May 28, 1957 J. E. COOK 2,793,636

BALL THROWING MACHINE

Filed March 3, 1953 3 Sheets-Sheet 1

Fig. 1.

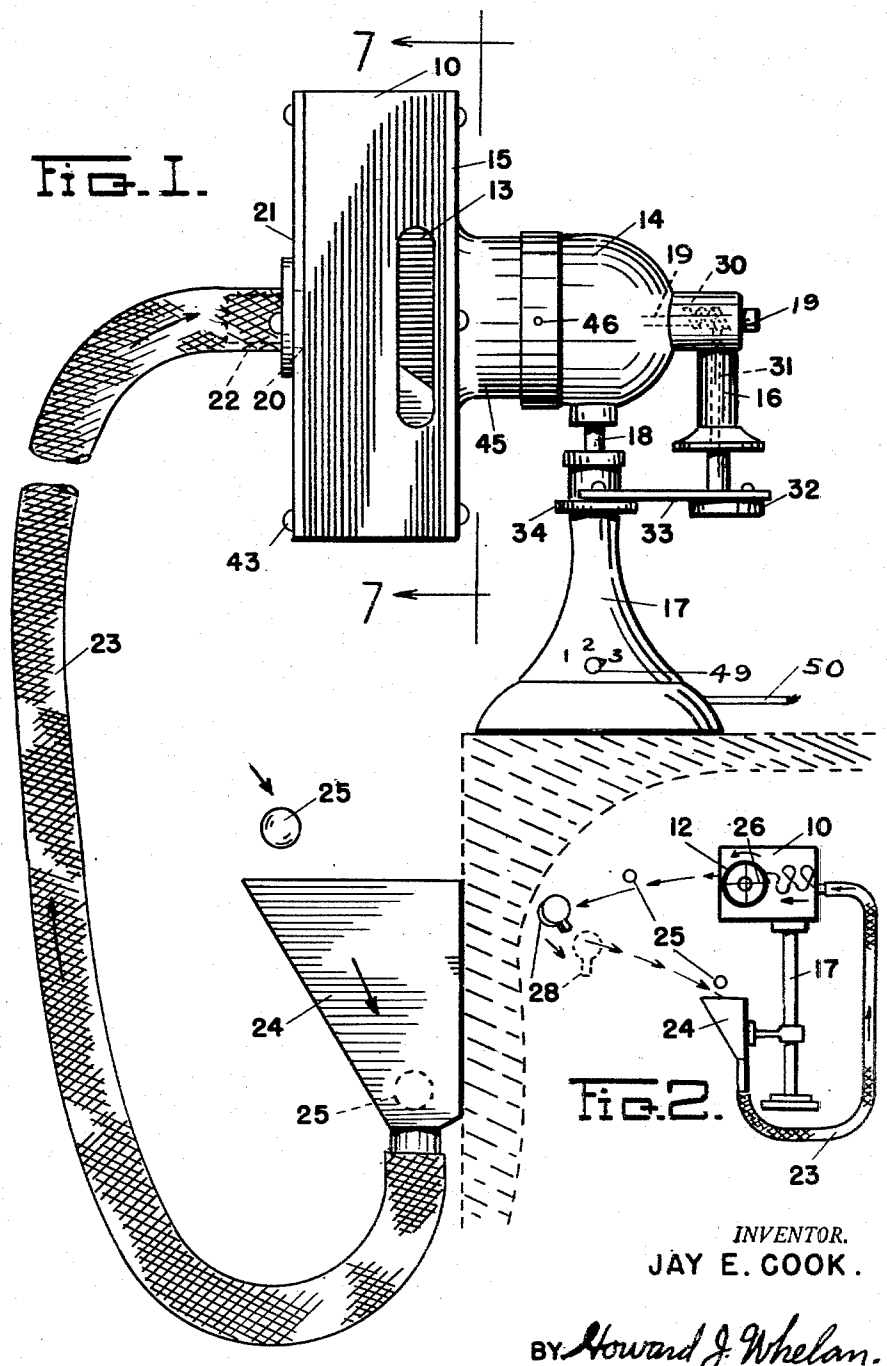


Fig. 2.

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Filed March 3, 1953 3 Sheets-Sheet 2

FIG. 3.

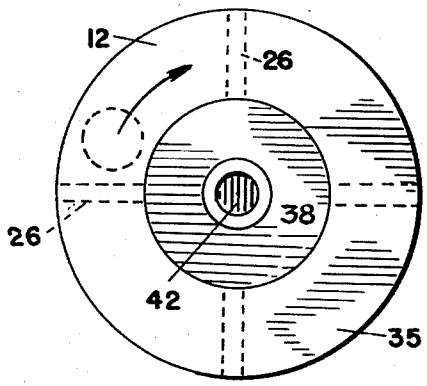


FIG. 4.

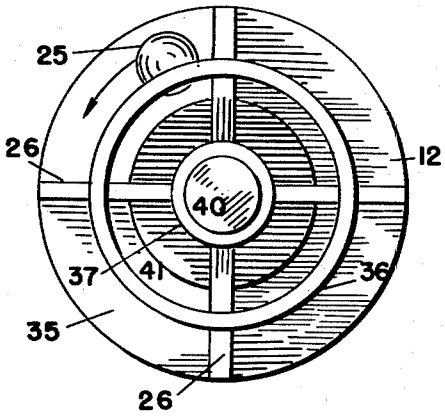


FIG. 5.

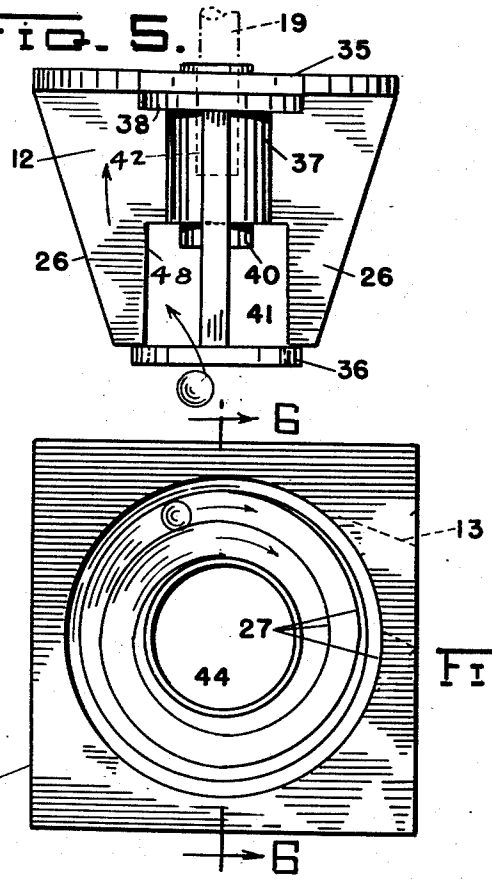


FIG. 6.

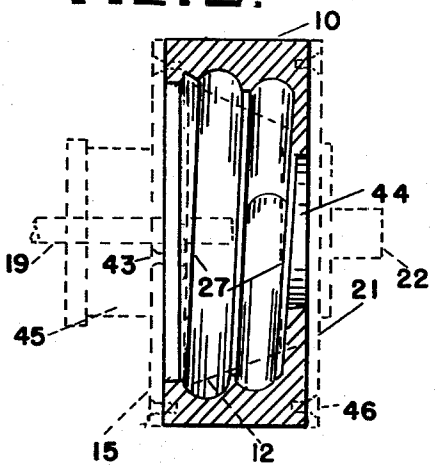


FIG. 7.

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May 28, 1957 J. E. COOK 2,793,636

BALL THROWING MACHINE

Filed March 3, 1953 3 Sheets-Sheet 3

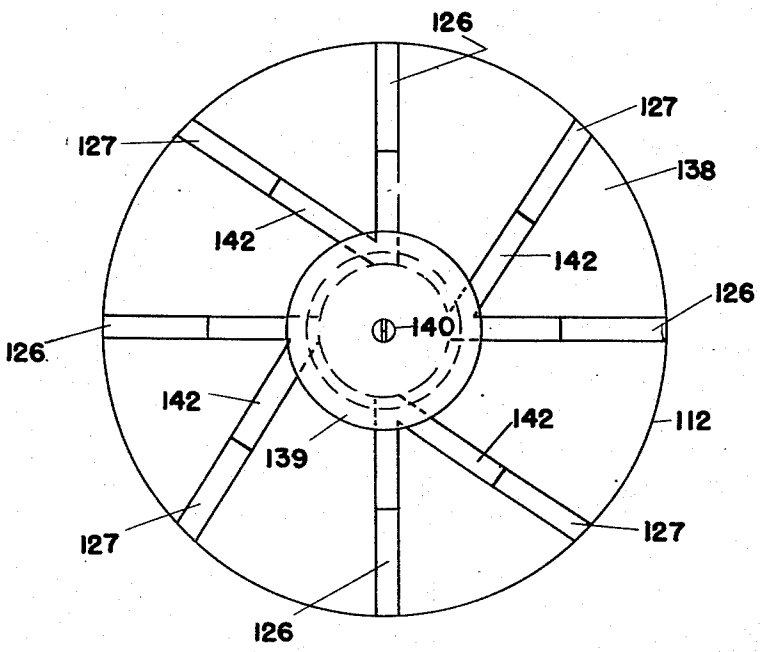


FIG. 8.

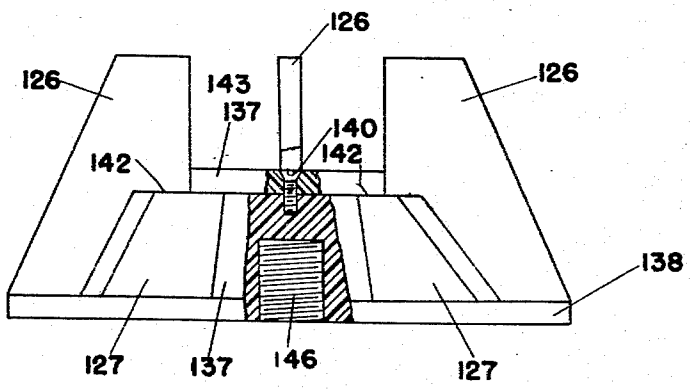


FIG. 9.

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United States Patent Office 2,793,636 Patented May 28, 1957

2,793,636

BALL THROWING MACHINE

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Application March 3, 1953, Serial No. 340,014

1 Claim. (Cl. 124—6)

This invention relates to games or sports of the type that promotes physical exercise and mental acumen, and more particularly to those included within the class of Ping-pong and similar ball games.

The game of Ping-pong is played with a ball struck by bats or paddles in the hands of the players and directed over a fence-like net mounted on a table. The arrangement offers no possibility for practice, unless another player is recruited to play with the original player. This would be inconsistent with the purpose of individual practicing and offers no practical solution. This invention was developed to meet such a situation and provides for practice at such a game by a single person, in a unique and effective manner. The ball used in the game such as Ping-pong is placed in an impeller housing in which a helical groove or runway is formed, for the practice ball or balls to travel in. An impeller rotates in the central portion of the impeller housing, and carries the ball along the groove or runway with increasing speed and centrifugal tension, until it arrives at an outlet in the wall of the impeller housing, and is expelled with force into the room where the player is waiting to hit it. However, since this arrangement alone would necessitate constant retrieving of the balls and their replacement in the impeller housing by hand, it would largely reduce the practice possibilities due to the tedious work involved, instead of play. To meet this situation, the invention includes a cage of suitable size and form situated in the room, serving to collect the balls after they are hit and leading them to a suction hose that carries them back to the impeller housing. A motor drives the impeller and incidently induces the vacuum action that draws the ball back into the impeller housing and recirculates it to the player, from the player to the cage and then through the hose back into the impeller housing.

Therefore the object of this invention is to provide a new and improved ball practicing machine that will avoid one or more of the disadvantages and limitations of the prior art.

Another object of the invention is to provide a new and improved ball playing machine for individual practice.

A further object of this invention is to provide a new and improved practice machine for ball playing games, that will enable individuals to play continuously with a ball without requiring their personal and physical efforts for retrieving the balls during such practice.

Still another object of the invention is to provide a new and improved practice machine for serving Ping-pong balls that will enable a player to practice indefinitely without the help of other individuals, and at the same time, have his skill promoted by the variable directioning of the balls as they are forcibly delivered to him.

An additional object of the invention is to provide a new and improved Ping-pong practicing machine that will be compact in design, economical to manufacture, and which will effectively imitate the vagaries of ball travel as encountered in playing the game of Ping-pong with another player.

Other objects of the invention will be indicated as it is more fully described.

For a better understanding of the invention and the objects thereof, reference is made to the accompanying drawings, wherein a form of invention is shown, and in the following specifications described.

In the drawings:

Figure 1 is a view in elevation of the equipment constituting an outfit for practicing Ping-pong batting practice and embodying this invention;

Figure 2 is a diagrammatic outline indicating the movement of the ball used in this embodiment during practice;

Figure 3 is a rear elevation of the impeller employed in the impeller housing included in this equipment;

Figure 4 is a front view showing the ball receiving end of the rotor shown in Figure 3;

Figure 5 is a side elevation of Figure 3;

Figure 6 is a sectional view of the housing included in this embodiment and taken on line 6—6 of Figure 7, the impeller and end plates being indicated in dotted outline;

Figure 7 is a rear elevation looking along line 7—7 of Figure 1;

Figure 8 is a front view of the modified form of ball impeller showing the ball receiving end of the rotor; and

Figure 9 is a side elevation of Figure 8.

Similar reference characters refer to similar parts throughout the drawings.

Referring to Figure 1, an impeller housing **10** for throwing the Ping-pong balls **25** consists of a housing in which the balls are collected and in which an impeller **12** drives them centrifugally and forcibly through an outlet **13**. The housing is rigidly supported on the casing of a electric motor **14** by a bracket plate **15** and oscillates directionally with it. The shaft **19** of the motor is removably attached to the impeller and rotates it directly. The motor **14** also operates through its shaft **19** with an oscillator unit **16**. This unit is of conventional construction, and includes a worm gear **30** mounted on the shaft **19** of the motor **14**, a worm and shaft **31**, for rotating a plate **32** and a connecting bar **33** connecting the plate **32** and the stationary ring **34** that is adjustably secured to the stand **17** that supports the motor and the vertical spindle **18** that enables the latter to be supported and to oscillate on the stand **17**. The stand **17** is made to support the components connected with it, and may be of the desk or table type as indicated in Figure 1 or of the extended form or standard illustrated in Figure 2. The housing **10** is provided with an inlet orifice **20**, covered by a face plate **21** on which a fitting **22** is attached to hold a suction hose **23** thereto. This hose **23** is made long enough to run to a hopper or cage **24** of suitable size and design that serves to catch the balls **25** hit by the player during the practice. When the ball **25** falls into the hopper, it passes down to the hose **23**, and travels under the suction effect in the hose to the impeller housing **10**, induced by the rotation of the impeller blades **26**.

In the impeller housing it is caught by the blades **26** of the rotor or impeller **12** and rotated along the helical grooves **27** formed on the inner peripheral wall of the impeller housing. This gives the ball **25** an increasing centrifugal propulsion until it reaches the outlet **13** which is arranged at a suitable point in the lateral impeller housing wall. The ball passes tangentially through the outlet **13** and travels in a curved trajectory into the room. The player darts about the room and endeavors to hit the ball back with his paddle **28** towards the hopper or cage **24** so it will be recirculated through the hose etc. The helical grooves **27** have a gradually increasing diameter from the orifice **20** to the outlet **13**. The impeller **12** is preferably constructed as indicated in the drawings. The blades **26** are flat faced and are cut on their edges with a taper from an end disc **35** to an open ring **36** of lesser diameter.

Four blades are preferably used and are shown radially mounted at 90° spacings on a cylindrical drum **37** axially extended from the disc **35** towards the ring **36**. The drum is stepped from a relatively thin and circular portion **38** in the plate to a smaller and longer portion **37** and thence to a smaller but short circular portion **40**. The latter portion **40** extends to an open space **41** left by the rectangular cuts **48** arranged axially in the blades adjacent to the ring **36** and the opening in the latter. This open arrangement in the ring **36** and blades **26** is provided for the free entrance of the ball **25** from the hose **23** into impeller against the faces of its blades. The impeller is rotated by the motor **14** through its shaft **19** embedded or threaded in a suitable recess **42** furnished in the cylindrical drum **37**.

The face plate **21** is removably secured by screws **43** to the face of the impeller housing **10** and is brought adjacent to the exterior face of the end of open ring **36** so as to close over the hole **44** in the face of the impeller housing. The bracket plate **15** is formed to encompass the body of the motor **14** by means of a shell **45** extending laterally from it and fastened to the magazine **10** by screws **46**. The details of the oscillating mechanism follow conventional lines and do not require further explanation as the construction and operation is well known, because of its frequent use where fans are employed for ventilating purposes. However in this invention, the motor **14** in operation actuates the oscillating mechanism simultaneously so that the ball can be propelled while the impeller housing is oscillated. The result on the trajectory of the ball can be in a great variety of directions, depending on the portion of the horizontal arc of oscillation of the impeller housing is in when the ball is discharged from it. This requires a continual alertness on the part of the player to hit the ball, as there is so much uncertainty as to the direction in which it will travel during the practice period.

The device is simple and requires but little attention to keep it in action and working to the satisfaction of the player. It offers effective delivery of the ball and keeps the player actively engaged during the batting practice. A number of balls can be used to speed up the play and keep the balls coming frequently from the impeller housing. The player needs no one else to help or cooperate with, since the equipment is entirely under his control, and he can stop and begin as often as he wishes. The force with which the ball **25** is propelled, is controlled by a speed regulator **49** which controls the speed at which the motor and impeller is operated. An electrical feeder **50** supplies an electrical current to operate the motor. When not in use the equipment can be packed away into a small space.

In the modified form shown in Figures 8 and 9, the rotary impeller **112** includes a plurality of large radial blades **126**, intermediate between each are a plurality of shorter tangential offset blades **127** positioned as indicated in Figure 8. All the blades extend outwardly from a central tapering drum **137** and are integrally attached thereto in a substantial and rigid manner. The drum is built up on a circular bottom disc plate **138** and all the parts in contact with each other are solidly and homogeneously connected. The member **137** is internally screw threaded at **146** to suit the shaft of the motor to which it is attached.

All the blades are peripherally tapered on an angle to the base **138** at their peripheral edges. The blades are shown straight and flat but it is understood they may be curved. A disc baffle **139** rests on and is attached to the member **137** by a screw **140** resting against the blade surfaces **141** and **142** of the blades **126** and **127**. The large radial blades **126** are cut out centrally at their upper portions to create openings there between. This form of the invention has the feature of providing an additional and greater vacuum effect by reason of the intermediate shorter tangential offset blades. The baffle provides a platform or stop for the incoming balls and directs them out between the blades through open space **143**.

While but two general forms of the invention are shown in the drawings and described in the specification, it is not desired to limit this application for patent to these particular forms as it is appreciated that other forms of construction could be made that would use the same principles and come within the scope of the appended claim.

Having thus described the invention, what is claimed is:

A machine for throwing light hollow balls of the ping pong type toward a player practicing to improve his play in a game involving the use of such balls, comprising, an impeller housing having a spiral groove extending from an inlet adjacent to the center of said impeller housing and terminating in an outlet opening through an edge of said impeller housing, a motor device having a casing supporting said impeller housing, a hopper for receiving said balls batted by said player, a flexible conduit connecting said hopper to said inlet, a rotary device for producing a suction effect for moving said balls from said hopper through said flexible conduit and for moving said balls through said spiral groove from said inlet thereof to said outlet; said rotary device including a disc, a member, a drum rigid with said disc, and a set of blades secured to said drum and angularly spaced around the same and connecting said disc to said member, all of said blades being cut away adjacent to said disc to provide edges spaced from said shaft and to provide a space to receive balls moved by suction from said hopper through said flexible conduit and the opening in said member, said motor device including a shaft extending into said impeller housing, said spiral groove including a set of superimposed convolutions with said blades each increasing progressively in width, from the first mentioned edges toward the outer edges thereof, and from said member toward said disc, and means for oscillating said motor device and said impeller housing.

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