

[54] TABLE TENNIS PRACTICE AND GAME EQUIPMENT

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[51] Int. Cl. .... A63b 39/00

[58] Field of Search. .... 273/30, 102.4, 26 D, 273/29 A

[56] References Cited

UNITED STATES PATENTS

3,043,592 7/1962 Lohr ..... 273/30  
3,375,005 3/1968 Cook ..... 273/30

FOREIGN PATENTS OR APPLICATIONS

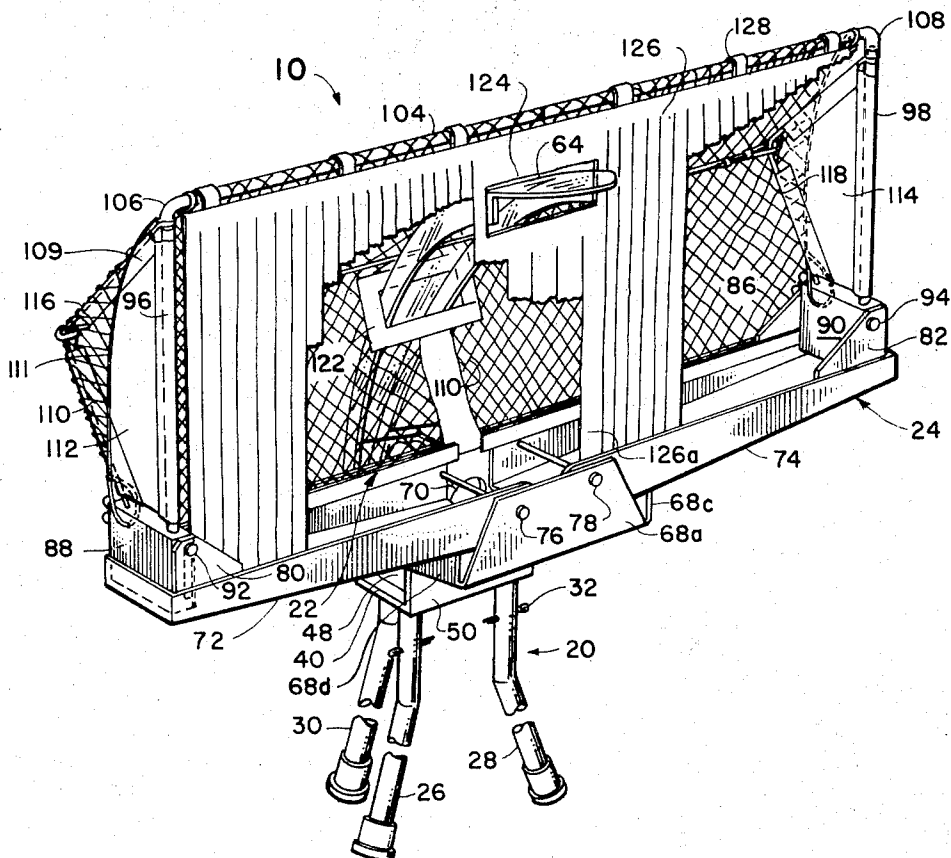
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[57] ABSTRACT

Table tennis practice and game equipment comprising a quick knock-down, quick-reassembly ball receiving and projecting unit, including tripod-mounted net, frame, and projector, the whole adapted for free standing deployment at one end of a table tennis table when in use, and for compact folding for shipment or storage when not in use; ball projection elevation angle adjustment is by tipping the ball receiving and ball projecting units together.

14 Claims, 6 Drawing Figures



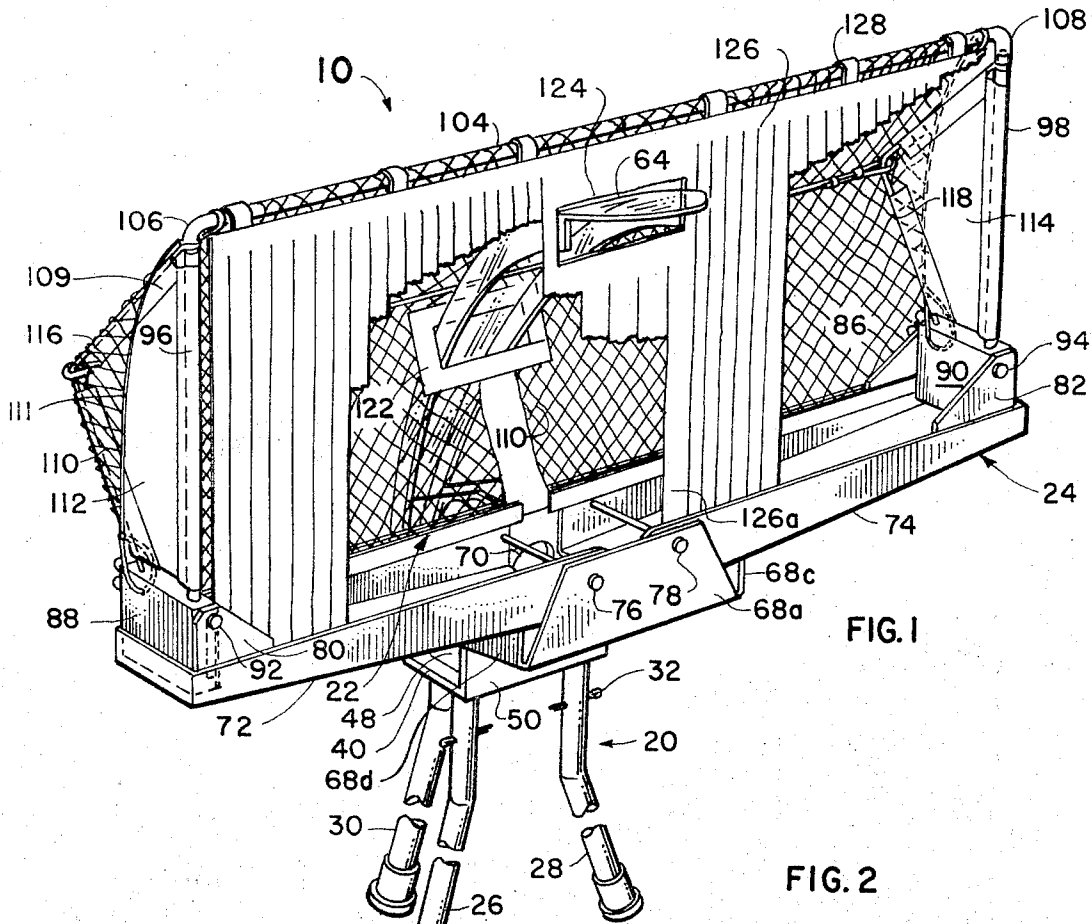


FIG. 1

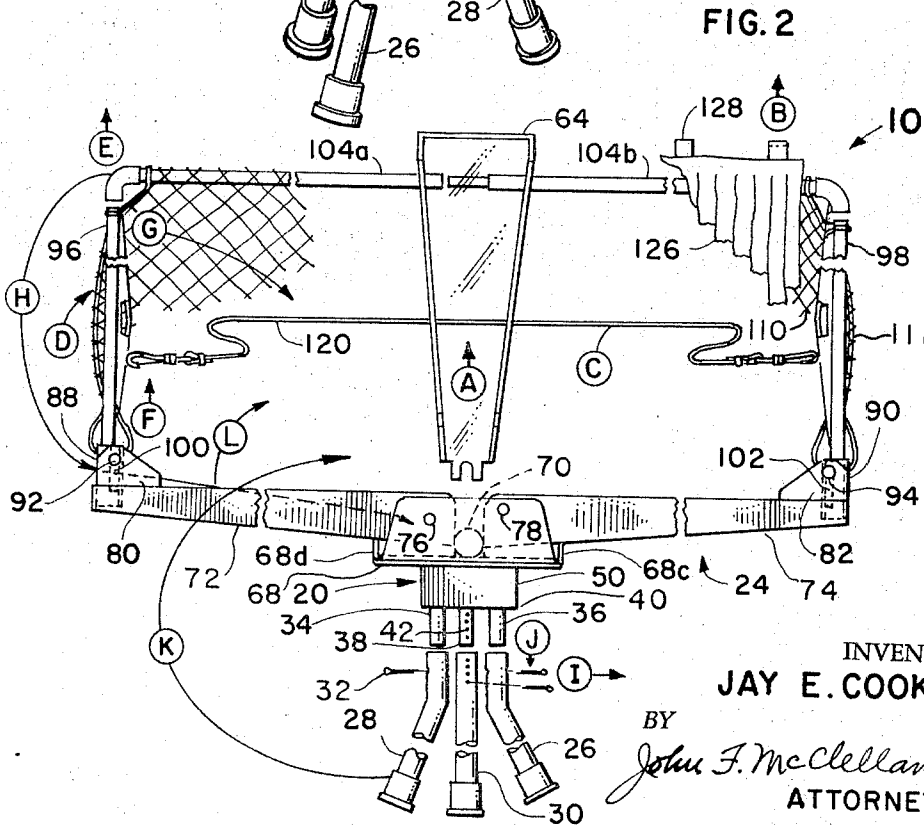


FIG. 2

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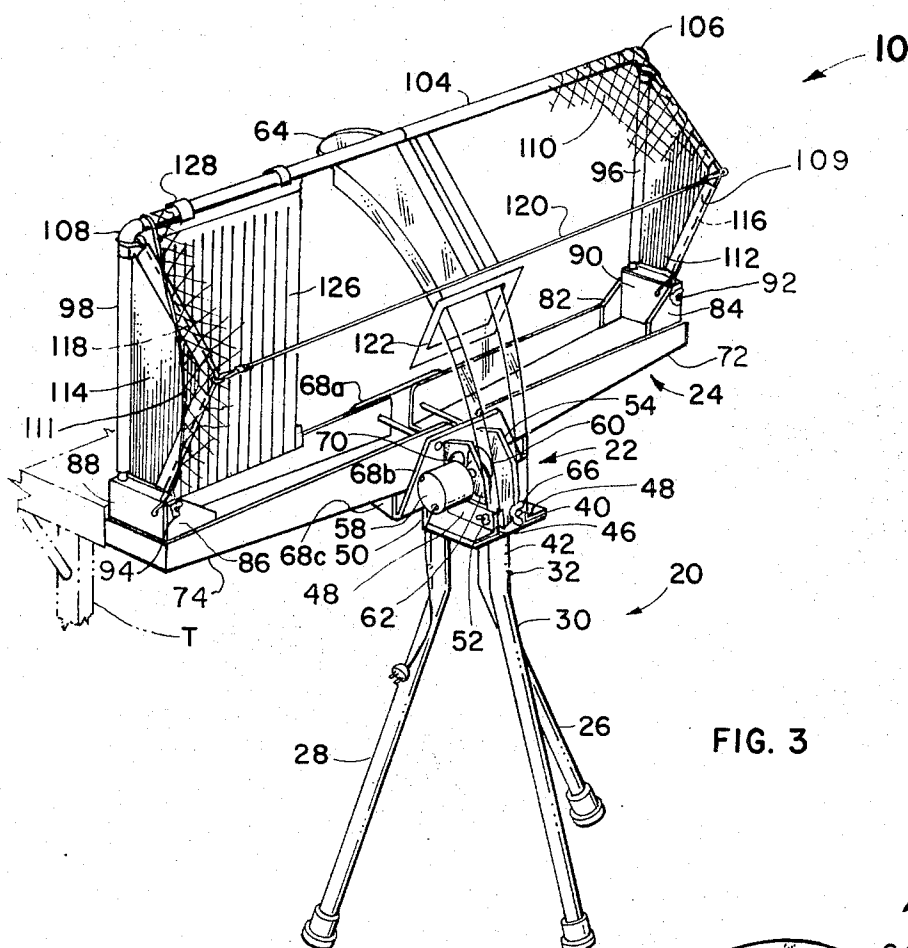


FIG. 3

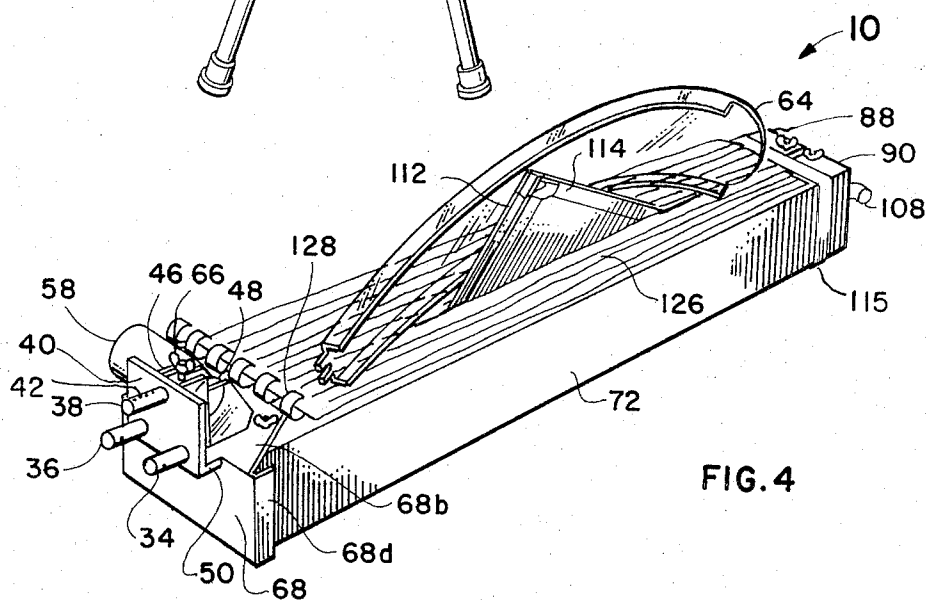


FIG. 4

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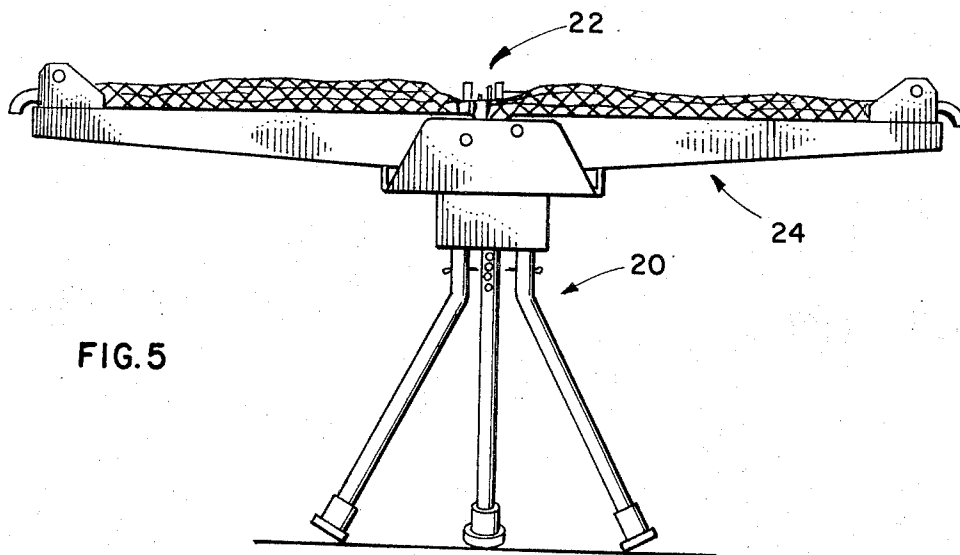


FIG. 5

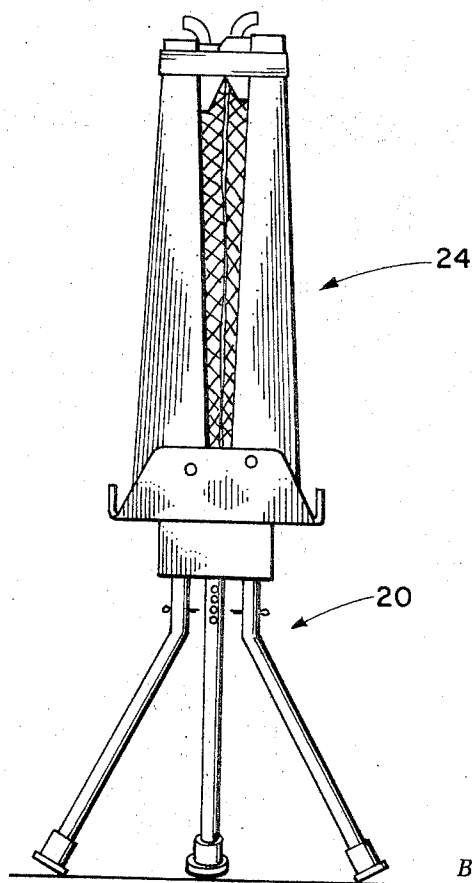


FIG. 6

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## TABLE TENNIS PRACTICE AND GAME EQUIPMENT

For purposes of priority, cross-reference is made to Applicant's co-pending U.S. Pat. Application, Ser. No. 91,455, filed Nov. 20, 1970, for "BALL THROWING AND RECEIVING SYSTEM."

This invention generally relates to athletic game equipment and specifically to table tennis and the like.

A principal object of the invention is to provide an economical, easily stored and deployed table tennis "Pro-Maker" or game and practice device which sharpens the reflexes of players by serving in various directions at adjustable speeds, and which receives and recycles balls returned by players, whether in practice or as part of a game.

In the prior art, an excellent device for the purpose is disclosed in Applicant's U.S. Pat. No. 3,375,005, issued Mar. 26, 1968 for "BALL THROWING MACHINE AND TARGET NET."

This patented device of Applicant's has proven to be satisfactory in all operational aspects, but it is best suited for fixed installations. The present invention is an advance in convenience and utility over aspects of the patented device, without great increase in cost.

Further objects of the invention are to provide a device as described which is very easy and safe to set up and to disassemble, which has very certain but simple ball trapping provisions to capture returned balls, which has simple but positive adjustments, and which in spite of the size when deployed is economical to ship because of the compact size when collapsed.

In typical embodiment the invention comprises a tripod-mounted assembly, including a central frame supporting a ball projector, and a receiving unit including folding trough wings and a collapsible net and screen assembly, with adjustment of the elevation angle of ball projection being through adjustment of the ball projector and receiving unit together.

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

FIG. 1 is a front perspective, looking slightly down on the invention as deployed, and partially broken away to show details;

FIG. 2 is a front elevational diagram of the invention being disassembled;

FIG. 3 is a rear perspective of the invention deployed as in FIG. 1;

FIG. 4 is a perspective view of the invention disassembled;

FIG. 5 is a front elevation of the invention partly dismantled; and

FIG. 6 is a front elevation of the invention folded for storage on the stand.

In FIG. 1 the invention is shown exaggeratedly heavy, for clearer exposition. FIG. 3 indicates the true proportions better.

Referring for a brief overall view to all of the Figures at once, the invention 10 includes a tripod stand 20, a ball projector system 22 clamped to the tripod stand, and a ball receiving system 24 attached to the front of the tripod stand. FIG. 3 indicates the proper positioning of the invention at one end of a table tennis table T, or any other suitable table, when in use.

In operation, balls received from a player at the opposite end of table T are trapped by the receiving sys-

tem and funneled down to the projector, which serves the balls back to the player.

For most compact storage or shipping, the equipment of this invention is simply, speedily, and safely disassembled into a compact bundle by removing the ball chute portion of the ball projector which can be seen sticking through the center of the net and the streamer screen, the top bar which supports the streamer screen in front and the net behind, and the tripod legs, and by folding the vertical screen-supports inward, followed by folding the trough wings inward.

The disassembly sequence is diagrammed in FIG. 2. Stages of disassembly are indicated in FIGS. 4, 5 and 6. Disassembly will be described in more detail after the following detailed description of the invention, which refers generally to all the figures.

### THE TRIPOD STAND

The tripod stand 20 includes novel and useful improvements over the prior art, in that it at the same time affords a more stable and more conveniently fabricated and adjusted pedestal than previously available. The stand includes three rubber-tipped legs 26, 28, 30. Each leg includes a short, straight upper section and relatively longer straight lower section set at an angle, as by bending or otherwise, to the upper section.

Each of the legs attached at the upper end by a cotter pin 32 or other suitable pin to one of three parallel spuds 34, 36, 38 (FIGS. 2 and 4) protruding down from the tripod top 40. Leg 30, the back leg, is made length-adjustable relative to the table top 40 by means of a vertical series of cotter pin holes 42 in the leg which can be selectively matched with similar holes in the back spud 38, or by other suitable means.

The arrangement described provides the fine adjustment necessary when adjusting the elevation angle for ball projection, while at the same time being economical, convenient and extremely stable. The resultant changes in the fore-and-aft trough incidental to this adjustment are immaterial because of the design of the center section of the trough, as will be seen.

The top 40 of the tripod stand is flat on the lower surface with the three parallel spuds for the legs protruding downward. The upper surface has a pair of parallel spaced vertical flanges 46 and 48 running in a fore and aft direction and a transverse vertical flange 50 at the front end. A bolt 52 (FIG. 3) provided with a wing nut is arranged to draw the parallel flanges together, securing the ball projector system 22 to the tripod stand.

The front flange 50 mounts the ball receiving system 24 by means of screws, not shown, welding, or other suitable attachment means.

### THE BALL PROJECTOR SYSTEM

The ball projector system is similar to that described in my above referenced application for U.S. Pat. No. 91,455. It consists of a parallel-walled box 54 (FIG. 3) having an arcuate bottom concentric with the axis of a motor 58 which is bolted to one wall with the motor-shaft inside the box. A parallel-spaced flexible-disc pair 60, 62, affixed to the motorshaft is arranged to grasp balls entering on the arcuate bottom and to fling them to the rear and upward. The flexible discs may be mounted concentric with the motorshaft, but in the preferred arrangement illustrated are oppositely offset radially to vary the grip randomly on successive balls, providing great variety in projection of the balls. An ar-

cuate, outwardly tapered projector chute 64 fitted to box 54 to form a continuous up-and-over run for the balls serves to direct the balls across the table tennis table in the proper direction for play. The projector chute 64 preferably engages a slot at the back of the box, and may be fastened with a bolt and wing nut 66.

### THE BALL RECEIVING SYSTEM

The ball receiving system is, as noted, cantilevered somewhat ahead of the tripod stand, the attachment being from the flange 50 at the front of the tripod stand top to the rear lower part of the ball receiving system central trough member 68, as best seen in FIGS. 3 and 4.

The central trough member 68 is a flat piece having four turned-up edges or flanges. The front and back flanges 68a, 68b are taller than the side flanges 68c, 68d.

Each pair of opposed flanges is parallel, but the body 68 or bottom of the piece slopes down sharply from front to back to cause balls fed to the center by the other parts of the ball receiving system to be gravity fed to the ball projector system 22. A hole 70 in the rear flange 68b, tangent with the body 68 or bottom of the central trough, allows the balls to pass downward into the ball projector.

Open-top vertically-tapered trough wings 72, 74 extend to either side of the central trough member with the deep ends inboard. Bolts 76, 78 pivotally attach the trough wings inside the central trough member 68, with the down sloping bottoms of the trough wings resting on the respective end flanges 68c, 68d of the central member. One of the bolt pivots (78) is attached higher than the other to provide clearance of parts to be described, when the trough wings are folded.

The relation of the bolts to the upturned side flanges 68c, 68d, sets the slope of the wing bottoms. Slightly bending these upturned flanges in or out easily sets the top edges of the troughs parallel and horizontal in case adjustment is needed.

As indicated best in FIG. 2, the ends of the wing troughs do not abut; instead they are spaced apart and are also spaced above the lower part of the central trough member. These important provisions have multiple effects.

First, balls travelling down the slope of one wing do not run freely up the slope of the other wing, but are trapped at the central gap. Back and forth oscillation which occurs without this provision wastes time and prevents prompt ball return. Balls trapped at the center between the ends of the trough wings are squarely aligned by them with the ball exit hole 70 through which they pass to the ball projector.

Second, manufacturing is simplified by having only the bottom of the central trough member sloped to shunt balls to the rear. The wing troughs can be identical except for the pivot holes, being symmetrical about the long axis.

Third, the hinged ends of the wing troughs have adequate room to swing at the center without binding.

The simplified structure of the wing troughs carries over into simplification of the stanchion structure at the outboard ends of the wing troughs.

Vertical gussets 80, 84 (FIGS. 1 and 2) are fastened to or are made integral with the front sides of the ends of the respective wing channels 72, 74, and a similar

gusset 84, 86 (FIG. 3) is provided at the end of each wing channel on the rear side.

A vertically slotted sliding block 88, 90, is fitted at the closed outboard end of each respective channel. The blocks are retained by respective horizontal bolts which pass through the gussets and engage the slots, as shown at 92 and 94.

A vertical net-support 96, 98 is integrally affixed to each sliding block.

The slots 100, 102, (FIG. 2) are long enough to allow the bottom edges of the sliding blocks to be lifted high enough for the blocks to clear the adjacent end of the channel, which acts as a stop, and to pivot inboard, allowing the vertical net supports to be folded inboard after the horizontal net support 104 at the top is removed with the sockets 106, 108.

The horizontal net support has a down pointing socket 106, 108 at each end; after removal from the net supports it slides apart at the middle into two sections 104a and 104b (FIG. 2), allowing the net 110, which has an elastic binding, 111, to collapse downward.

Triangular end panels 112, 114, support the net 110, at the ends, stretching it toward the rear in a horizontal interior corner configuration which prevents balls from bouncing directly back out of the net when received. Each of the panels is framed by a heavy wire 116, 118. These wires loop about the respective vertical net supports at the top and engage the respective sliding blocks at the bottom. The net slips over the end panels when the elastic binding relaxes. The net is secured to the rear edges of the trough sections by tape 109 or the like.

The rearwardly pointing apices of the end panels are connected by a line 120 which holds the net in the corner configuration described, but yieldingly so that the net contributes even less than it would otherwise to bounce-out of the balls when struck. A flexible-frame aperture 122 is provided in the net to allow the ball projector channel to pass through.

A similar through-pass 124 is provided for the same purpose higher up in the streamer screen 126 which hangs at the front of the ball receiving system from the horizontal net-support.

The streamer panel 126 consists of a piece of fabric having hooks 128 detachably engaging the horizontal net support and slit from the bottom upwards almost to the top, leaving broad, contiguous, limp streamers. The streamers yield when struck and allow balls to pass into the interior of the ball receiving system, but extract energy from the balls going in and retain the balls which attempt to bounce out after hitting the net.

The exact screen mass and stiffness needed for nice discrimination between high-energy balls going in and lower energy balls reflected from the net inside is easy to achieve by cutting streamers to the proper width. This is so even though the fabric available for the purpose may be very heavy or very light.

No other system of streamer fabrication even approaches this in convenience and precision. For example, using ropes or cords requires tying individual pieces in place, and necessitates complete replacement with other rope or cord material if the material on hand is too heavy or too light. In contrast, even though the center streamers 126a are shorter than the outboard streamers, they are easily adjusted to the same impedance by being cut a little broader than the outboard streamers.

Materials used for the invention are conventional. The tubular parts may be of medium temper aluminum or of heavy wall plastic; the tripod stand may be cast or fabricated of aluminum or plastic, either as a separate unit or integral with the central trough member; the end panels may be of plastic, thin metal, or heavy paperboard; the trough wings may be of aluminum or of rigid plastic; the slotted blocks may be of plastic or wood; the netting may be ordinary fishnetting, the streamer screen may be of impregnated cloth such as oil cloth, the hooks may be of any springy metal or plastic, and the projector system may be of methyl methacrylate plastic or other suitable rigid material, preferably transparent.

Disassembly detail sequence is as follows, referring particularly to the FIG. 2 diagram:

A. the projector chute is released, passed through the net and screen openings, and removed;

B. the streamer hooks are lifted and the streamer is removed;

C. the net is slackened by removing the line connecting the end panels;

D. the net is slipped loose from the end panels;

E. the upper bar is lifted free of the vertical net supports and separated;

F, G. the vertical net supports are respectively raised in the sliding pivots and folded inboard into the wing troughs;

H. the upper bar parts are stored in the wing troughs;

I. the tripod assembly pins are removed;

J. the tripod assembly legs are removed;

K. the tripod assembly legs are stored in the wing troughs;

L. the wing troughs are folded together and the projector chute laid on top as in FIG. 4, completing the compact bundle, ready for storage or boxing for shipment. A rubber band, strap, or the like may be used to keep the trough wings folded together, if desired, as indicated in FIG. 4 at 115.

As noted, if the unit is to be stored away in a closet or corner ready for immediate redeployment and use, it can be quickly collapsed and folded into the successive stages shown in FIGS. 5 and 6 for storage on the stand, and can be quickly set up again by reversing the procedure.

In spite of the great size when deployed, the entire assembly when completely collapsed falls with the current parcel post regulation of 84 inches combined length and girth, making for great economies in shipping as well as in storage for sale.

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 and desired to be obtained by United States Letters Patent is:

1. Table tennis practice and game apparatus adapted for ready deployment and use proximate a table tennis table and for quick disassembly into a compact bundle, comprising: means for receiving balls passing the end of a said table tennis table, including first and second collapsible wall means; means for supporting all said collapsible wall means, including horizontal support means and vertical support means for supporting the horizontal support means; means for collecting balls from the receiving means, including folding trough

means below and movably connected with said vertical support means; means for serving balls collected by the collecting means; and means for positioning the serving means and the folding trough means for co-action with a said table tennis table; said folding trough means comprising a central member having spaced upright first and second flanges connected by a bottom, the first flange being affixed adjacent the means for serving balls and having a hole for passage of balls and the bottom being sloped toward the hole for gravitational delivery of balls therethrough to the means for serving balls, and a pair of inwardly downsloping wing troughs, the wing troughs having open ends pivoted in spaced proximity inside the central member, thereby providing for balls collected to be delivered to said central member bottom through the spacing between the ends of the wing troughs, without oscillation.

2. Table tennis practice and game apparatus as recited in claim 1, wherein a wing trough is adapted to rest on an upturned portion of the central member bottom, thereby establishing the degree of said downsloping.

3. Table tennis practice and game apparatus as recited in claim 1, wherein: one of said vertical support means is pivotally attached to the end away from said central member of each wing trough, the horizontal support means extends between the tops of the vertical support means, the first collapsible wall means depends freely from the horizontal support means to a position adjacent the folding trough means, and the second collapsible wall means extends down rearwardly from the horizontal support means and then forwardly to the folding trough means thereby adapting the receiving means further to deter balls from bouncing free of the receiving means.

4. Table tennis practice and game apparatus as recited in claim 3, wherein the pivotal attachment of the vertical support means includes a vertically slotted pivot, and wherein a stop is provided adjacent the vertically slotted pivot for holding it in a vertical direction, whereby the vertically slotted pivot is adapted to be lifted free of the adjacent stop, allowing the vertical support means to be folded inboard for storage.

5. Table tennis practice and game apparatus as recited in claim 3, said apparatus having additionally a vertical end-panel at each vertical support means extending rearwardly to an apex, and a flexible member inside the second collapsible wall means connecting the apices of the end panels whereby the second collapsible wall means is maintained in the configuration of said extension down rearwardly from the horizontal support means and then forwardly to the folding trough means.

6. Table tennis practice and game apparatus as recited in claim 3, wherein the horizontal support means comprises a tubular member adapted to engage the tops of the vertical support means, and wherein the tubular member has a collapsible joint intermediate the length thereof.

7. Table tennis practice and game apparatus as recited in claim 1 wherein the first collapsible wall means comprises a length of flexible sheet material divided from the bottom up into parallel streamers.

8. Table tennis practice and game apparatus as recited in claim 7, wherein the streamers are of plural lengths and have differing widths corresponding to the lengths.

9. Table tennis practice and game apparatus as recited in claim 7 wherein the top border of the flexible sheet material is substantially continuous and has an aperture therethrough for passage of a portion of the means for serving balls, and wherein the second collapsible wall means comprises flexible reticulate material.

10. Table tennis practice and game apparatus as recited in claim 1 wherein the means for serving balls comprises a ball run extending from a position proximate the hole in the central member first flange in an arc rearwardly, upwardly, and forwardly, through the first collapsible wall means; and wherein means is provided for urging balls received from said hole around said arc for projection as table tennis serves.

11. Table tennis practice and game apparatus as recited in claim 10, wherein the ball projection elevation angle is adjusted by adjusting the vertical angle of the means for receiving balls and the means for serving

balls together as a unit.

12. Table tennis practice and game apparatus as recited in claim 10, wherein the means for positioning comprises a table member having plural downwardly protruding spuds, plural respective legs adapted to engage said spuds, at least one of said engagements of leg and spud having a pin and plural transverse holes associated therewith, whereby the effective length of said leg is adjustable by selective engagement between the pin and one of said holes thereby adjusting the ball projection angle.

13. Table tennis practice and game apparatus as recited in claim 12, wherein at least one of said legs is angled outwardly intermediate the length thereof.

14. Table tennis practice and game apparatus as recited in claim 13, wherein the table member has parallel flange means for releasibly gripping the bottom of the serving means.

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