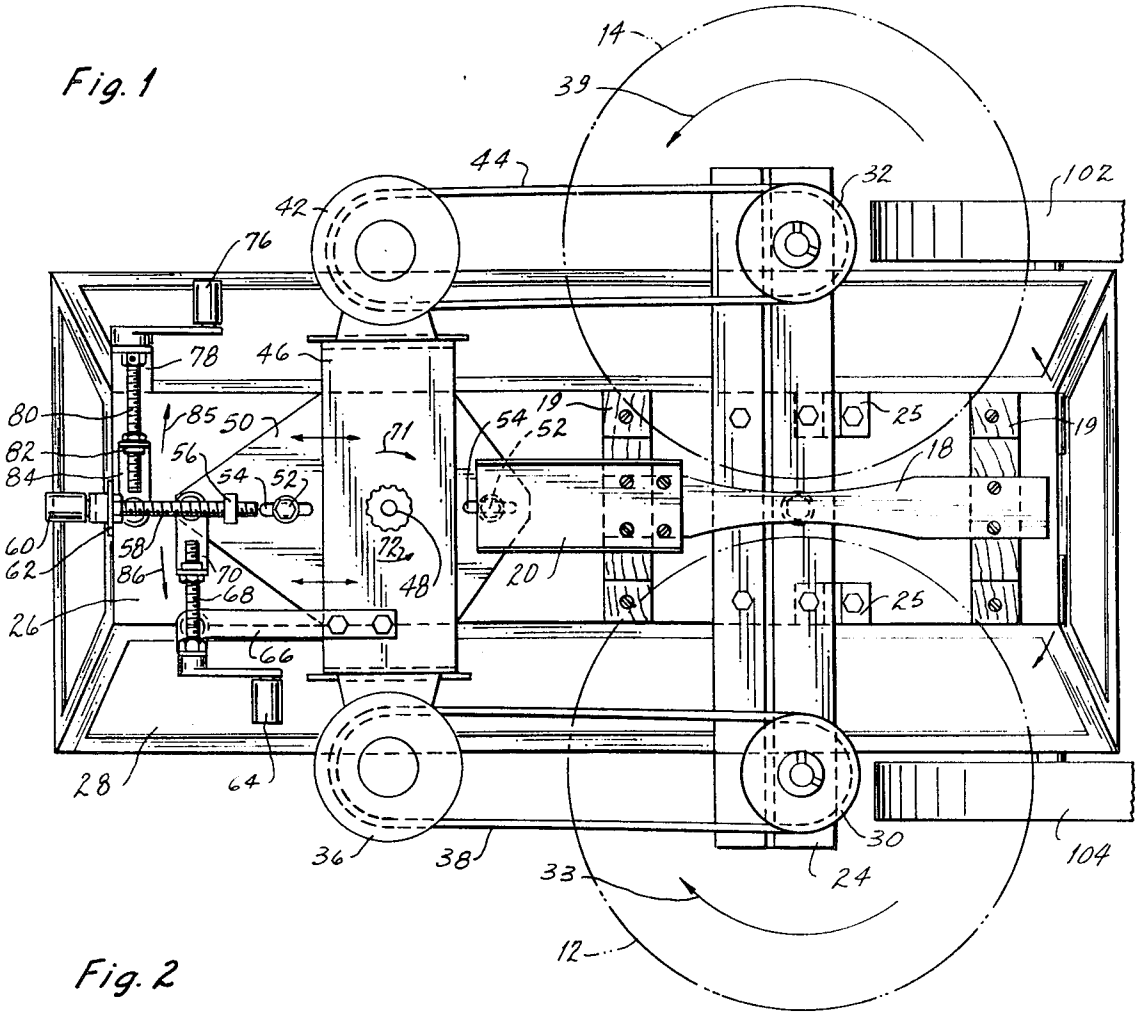
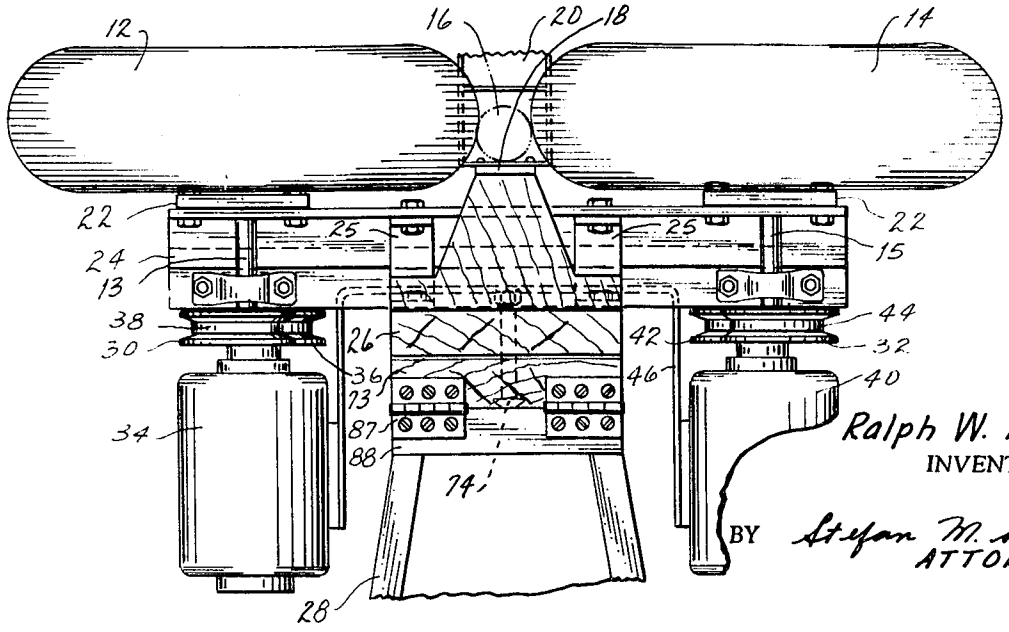


Fig. 2



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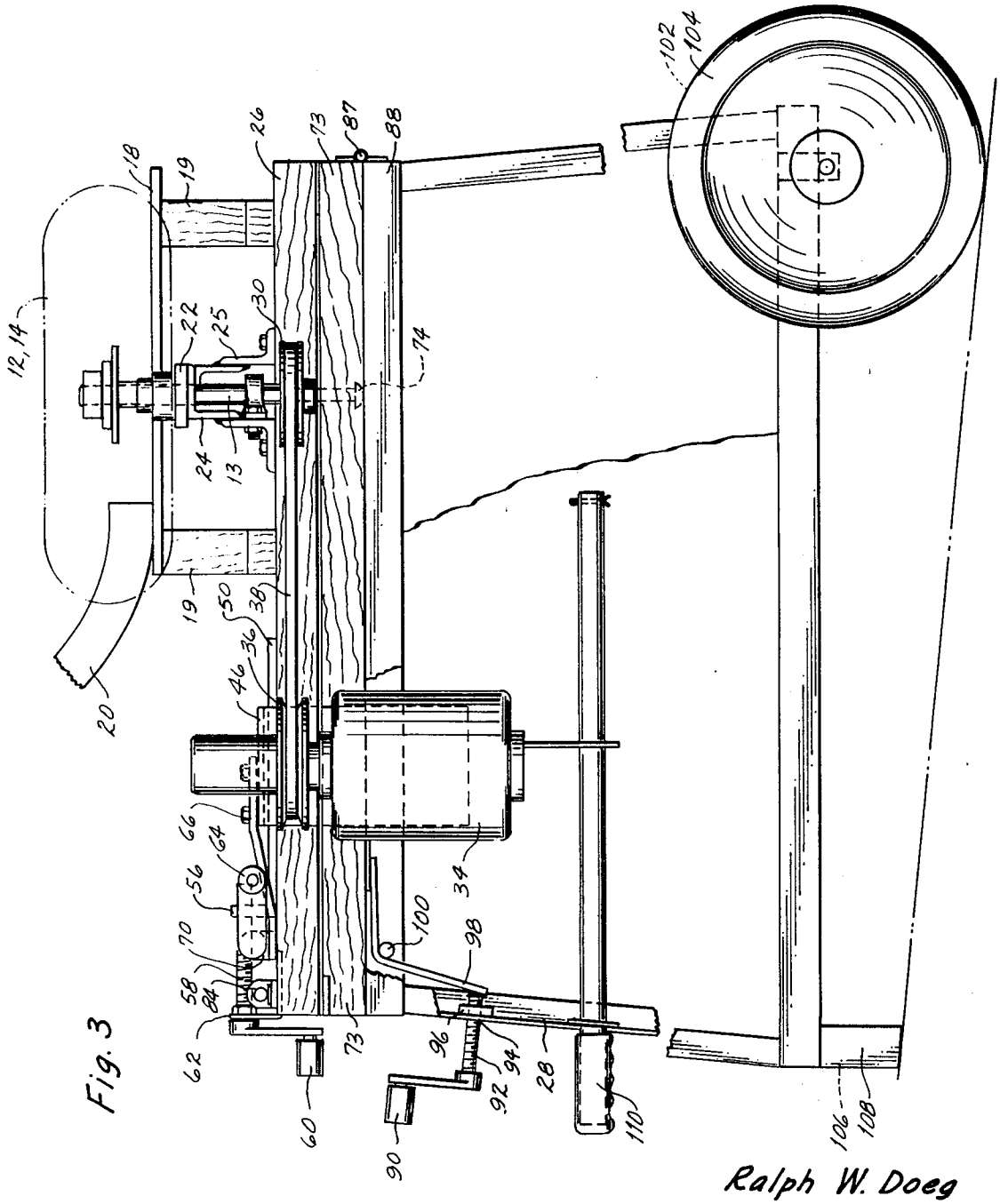


Fig. 3

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BALL PROJECTING MACHINE WITH DIRECTION CONTROL MECHANISM

This invention relates to baseball-pitching machines; more particularly, this invention relates to baseball-pitching machines which are adapted to pitch both a straight and curve ball to a batter.

Baseball-pitching machines have been devised to pitch baseballs to a batter to assist the batter in improving his swing. The machines are obviously helpful in that they eliminate the need of a person pitching the ball to the batter. The more desirable machines pitch both straight and curve balls to enable the batter to practice on both types of pitches.

Unfortunately, known baseball-pitching machines have a number of disadvantages. Some of these pitching machines use a rotatable arm which simulates an overhand pitching delivery. One disadvantage of these machines is that they are not accurate. As the arm rotates and releases the pitch, the baseball cannot be controlled to be released precisely at the same point along the arm's arc for each pitch. As a consequence, the ball does not come over the plate or target at the exact point each time. Thus, a batter cannot concentrate, for example, on hitting an outside pitch because the machine is unable to continually pitch the ball in that particular area of the strike zone. These and other known machines are also exceedingly unstable, often requiring that they be embedded in concrete. The reason for this is that the operating parts of the machine are not balanced and as the machine pitches a baseball, the reactive force jars the machine. Thus, if the machine is not adequately anchored, the jar disturbs the accuracy of the pitched ball. Also, because the operating parts are not balanced, the machines tend to vibrate which cause them to "walk" about the surface of the ground, again disturbing the pitching accuracy.

Another disadvantage of known machines is that they cannot effectively and simply curve a baseball with means to accurately vary the degree of the curve such that both a wide curve and sharp curve can be pitched. Still another disadvantage is that present machines have no means to readily vary the speed of the ball being pitched regardless of whether the pitched ball is a curve or straight ball. A further disadvantage is that known machines are also difficult to adjust, if they can be adjusted, to pitch the baseball precisely at a particular portion of the strike zone. Moreover, present machines frequently have no provision to allow the batter to see a baseball being fed to the pitching members of the machine such that the batter may anticipate and be prepared for the pitch. The noise of previous machines is also often so high that it disturbs the concentration of the batter. A still further disadvantage is that instead of being simply constructed, the machines are frequently complicated which makes them either expensive to manufacture and/or difficult to repair. Attempts have been made to overcome these disadvantages but to date have been unsuccessful.

Accordingly, it is an object of this invention to provide a baseball-pitching machine which can pitch both straight and curve balls.

Another object is to provide a baseball-pitching machine which can pitch curve balls with various arcs.

Still another object is to provide a baseball-pitching machine which can easily vary the speed of the ball being pitched.

A further object is to provide a baseball-pitching machine which can vary the horizontal direction of the ball being pitched.

A still further object is to provide a baseball-pitching machine which can vary the vertical direction of the ball being pitched.

Another object is to provide a baseball-pitching machine which is exceedingly accurate and which can continually pitch the ball at the same point on a target for a given setting of the machine.

Another object is to provide a baseball-pitching machine which has balanced operating parts to make the machine exceptionally stable.

A still further object is to provide a baseball-pitching machine which is substantially noise-free.

Another object is to provide a baseball-pitching machine which may be easily adjusted to pitch a baseball over any portion of the strike zone.

Another object is to provide a baseball-pitching machine which is simple yet exceedingly effective.

Another object is to provide a baseball-pitching machine which is portable.

Another object is to provide a baseball-pitching machine which is practical and economically feasible to manufacture.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

In accordance with these objects, the invention comprises a baseball-pitching machine having two horizontal, oppositely rotating pneumatic wheels or tires. As a baseball is fed between their approaching ends, the wheels are slightly compressed by the ball. This compression tightly grips the ball which is then carried with the wheels and pitched forwardly. Each wheel is conveniently driven by a motor-operated variable drive pulley and pulley belt. The motors and variable drive pulleys are mounted on a pivotable motor bracket such that as the bracket is pivoted one pulley is moved toward its respective wheel and the other is moved away from its wheel. By this movement, due to the characteristics of the variable drive pulleys, one wheel is rotated faster than the other wheel causing the baseball to spin which in turn causes the baseball to curve when pitched. The arc of the curve may easily be adjusted by varying the pivot direction of the bracket. Moreover, to vary the speed of the ball being pitched, the motor bracket itself is adjustable to be shifted toward or away from the wheels. To vary the horizontal direction of the ball being pitched, an upper platform of the machine on which the wheels are mounted is pivoted to the stand. Provision is also made to vary the vertical direction of the ball being pitched by elevating or lowering the rearward end of the platform on which the wheels are mounted. Since the wheels rotate in opposite directions, the operating parts are balanced, causing little vibration of the machine and making it exceedingly stable, noiseless and accurate. In addition, the arrangement of components enable a batter to easily see the ball being gripped by the wheels and therefore anticipate the pitch. The machine is easily portable having two wheels on its front end and two legs on its rearward end with a handle for manipulating the machine similar to a wheelbarrow.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a top view of a preferred embodiment of the invention.

FIG. 2 is a front elevation view of the upper portion of the machine shown in FIG. 1.

FIG. 3 is a side elevation view of the machine shown in FIG. 1.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings in detail, the invention as illustrated comprises two oppositely rotating pneumatic wheels designated as **12** and **14** respectively. Although pneumatic wheels are preferred, it is to be understood that the wheels may be filled with an elastic material such as foam plastic which will give the wheels a compressible pneumatic characteristic. When pneumatic wheels are utilized, these wheels are preferably of the type that are permanently sealed. That is, to

prevent escaping gas, they are not fitted with valve means to inflate and deflate the wheels once they have pneumatically filled. To prevent marring the ball with black streaks, the wheels are fabricated with a noncarbonous surface. These wheels are horizontally disposed and adapted to receive a baseball **16** between them such that when the ball is gripped by the wheels, the wheels being slightly compressed by the ball, the baseball is rotated with the wheels and pitched forwardly when the grip on the ball is released.

To insure that a series of pitched balls for particular machine setting are pitched precisely at the same point on a target, such as a strike zone, the balls are gripped between the wheels at a constant location. To accomplish this, a ball guide table **18**, supported on legs **19**, is disposed beneath the opening of the wheel ends, and at a height which allows ball **16** to ride on the guide table while being gripped slightly below the horizontal centerline of the wheels as best seen in FIG. **2**. Also, since ball **16** rides on guide table **18** as it is carried between the wheels, the ball is advantageously given a slight forward rotation which beneficially gives "a drop" to the ball as it is being pitched and assists in giving the ball aerodynamic stability.

A baseball feed chute **20** is adapted to receive baseballs and feed them seriatim to the guide table **18** whereupon they roll to the approaching ends of wheels **12**, **14**. Although not shown, it is to be understood that a baseball supply cartridge may be operatively connected to the baseball feed chute **20**. Baseballs may then be automatically delivered to wheels **12**, **14** at predetermined intervals. The machine however, is preferably utilized by an operator feeding baseballs one at a time into chute **20**. Wheels **12**, **14**, guide table **18**, and chute **20** are all arranged such that a batter may easily see the ball approaching the wheels, as best seen in FIG. **2**, to anticipate and prepare himself for the pitch.

Each of the wheels **12**, **14** is attached to a vertical axle **13**, **15** which is rotatably journaled in a wheel pedestal **22** mounted on each end of a transverse wheel support bracket **24** comprising a pair of L-shaped angles welded together as shown. Supporting the front end of the bracket **24** are a narrow pair of such welded angles designated clips **25**. Wheel support bracket **24** is carried on an upper rectangular platform **26** of a portable machine stand **28** which supports the machine. Each axle extends through wheel support bracket **24** and is affixed at its lower end to a wheel pulley. As seen in FIG. **2**, the left wheel pulley is designated as **30** and the right wheel pulley is **32**.

Wheel **12** is rotated in a clockwise direction, designated by arrow **33**, by a motor **34** through a variable drive pulley **36**, drive belt **38**, and wheel pulley **30**. Wheel **14** is rotated counterclockwise, designated by arrow **39**, by motor **40** through variable drive pulley **42**, drive belt **44** and wheel pulley **32**.

The variable drive pulleys, **36**, **42** are respectively driven by motors **34** and **40** and are of the conventional type. That is, to vary the speed of a belt driven by the pulleys, the rims or flanges of each variable drive pulley are adjusted relative to each other to receive and carry a pulley belt at various radial distances from the pulley's center. For example, when a pulley belt is carried adjacent the periphery of the pulley's flanges, it will be driven relatively faster than when the pulley belt is carried adjacent the flange's center. The pulley belt moves outwardly or inwardly along the flanges in accordance with the tension on the belt.

The motors and variable drive pulleys are mounted on the vertical legs of a U-shaped motor support bracket **46** which straddles with width of upper platform **26**. Motor support bracket **46** is pivotally mounted by a pivot pin **48** to an adjustable, longitudinal shift plate **50**.

Shift plate **50** is provided as a speed-changing means for varying the speed of the ball being pitched. It is bolted to the upper platform **26** of support stand **28** by bolts **52** which extend through slots **54** on shift plate **50**. The shift plate **50** is provided to move variable drive pulleys **36**, **42** in unison toward or away from wheels **12** and **14** within the limits defined by the forward and rearward end walls of slots **54**. As variable drive pulleys **36**, **42** move toward the wheels, it should be obvious that pulley belts **38** and **44** move outwardly on their respective variable drive pulleys which increases the linear speed of the belts. This in turn increases the rotational speed of the wheels to pitch the ball faster. Conversely, when variable drive pulleys **36**, **42** move away from the wheels, the pulley belts **38** and **44** are brought closer to the concentric center of the variable drive pulleys and are then reduced in lineal speed. This reduces the rotational speed of the wheels causing them to pitch the ball slower. In this manner, the speed of the ball being pitched is accurately and easily controlled.

A shifting means is provided to shift the shift plate forwardly and rearwardly. Shift plate **50** carries on its rearward end a bracket **56** having a threaded opening to receive a threaded rod **58** rotated by a speed regulating hand crank **60** rotatably mounted on a crank support bracket **62** supported on upper platform **26**. Threaded rod **58** is suitably threaded such that turning speed regulating hand crank **60** clockwise rotates rod **58** in the manner to draw bracket **56** and connected shift-plate **50** rearwardly. Conversely, turning crank **60** counterclockwise rotates rod **58** in a manner to push bracket **62** and shift-plate **50** forwardly.

Provision is also made to curve the ball by a relative velocity changing means for varying the relative rotational velocity of wheels **12**, **14**. To rotate one wheel faster than the other wheel, motor support bracket **46** is pivoted about pivot pin **48** by a pivoting means comprising a rotatable, ball-curving handcrank **64** carried on a vertical leg of a supporting bracket **66** extending at right angles and bolted to motor support bracket **46**. Ball-curving handcrank **64** rotates a threaded rod **68** which extends through and meshes with a threaded aperture on an L-shaped arm **70** attached to the rearward end of shift plate **50**. The parts are arranged such that when crank **64** is rotated clockwise, rod **68** is advanced into the threaded aperture of arm **70** causing bracket **66** and motor support bracket **46** to pivot clockwise, as designated by arrow **71**. This moves variable drive pulley **42** closer to wheel **14** and simultaneously moves variable drive pulley **36** further from wheel **12**. Since pulley **42** is closer than pulley **36**, wheel **12** is rotated at a relatively faster rate than wheel **14**. Conversely, in a similar manner, rotating handle **64** counterclockwise pivots motor support bracket **46** counterclockwise, as designated by arrow **72**, causing wheel **14** to rotate at a relatively faster rate than wheel **12**.

The horizontal and vertical directions of the ball to be pitched may be adjusted by a directional-adjusting means comprising a horizontal and vertical adjusting means to be described hereinafter. To adjust the horizontal direction of the ball being pitched to precisely pitch the ball at a particular point on the target, the machine is also provided with a horizontal adjusting means. The upper platform **26** of stand **28** is pivoted to an intermediate platform **73** about a pivot pin **74** attached to the intermediate platform. Intermediate platform **73** has a rectangular perimeter identical to upper platform **26** and lies immediately below it. To pivot upper platform **26** a drive means is provided comprising a horizontal pitch adjusting hand crank **76** rotatably supported on bracket **78** attached to intermediate platform **73**. Horizontal pitch-adjusting handcrank **76** rotates a threaded rod **80** received in threaded opening **82** on a vertical leg of an L-shaped arm **84** bolted to upper platform **26**. The parts are arranged such that when handle **76** is rotated clockwise, arm **84** advances toward crank **76** as rod **80** rotates in opening **82**. This pivots upper platform **26** clockwise as indicated by arrows **85**. Conversely, in a similar manner, when handle **76** is rotated counterclockwise, arm **84** moves further from crank **76** and the upper base member **26** is pivoted counterclockwise as indicated by arrow **86**. Since wheels **12**, **14** are mounted on upper platform **26** it should be obvious that the direction of their opening and consequently the horizontal direction of the ball being pitched will vary as upper platform **26** is pivoted in a horizontal arc.

The machine also has a means to adjust the vertical direction of the ball being pitched. This is accomplished by pivoting intermediate base members **73** about a hinge **87** attached at the forward end of the machine to a lower platform **88** affixed to stand **28**. Lower platform **88** has a rectangular perimeter identical to platforms **26**, **73** and is located immediately below intermediate platform **73**. When the platforms are in a collapsed position as shown in FIG. **3**, they are slightly inclined upwardly at their forward ends so that the ball will be pitched at a relatively high point over the target. Elevating means are provided to lower the elevation of the pitched ball. The rearward end of intermediate platform **73** is elevated by vertical pitch adjusting hand crank **90** affixed to a threaded rod **92** extending through a threaded opening **94** in a bracket **96** supported on stand **28**. The free end of rod **92** cooperates with an elevating lever **98** pivoted about a pivot pin **100** to raise or lower the intermediate platform **73**. Turning pitch adjusting hand crank **90** clockwise advances rod **92** forwardly through threaded opening **94**. As the rod advances, it pushes the bottom end of elevating lever **98** forwardly. Since the upper portion of lever **98** contacts the lower face of intermediate platform **73**, as the bottom of the lever is pushed forwardly, the upper portion of lever **98** elevates the rearward end of intermediate platform **73**. As should be obvious, as the rearward end of intermediate platform **73** is raised, wheels **12**, **14** are inclined forwardly causing them to pitch the ball at a lower point over the target. Similarly, turning vertical pitch adjusting handcrank **90** counterclockwise moves rod **92** away from lever **98** causing the rearward end of intermediate platform **73** to be lowered. When this occurs, the elevation of the pitched ball will be raised.

Stand **28** is supported on its forward end by wheels **102** and **104** and on its rearward end by legs **106** and **108**. A handle **110** for moving the stand is slidably mounted within the stand. The handle is pulled outwardly when utilized but in other instances can conveniently be slid forwardly underneath the platforms to prevent interference as shown in FIG. **3**.

In operation of the machine, the machine is wheeled to a desired location and situated such that the opening between the wheels **12**, **14** is approximately in line with the target. An operator then places the balls seriatim into chute **20**. A straight ball, a ball having no horizontal spin, is pitched by rotating wheels **12**, **14** with the same velocity. This is accomplished by positioning the U-shaped bracket **46** in a manner shown in FIG. **3**. That is, both of the variable drive pulleys **36**, **42** are equidistant from the respective wheels **12**, **14**.

To curve the ball, one wheel is rotated relatively faster than the other causing the ball to spin. For example, to curve the ball to the right, wheel **12** is rotated relatively faster then wheel by pivoting motor support bracket **46** counterclockwise with ball-curving handcrank **64**. Conversely, if the ball is to be curved to the left, the motor support bracket is pivoted clockwise. The desired arc of the curve is regulated by the difference in speeds of the two rotating wheels which is determined by the angular position of the motor support bracket.

Advantageously, the balls may be pitched faster by rotating speed-regulating handcrank **60** clockwise to shift shift-plate **50** forwardly. Or, if so desired, the balls may be pitched slower by a rotating speed-regulating handcrank **60** counterclockwise to move shift plate **50** rearwardly.

When pitching wither straight or curved balls, the ball may be precisely pitched over a particular point in the strike zone. This is accomplished by adjusting the horizontal direction of the ball being pitched with horizontal pitch-adjusting handcrank **76** to pivot upper platform **26** about pivot pin **48** and by adjusting the vertical direction of the ball being pitched with vertical pitch-adjusting handcrank **90** to elevate or lower the rearward end of intermediate platform **73**.

Although the machine is preferably utilized to pitch baseballs, it should be understood that it can be adapted to pitch other balls such as tennis balls and the like.

From the above description, it should now be obvious that a novel baseball pitching machine has now been invented. The machine not only can pitch straight balls with varying speeds but also can pitch curve balls with varying arcs. The machine further has a vertical and horizontal adjusting means to pitch the ball precisely over any particular point in a strike zone regardless of whether a straight ball or a curve ball is being pitched. Being that the operating parts rotate in opposite directions, these parts are balanced making the machine exceedingly stable and substantially free of vibration and resulting noise. This advantageously allows the machine to be utilized merely by setting it on the ground without further support and unlike many previous machines, the baseball machine does not tend to walk over the surface of the ground when operating. Thus, for a given setting on the machine, each ball that is pitched is pitched precisely over the same point in the strike zone. Advantageously the parts are arranged so the batter may anticipate the pitch as he easily can see the ball as it engages the rotating wheels and therefore be prepared for it. Because the machine is comprised of substantially few components and is simply constructed, it is practical and economically feasible to manufacture.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described:

I claim:

1. A baseball-pitching machine comprising a stand, a pair of wheels rotatably driven on said stand, said wheels disposed in substantially a horizontal plane with part of their peripheral surface adjacent each other, drive means for rotating said wheels in opposite directions, relative velocity-changing means for varying the relative rotational velocity of said wheels, means for varying the direction of throw of a projectile including a plurality of platforms mounted on said stand, said platforms being movable with respect to one another, said means connected to said wheels whereby the desired direction of the pitched ball is dependent upon varying the positions of said platforms with respect to one another, means for feeding balls between the adjacent peripheral surfaces of said wheels during rotation of said wheels, said wheel ends having an elastic compressible surface adapted to grip the ball, and the ball being pitched by said wheels with a horizontal arch or curve depending upon the velocity difference between said wheels.

2. The baseball-pitching machine of claim **1** wherein said plurality of platforms include at least an upper, lower and intermediate platform, said direction-adjusting means including a horizontal adjusting means comprising said upper and intermediate platforms being pivotally connected to one another such that the relative positions of said upper and intermediate platforms with respect to one another determine the horizontal direction of the ball being pitched.

3. The baseball-pitching machine as in claim **2** wherein said horizontal adjusting means further comprises horizontal driving means to pivot said upper platform relative to said intermediate platform, said horizontal driving means including a first crank means connected to said upper platform, whereby operation of said crank means pivot said upper platform relative to said intermediate platform.

4. The baseball-pitching machine of claim **1** wherein said plurality of platforms includes at least an upper, lower and intermediate platform, said means for varying the direction of throw of a projectile including a vertical adjusting means comprising said intermediate and lower platforms being hingedly connected to one another such that the relative positions of

said intermediate and lower platforms determine the vertical direction of the ball being pitched.

5. The baseball-pitching machine of claim 4 wherein said vertical adjusting means further comprises a vertical driving means in the form of a second crank means connected to said intermediate platform, whereby operation of said second crank causes relative movement of said intermediate platform relative to said lower platform.

6. The baseball-pitching machine of claim 1 wherein said drive means includes for each wheel a motor, a variable drive pulley operatively connected to said motor, a wheel pulley adapted to drive said wheel, and a flexible member connecting said variable drive pulley to said wheel pulley.

7. The baseball-pitchine machine of claim 6 wherein said relative velocity-changing means includes a motor support bracket on which said motors and variable drive pulleys are mounted, said bracket pivotally mounted on said stand such that one variable drive pulley may be positioned closer to the wheel it is connected to while said other variable drive pulley is simultaneously positioned away from the wheel it is connected to, and pivoting means to pivot said bracket.

8. The baseball-pitching machine of claim 7 including speed-changing means comprising a shift plate for supporting said motor bracket, said shift plate movably mounted on said stand to shift toward and away from said wheels, and a shifting means for shifting said shift plate.

9. The baseball-pitching machine as in claim 8 wherein said shifting means includes a third crank means connected to said plate such that operation of said third crank means will vary the position of said shifting plate relative to said wheels.