SPORTS EQUIPMENT COLLECTION AND RETURN DEVICE AND METHODS OF USE THEREOF

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ABSTRACT
One aspect of the invention provides a sports equipment collection and return device including: a vacuum tube terminating in an opening; a return adapted and configured to return the sports equipment to a user; and a vacuum source adapted and configured to apply vacuum to the vacuum tube to draw the sports equipment from the inlet to the return.
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BACKGROUND OF THE INVENTION

[0001] The simplest and most common obstacle in training for sports involving ball(s), puck(s), or birdies is when a training partner or coach is not available to retrieve and serve the balls. Even when a skilled coach is present, often the coach is serving and retrieving the balls, which means the coach’s ability to train players is compromised by having to stand far away from the players being trained and focus on serving and retrieving the ball rather than actions of the player or players being trained.

SUMMARY OF THE PRESENT INVENTION

[0002] Accordingly, the present invention overcomes the shortcomings of the prior art by providing a device that retrieves balls from multiple varying distances. Also, the invention collects the balls and safely returns them so they can be dispensed one at a time through one or more hoppers.

[0003] One aspect of the invention provides a sports equipment collection and return device including: a vacuum tube terminating in an opening; a return adapted and configured to return the sports equipment to a user; and a vacuum source adapted and configured to apply vacuum to the vacuum tube to draw the sports equipment from the inlet to the return.

[0004] This aspect of the invention can have a variety of embodiments. The sports equipment can be selected from the group consisting of: a baseball, a softball, a football, a rugby ball, a soccer ball, a volleyball, a lacrosse ball, a tennis ball, a golf ball, a basketball, a cricket ball, a water polo ball, and a hockey puck.

[0005] The vacuum tube can have an internal diameter that approximates an external diameter of the sports equipment. The vacuum tube can have an internal diameter that is less than an external diameter of the sports equipment and the vacuum tube can be capable of deforming to allow the sports equipment to pass through the vacuum tube. The vacuum tube can be reinforced by a wire coil.

[0006] The return can be adapted and configured to mechanically apply acceleration to the sports equipment.

[0007] The vacuum tube can include one or more baffles adapted and configured to promote suction of the sports equipment through the vacuum tube.

[0008] The device can include one or more additional vacuum tubes. The device can include one or more wheels adapted and configured to enable movement of the device. The device can include a goal coupled to the opening of the vacuum tube. The device can include a variable aperture coupled to the opening of the vacuum tube.

[0009] The device can include an angle adjuster adapted and configured to hold the vacuum tube and the opening at a plurality of angles. The plurality of angles can lie between 0° and 180° with respect to horizontal.

[0010] The vacuum source can be powered by a power source selected from the group consisting of: a battery, line voltage, a fuel cell, a solar cell, and a generator.

[0011] The device can include a remote control adapted and configured to control the operation of the device.

[0012] The device can be collapsible.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a schematic view of a portion of the inventive apparatus.

[0014] FIG. 2 is a schematic view of the apparatus showing the soccer ball dispensing hopper.

[0015] FIG. 3 is an illustration of the apparatus without the extension tube or hose.

[0016] FIG. 4 is an illustration of the apparatus with one intake tube removed.

[0017] FIG. 5 is a side view of FIG. 3 showing the vacuum suction device connected to an intake tube.

[0018] FIG. 6 is an illustration of the apparatus with the intake tubes attached to goal posts.

[0019] FIG. 7 is a view showing details of the goal post that can be connected to the front end of the intake tube. The drawing shows an opening in the goal post for the insertion of the opening of the retrieving intake tube.

[0020] FIG. 8 is an illustration of the apparatus with an intake tube attached to a device which can vary the aperture of the entrance of the intake tube.

[0021] FIG. 9 is an illustration of the apparatus with the intake tubes adjusted using platforms.

[0022] FIG. 10 is a side view illustration of the apparatus with the retrieving intake tube adjusted using a platform.

[0023] FIG. 11 is a side view illustration of the apparatus with the retrieving intake tube adjusted at varying angles using a platform as shown in FIG. 10.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Referring initially to FIG. 1, an illustration of a portion of the inventive device is shown to include two ball retrieving intake tubes 1 connected to at least one vacuum suction device. Although two intake tubes 1 are shown, the invention is not so limited. Thus the inventive apparatus may include more than two tubes connected to vacuum suction device 2 or only a single tube connected to vacuum suction device 2. Moreover, the intake tubes 1 may be fixedly coupled to vacuum suction device 2 or may be removably coupled to vacuum suction device 2. In the latter case, a user of the inventive device has the flexibility to attach as many tubes 1 to suction device 2 as needed for a particular game or practice session, limited only by the number of tubes the vacuum suction device 2 will accept. The tubes 1 are attached at one or more openings (not shown) in vacuum suction device 2. In FIG. 1, the hopper/ball thrower 3 is not shown for clarity.

[0025] Referring to FIG. 2, an illustration of the invention is shown, this time with the hopper/ball thrower 3 attached to vacuum suction device 2. Hopper/ball thrower 3 is attached to vacuum suction device at manifold 13. The hopper/ball thrower 3 shoots or throws balls to a user of the inventive apparatus as will be described more fully below. Hopper/ball thrower 3 may also be controlled remotely in terms of feed speed, throwing angle, distance, speed and power. For simplicity, FIG. 2 shows a single hopper/ball thrower 3 attached to vacuum suction device 2 at opening or manifold 13. However, more than one opening or manifold 13 may be provided so that additional ball throwers 3 can be attached to vacuum suction device 2. Additionally, although FIG. 2 shows two intake tubes 1, less than or more than the two tubes 1 may be attached to vacuum suction device 2, as previously described.

[0026] Thus, the balls are suctioned through openings 4 by vacuum suction device 2 and deposited into hopper/ball thrower 3 where they may be shot or thrown out randomly or
in a manner selected by a user of the inventive apparatus. In a soccer practice session, for example, a player can kick the balls thrown by ball thrower 3 and the balls are retrieved by suctioning through openings 4 in tubes 1. The flexible tubing 1 can be stretched to great distances from the hopper/ball thrower through the use of extension 11 attached to opening 4 of tubes 1. Extension 11 can comprise a length of flexible tubing. Although FIG. 2 shows only one such extension 11 attached to one of the tubes 1, extensions 11 can be attached to the ends of more than one of the tubes 1. Additionally, extensions can be attached to other extensions to provide even greater distances from hopper/ball thrower 3. The limitation of the distance is determined only by the power of the vacuum suction device 2.

[0027] In some applications, the device will be connected by an adapter or manifold to a feeding unit or hopper equipped with a ball throwing mechanism 3. In one embodiment, the remote retrieving device is controlled remotely in terms of feed speed, throwing angle, distance, speed and power.

[0028] In one embodiment, the device consists of a rigid, flexible tube, hose or canal 1 connected posterior to a vacuum suction device 2.

[0029] The vacuum suction device 2 can be connected via an adapter or manifold to a hopper equipped with a ball throwing mechanism 3. The vacuum suction device can have a plurality of openings to accept a plurality of tubes 1 and a plurality of ball throwing mechanisms 3. For simplification, FIG. 2 illustrates the vacuum suction device attached to a single hopper equipped with a ball throwing mechanism 3 and two retrieving intake tubes 1. In this embodiment, the soccer ball is suctioned through the opening 4 of 1. A plurality of balls can be suctioned through opening 4 into tubing 1. The flexible tubing 1 can be stretched to great distances from the hopper. Herein, the distance can be further extended by attachment of a flexible extension hose 11 to the distal end of 4. The limitation of the distance will be determined and limited only by the suction power of vacuum 2.

[0030] Thus, the ball can be thrown to a player from the hopper/thrower 3 at a predetermined angle, distance, power or speed. Conversely, the player or coach can select a random placement of the balls. Upon delivery, the player can practice various skills such as, “one touch”. Thereafter, the player can kick the ball in close proximity to the opening 4. The ball is then conveyed through 1 via suction of 2 and placed in the hopper to be re-thrown or redistributed. In this embodiment, the ball can be conveyed from the left- or right-hand side of the field. Furthermore, it encourages a player to practice left or right feet “one touch” techniques. In addition, this embodiment allows for several players to practice at the same time at close proximity or far apart.

[0031] The embodiment depicted in FIG. 3 may be preferred if the practice sessions are in smaller fields, arenas, or courts. Thus the need for extension tube 11 will not be necessary. If space is a major issue intake 1 can be retracted and made shorter due to its construction from folding ribs.

[0032] FIG. 4 shows an illustration where only one intake hose is needed. Here the vacuum suction is maintained by a shut-off gate on the side of 2. The shut-off gate ensures that a strong suction is present in 1. The flexible hose 1 can be easily switched from the left to the right of the hopper 3. Thus, the player or players can practice scoring left or right through 4. This setup is desired in situations where space is an issue or limited, or the cost of an extra intake hose 1 is not affordable.

[0033] In an embodiment of the device, the vacuum 2 can include a trap door that closes and opens to enhance the suction of the vacuum 2.

[0034] FIG. 5 shows the side view of the invention apparatus with one intake 1 attached to a hopper and thrower 3. The control of the shut-off gate to maintain suction to a single intake tube is depicted as element 10.

[0035] FIG. 6, two goal posts 5 are attached to the flexible intake tubes 1. This representation is desirable if the player(s) need to score with balls slightly above ground. The post can be of varying sizes depending on the desire of the coach and player(s). Here and also in FIG. 7, the post base mats can be equipped with a sensor score counter. The opening 4 will be designed to fit the aperture or opening of the post.

[0036] The embodiment illustrated in FIG. 8, shows the distal end of intake tube 1 attached to varying aperture tool 6 through clamps on 4. The varying aperture tool 6 consists of a handle 7 that can be used to widen or narrow the entrance through 4. The varying aperture can be made of plastic, wood, metal, or any substance that can be easily molded or crafted. It consists of a mechanism of blade(s) or shutter(s) whose position can be varied by cranking or turning 7 to increase or decrease the entrance 4. Handle 7 is a means of changing the position of the shutters or blinds in aperture 6. The varying aperture can also be operated remotely by a coach or instructor. Therefore, with tool 6, the player can enhance accuracy and precision skills. Herein, the varying aperture tool 6 is placed on one intake tube 1; however, it could be placed on both intake tubes to enhance both right and left accuracy and precision.

[0037] The foregoing discussion has presented the invention for instances where the game is soccer, for illustrative purposes. However, the invention is suitable for most ball, birdie or puck games where repetition and practice is required for enhancing skills, such as, tennis, football, rugby, lacrosse, volleyball and hockey.

[0038] Thus, FIG. 9 shows an embodiment of the invention for sports where the player(s) uses their hands more than their feet, such as, football. Herein, a vertical placement adjuster 8 is used to tilt the distal end 4 of intake tube 1 upwards. This configuration allows for the ball to be thrown or pitched to a player(s) from 3. Upon reception, the player then throws the ball back into tube 1 through opening 4. It is clear to anyone sketched in the art that the opening 4 for a ball such as football may be much wider than for example, soccer. In the game of soccer the objective will be to score through opening 4 and have the ball thrown back; while in the game of football, the objective is not to score through opening 4, but to solely use opening 4 to as an orifice to return the ball. In FIG. 8, knob 9 can be used to adjust the angle of the orifice 4 and to keep it steady. In instance where the ball has to be thrown through opening 4 from great distances, a funnel or hopper can be attached to orifice 4.

[0039] FIG. 10 shows the side profile of the invention configured for football. Only one intake tube is shown, for instances that are space limited. The shut-off gate control 10 can be used to close the opening of the other intake tube 1 on the vacuum suction 2 to enhance suction.

[0040] Angle adjuster 9 can be used to vary the angle of the orifice 4. Thus, FIG. 11 shows the orifice angle varying from 0 to 90 degrees.

[0041] The invention device is designed to be wheeled for easy transportation and storage. The device can preferably be powered by a solar power generator or a battery that stores
energy. However, energy from a portal diesel or petrol generator is acceptable. It is further anticipated that in an indoor environment such as a rink or court, a plug to a building power source will be ideal. The remote controller can be operated wirelessly with a battery or cell power source.

[0042] The invention in its broadest aspects is not limited to the specific details shown and described. Consequently, departures may be made from details described herein without departing from the spirit and scope of the invention.

The invention claimed is:

1. A sports equipment collection and return device comprising:
   a vacuum tube terminating in an opening;
   a return adapted and configured to return the sports equipment to a user; and
   a vacuum source adapted and configured to apply vacuum to the vacuum tube to draw the sports equipment from the inlet to the return.

2. The device of claim 1, wherein the sports equipment is selected from the group consisting of: a baseball, a softball, a football, a rugby ball, a soccer ball, a volleyball, a lacrosse ball, a tennis ball, a golf ball, a basketball, a cricket ball, a water polo ball, and a hockey puck.

3. The device of claim 1, wherein the vacuum tube has an internal diameter that approximates an external diameter of the sports equipment.

4. The device of claim 1, wherein the vacuum tube has an internal diameter that is less than an external diameter of the sports equipment and the vacuum tube is capable of deforming to allow the sports equipment to pass through the vacuum tube.

5. The device of claim 1, wherein the vacuum tube is reinforced by a wire coil.

6. The device of claim 1, wherein the return is adapted and configured to mechanically apply acceleration to the sports equipment.

7. The device of claim 1, wherein the vacuum tube includes one or more baffles adapted and configured to promote suction of the sports equipment through the vacuum tube.

8. The device of claim 1, further comprising:
   one or more additional vacuum tubes.

9. The device of claim 1, further comprising:
   one or more wheels adapted and configured to enable movement of the device.

10. The device of claim 1, further comprising:
    a goal coupled to the opening of the vacuum tube.

11. The device of claim 1, further comprising:
    a variable aperture coupled to the opening of the vacuum tube.

12. The device of claim 1, further comprising:
    an angle adjuster adapted and configured to hold the vacuum tube and the opening at a plurality of angles.

13. The device of claim 12, wherein the plurality of angles lie between 0° and 180° with respect to horizontal.

14. The device of claim 1, wherein the vacuum source is powered by a power source selected from the group consisting of: a battery, line voltage, a fuel cell, a solar cell, and a generator.

15. The device of claim 1, further comprising:
    a remote control adapted and configured to control the operation of the device.

16. The device of claim 1, wherein the device is collapsible.

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