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Newgarden, Jr.

[11] **3,794,011**

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[54] **BALL PROJECTING DEVICE WITH SPIN PRODUCING MECHANISM**

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[52] **U.S. Cl.** ..... **124/1,** 124/30 R, 124/51

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

[58] **Field of Search** 124/1, 41, 49, 50, 34

[56] **References Cited**

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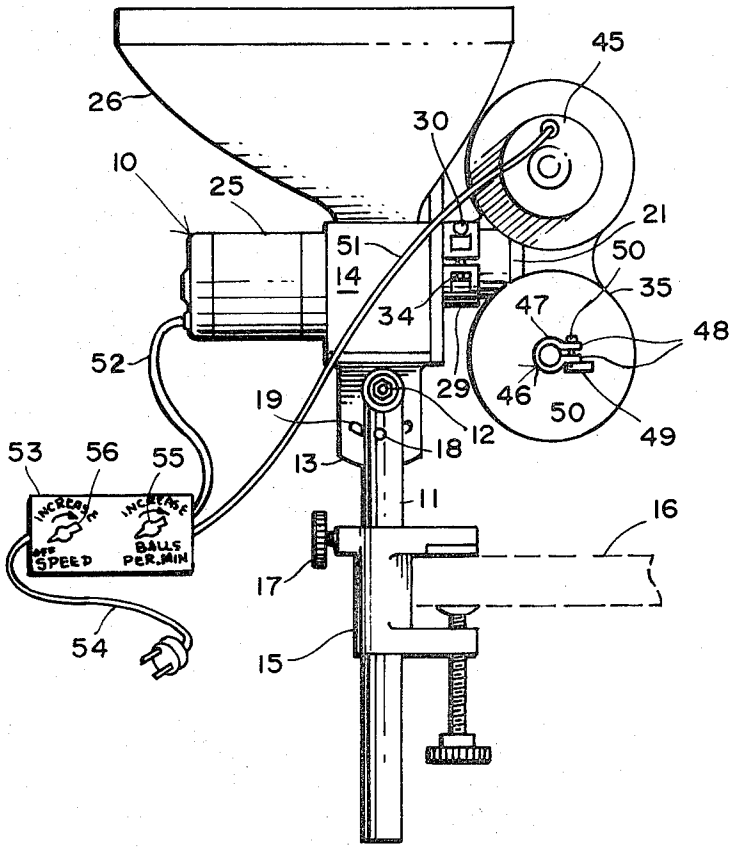
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Assistant Examiner—William R. Browne
Attorney, Agent, or Firm—Salvatore G. Militana

[57] **ABSTRACT**

A table tennis robot for serving table tennis balls at a predetermined rates of ejection and varying amounts of spin. The device is provided with an impeller that feeds the balls individually into a tapered passageway so that each ball comes into contact with a pair of wheels or discs with roughened outer surfaces, one of which is powered by a motor while the other is free wheeling with a brake attachment to cause variation of the amount of spin applied to a ball. The powered wheel or disc and the free wheeling wheel are on a manually rotatable carriage and they engage the ball between their roughened peripheries and eject the ball with the powered wheel adding spin to the ball.

2 Claims, 4 Drawing Figures



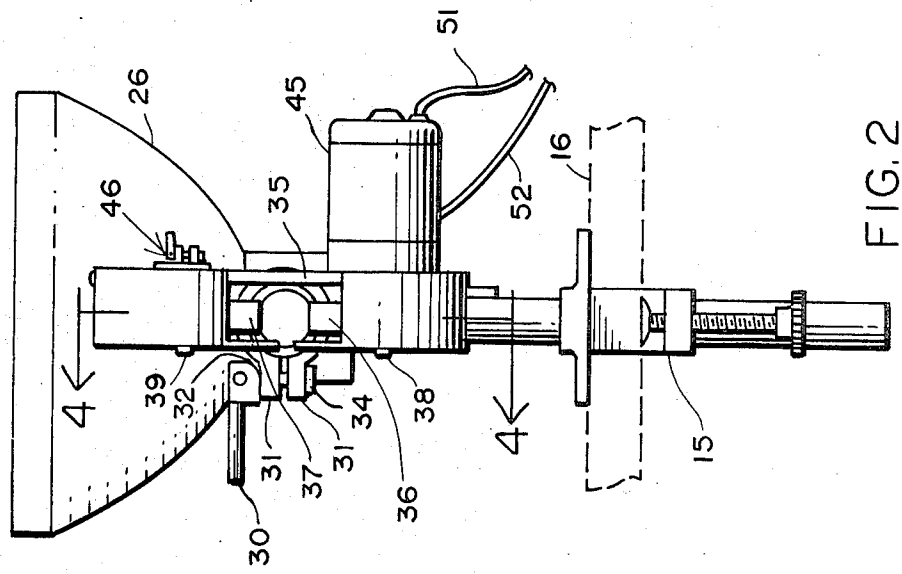

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FIG. 2

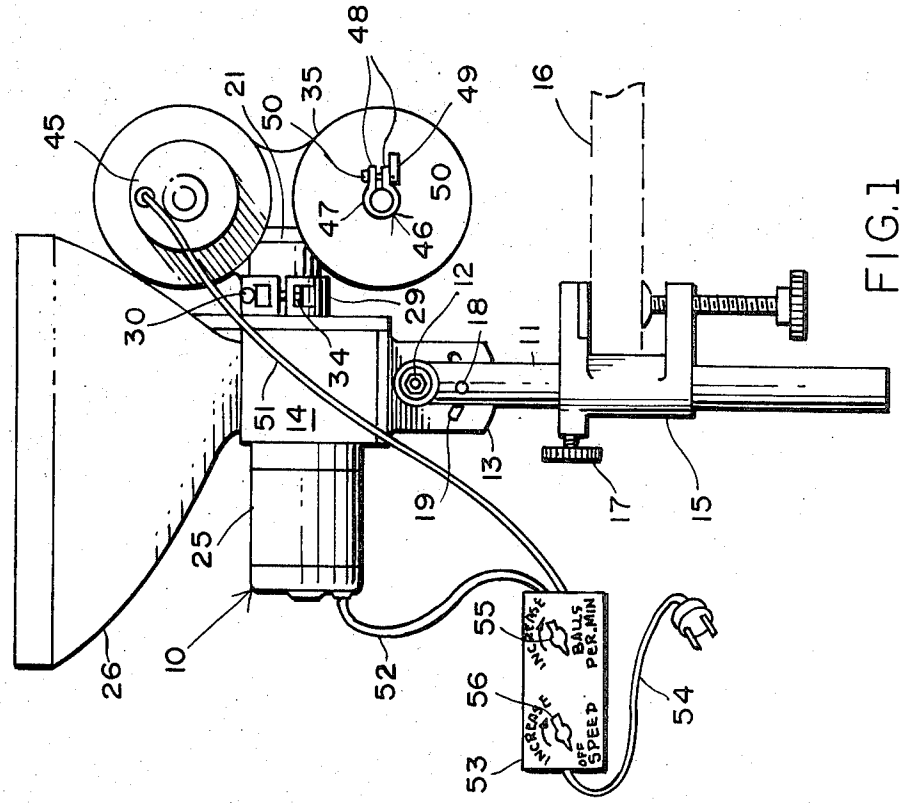

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INCREASE
BALLS PER MIN
INCREASE
OFF SPEED

FIG. 1

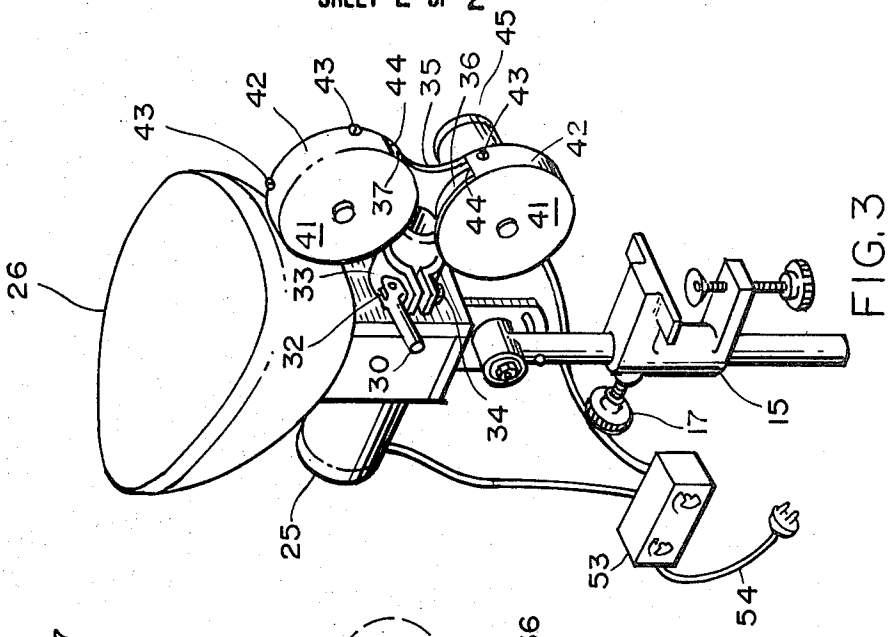

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FIG. 3

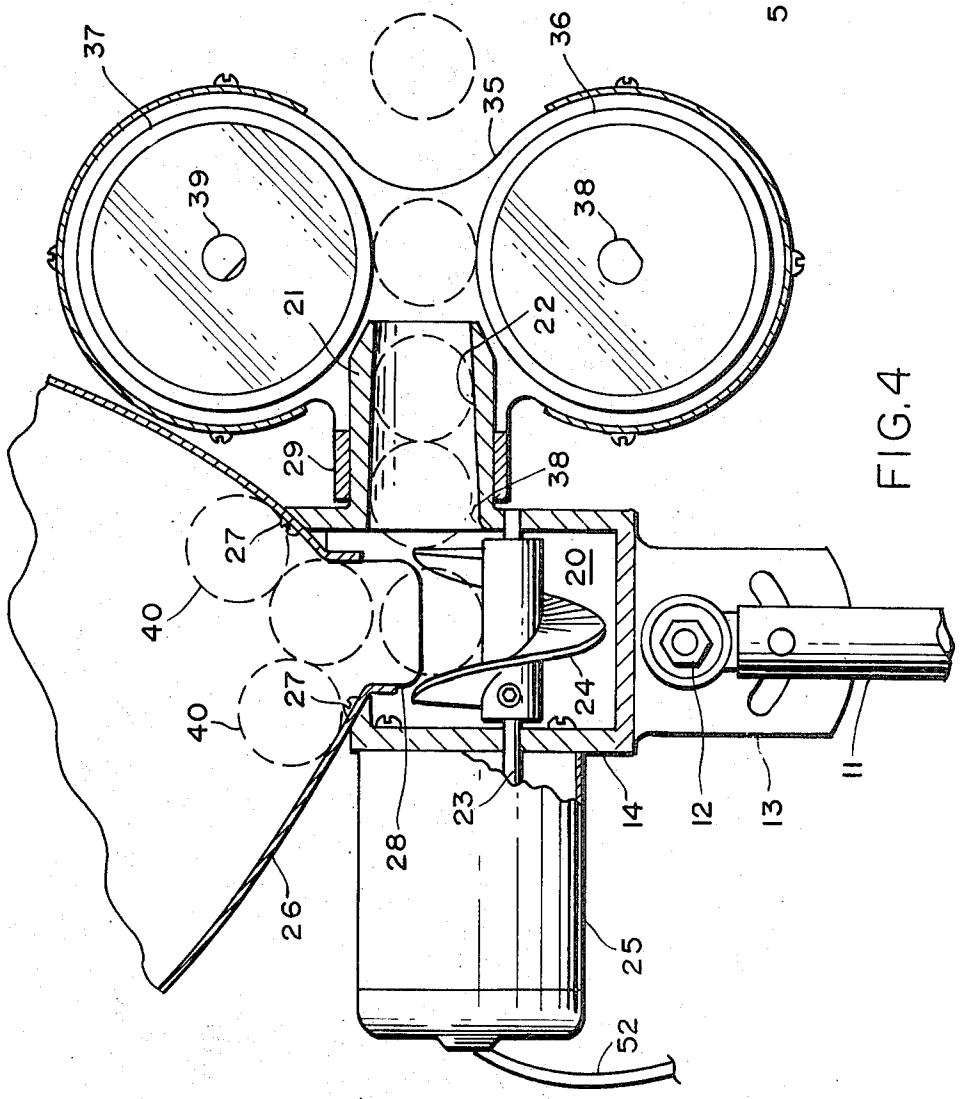

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FIG. 4

BALL PROJECTING DEVICE WITH SPIN PRODUCING MECHANISM

BACKGROUND OF THE INVENTION

1. Field Of The Invention

This invention relates to ball throwing devices and is more particularly directed to one which ejects table tennis balls and is capable of providing different types of spin on the balls at predetermined speeds.

2. Description Of The Prior Art

At the present state of development of ball serving devices, a pair of powered discs or wheels are used to engage a ball fed to it and ejected in a predetermined fashion. These devices are somewhat complicated and expensive in cost, since each of the discs or wheels of the present devices are powered by a motor. The present invention contemplates avoiding the above indicated objections to the present table tennis ball serving device.

SUMMARY OF THE INVENTION

Therefore, a principal object of the present invention is to provide a table tennis robot which ejects balls at any desired interval and at a predetermined velocity with overspin or underspin and variations of these spins whereby a person can have available for practise the entire gaumet of serves that may be effected.

Another object of the present invention is to provide a table tennis ball serving device which is simple in construction, uncomplicated in operation having a minimum of controls and also relatively inexpensive in cost.

A further object of the present invention is to provide a table tennis robot with a minimum of motors for operating the device and with discs carrying carriage that is rotatably mounted for effecting spin on the balls in lieu of a motor.

With these and other objects in view, the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a side elevational view of a table tennis ball ejecting device constructed in accordance with my invention.

FIG. 2 is a front elevational view.

FIG. 3 is a perspective view.

FIG. 4 is a cross sectional view taken along the line 4—4 of FIG. 2.

Referring to the drawings wherein like numerals are used to designate similar parts throughout the several views, the numeral 10 refers to my table tennis ball serving apparatus consisting of a support member 11 pivoted as at 12 to a base member 13 that extends downwardly of a housing 14. The support member 11 which is slidably positioned on a conventional clamp 15 may be adjusted to any desired height above a table top 16 (shown in dotted lines) by an adjusting bolt 17. In addition, the apparatus 10 may be inclined along a vertical plane about the pivot pin 12 by means of a pin 18 mounted on the support 11 and extending through an arcuate opening 19 formed in the base member 13.

The housing 14 which is rectangular in cross section is provided with an open top chamber 20 communicating by means of an opening 38 in the front wall with a cylindrical member 21 forming a tapered ball ejecting chute or passageway 22.

Mounted within the chamber 20 is a spiral or helical impeller 24 mounted on a motor shaft 23 whose ends are journalled on the side walls of the housing 14. The shaft 23 is connected to a motor 25 that is secured to the outer surface of the housing 14. Fastened to the top of the housing 14 by screws 27 is a hopper 26 for receiving and containing a large number of table tennis balls 40 and feeding them singly into the chamber 20. The lower edge portion of the hopper 26 is provided with a pair of depending spaced apart baffle plates 28. The baffle plates 28 center the table tennis balls and maintain them in axial alignment with the passageway 22 as the impeller 24 rotates.

Rotatably mounted on the cylindrical member 21 is a split collar 29 having a cam operated locking handle 30 mounted on flanges 31 extending outwardly of the separated edges of the collar 29. The cam arm 30 is provided with a cam 32 that engages the outersurface of one of the flanges 31, the cam 32 being pivoted as at 33. A support bolt 34 engages the outer surface of the other flange 31 and extends through bores in the flanges 31 and has its end secured to the pivot pin 33.

Secured to the rotatable collar 29 is a flat plate member forming a carriage 35 which extends on both sides of the cylindrical member 21. Each end portion of the carriage 35 is circular to receive a disc or wheel 36 and 37 thereon. The wheels 30 and 37 are rotatably mounted by shafts 38 and 39 respectively that are journalled on the carriage wall 35 at one end to a cover 41 having a side wall 42 which is fastened to the carriage 35 by screws 43. Both of the covers 41 are provided with openings 44 on the side walls 42 at their inner portions to permit the ball engaging wheels 36 and 37 to engage the balls 40 as they leave the tapered duct 22.

The wheels or discs 36 and 37 have a roughened peripheral surface which engages the balls 40 as the impeller 24 pushes the balls 40 through the duct 22. The wheel 37 is a powered wheel having a motor 45 secured to the carriage 35 and its shaft connected to the shaft 37 about which the wheel or disc 36 rotates. The other wheel or disc 37 is a free rotating wheel on whose shaft 39 brake, if desired may be applied thereon. The brake 46 which is secured to the outer surface of the carriage 35 is provided with a split collar 47 having flanges 48 extending outwardly at the split portion thereof with an adjustment bolt 49 extending through openings in the flanges 48. The remote flange 48 is provided with a nut 50 attached thereto with the bolt 49 threaded therein. Upon tightening the bolt 49 on the nut 50, the flanges 48 are brought together to tighten the split collar 47 on the shaft 39 to increase the brake on the wheel 37 and to reduce the braking effect when the bolt 49 is loosened on the nut 50.

The motors 45 and 25 are connected by electric conduits 51 and 52 to a control box 53 which in turn is connected by a conduit 54 to a source of electricity (not

shown). The control box 53 is provided with a control 55 for adjusting the speed of the motor 25 which controls the number of balls per minute being ejected by the device 10 and the control 56 is adjustable to effect a desired speed at which the ball is ejected by the device 10 and the amount of spin applied on the balls 40. The amount of spin, over spin or undercut applied to a bolt 40 is also varied by applying a brake on the follower disc or wheel 37 as explained hereinafter.

From the above description taken in connection with the drawings, it is readily noted that my table tennis robot 10 is an effective table tennis ball server device wherein balls 40 are ejected at varying speeds and with varying amounts of overspin and underspin applied to the ejected balls 40. Although the device 10 is intended for use with table tennis balls 40, the device 10 may be adapted for use in batting practise in baseball and for serving tennis balls.

When a person desires to use my device 10, he secures the device 10 to the edge of a table tennis platform 16 by use of the clamp 15. By actuating the knob 17 he adjusts the height above the table 16 at which he wishes the balls 40 to be ejected from. Then he adjusts for the angle at which the trajectory of the balls is to take by respect to the horizontal by adjusting the position of the pin 18 in the slot 19 and locking the device 10 in place by tightening the knob 12. The person then fills the hopper 26 with balls 40. The plug 57 is then connected a source of electricity to power the motors 25 and 45. By adjusting the control 55 the person can control the rotational speed of the impeller 24 so that he can decide the rate at which he wishes to have balls 40 served by the device 10. Now he has to decide on what type of serve he wishes and at what velocity he wants the balls 40 to be served to him. For example, if he wishes to have balls 40 served to him with overspin, he will rotate the carriage 35 to position the powered disc or wheel 36 in the upper vertical position as shown by FIG. 1. As the balls 40 are received by the impeller 24 and pushed forwardly into the tapered duct or passageway 22, the outermost ball in the duct 22 is pushed out of the duct 22 into contact with the roughened edges of the discs on wheels 36 and 37. The disc 36 which is powered by the motor 45 rotates counterclockwise as viewed in FIG. 1, applies overspin to the ball 40 thus engaged and is ejected forwardly from the device 10. The lower disc 37 revolves freely since the ball 40 spun by the powered disc 36 will cause the disc 37 to rotate. The velocity of the disc 36 determines both the speed at which the balls 40 are ejected as well as the amount of overspin applied to the balls 40. In the event it is decided not to increase the speed at which the balls 40 are ejected from the device 10, but to increase the amount of overspin applied to the balls 40, then the brake device 46 will be tightened to increase the resistance to rotate to the free wheeling disc 37.

Now, if the person wishes to have balls 40 served to him with underspin or undercut, he loosens the locking member 30 and rotates the entire carriage 35 about its collar 29 to position the powered disc or wheel 36 to the lower position as shown by FIGS. 2 and 3. Now, the powered wheel 36 will rotate clockwise as viewed in FIGS. 2 and 3 to impart a counter-clockwise rotation or spin on the balls 40 as they are ejected by my device 10. Again, the speed at which the balls 40 are ejected and the amount of spin on each ball can be adjusted by manipulation of the control 56 and adjustment of the brake device 46. Also, the carriage 35 may be positioned at an angle to the vertical to effect angle spins on the balls 40 along with the overspin and underspin discussed hereinabove. By use of my device 10, a person has available to him service of balls 40 that are characterized by all possible kinds of serves at any desired speed to give the person he needs for proper training in the game of table tennis.

What I claim as new and desired to secure by Letters Patent is:

1. A table tennis ball serving apparatus comprising an open top housing having an opening, a cylindrical duct connected to said opening and extending forwardly of said housing, impeller means mounted in said housing in substantial alignment with said duct, a hopper mounted on said housing at said open top for feeding balls to said impeller means, power operated means for operating said impeller means, adjustable braking mechanism on said impeller means, a collar rotatably mounted on said cylindrical duct, an elongated carriage mounted on said collar and extending on each side of said collar, a pair of ball engaging wheels rotatably mounted on said carriage, one of said ball engaging wheels being free to rotate except for said adjustable braking mechanism acting thereon, said wheels lying in substantial coplanar relation with each other and the axis of said duct, and power operated means mounted on said carriage operative to power only the other one of said wheels so that when a ball is impelled through said duct, to engagement with both of said wheels it will be projected from the impeller means, and the braking mechanism will cause a ball being projected to spin.

2. The structure as recited by claim 1 taken in combination with locking means mounted on said collar for adjusting the position of said powered wheel whereby varying spins may be applied to said balls as ejected from said apparatus.

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