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Pickleball Retrieval and Collection Apparatuses

Abstract

This disclosure provides pickleball retrieval and collection apparatuses. An example pickleball retrieval and collection apparatus comprises a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column, a ball retrieval device arranged at a first end of the tube and configured to provide for a pickleball to enter the tube when placed over the pickleball and pressure is applied by contact on the pickleball, and a ball collecting bag constructed from a flexible material, where one end of the ball collecting bag is connected to a second end of the tube and configured to hold a second plurality of pickleballs.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS [0001] This application claims priority to U.S. Provisional Application No. 63/556,395 filed Feb. 21, 2024, the entire content of which is incorporated herein by reference.

FIELD
[0002] This disclosure relates to pickleball, and more particularly to pickleball retrieval and collection apparatuses.
BACKGROUND
[0003] Pickleball has recently become very popular and is played both indoors and outdoors, as either doubles or singles. In certain scenarios in the sport of pickleball such as, for example, practice sessions, training sessions, recreational games, and competitive games, a large number of pickleballs can be spread throughout the pickleball court and the surrounding areas before players begin to collect them. Many existing pickleball ball collection devices are cumbersome to use.
[0004] Improved pickleball ball collection devices, therefore, are desired to ease the burden on the players for gathering the balls.
SUMMARY OF EXAMPLE EMBODIMENTS
[0005] An example embodiment provides a pickleball retrieval and collection apparatus comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball and pressure is applied by contact on the pickleball, provide for the pickleball to enter the tube; and a ball collecting bag constructed from a flexible material, wherein one end of the ball collecting bag is connected to a second end of the tube and configured to hold a second plurality of pickleballs.
[0006] The ball collecting bag may be configured to expand with a number of pickleballs in the ball collecting bag. The ball collecting bag may be expandable from a predetermined initial capacity to a predetermined maximum capacity.
[0007] The ball collecting bag may be attached to the tube only at an opening of the second end of the tube, or the bag may be attached to the tube only at an end of the tube near an opening of the second end of the tube. One end of the bag may not be attached to a structural support. For example, the bag may be without structural support except at the second end of the tube.
[0008] The bag may be detachable from the tube. The bag may include an opening secured by a zipper, or by a Velcro sticker. Alternatively, the bag may include an opening secured by one or more buttons.
[0009] When the bag is connected to the tube, pickleballs from the tube may be prevented from entering the bag until the tube is full and another ball is retrieved through the ball retrieval device. When the bag is connected to the tube, pickleballs from the bag may be prevented from entering the tube.
[0010] A handle may be attached to the tube. The handle may be located closer to the second end of the tube than to the first end of the tube. The handle may be configured to be held by one hand.
[0011] In an implementation, the first end of the tube or the ball retrieval device comprises a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction. The second end of the tube or the ball collection container may comprise a second one-way gating arrangement to enable pickleball movement into the bag and to prevent pickleball movement in the opposite direction from the container to the tube. The first and second one-way gating arrangements are responsive to pressure.
[0012] In an implementation, the ball retrieval device comprises outer and inner concentric circular parts, and the first one-way gating arrangement comprises a flexible and/or elastic surface formed

on an internal surface of the inner concentric circular part.
[0013] In an implementation, the ball retrieval device comprises outer and inner concentric circular parts, and the first one-way gating arrangement comprises a flexible ledge formed on an internal surface of the inner concentric circular part.
[0014] In an implementation, the ball retrieval device comprises a circular part attached to the tube, and the first one-way gating arrangement comprises a flexible ledge formed on an internal surface of the circular part. The ledge may be wider than a pickleball at a bottom of the ledge and is narrower than the pickleball at a higher position of the ledge.
[0015] In an implementation, the ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism, and the suspension mechanism is engaged to enable the inner concentric circular part to move in relation to the outer concentric circular part. A soft padding material may be attached to the bottom of at least the inner concentric circular part. The soft padding material may also be attached to a bottom of the outer concentric circular part. The soft padding material may be configured to reduce the impact and noise generated when the inner concentric circular part makes contact with a surface.
[0016] In an implementation, the ball retrieval device comprises outer and inner concentric circular parts, and the first one-way gating arrangement comprises a curved protrusion formed in the inner concentric circular part such that parts of the curved protrusion extend on the internal surface of the inner concentric circular part and on the external surface of the inner concentric circular part.
[0017] In an implementation, the pickleball retrieval and collection apparatus further comprises a suspension device located between the outer and inner concentric circular parts, and the suspension device is configured to push the curved protrusion in the direction of the center of the concentric circular parts. The curved protrusion may be ball-shaped. The ball retrieval device may be configured to, in response to upward pressure exerted on the curved protrusion by a pickleball located within the inner concentric circular part, elastically displace the curved protrusion towards the outer concentric circular part.
[0018] In an implementation, the ball retrieval device comprises outer and inner concentric circular parts, and the first one-way gating arrangement comprises a curved object attached to a suspension device located between the outer concentric circular part and the inner circular concentric part and configured to move through an opening in the inner concentric circular part. The suspension device may be configured to push the curved object in the direction of the center of the concentric circular parts. The curved-shaped object may be ball-shaped. The ball retrieval device may be configured to, in response to upward pressure exerted on the curved object by a pickleball located within the inner concentric circular part, elastically displace the curved protrusion towards the outer concentric circular part.
[0019] In an implementation, the pressure applied by contact is a downward pressure. The pressure may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0020] In an implementation, the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube. The second one-way gating arrangement may be responsive to pressure in the direction of the container, wherein the pressure is caused by the pickleball entering the tube. The second one-way gating arrangement may be configured to prevent any pickleball from entering the container until the tube is full.
[0021] In an implementation, the pickleball retrieval and collection apparatus is configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, the pickleball retrieval and collection apparatus may be unmotorized.
[0022] In an implementation, the ball collecting bag is removable from the tube, and the pickleball retrieval and collection apparatus is configured to function at a lower capacity when the bag is removed.

[0023] In an implementation, another end of the ball collecting bag is above the structure of the tube when the ball collecting bag is pulled upward.
[0024] In an implementation, a handle is attached to the tube below the ball collecting bag.
[0025] In an implementation, another end of the ball collecting bag is not connected to and/or is separate from a firm structure of the pickleball retrieval and collection apparatus.
[0026] In an implementation, another end of the ball collecting bag is above a firm structure of the pickleball retrieval and collection apparatus when the bag is pulled upward.
[0027] In an implementation, another end of the ball collecting bag is hanging from a firm structure of pickleball retrieval and collection apparatus.
[0028] An embodiment provides a pickleball retrieval and collection apparatus comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube. The ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism. The suspension mechanism is engaged to enable the inner circular part to move in relation to the outer circular part, and a soft padding material is attached to a bottom of the inner concentric circular part and the outer concentric circular part. The soft padding material may be configured to reduce the impact and noise generated when the inner concentric circular part makes contact with a surface.
[0029] In an implementation, one or more coil springs in the suspension mechanism are engaged to enable the inner concentric circular part to move vertically and elastically in relation to the outer concentric circular part. The inner concentric circular part may comprise a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction.
[0030] In an implementation, the pickleball retrieval and collection apparatus further comprises a ball collecting container arranged at a second end of the tube and configured to hold a second plurality of pickleballs, where the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube.
[0031] The first and second one-way gating arrangements may be responsive to pressure. The pressure to which the first and second one-way gating arrangements are responsive may be initiated by a downward force applied to the pickleball by contact. The downward force may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0032] In an implementation, the pickleball retrieval and collection apparatus is configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, the pickleball retrieval and collection apparatus may be unmotorized.
[0033] An embodiment provides a pickleball retrieval and collection apparatus comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube. The ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism. The suspension mechanism is engaged to enable the inner concentric circular part to move in relation to the outer concentric circular part, and an inner surface of the inner concentric circular part comprises an elastic material.
[0034] The pickleball retrieval and collection apparatus may include a soft padding material attached to a bottom of the inner concentric circular part and the outer concentric circular part. The soft padding material may be configured to reduce an impact and a noise generated when at least the inner concentric circular part makes contact with a surface.
[0035] In an implementation, the inner concentric circular part comprises a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the

opposite direction. The first one-way gating arrangement may comprise the elastic material, and wherein a height of the elastic material arranged on the internal surface of the inner concentric circular part may be less than half the height of the pickleball.
[0036] In an implementation, the pickleball retrieval and collection apparatus further comprises a ball collecting container arranged at a second end of the tube and configured to hold a second plurality of pickleballs. The second end of the tube or the ball collection container may comprise a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube.
[0037] In an implementation, the first and second one-way gating arrangements are responsive to pressure. The pressure to which the first and second one-way gating arrangements are responsive may be initiated by a downward force applied to the pickleball by contact. The downward force may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0038] In an implementation, the pickleball retrieval and collection apparatus is configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, the pickleball retrieval and collection apparatus may be unmotorized.
[0039] An example embodiment provides a pickleball retrieval and collection apparatus comprising a hollow tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column, and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube. The ball retrieval device comprises a first one-way gating arrangement, and wherein the first one-way gating arrangement comprises a flexible ledge formed on an internal surface of an inner concentric circular part of the ball retrieval device.
[0040] The pickleball retrieval and collection apparatus may include a soft padding material that is attached to a bottom of the inner concentric circular part and the outer concentric circular part. The soft padding material may be configured to reduce the impact and the noise generated when at least the inner concentric circular part makes contact with a surface.
[0041] The first one-way gating arrangement may be configured to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction. The first one-way gating arrangement may comprise an elastic material. The ball retrieval device may further comprise an outer concentric circular device and the inner concentric circular part may be arranged to move in relation to the outer concentric circular part. The pickleball retrieval and collection apparatus may further comprise a ball collecting container arranged at a second end of the tube and configured to hold a second plurality of pickleballs, wherein the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube. The first and second one-way gating arrangements may be responsive to pressure. The pressure to which the first and second one-way gating arrangements are responsive may be initiated by a downward force applied to the pickleball by contact. The downward force may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0042] In an implementation, the pickleball retrieval and collection apparatus is configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, pickleball retrieval and collection apparatus is unmotorized.
[0043] An embodiment provides a pickleball retrieval and collection apparatus comprising: a hollow tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube. The ball retrieval device comprises outer and inner concentric circular parts. A first one-way gating arrangement formed on the inner concentric circular part comprises a curved protrusion formed in the inner concentric circular part such that parts of the curved protrusion extend on the internal surface of the inner concentric circular part and on the external surface of the inner concentric

circular part.
[0044] A soft padding material may be attached to the bottom of the inner concentric circular part and the outer concentric circular part. The soft padding material may be configured to reduce an impact and a noise generated when at least the inner concentric circular part makes contact with a surface.
[0045] In an implementation, the first one-way gating arrangement may be configured to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction. The ball retrieval device may comprise a suspension device arranged between the outer and inner concentric circular parts, and the suspension device may be configured to exert pressure on a blocking object that comprises the curved protrusions. The blocking object may be a ball-shaped object. In some examples, a ball collecting container may be arranged at a second end of the tube and configured to hold a second plurality of pickleballs. The second end of the tube or the ball collection container may comprise a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube. The first and second one-way gating arrangements may be responsive to pressure. The pressure to which the first and second one-way gating arrangements are responsive may be initiated by a downward force applied to the pickleball by contact. The downward force may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0046] In an implementation, the pickleball retrieval and collection apparatus may be configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, the pickleball retrieval and collection apparatus may be unmotorized.
[0047] An embodiment provides a pickleball retrieval and collection apparatus comprising: a hollow tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube. The ball retrieval device may comprise outer and inner concentric circular parts, where a first one-way gating arrangement formed on the inner concentric circular part comprises a curved object attached to a suspension device located between the outer concentric circular part and the inner concentric circular concentric part and configured to move through an opening in the inner concentric circular part.
[0048] A soft padding material may be attached to a bottom of the inner concentric circular part and the outer concentric circular part. The soft padding material may be configured to reduce an impact and a noise generated when at least the inner concentric circular part makes contact with a surface.
[0049] In an implementation, the first one-way gating arrangement is configured to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction. The curved object may be a ball-shaped object. A ball collecting container may be arranged at a second end of the tube and configured to hold a second plurality of pickleballs, where the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube.
[0050] The first and second one-way gating arrangements may be responsive to pressure. The pressure to which the first and second one-way gating arrangements are responsive may be initiated by a downward force applied to the pickleball by contact. The downward force may be caused by a manual movement by a user of the pickleball retrieval and collection apparatus.
[0051] In an implementation, the pickleball retrieval and collection apparatus may be configured to perform intake of pickleballs into the elongated tube without use of electric power. For example, the pickleball retrieval and collection apparatus may be unmotorized.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] Some features are shown by way of example, and not by limitation, in the accompanying drawings. In the drawings, like numerals may reference similar elements.

[0053] FIG. **1**A shows an example pickleball court, in which embodiments of the present disclosure may be applied.

[0054] FIG. **1**B shows another view of a pickleball court.

[0055] FIG. **2** shows a pickleball retrieval and collection apparatus including an elongated hollow tube and a ball collection container at one end of the tube, according to some embodiments of the present disclosure.

[0056] FIG. **3** shows a pickleball retrieval and collection apparatus with a handle attached to the elongated hollow tube, according to some embodiments of the present disclosure.

[0057] FIG. **4**A shows a ball retrieval device that can be arranged at one end of the elongated hollow tube of a pickleball retrieval and collection apparatus, according to some embodiments.

[0058] FIG. **4**B shows a more detailed view of outer and inner concentric circular parts of a ball retrieval device similar to that shown in FIG. **4**A, according to some embodiments of the present disclosure.

[0059] FIG. **4**C shows a cross-section view of the outer and inner concentric circular parts shown in FIG. **4**B with a suspension mechanism between them, according to some embodiments of the present disclosure.

[0060] FIG. **5**A and FIG. **5**B show a ball intake arrangement that may be configured on a circular inner surface at an endpoint of the elongated hollow tube of a pickleball retrieval and collection apparatus according to some embodiments of the present disclosure.

[0061] FIGS. **6**A and **6**B show a ball intake arrangement that may be configured on the elongated hollow tube and that uses a suspension mechanism, according to some embodiments of the present disclosure.

[0062] FIGS. **6**C and **6**D show a ball intake arrangement that may be configured to move through the elongated hollow tube and that uses a suspension mechanism, according to some embodiments of the present disclosure.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

[0063] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the disclosure. However, it will be apparent to those skilled in the art that the disclosure, including structures, systems, and methods, may be practiced without these specific details. The description and representation herein are the common means used by those experienced or skilled in the art to most effectively convey the substance of their work to others skilled in the art. In other instances, well-known methods, procedures, components, and circuitry have not been described in detail to avoid unnecessarily obscuring aspects of the disclosure.

[0064] References in the specification to “one embodiment,” “an embodiment,” “an example embodiment,” etc., indicate that the embodiment described may include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is submitted that it is within the knowledge of one skilled in the art to affect such feature, structure, or characteristic in connection with other embodiments whether or not explicitly described.

[0065] This disclosure relates to “Pickleball,” a game that has in recent years seen a massive increase in popularity among all age groups of players, including among senior citizens. Pickleball is a game that can be described as combining aspects of tennis, badminton, and ping-pong. It is played on a badminton-sized court, with paddles and a ball similar to a wiffle ball, but slightly smaller in size. The net used in pickleball is similar to a tennis net in some ways, but is lowered at

the center.
[0066] Pickleball has recently become very popular and is played both indoors and outdoors, as either doubles or singles. The rules are relatively simple and the game is easy for beginners to learn. However, among skilled players, pickleball can develop into a quick, fast-paced, and competitive game.
[0067] FIG. **1**A shows an example pickleball court **100** that includes a pickleball playing surface **130** and a pickleball net **132**. The playing surface **130** comprises two left serve areas **102** and **108**, two right serve areas **104** and **106**, and two non-volley areas **110** and **112**, with one of the left serve areas, one of the right serve areas, and one of the non-volley areas being on each side of the pickleball net **132**. The net is 36 inches tall at the edges, and lowered to 34 inches in the middle. The areas **102**-**112** are defined by baselines **118** and **120** each 20 feet, sidelines **114** and **116** each 44 feet, center lines **122** and **124** each 15 feet, and non-volley lines **126** and **128** each the same size as a baseline. Each of the lines may be 2 inches wide. The term "court line" is used in this disclosure to refer to any sideline, baseline, centerline or non-volley line on the pickleball court. Non-volley areas **110** and **112**, each extending 7 feet from the net, are also referred to as the "kitchen".
[0068] The game of pickleball is played with a pickleball paddle **134** and pickleball ball **136**. The ball **136** is typically made of plastic and has a 3-inch diameter. Similar to a wiffleball, the ball **136** has through holes throughout the surface. Different types (e.g., with different levels of hardness and different sizes of the through holes) may be used for playing the game on the various types of pickleball courts (e.g., indoor, outdoor, hard surface, soft surface etc.).
[0069] Pickleball can be played as singles or doubles, and is most commonly played as doubles. Each point begins with an underarm serve. The serve is performed diagonally beginning at the right-hand service square. A valid serve sends the ball from one left serve area to the other left serve area or from one right serve area to the other right serve area. The serve must clear the non-volley-zone. The serve must bounce before being hit by the receiver. The return of serve must also bounce before being hit (this is known as the 2 bounce rule). After the serve and the return of the serve, the ball can land anywhere on the opposite side of the playing surface **130**. Volleys can only be performed outside of the non-volley zone. Volleys, that is, hitting the ball in the air without first letting it bounce, can only be made after the 2 bounce rule has been followed. However, if the ball is hit from within the kitchen, then it cannot land in the kitchen on the other side of the net.
[0070] A fault is any action that stops play due to a rule violation. A fault by the receiving team results in the servers earning a point. A fault by the serving team results in the server's loss of service and/or side out. A fault is committed when the serve touches any part of the non-volley zone (including the line) or the ball is hit out of bounds.
[0071] Pickleball games are typically played without a referee and are self-judged. Each player makes the line calls as to whether the ball is in or out when the ball contacts the playing surface on that player's side. The game continues to at least 11 points and requires a 2-point difference for a win. FIG. **1**B shows another view of a pickleball court.
[0072] In certain scenarios in the sport of pickleball such as, for example, practice sessions, training sessions, recreational games, and competitive games, a large number of pickleballs can be spread throughout the pickleball court and the surrounding areas before a player begins to collect them. In order to maximize the benefit and enjoyment of such scenarios, players tend to start play with a large number of balls and use almost all the balls before they start collecting the balls that have been used. Various apparatuses, often inspired by ball collection equipment used in tennis, are available to make the collection of these pickleballs easier or more convenient.
[0073] From an efficiency point of view, when a player begins to gather such balls in and around a pickleball court, it is preferable to collect as many balls as practically possible in that collection effort. The higher capacity pickleball retriever and collection apparatuses that are currently available have a bucket or the like to hold collected pickleballs, and are configured to be wheeled throughout the court areas by pushing. The capacity (e.g., the total number of pickleballs that can

be held in the pickleball retrieval and collection apparatus) is often determined by the size of the bucket. Due to the size and weight of such buckets, these higher capacity devices are cumbersome to operate.

[0074] Elongated tube-shaped pickleball retriever and collection apparatuses are available and are less bulky than the wheeled types of pickleball retrieval and collection apparatuses. The tube-shaped devices can be carried with a shoulder strap and are configured to collect the balls one at a time. In order to collect a ball, it is typically the case that one end of the tube is placed over the ball and the tube is pushed down to have the ball taken in (i.e. retrieved) into the tube. The push action of the tube in the process of picking up pickleball tends to generate substantial noise when the rim of the tube (or attachment thereto) hits the surface of the court. However, the currently available elongated tube pickleball retrieval and collection devices are limited to collecting only the quantity of balls that can fit in the tube in a single column.

[0075] Some example embodiments of the present disclosure provide an elongated tube pickleball retrieval and collection apparatus that has substantially more capacity than conventional elongated tube pickleball retrieval and collection apparatuses. Some embodiments provide for improved for improved ball retrieval devices for elongated tube pickleball retrieval and collection apparatuses.

[0076] Since pickleball is highly popular with seniors, a ball retrieval and collection apparatus that minimizes requiring players to bend their bodies to pickup balls and that can minimize interruptions to practice sessions and the like by enabling the collection of a larger number of pickleballs between interruptions is highly desired.

[0077] Some embodiments of the present disclosure provide pickleball retrieval and collection apparatuses that are convenient to be operated by players, are not bulky, and have a high ball collection capacity. FIG. **2** shows a pickleball retrieval and collection apparatus **200** that includes a ball collection container at one end, according to some embodiments of the present disclosure.

[0078] The pickleball retrieval and collection apparatus **200** includes a hollow elongated tube **202**, a ball retrieval device **204** arranged at a first end, and a ball collection container **208** arranged at the other end of the tube **202**.

[0079] The tube **202** may be constructed with plastic or such material of low weight, and may be transparent. The transparent tube body enables the user to quickly know how many collected pickleballs **210** are currently being held in the tube **202**.

[0080] The hollow tube **202** may be circular and may be configured to accommodate the pickleballs **210** arranged in a single column as shown in FIG. **2**. The outer shape of the tube **202**, however, is not limited to being circular, and can, for example, be another shape such as a square or rectangular in the cross-section.

[0081] The apparatus **200** has the ball retrieval device **204** at a first end of the tube **202**. The ball retrieval device **204** may be configured to have pickleballs, one-by-one, enter the tube **202** by applying force on the tube **202**.

[0082] The apparatus **200** also includes the ball collection container **208** at the second end of the tube **202**. The ball collection container **208** may include a zipper **214** that can be used to open the container **208** in order to access the collected balls that are in the container **208**. The ball collection container **208** may be of any shape and may be sized in accordance with an expected number of balls to be collected. In some embodiments, means other than a zipper **214**, such as, for example, Velcro strips or buttons, can be used to open or close the opening of the container **208**.

[0083] In some embodiments, the container **208** may be a flexible and/or expandable bag. The bag may be expandable from 1 pickleball, or a predefined minimum number of pickleballs, to a predefined maximum number of pickleballs. In some embodiments, the bag may be constructed from an elastic material that can expand and contract in accordance with the number of pickleballs in the container **208**. For example, the container **208** may be a bag constructed from a light material such as cloth, mesh or plastic, with elastic properties. The elasticity may provide for the bag, when having collected balls therein, to hold the balls under force of the elastic material and thereby keep

the bag at a level of rigidity so that carrying the retrieval and collection apparatus **200** is convenient even when a high number of balls are in the bag **208**. For example, when more than a predetermined minimum number of balls are collected in the bag, the elastic material of the bag holds the balls with elastic force such that the bag may have a shape defined by the balls and may be held against the second end of the elongated tube. When the balls in the bag are tightly held, for example by the elastic forces, carrying the apparatus may be more convenient than when the container holds the balls loosely. The flexible bag may not have a fixed shape, and/or may be connected to the tube only at the second end of the tube.

[0084] In some embodiments, the container **208** may be a flexible and not necessarily an expandable ball collecting bag. The bag may be for example, a bag made of nontransparent or transparent plastic, fabric, or fabric or plastic mesh or a combination of these materials and/or the like.

[0085] In some embodiments, the bag is detachable/removable from the tube. The pickleball retrieval and collection apparatus may be configured to function at a lower capacity when the bag is removed. One end of the ball collecting bag may be connected to a second end of the tube and configured to hold a second plurality of pickleballs. Another end of the bag may be above the structure of the tube when the bag is pulled upward. A handle may be attached to the tube below the bag. Another end of the bag is not connected to and/or may be separate from a firm structure of the pickleball retrieval and collection apparatus. Another end of the bag may be above a firm structure of the pickleball retrieval and collection apparatus when the bag is pulled upward. Another end of the bag is hanging from the firm structure of pickleball retrieval and collection apparatus.

[0086] In example embodiments, the bag and the manner in which the bag is connected to the tube to increase ball retriever capacity is practical for the reason that pickleball balls are generally lightweight. In some example embodiments, the ball collecting bag may not require a firm structural support and could simply hang from the end of the ball collecting tube.

[0087] In some embodiments, the container (e.g., bag) **208** is detachable from the tube **202**. This may enable the apparatus **200** to be used without the additional collection capacity enabled by the container **208**. For example, the container **208** may include an adapter that provides for connection to the end part **206** of the elongated tube **202**. When the container **208** is not attached to the elongated tube **202**, the end part **206** may be capped to prevent pickleballs from within the tube exiting through the end part.

[0088] It should be noted that pickleballs are light (e.g., a pickleball weighs less than an ounce), and therefore, even if the container **208** is full of collected pickleballs, the entire pickleball retrieval and collection apparatus **200** may still be at a level of weight that can allow for the player to still handle and operate the apparatus **200** with convenience. For example, when the container **208** is a flexible and elastic bag such as described above and because the bag itself may be of minimal weight, up to the bag's predefined maximum number of balls may be added on with minimal increase in weight. The light weight of pickleballs also provides for bag to be supported by of the apparatus **200** only at the second end of the elongated tube. For example, in some embodiments, although the bag is connected to the apparatus **200** only at the second end of the elongated tube, the elastic forces acting on the pickleballs in the bag hold the bag against the second end of the elongated tube with some level of rigidity. In some example embodiments, the bag may not be made from materials that are flexible but not necessarily stretchable. Whereas these designs and construction of the bag is ideal for light-weighted pickleballs, it would be impractical for use with tennis balls, golf balls, etc. that have much higher weight.

[0089] A one-way ball movement arrangement may be configured at each end of the tube **202**. The one-way ball movement arrangement at the first end (i.e., end with the ball retrieval device **204**) is configured to enable pickleballs to enter the tube **202** and to prevent pickleballs that are in the tube from exiting through the first end. The one-way ball movement arrangement at the second end (i.e., end with the ball collection container **208**) may be configured to permit pickleballs to move from

within the tube **202** to the container **208** and to prevent the movement of pickleballs from the container **208** into the tube **202**. In some embodiments, the one-way ball movement arrangement is provided at only the first end, and in some embodiments, both the first and second ends are configured with respective one-way ball movement arrangements. The one-way ball movement arrangement at the first end is engaged when the tube **202** is moved down over a pickleball and thus providing for that pickleball to exert upward pressure on the one-way ball movement arrangement at the first end. The one-way ball movement arrangement at the second end may be engaged when the tube **202** is full of pickleballs and a another pickleball is entered through the first end thereby exerting upward pressure on all the pickleballs in the tube so that the pickleball immediately adjacent to the second one-way ball movement arrangement exerts upward pressure on the second one-way ball movement arrangement at the second end of the elongated tube. In some embodiments, such as when the container **208** comprises a flexible and/or elastic bag, the amount of upward pressure required to intake of balls at the first end of the elongated tube may be higher when the bag contains balls may be higher than when the bag does not contain any balls. For example, when the bag contains balls, the upward pressure imposed must also account for the downward elastic force imposed by the bag at the second end of the tube on any new pickleball entering the bag.

[0090] In some embodiments, the bag may be hanging from the ball retrieval tube. After the tube becomes full, the balls may enter/fall, one at a time, into the ball collecting bag. The ball collecting bag may not have a firm structural support. As the balls are collected in the bag, the bag may become substantially full. Depending on the size and type of the bag and when the bag contains (e.g. is substantially full, is half full) of pickleballs, the bag may connect/hang upward due to pressure created by the pickleballs, or may connect/hang downward or sideway from the tube. FIG. **2** and FIG. **3** show the example where the bag connected upward when the bag is substantially full.

[0091] In some embodiments, a shoulder strap **212** may be provided to enable the apparatus **200** to be carried by a player. The strap **212** may attach to the ends of the tube **202**. In some embodiments, connecting one end of the strap **212** to the connector **206** enables the retrieval and collection apparatus **200** to be conveniently carried by a player by putting the strap **212** on his/her shoulder even when the bag **208** is full of pickleball balls.

[0092] In some embodiments, the pickleball retrieval and collection apparatus **200** is configured such that the elongated tube **202** holds between 16-24 pickleballs within the tube, and the container **208** may hold upto **60** additional pickleballs. It should be noted, however, that embodiments are not limited by the capacity of the apparatus **200**.

[0093] FIG. **3** shows a pickleball retrieval and collection apparatus **300** with a handle **302** attached to the elongated tube **202**, according to some embodiments of the present disclosure.

[0094] The apparatus **300** may be similar to apparatus **200** described in relation to FIG. **2**, but additionally may have the handle **302** configured to enable player to more conveniently operate the apparatus **300**.

[0095] For example, by holding (e.g., gripping) the handle with one hand, a player is able to exert sufficient force on the tube **202** to intake pickleballs.

[0096] The handle **302** may be fixedly or detachably attached to the tube **202**, and may be made from plastic, rubber or a combination thereof.

[0097] The location of the handle may be at or near the second end of the tube **202**. This enables the player to better balance the weight of the pickleballs collected in the container **208** and operate the apparatus **300** to retrieve pickleballs with minimum bending. For example, when the container **208** is a flexible and/or elastic bag connected to the second end of the elongated tube as described above, the handle can be located immediately below the second end of the tube so that apparatus **200** can be conveniently held even when the bag contains the maximum number of balls.

[0098] In some embodiments, the handle **302** may be attached to the tube **202** in a movable manner. For example, an adjustable screw on each of the parts of handle **302** that encircles the tube

202 may be loosened to enable sliding the handle **302** to a new position on the tube, and then the adjustable screws can be tightened to hold the handle **302** in place.
[0099] In some embodiments the length and width of the handle **302** is configured to be strongly gripped with one hand, but embodiments are not limited to a particular size of the handle.
[0100] FIG. **4**A shows a ball retrieval device **402** that can be arranged at one end of the tube of a pickleball retrieval and collection apparatus **400**, according to some embodiments. A suspension arrangement in the ball retrieval device **402** enables picking up pickleballs in a manner that reduces impact on the surface and reduces noise generated.
[0101] The pickleball retrieval and collection apparatus **400** may be the same or similar as the apparatus **200** described in relation to FIG. **2** and/or the apparatus **300** described in relation to FIG. **3**. For example, apparatus **400** as shown may represent apparatus **200** without the detachable ball collection container **208**.
[0102] In some embodiments, the ball retrieval device **402** shown on apparatus **400** may be used for the ball retrieval device **204** in apparatus **200** in FIG. **2**.
[0103] The ball retrieval device **402** comprises two concentric circular parts. The circular parts are a larger (e.g., larger radius) outer circular part **404** and a smaller (e.g., smaller radius) inner circular part **406**. In FIG. **4**A, the upper illustration on the left shows a horizontal view of the device **402** and the lower illustration shows a bottom view of the same.
[0104] In some embodiments, the inner circular part **406** may have a flexible/elastic inner surface. The diameter of the outer circular part **404** is slightly larger than the diameter of a pickleball and the diameter of the inner circular part **406** is configured to snugly (tightly) but flexibly fit a pickleball. For example, since the diameter of a pickleball is 2.874-2.972 inches, the diameter of the inner circular part **406** may be 2.85-2.95 inches. The flexible (elastic) material (see **408** in FIG. **4**C) of the inner surface of the inner circular part **406** enables the pickleball to be forced through the length of the inner circular part **406**.
[0105] In operation of the ball retrieval device **402**, when the outer circular part **404** is placed over and encompassing a pickleball on a surface (ground/floor), the inner circular part **406** may be suspended at a height above the surface in a manner that it does not contact (e.g., the lower end of the inner circular part **406** is located higher than the middle (widest) portion of the pickleball) the pickleball that is resting on the surface. As the player exerts force to push down the elongated tube **402**, and thus cause downward movement of the attached inner circular part **406**, the flexible/elastic inner surface of the inner circular part **406** progressively contacts the pickleball first lightly, then snugly, and then as the upper end of the inner circular part **406** moves below the middle part of the pickleball, the pickleball is released into the tube. Since in the relaxed state the, the diameter of the inner circular part **406** is smaller than the width of the pickleball, the pickleball does not drop out of the tube. When the player releases the downward force exerted on the tube **402**, the inner circular part **406** snaps back into the relaxed position at which its lower end is located higher (e.g., by at least more than half the height of a pickleball) than the lower end of the outer circular part **404**.
[0106] FIG. **4**B shows a cross section view of outer and inner concentric circular parts of the ball retrieval device **402** shown in FIG. **4**A. As illustrated in FIG. **4**B, the inner circular part **406** of the ball retrieval device **402** may be configured as an attachment to the first end of the hollow tube (e.g., tube **202**) and may be integrated with, or attached to, the tube at the first end.
[0107] In operation, the inner circular part **406** is configured to move down under pressure of a suspension mechanism **410** in relation to the outer circular part **404**. FIG. **4**C shows a larger cross-section view of the outer and inner concentric circular parts **404** and **406** with a suspension mechanism **410** between them, according to some embodiments of the present disclosure.
[0108] The suspension mechanism **410** may comprise a coil spring or the like suspended in a narrow spacing between the circular parts **404**. The coil spring is oriented to compress and expand vertically (or parallel to the inner surface of the outer circular part **404** and the outer surface of the

inner circular part **406**). The coil spring may be attached to respective endpoint attachments at the top and bottom of the coil spring. In an embodiment, the bottom endpoint attachment may be part of, or fixed to, the inner circular part **406** and the top endpoint may be part of, or fixed to, the outer circular part **404**. The endpoint attachments each may be configured to attach to a railing on the other circular part, so that one may be moved in relation to the other while keeping the two circular parts in fixed alignment.

[0109] According to some embodiments, when the suspension arrangement **410** is not engaged (e.g., when the coil spring is in the relaxed/expanded state), the circular parts **404** and **406** may be positioned as shown in FIG. **4**C in relation to each other. More specifically, the inner circular part **406** may be positioned at a higher elevation in relation to the outer circular part **404** (e.g., by at least more than half the height of a pickleball). Then during operation to collect a ball, the player would manipulate the tube **202** to position the ball retrieval **402** such that the outer circular part **404** is resting on the ground/floor encircling the ball to be picked up. Thereafter, the player exerts a force on the tube **202** (e.g., using handle **302** or otherwise manually pushing down the tube **202**) so that the inner circular part **406** moves down under the suspension pressure of suspension mechanism **410**, while the outer circular part **404** stays stationary.

[0110] The inner circular part **406** makes contact with the ball and a ball pickup component, in this embodiment, the flexible/elastic material on the inner surface of the inner circular part **406**, engages with the pickleball. Since the inner circular part **406** diameter is configured to fit the ball snugly, the ball begins to exert an upward pressure on the ball pickup component that may be attached, or configured on, the inner surface of the inner circular part **406**. The flexible/elastic material may have a height less than half that of a pickleball. When the inner circular part **406** moves further down and at or before the inner circular part **406** makes contact with the ground/floor the ball pickup component pushes or releases the ball into the tube.

[0111] When the outer circular part **404** or the inner circular part **404** makes contact with the ground/floor, there may be a noticeable noise. For example, at least portions of the circular parts may be constructed from hard plastic that may generate noise upon contact with the ground/floor and may in some instances cause damage (e.g., scratches) on the surfaces. Thus, in some embodiments, a soft padding material **414** and **412** is attached to the bottom of the circular parts to reduce the noise and/or to reduce potential of damage to the surface of the pickleball court. In some embodiments, the soft padding material may be attached only to one of the inner or outer circular parts. For example, since the inner circular part **406** is pushed down with force to the surface and thus is likely to cause more noise and/or damage, in some embodiments the soft padding is attached to the inner circular part (e.g., see **412**) rather than the outer circular part. In some embodiments, although padding material is attached to both circular parts (e.g., **414** and **412**), a higher grade (e.g., more effective at reducing sound and/or damage to surfaces under higher force) may be attached to the bottom of the inner circular part than to the outer circular part.

[0112] FIG. **5**A and FIG. **5**B illustrate an example ball pickup component **506** that may be integrated with, or attached to, the internal surface of a circular part **504** that is attached to the elongated tube **502** of a ball retrieval and collection apparatus such as any of the apparatuses **200**, **300** or **400** described above. For example, in an embodiment, circular part **504** may replace or attach to end component **204** of the elongated tube **202** as shown in FIG. **2** and FIG. **3**. In another embodiment, the circular part **504** may replace the inner circular part **406** shown in FIGS. **4**A-**4**C.

[0113] The pickup component **506** may be a ledge or other extrusion from the inner surface of the inner circular part (e.g., inner circular part **406**) **504**. The ledge may be shaped so that the horizontal spacing between the ledge on opposite sides of the inner surface of the circular part **504** is widest (e.g., slightly larger than the width of a pickleball) at the bottom and is narrowest (e.g., smaller than the width of a pickleball) at the highest.

[0114] FIG. **5**A illustrates the pickup component **506** when no force in the upward direction (i.e., towards the tube) is being exerted upon it. In the rest position shown in FIG. **5**A, the pickup

component **506** prevents pickleballs from inside the tube from exiting through the first end of the tube.

[0115] FIG. **5**B illustrates the pickup component **506** when an upward force is being exerted upon it. For example, as the tube is being pushed, by a player, down over the pickleball, the ball exerts upward pressure on the pickup component **506**. The pickup component compresses against the inner surface of the inner circular component under increasing pressure from the ball as the highest width (e.g., horizontal diameter) of the ball is encountered between the nearest edges of the pickup component **506**.

[0116] As the highest width of the ball proceeds past the nearest edges of the pickup component **506**, the pickup component **506** automatically snaps back into the relaxed position, thereby pushing the ball into the tube and preventing it from coming out of the tube.

[0117] The pickup component **506** is constructed from a flexible/elastic material, that offers some level of resistance to the upward pressure exerted on it by the ball and provides for snapping back to the original position with some level of strength when the pressure is released. The material can maintain its shape over multiple uses. In some embodiments, a plastic and/or rubber compound is used as the material.

[0118] In some embodiments, the ledge of the pickup component **506** extends completely through the inner circumference of the inner circular component. In some other embodiments, the pickup component **506** is discontinuous through the inner circumference of the inner circular component. For example, component **506** may comprise two, three or four ledges equidistantly located around the inner circumference of the inner circular component. In some embodiments, the pickup component **506** is integrated on the inner surface of an inner concentric circular part that may move vertically in relation to an outer concentric circular part to make engagement with the pickleball more convenient.

[0119] FIGS. **6**A and **6**B show another ball intake arrangement that can be configured on the elongated tube of a pickleball retrieval and collection apparatus and that uses a suspension mechanism, according to some embodiments of the present disclosure. FIG. **6**A and FIG. **6**B each illustrate a cross-section view of the bottom portion of the elongated tube and an integrated or attached ball retrieval device. The ball retrieval device may include two concentric circular parts with an inner circular part and an outer circular part. In the illustrated embodiment, the ball retrieval device is integrated (e.g., the inner concentric part is integrated) with the elongated tube **602**, but another embodiment may have the ball retrieval device as an attachment to the elongated tube **602**. The ball retrieval device in FIG. **6**A and FIG. **6**B includes a ball pickup component comprising a plurality of ball-shaped blocking structures formed near the bottom end. The plurality of ball-shaped blocking structures are arranged at the same height from the bottom end.

[0120] Two of the ball-shaped blocking structures are shown in the example arrangement, but any number greater than 2 of ball-shaped blocking structures may be formed. Each ball-shaped blocking structure forms a curved protrusion on the inner surface and the outer surface of the elongated tube. The curved-shape protrusion may be sized so that, when no force/pressure is being exerted by the suspension device (or also when no upward force or pressure is being exerted by a pickleball that is being retrieved) on the curved-shape protrusion formed on the inside surface of the tube, the ball-shaped blocking structure extends sufficiently into the elongated tube such that any pickleballs that are already in the tube are prevented from exiting, and pickleballs from outside are prevented from entering the tube without exerting upward force on the ball-shaped blocking structures.

[0121] FIG. **6**A illustrates a scenario when there is no suspension force/pressure being imposed on the ball-shaped blocking structure **608** by the suspension plate **606**. The suspension plate **606** is configured to move, under force/pressure of one or more elastic springs **610**, in the space between the outer surface of the elongated tube **602** and a perimeter wall (e.g., the outer concentric part) of the ball retrieval device **604**. In some embodiments, the ball-shaped blocking structure may be

directly connected to a spring (e.g., without the use of a suspension plate).
[0122] FIG. **6**A illustrates that, when no pressure is being exerted by the suspension device (e.g., suspension plate **608**) on the ball-shaped blocking structures, the ball-shaped blocking structures extend sufficiently into the tube such that any pickleballs that are already in the tube are prevented from exiting, and pickleballs can enter the tube only by exerting at least a predetermined amount of upward force on the ball-shaped blocking structures.
[0123] FIG. **6**B illustrates a pickleball in the process of entering the elongated tube. In the scenario, as the pickleball is about to be forced into the tube, the pickleball exerts upward pressure on the curved surface of the ball-shaped blocking structure. For example, the user of the ball retrieval and collection apparatus may place the ball retrieval device **604** end of the elongated tube **602** over the pickleball and exert downward force such that the resulting upward pressure exerted by the pickleball on the curved surfaces of the ball-shaped blocking structures that extend into the tube increases as the tube is pushed down by the user's force. As the upward pressure on them increases, the ball-shaped blocking structures gradually move outward in opposition to the pressure from the suspension mechanism **610** until the widest portion of the pickleball passes the ball-shaped blocking structures at the opening between the ball-shaped blocking structures. Immediately upon the widest portion of the pickleball passing the ball-shaped blocking structures at the opening between the ball-shaped blocking structures, the ball-shaped blocking structures move, under force of the suspension device **610**, back towards their original positions and prevent the pickleball from exiting the tube.
[0124] FIGS. **6**C and **6**D show a ball intake arrangement that uses a ball-shaped blocking structure configured to move through the wall of the elongated tube or an inner wall of a ball retrieval device and that uses a suspension mechanism to obstruct the path for pickleballs to enter and exit the elongated tube, according to some embodiments of the present disclosure.
[0125] FIG. **6**C and FIG. **6**D each illustrate a cross-section view of the bottom portion of the elongated tube and an integrated or attached ball retrieval device. The ball retrieval device may include two concentric circular parts with an inner circular part and an outer circular part. In the illustrated embodiment, the ball retrieval device is integrated (e.g., the inner concentric part is integrated) with the elongated tube **612**, but another embodiment may have the ball retrieval device as an attachment to the elongated tube **612**.
[0126] In the embodiment illustrated in FIGS. **6**C-**6**D, the wall of the elongated tube **612** (e.g., the wall of the inner concentric part) of a pickleball retrieval and collection apparatus may include two or more circular openings through which a ball-shaped blocking structure **618** can pass through from the inside of the elongated tube **612** to the outside of that tube. The ball-shaped blocking structure **618** may be connected to a suspension mechanism **616**, and thereby move as a unit with the suspension mechanism **616**. The suspension mechanism **616** may be a plate, flap or other structure that elastically moves back to its original position when pressed towards the outer wall (e.g., outer concentric part) of the ball retrieval device **614**. In some embodiments, the plate or flap may be constructed from a rubber, polyurethane or plastic compound material such that it automatically elastically moves back to its original position when pressed towards the outer wall of the ball retrieval device **614** and released. In some embodiments, one or more springs (e.g., coil sprints) may be attached connecting the outer wall of the ball retrieval device **614** and the plate or flap **616**, thereby providing for the plate or flap **616** and the ball-shaped blocking structure **618** moves under the force of the one or more springs.
[0127] When no upward pressure is being exerted on the ball-shaped blocking structures **618**, for example, by a pickleball in the process of being retrieved, the ball-shaped blocking structures **618** are positioned such that the two or more of the ball-shaped blocking structures are located so that they obstruct the tube sufficiently to prevent pickleballs freely moving from inside of the tube to outside, or from the outside to in. When a pickleball is being retrieved, as the user of the pickleball retrieval and collection apparatus positions the ball retrieval device **614** over the pickleball to be

retrieved and pushed the elongated tube **612** downwards, the pickleball exerts gradually increasing levels of pressure on the ball-shaped blocking structures **618** that, in response, gradually move away from the inside of the tube to the outside against the elastic pressure of the suspension mechanism allowing the upper part of the pickleball to proceed past the ball-shaped blocking structures into the tube. When the widest part of the pickleball is between the ball-shaped blocking structures, the ball-shaped blocking structures are at their maximum displacement away from their original positions. Immediately upon the widest part of the pickleball proceeding past the ball-shaped blocking structures, the part of the pickleball that is between the ball-shaped blocking structures becomes narrower allowing the suspension mechanism to push the ball-shaped blocking structures back towards its original position. As the ball-shaped blocking structures return to their original positions, the pickleball is pushed into the tube and is prevented from moving out.

[0128] The embodiments described in relation to FIGS. **6**A-**6**D result in reduced levels of noise when the pickleball retrieval and collection apparatus is operated to retrieve pickleballs. The noise reduction may exceed 50% of the noise level of conventional retrieval and collection apparatuses. In the descriptions of FIGS. **6**A-**6**D, the blocking structure described is a ball-shaped blocking structure. However, embodiments are not limited thereto. For example, other blocking structures that have curved shapes that come in contact with the pickleball that is exerting the upward pressure may be used in some embodiments with similar reduction in the resulting noise.

[0129] According to embodiments of the present disclosure, a pickleball retrieval and collection apparatus includes a hollow elongated tube, with a ball retrieval device at a first end of the tube. The tube is configured to hold a plurality of pickleballs arranged in a single column. In some embodiments, a ball collection container that substantially augments the ball carrying capacity of the apparatus may be attached to the second end of the elongated tube. In some embodiments, the ball retrieval device may have a ball pickup component formed on the inner surface of the elongated tube or on an attachment at the bottom end of the tube, where the ball pickup component is constructed from an elastic material so that it can allow a pickleball to enter the tube when sufficient upward force is exerted by the pickleball and can prevent pickleballs that are in from exiting the tube. In some embodiments, the ball retrieval device may include two concentric circular parts with the inner circular part configured to move in relation to the outer circular part, under suspension. The inner circular part may have its inner surface formed from a flexible/elastic material. In some embodiments, the ball retrieval component may have a circular part configured with a ball pickup component arranged on its inner surface. In some embodiments, a soft padding material is attached to the bottom of the ball retrieval device in order to reduce noise generated. Some embodiments provide a curved-shape on the ball pickup component so that the noise levels can be minimized. In some embodiments, a handle is attached to the tube. It is noted that the above-described embodiments, the pickleball retrieval and collection apparatuses do not use motorized-power to perform the retrieval or collection of pickleballs, and may be entirely without any requirement for electrical power. It will be understood that the features described in embodiments can be combined in various combinations to yield other embodiments. It will also be understood that implementations that include obvious modifications of embodiments or features described herein are also encompassed by the claims of this disclosure.

[0130] Although various embodiments have been shown and described in detail, the claims are not limited to any particular embodiment or example.

Claims

1. A pickleball retrieval and collection apparatus, comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball and pressure is applied by contact on the pickleball, provide for the pickleball to enter

the tube; and a ball collecting bag constructed from a flexible material, wherein one end of the ball collecting bag is connected to a second end of the tube and configured to hold a second plurality of pickleballs.

2. The pickleball retrieval and collection apparatus according to claim 1, wherein the ball collecting bag is configured to expand with a number of pickleballs in the ball collecting bag.

3. The pickleball retrieval and collection apparatus according to claim 1, wherein the bag is attached to the tube only at an opening of the second end of the tube.

4. The pickleball retrieval and collection apparatus according to claim 1, wherein the bag is attached to the tube only at an end of the tube near an opening of the second end of the tube.

5. The pickleball retrieval and collection apparatus according to claim 1, wherein one end of the bag is not attached to a structural support.

6. The pickleball retrieval and collection apparatus according to claim 1, wherein the bag is detachable from the tube.

7. The pickleball retrieval and collection apparatus according to claim 1, wherein the bag includes an opening secured by a zipper, a Velcro sticker, or one or more buttons.

8. The pickleball retrieval and collection apparatus according to claim 1, wherein, when the bag is connected to the tube, pickleballs from the tube are prevented from entering the bag until the tube is full and another ball is retrieved through the ball retrieval device.

9. The pickleball retrieval and collection apparatus according to claim 1, wherein the first end of the tube or the ball retrieval device comprises a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction, and wherein the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the bag and to prevent pickleball movement in the opposite direction from the container to the tube.

10. The pickleball retrieval and collection apparatus according to claim 9, wherein the ball retrieval device comprises outer and inner concentric circular parts, and wherein the first one-way gating arrangement comprises a flexible ledge formed on an internal surface of the inner concentric circular part.

11. The pickleball retrieval and collection apparatus according to claim 9, wherein the ball retrieval device comprises a circular part attached to the tube, and wherein the first one-way gating arrangement comprises a flexible ledge formed on an internal surface of the circular part.

12. The pickleball retrieval and collection apparatus according to claim 1, wherein the ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism, wherein the suspension mechanism is engaged to enable the inner concentric circular part to move in relation to the outer concentric circular part.

13. The pickleball retrieval and collection apparatus according to claim 9, wherein the ball retrieval device comprises outer and inner concentric circular parts, and wherein the first one-way gating arrangement comprises a curved protrusion formed in the inner concentric circular part such that parts of the curved protrusion extend on the internal surface of the inner concentric circular part and on the external surface of the inner concentric circular part.

14. The pickleball retrieval and collection apparatus according to claim 9, wherein the ball retrieval device comprises outer and inner concentric circular parts, and wherein the first one-way gating arrangement comprises a curved object attached to a suspension device located between the outer concentric circular part and the inner circular concentric part and configured to move through an opening in the inner concentric circular part.

15. A pickleball retrieval and collection apparatus, comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube, wherein the ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism, wherein the suspension

mechanism is engaged to enable the inner circular part to move in relation to the outer circular part, and wherein a soft padding material is attached to a bottom of the inner concentric circular part and the outer concentric circular part.

16. The pickleball retrieval and collection apparatus according to claim 15, wherein one or more coil springs in the suspension mechanism are engaged to enable the inner concentric circular part to move vertically and elastically in relation to the outer concentric circular part.

17. The pickleball retrieval and collection apparatus according to claim 15, wherein the inner concentric circular part comprises a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction.

18. The pickleball retrieval and collection apparatus according to claim 17, further comprising a ball collecting container arranged at a second end of the tube and configured to hold a second plurality of pickleballs, wherein the second end of the tube or the ball collection container comprises a second one-way gating arrangement to enable pickleball movement into the container and to prevent pickleball movement in the opposite direction from the container to the tube.

19. A pickleball retrieval and collection apparatus, comprising: a hollow elongated tube having an inner area configured to accommodate a first plurality of pickleballs arranged in a single column; and a ball retrieval device arranged at a first end of the tube and configured to, when placed over a pickleball, provide for the pickleball to enter the tube, wherein the ball retrieval device comprises outer and inner concentric circular parts and a suspension mechanism, wherein the suspension mechanism is engaged to enable the inner concentric circular part to move in relation to the outer concentric circular part, and wherein an inner surface of the inner concentric circular part comprises an elastic material.

20. The pickleball retrieval and collection apparatus according to claim 19, wherein the inner concentric circular part comprises a first one-way gating arrangement to allow pickleball movement into the tube and prevent pickleball movement in the opposite direction.