

[54] BALL THROWING AND RECEIVING
SYSTEM

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273/30

[51] Int. Cl.A63b 69/40

[58] Field of Search273/26 D, 29 A, 30, 101, 129;
124/26, 1, 6

[56] References Cited

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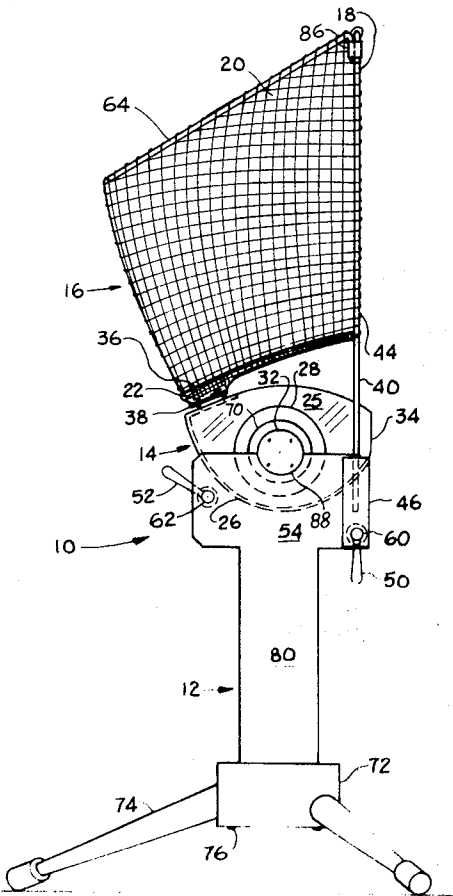
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[57] ABSTRACT

A ball-throwing and receiving system consisting typically of a yoke-shaped, tripod supported base, a motor driven flexible-disc ball-propelling unit adjustably clamped in the yoke, and a rectangular-throat conical net above the ball propelling unit connected at the small end to the ball-propelling unit and at the large end to a rectangular-throat frame pivotally supported by the yoke; a table tennis embodiment is also disclosed.

7 Claims, 3 Drawing Figures



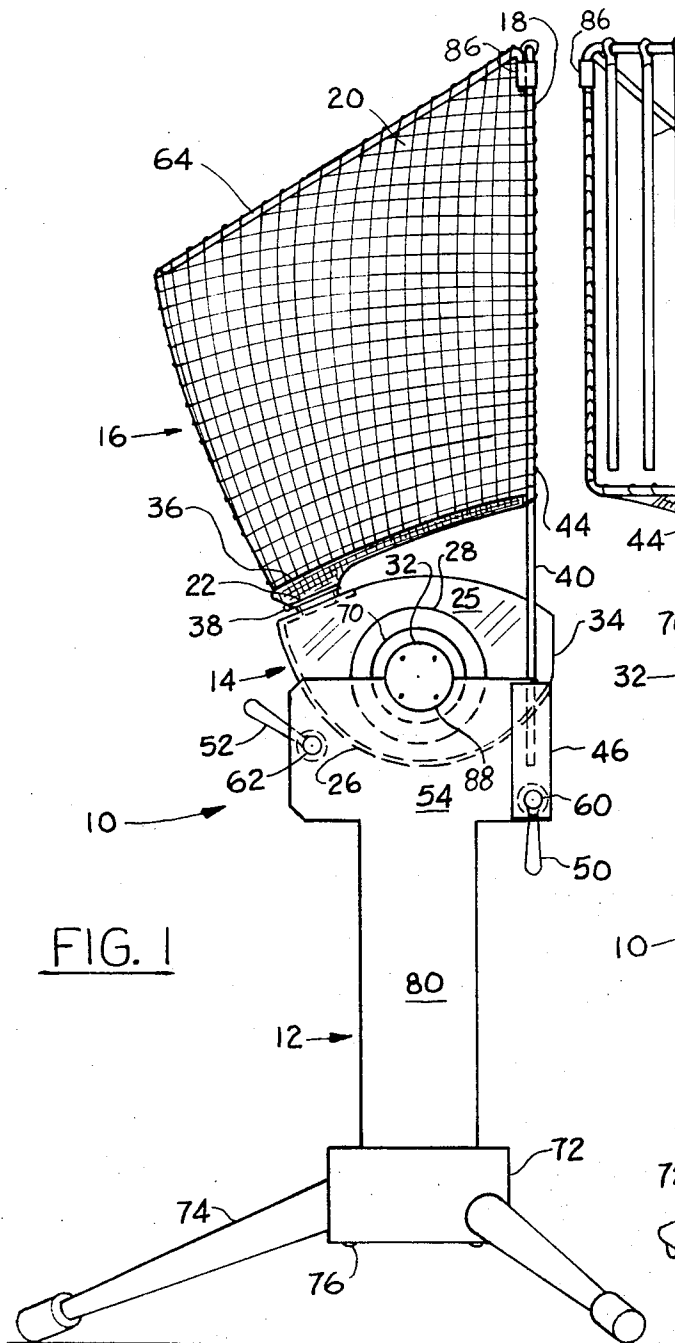


FIG. 1

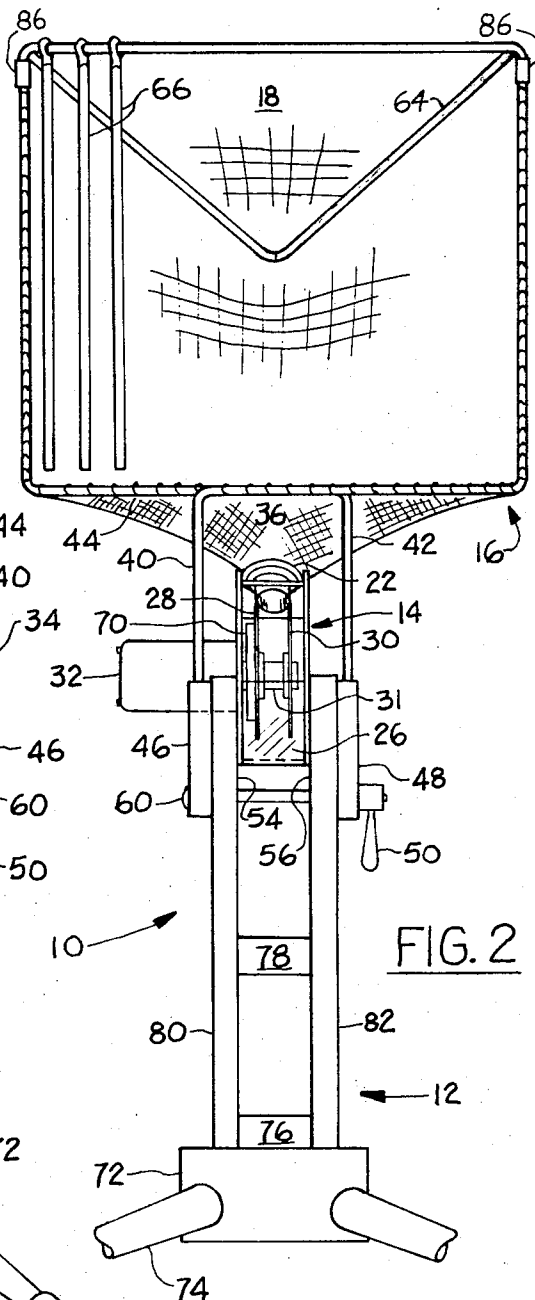


FIG. 2

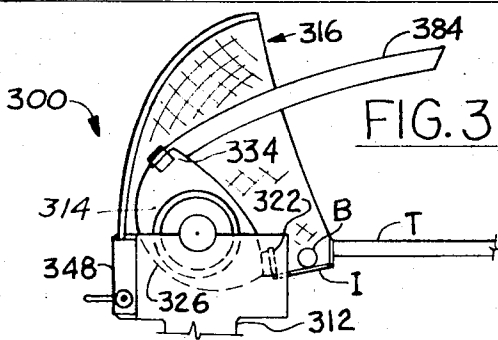


FIG. 3

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BALL THROWING AND RECEIVING SYSTEM

This invention relates generally to sporting apparatus and particularly to ball throwing and receiving systems.

Ball throwing and receiving systems are known in the prior art, and some of these have reached a high state of development and practicality see for example U.S. Pat. Nos. 2,925,811 and 3,375,005 granted to the present inventor, disclosing table tennis apparatus). Baseball throwing devices have been used for a number of years, even though relatively expensive.

However, it is believed that no ball throwing and receiving system presently available on the market represents the ideal in simplicity, adaptability, reliability, economy, and attractive appearance, and it is among the objects of this invention to provide an improved system approaching these qualities as closely as possible.

Another object of the invention is to provide a system as described which has extremely effective provisions for preventing balls from rebounding from the receiving means and for directing received balls to the ball throwing means.

Further objects of the invention are to provide a ball-throwing and receiving system which has easy, infinitely variable adjustment within the range of elevation provided for throwing, which has capacity for receiving and throwing more than one ball size, which is free-standing, portably lightweight, which can be used at any place, indoors or out, and which is adapted for receiving and projecting balls either from below or above, depending on the receiving arrangement and the elevation angle adjustment for throwing.

Yet further objects of the invention are to provide a system as described which can be used as a mechanized "catcher" to train pitchers in hitting the strike zone, or which alternatively can be used as a mechanized "opponent" in table tennis, with a minimum of readjustment.

Still further objects are to provide a system as described which is very economical to manufacture, simple to assemble, ideally adapted for battery operation, non-jamming, durable, attractive in appearance, and great fun to use.

The invention in one embodiment is characterized by a rotary propeller unit including opposed flexible discs axially aligned on, and driven by, a motor shaft; a housing positioning the motor and having a ball receiving and a ball projecting opening peripherally aligned with the discs on opposite sides, and connected by a ball-run circularly contoured past the lower circumferences of the discs; a stand-supported yoke assembly cutout to provide a bearing surface fitting the motor housing which is pivotal in the cut-out for elevation adjustment; a clamp arrangement to fix the propeller unit in position when adjusted; and a tapered ball-receiving net assembly adjustably mounted on the stand with the small end of the taper affixed at the ball receiving opening of the housing.

The above and other advantages and objects of this invention will become more apparent on examination of the following description and the drawings in which:

FIG. 1 is a side elevation of an embodiment of this invention;

FIG. 2 is a front elevation of the FIG. 1 embodiment; and

FIG. 3 is a side elevation, partly in section, of another embodiment of this invention.

Now taking up the Figures in detail; FIGS. 1 and 2 show a ball-throwing and receiving device 10 made according to this invention and intended primarily for pitch-and-catch use, using a baseball, softball, tennis ball or the like. This device is called the "SKY-BALL" and is made-up of three assemblies: the tripod base 12, the propeller unit 14 which is adjustably positioned by the base assembly, and the net assembly 16 which is adjustably positioned by the base assembly and attached at the back to the propeller unit. In a practical, economical, and attractive embodiment the base is made of wood, the propeller unit housing is made of Plexiglass, and the net frame is made of spring steel rod. The net assembly itself is made preferably of netting at the top and sides, as indicated, with the bottom being canvas laced to the netting and frame and secured to the propeller unit by a hose clamp.

In operation, a ball thrown by a player into the open front 18 of the net 20 is channeled downward by the net assembly through the receiving end 22 of the propeller unit 14, rolls down ball-run 26, is gripped between a pair of spaced neoprene discs or fins 28, 30, which are mounted on motorshaft 31 and driven by the motor 32, and is thrown by the fins from the discharge end 34 of the propeller unit on a pre-set elevation trajectory determined by angular adjustment of the propeller unit in the base. Take-down, re-assembly, and adjustment of the device are extremely simple and easy because of careful design provisions. To take down or dis-assemble the device requires only three steps. First, the small end 36 of the net assembly 16 is released from the receiving end 22 of the propeller unit 14 by releasing hose-clamp 38 securing it. Second, the net assembly is removed by lifting the standards 40, 42 of the netting frame 44 out of the sockets provided respectively in blocks 46 and 48 which are affixed to opposite jaws of the tripod base. Third, clamps 50, 52 are loosened allowing opposed jaws 54, 56 of the tripod base assembly 12 to open slightly, and the propeller unit 14 is lifted free, completing disassembly. A further provision by which the net assembly may be collapsed flat for shipment or storage is described later.

Several features of the design as illustrated in FIGS. 1 and 2 should be noted at this point. The motor 32 chosen for this application and fixed to one sidewall 25 of the propeller unit housing has a cylindrical exterior configuration. The adjacent jaw 54 of the tripod stand is recessed to provide a bearing surface 88 for the motor housing. The bolts 60, 62 of clamps 50, 52 which adjustably draw the jaws to grip the propeller unit 14, are positioned well clear of the ends of the propeller unit. This arrangement allows the propeller unit 14, when the clamps are released, to be rotated between the jaws of the tripod stand, about the motor housing as an axis, to adjust the elevation angle at which balls are thrown from the unit.

Within the range of this rotation an infinite number of adjustments are thus possible, easily, quickly and surely. The range of rotation is substantial and a further use of the device which is made possible by this feature will be described later in reference to the FIG. 3 embodiment.

The design of the propeller unit housing is simple and easy to mold, adapting it for economical mass-production, consisting as it does of only four shapes, namely: two flat sides, a rocker-bottom connection between the

sides below and a short flat connection between the sides at one end above, one flat side and the short flat connection being perforated.

The net is readily and simply kept taut by appropriately pivoting the blocks 46, 48 holding the net frame standards 40, 42. These blocks are secured to the tripod stand only by bolt 60 of the forward clamp 50, and are released and tightened by this clamp. Proper extension of the net at all times is assured by the V-shaped, 45° downward, rearward extension 64 of the frame. The ends of the legs of the V are bent downward so that the extension may be attached to the rectangular frame 44 of the netting assembly by having the ends of the legs removably inserted in clips 86 which are secured to the net frame on either side. Note that a ball which strikes any part of the net assembly, whether down-sloping top, V extension, or sides, will be deflected and funneled down instead of bouncing out.

A rectangular net frame opening is preferred, to simulate the rectangular strike-zone in baseball.

A further feature of the net assembly is apparent in the face view, FIG. 2, showing the rectangular opening. Heavy streamers 66, preferably of rope, affixed at one end to the top of the frame and spaced apart, depend downward to the bottom edge of the net opening 18. These streamers help absorb the energy of incoming balls and help retain balls in the net so that the balls cannot bounce back out once inside but instead funnel down to the propeller unit very reliably.

Both large and small balls can be handled by the device this way, and will pass through the projector without jamming because the fins are flexible; as noted, neoprene discs are preferred for the purpose. So that heavy balls will not slow the motor excessively as fins throw them, a flywheel, 70, is mounted on the inboard end of the motor shaft 31.

The lower portion 72 of the tripod base is made of a solid wooden block drilled to receive the three legs 74, which are secured by screws 76 in the bottom of the block. Some height adjustment results in accordance with how far the legs are inserted into the block. Stabilizing spacers 76, 78 are fixed between the uprights 80, 82 of the base at the bottom and partway up the length of the uprights.

FIG. 3 illustrates a further feature of the invention in an embodiment adapted for use as an automatic ball reception and projection unit for table tennis and the like.

The principle difference between the embodiment of FIGS. 1 and 2 and that of FIG. 3 is that in the first embodiment described the ball was received in a net overhead and thrown from beneath the propeller unit, whereas in the FIG. 3 embodiment the ball B is received at 322 beneath propeller unit 300 from an incline I along the edge of a table tennis table T, and is discharged at 334 over the top of the unit, using a fixed extension 384 of the ball-run 326 to guide it. The extension is affixed by being slipped in a holding strap attached to the propeller unit housing, or by any other suitable means.

The difference between the two embodiments is more apparent than real, since, except for addition of the extension 384, the propeller unit 314 of FIG. 3 can be identical with the propeller unit 14 of FIGS. 1 and 2. Not only that, but also the tripod base stand 312 can be

identical. The only change required is to reposition the device for the FIG. 3 use by rotating the propeller unit about the motor housing as previously described to lower the receiving end and elevate the discharge end, and then to place the receiving end adjacent to the table tennis table. A special net assembly 316 suitable for the table tennis application can be block mounted, as shown in referenced block 348, in the manner previously noted, to receive and channel balls to the incline. Elevation trajectory is adjusted in the same manner, with the additional advantage (over separate adjustment by changing the angle of the extension 384) that the same smooth transition from ball run 326 to the extension 384 is always assured, regardless of the elevation angle chosen.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. For example, the "net" can be entirely of canvas or entirely of screening, or the rectangular opening can be circular. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:

1. A ball throwing and receiving system comprising a base, ball propeller means having a ball outlet and a motor drive, and ball receiving means, wherein the base includes means having upwardly extending therefrom opposed jaws and means for adjustably closing the jaws, wherein the ball propeller means is adjustably retained by closure of the opposed jaws to adjust the position of said ball outlet to change the direction of a propelled ball, and wherein the ball receiving means is adjustably supported by the opposed jaws and extends above the ball propeller means.

2. A ball throwing and receiving system as recited in claim 1, wherein the ball receiving means comprises a structure forming an enclosure with an opening therein for receiving balls, and wherein the opening is provided with a plurality of pendant streamers adapted for admitting balls into the enclosure and for deterring balls from leaving the enclosure.

3. A ball throwing and receiving system as recited in claim 1, wherein the ball propeller means comprises spaced side-plates with an arcuate ball-run connecting the side plates along lower portions thereof, one end portion of said ball run forming said ball outlet, wherein the motor drive comprises a motor mounted to one of the side plates, said motor drive having a motorshaft extending into the space between the side plates and a circular motor housing portion extending exterior the side plate to which mounted, and wherein a jaw is provided with a recess retaining the circular motor housing portion whereby the ball propeller means is pivotally adjustable in rotation about the axis of the motorshaft and between said jaws.

4. A ball throwing and receiving system as recited in claim 3, wherein the ball propeller means additionally comprises a pair of flexible circular members spacedly mounted on the motorshaft proximate said arcuate ball run, whereby balls are thrown when seized between said flexible circular members while the motor is operating, wherein the ball receiving means comprises releasable gripping means pivotally secured to the exterior of a jaw by said means for adjustably closing the

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jaws, a frame held by the releasable gripping means, and a conical netting means having the large end thereof held open by the frame and the small end thereof attached to the ball propeller means, whereby pivoting the releasable gripping means tensions the netting means between the frame and the ball propeller means.

5. A ball throwing and receiving system as recited in claim 4, wherein the frame is rectangular in shape at the large end of the netting means, thereby simulating the shape of a baseball strike zone.

6. A ball throwing and receiving system as recited in

claim 4, wherein the rectangular frame includes a V-shaped member for extending the netting means rearwardly, thereby forming sloping roof and walls for trapping balls received.

7. A ball throwing and receiving system as recited in claim 4, wherein the means having upwardly extending jaws includes tripod legs, and wherein the means for adjustably closing the jaws includes a bolt connecting one end of the jaws and a second bolt connecting the other end of the jaws, whereby the ball propeller unit means lies intermediate said bolts.

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