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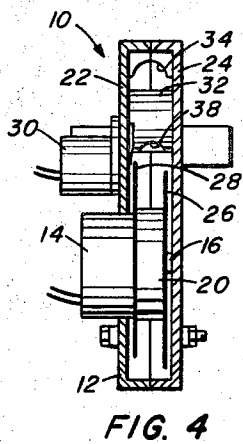
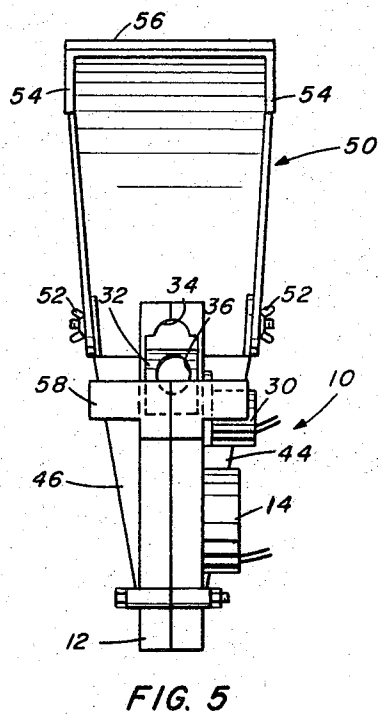
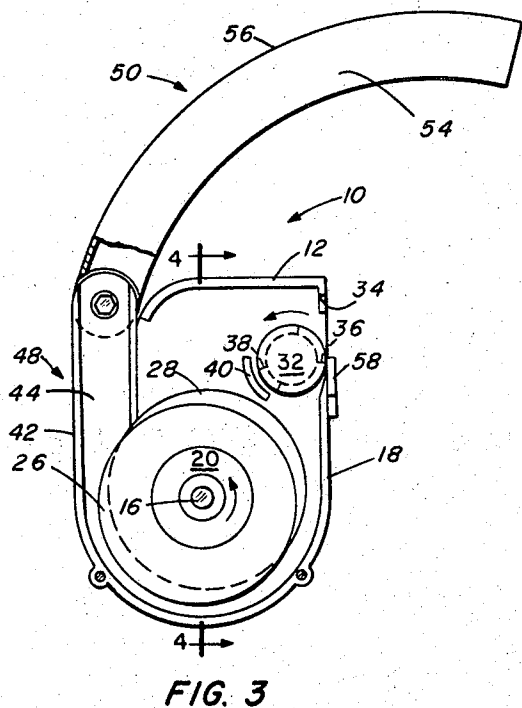
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3,375,005

BALL THROWING MACHINE AND TARGET NET

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3 Sheets-Sheet 1



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BALL THROWING MACHINE AND TARGET NET

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This invention relates generally to ball amusement devices, and more particularly it pertains to a ball gathering and projecting arrangement for individually practicing the game of table tennis.

An object of this invention is to provide an improved ball throwing machine which projects a ball at predetermined equal intervals.

Another object of the invention is to provide a ball gathering and projecting machine which is anti-clogging and throws only one ball at a time.

To provide a ball-throwing machine which ejects a ball at a non-predictable horizontal angle at any desired trajectory, is yet another object.

Still another object of this invention is to provide a demountable receiving net and ball gathering mat for solitary play of the game of table tennis.

Other objects and attendant advantages of the invention will become more readily apparent and understood from the following detailed specification and accompanying drawings in which:

FIG. 1 is a perspective view of the ball gathering and projecting machine installed on a table for the purpose of individual table tennis practice;

FIG. 2 is a fragmentary detail view taken on line 2—2 of FIG. 1;

FIG. 3 is a side elevation, partly in section, of the ball projector;

FIG. 4 is a vertical section of the ball projector viewed in the direction of the arrows 4—4 of FIG. 3;

FIG. 5 is a front elevation of the ball projector;

FIG. 6 is a view similar to FIG. 1 but depicting the net arrangement in greater detail; and

FIG. 7 illustrates the net and mat in dismantled form.

Referring now to the details of the invention, the ball projector 10 as best shown in FIGS. 3, 4 and 5, consists of a flat hollow housing 12 having a generally U-shaped internal configuration. A high speed motor 14 is mounted on one side wall 22 of the housing 12 with its shaft 16 extending therein and displaced a small amount from the center of radius of the U in a horizontal direction toward the front wall 18 of the housing 12.

A cylindrical rotor 20 is secured on shaft 16, rotates in the direction of the arrow, and nearly fills the space between the side wall 22 and the opposite sidewall 24.

A pair of flexible rubber cheeks 26 and 28 spaced slightly less than the diameter of a ball extend radially outward from the rotor 20 and are cut eccentrically round at their peripheries. One cheek 26 is mounted so as to extend its maximum point of eccentricity 180 degrees displaced around the rotor 20 from that of the other cheek 28.

A slow speed motor 30 is mounted on the housing 12 above the high speed motor 20 and close to front wall 18. This motor 30 rotates a hollow cylindrical gate rotor 32. Other suitable means, such as step-down gearing from the main high speed motor 14 could be utilized to rotate the rotor 32, if desired.

The gate rotor 32 turns in the direction of the curved arrow of FIG. 3 immediately below an aperture 34 in front wall 18. A pair of diametrically opposed apertures 36, 38 are located in the gate rotor 32 and a curved guard 40 attached to the interior of the housing 12 covers these apertures 36, 38 during a downward arc of their movement.

The rear wall 42 of the housing has adjacent to it upwardly divergent extensions 44, 46 of sidewalls 22 and

24. These extensions 44, 46, together with rear wall 42 form a flaring upwardly extending rectangular nozzle 48. An open ended deflecting scoop 50 is adjustably secured with a pair of bolts and wing nuts 52 to the upper ends of the extensions 44, 46 and flares laterally in continuation of the flare of nozzle 48.

Scoop 50 is made adjustable and with curved side walls 54 and an arcuate top wall 56 so as to direct a ball B when ejected into a desired trajectory which may be raised or lowered. On the other hand its lateral flare permits successive balls to emerge with considerable variation in azimuth as will be related.

As mounting provisions, the projector 10 is provided with a flat cross bar 58 secured horizontally across the front wall 18. A receptacle 60 is secured by screws or clamps as shown in FIG. 2 to the rear edge of a table T to receive this cross bar 58 and secure projector 10.

The rear area of the table T is provided with a tapered mat 62 having a central valley 64 which slopes into the aperture 34 as shown in FIG. 1. A net 66 extends above three sides of mat 62 and across the front of the projector except for an aperture 68 through which the end of scoop 50 protrudes. A target pocket 70 may be mounted in the net 66 if desired.

In use, the motors 14 and 30 are turned on and both rotors 20 and 32 rotate continuously. The latter gate rotor 32 periodically exposes a rotor aperture 36 to the aperture 34 allowing a ball B to enter from the valley 64 of mat 62. The other rotor aperture 38 is made smaller and functions as a seat for the received ball.

The guard 40 prevents the ball from dropping out except at the lowermost position of the aperture 36 whereupon the dropped ball is seized between the cheeks 26 and 28 of the rotor 20. A half turn later the ball leaves the rotor 20 at high speed in an upwardly direction and with a spin imparted by one or the other eccentric peripheries of cheeks 26 and 28. The scoop then gives the ball the desired trajectory and limits the chance azimuth excursion thereof due to ball spin so it will drop somewhere on the forward part of the table T for return by the player.

To provide for easy knock-down and storage of the receiving net 66 and ball gathering mat 62 the arrangement illustrated in FIGS. 6 and 7 is used. The mat 62 comprises four elements namely a front piece 72, a rear piece 74, and ramps 76 and 78.

The front piece 72 has a face plate 80 secured in a vertical position to the sides of two spaced elevating blocks 82. It also has a narrow stiffener 84 for stiffening plate 80 so that lighter, thin material can be utilized in the construction of the unit. Fingers 86 extend downward from the ends of the plate 80 for centering the assembled mat 62 on the table.

One of the ramps 76 is provided with an under-extending lap strip 88 to support the abutting edge of the other ramp 78 when assembled to form the previously mentioned valley 64. The rear piece 74 has a vertical face plate 90 secured to the sides of two more spaced elevating blocks 92 and a pair of ramp receiving channels 94. These channels 94 terminate short of abutment at the center of the plate 90 to expose the gate aperture 34 therethrough.

The blocks 82, 92 are vertically apertured in register with apertures 96 in the outer corners of the ramps 76 and 78. An inverted U-shaped frame 98 of round rod fits into the apertures 96 extending into the blocks 92 at the rear. A pair of side braces 100 fit into the forward apertures 96 and blocks 82 thus locking the ramps 76, 78 together and in position with the front and rear faceplates 80 and 90.

The other ends of the side braces 100 engage with the U-frame 98 and when erected rest on stops 102 thereon. The netting 104 is reeved by its edges to the U-frame and

side braces. It has been omitted for clarity in the demounted view of FIG. 7.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A ball projecting apparatus, comprising, a projector consisting of a flat hollow housing having a generally U-shaped internal configuration with a pair of side walls and rear and front walls, first motor means having a shaft extending into said housing, a rotor mounted on said shaft and arranged to fill the space between said sidewalls of said housing, a pair of flexible cheeks spaced slightly less than the diameter of a ball extending radially outward from said rotor and shaped eccentrically round at their peripheries, with one cheek of said pair of cheeks being mounted so as to extend its maximum point of eccentricity 180 degrees displaced around said rotor from that of the other cheek of said pair of cheeks, second motor means having a hollow cylindrical gate rotor immediately below an aperture formed in said front wall of said housing, said hollow cylindrical gate rotor having a pair of diametrically opposed apertures located therein, said housing having a curved guard attached to the interior thereof covering said pair of diametrically opposed apertures during a downward arc of their movement, said rearwall of said housing having upwardly divergent extensions of said sidewalls, with said extensions together with said rear wall forming a flaring upwardly extending rectangular nozzle, an open ended deflecting scoop means adjustably secured to the upper ends of said extensions and flared laterally in continuation of the flare of said nozzle, said scoop means having curved sidewalls and an arcuate top wall so as to direct said ball when ejected into a desired trajectory which may be raised or lowered due to the adjustability of said scoop means, with the lateral flare of said scoop means permitting successive balls to emerge with considerable variation in azimuth.

2. A ball gathering and projecting apparatus, comprising, a projector consisting of a flat hollow housing having a generally U-shaped internal configuration with a pair of side walls and rear and front walls, first motor means having a shaft extending into said housing, a rotor mounted on said shaft and arranged to fill the space between said sidewalls of said housing, a pair of flexible cheeks spaced slightly less than the diameter of a ball extending radially outward from said rotor and shaped eccentrically round at their peripheries, with one cheek of said pair of cheeks being mounted so as to extend its maximum point of eccentricity 180 degrees displaced around said rotor from that of the other cheek of said pair of cheeks, second motor means having a hollow cylindrical gate rotor immediately below an aperture formed in said front wall of said housing, said hollow cylindrical gate rotor having a pair of diametrically opposed apertures located therein, said housing having a curved guard attached to the interior thereof covering said pair of diametrically opposed apertures during a downward arc of their movement, said rearwall of said housing having upwardly divergent extensions of said sidewalls, with said extensions together with said rear wall forming a flaring upwardly extending rectangular nozzle, an open ended deflecting scoop means adjustably secured to the upper ends of said extensions and flared laterally in continuation of the flare of said nozzle, said scoop means having curved side walls and an arcuate top wall so as to direct said ball when ejected into a desired trajectory which may be raised or lowered due to the adjustability of said scoop means, with the lateral flare of said scoop means permitting successive balls to emerge with considerable variations in azimuth, a table for mounting said projector, the rear area of said table being provided with a tapered mat having a central valley sloping into said aperture in said front

wall, netting extending above three sides of said mat and across the front of said projector except for an opening through which the end of said scoop means protrudes, and a target pocket mounted in said netting.

3. A ball gathering and projecting apparatus as recited in claim 2, wherein said receiving netting and ball gathering mat is demountable for solitary play of the game of table tennis.

4. A ball projecting apparatus, comprising, a projector consisting of a flat hollow housing having a generally U-shaped internal configuration with a pair of side walls and rear and front walls, high speed motor means mounted on one side wall of said housing and having a shaft extending into said housing and displaced from the center of radius of the U in a horizontal direction toward the front wall of said housing, a cylindrical rotor mounted on said shaft and arranged to fill the space between said sidewalls of said housing, a pair of flexible rubber cheeks spaced slightly less than the diameter of a ball extending radially outward from said rotor and shaped eccentrically round at their peripheries, with one cheek of said pair of cheeks being mounted so as to extend its maximum point of eccentricity 180 degrees displaced around said rotor from that of the other cheek of said pair of cheeks, slow speed motor means mounted on said housing above said high speed motor means and having a hollow cylindrical gate rotor immediately below an aperture formed in said front wall of said housing, said hollow cylindrical gate rotor having a pair of diametrically opposed apertures located therein, said housing having a curved guard attached to the interior thereof covering said pair of diametrically opposed apertures during a downward arc of their movement, said rearwall of said housing having upwardly divergent extensions of said sidewalls, with said extensions together with said rear wall forming a flaring upwardly extending rectangular nozzle, an open ended deflecting scoop adjustably secured to the upper ends of said extensions and flared laterally in continuation of the flare of said nozzle, said scoop having curved side walls and an arcuate top wall so as to direct said ball when ejected from said projector into a desired trajectory which may be raised or lowered due to the adjustability of said scoop, with the lateral flare of said scoop permitting successive balls to emerge with considerable variation in azimuth.

5. A ball gathering and projecting apparatus, comprising, a projector consisting of a flat hollow housing having a generally U-shaped internal configuration with a pair of side walls and rear and front walls, high speed motor means mounted on one side wall of said housing and having a shaft extending into said housing and displaced from the center of radius of the U in a horizontal direction toward the front wall of said housing, a cylindrical rotor mounted on said shaft and arranged to fill the space between said sidewalls of said housing, a pair of flexible rubber cheeks spaced slightly less than the diameter of a ball extending radially outward from said rotor and shaped eccentrically round at their peripheries, with one cheek of said pair of cheeks being mounted so as to extend its maximum point of eccentricity 180 degrees displaced around said rotor from that of the other cheek of said pair of cheeks, slow speed motor means mounted on said housing above said high speed motor means and having a hollow cylindrical gate rotor immediately below an aperture formed in said front wall of said housing, said hollow cylindrical gate rotor having a pair of diametrically opposed apertures located therein, said housing having a curved guard attached to the interior thereof covering said pair of diametrically opposed apertures during a downward arc of their movement, said rearwall of said housing having upwardly divergent extensions of said sidewalls, with said extensions together with said rear wall forming a flaring upwardly extending rectangular nozzle, an open ended deflecting scoop adjustably secured to the upper ends of said extensions and

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flared laterally in continuation of the flare of said nozzle, said scoop having curved side walls and an arcuate top wall so as to direct said ball when ejected from said projector into a desired trajectory which may be raised or lowered due to the adjustability of said scoop, with the lateral flare of said scoop permitting successive balls to emerge with considerable variation in azimuth, a table for mounting said projector, the rear area of said table being provided with a tapered mat having a central valley sloping into said aperture in said front wall for feeding a ball into said projector, netting extending above three sides of said mat and across the front of said projector except for an opening through which the end of said scoop protrudes, and a target pocket mounted in said netting.

6. A ball gathering and projecting apparatus as re-

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cited in claim 5, and means for rapidly securing said projector to the rear of said table.

7. A ball gathering and projecting apparatus as recited in claim 5, and demountable and foldable framing for holding said netting in position on three sides of said mat.

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