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(54) **PRESSURIZABLE CONTAINER AND MOVABLE RECOVERY UNIT FOR USED TENNIS AND PADDLE TENNIS BALLS**

(57) The present invention relates to a pressurizable container capable of keeping tennis and paddle tennis balls in optimal conditions for use during a long period of time without them losing consistency when bouncing and impacting against tennis rackets and paddle tennis paddles, in addition to maintaining the required pressure throughout classes and prolonged training sessions. Fur-

thermore, the present invention relates to a movable recovery unit carrying said pressurizable container which allows used tennis and paddle tennis balls to recover and always maintain pressure compliant with game rules, while at the same time allowing players to have a full set of equipment with all the attachments required for classes.

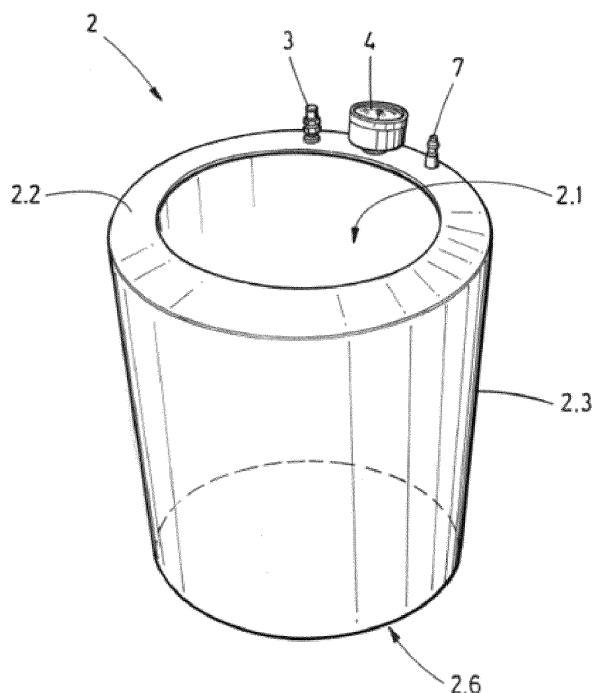


FIG.3

Description

Object of the Invention

[0001] The present invention relates to a pressurizable container capable of keeping tennis and paddle tennis balls in optimal conditions for use during a long period of time without them losing consistency when bouncing and impacting against tennis rackets and paddle tennis paddles, in addition to maintaining the required pressure throughout classes and prolonged training sessions. Furthermore, the present invention relates to a movable recovery unit carrying said pressurizable container which allows used tennis and paddle tennis balls to recover and always maintain pressure compliant with game rules, while at the same time allowing players to have a full set of equipment with all the attachments required for classes.

Background of the Invention

[0002] No system is known today which meets all the conditions required for maintaining and recovering tennis and paddle tennis balls, and having said balls available in optimal conditions immediately at the training site.

[0003] There are some apparatus which are based on storing balls in vessels that are pressurized, but they do not take into account aspects that influence ball recovery, such as the pressures, volumes and textures of the rubber used, and furthermore the apparatus that do exist are very unwieldy and rather impractical when training for or playing tennis and paddle tennis.

[0004] The apparatus that have been known until now intended for achieving the desired result with respect to pressure and the conservation of balls have not achieved their objective due to how difficult it is to control adequate pressure in the apparatus, so the result is uncertain since the pressure range is very critical and has not been achieved until now.

[0005] Furthermore there is a fundamental relationship between the volume of the container, the volume that is taken up by the balls and the pressure inside the container to achieve recovery of the balls, which had not been taken into account until now. The most important physical characteristic that tennis and paddle tennis balls must comply with are the internal pressure of said balls to be able to suitably bounce and rebound. These balls are manufactured with a very precise internal pressure, with very narrow limits ranging between ± 0.2 atm. Since the balls are manufactured with porous materials, i.e., rubber, from the time the balls are exposed to atmospheric pressure, they start to lose their internal pressure until it becomes equal to atmospheric pressure. Once these balls are exposed to atmospheric pressure, they start to lose pressure therein, and therefore playing quality drops. Furthermore, when these balls are used in tennis or paddle tennis classes, they can lose around one third or one fourth of the internal pressure due to impact-

ing against the rackets, the ground or the wall depending on the hitting intensity of said balls. Therefore, the service life of balls in optimal conditions does not extend beyond 15 days straight, which would be the same as using a single ball for not more than one hour of use. Furthermore, it must be mentioned that with the balls simply being exposed to atmospheric pressure, without even being used, the internal pressure thereof tends to balance out with the external pressure through the pores of the material used to make said balls. Accordingly, the balls no longer possess the bounce and consistency needed and required for an optimal result during tennis or paddle tennis classes.

[0006] Nevertheless, these known solutions have some problems, *inter alia*: recovering and maintaining balls with adequate pressure, and in turn having a plurality of recovered balls rapidly available during a training class.

[0007] Therefore, the present invention solves the problems set forth above and allows making available to the players a large number of tennis and paddle tennis balls which comply with the parameters and physical characteristics defined by international federations in a rapid manner and at the actual training site.

Description of the Invention

[0008] The present invention proposes a solution to the preceding problems by means of a pressurizable container for used tennis and paddle tennis balls according to claim 1 and a movable recovery unit for used tennis and paddle tennis balls according to claim 13. The dependent claims define preferred embodiments of the invention.

[0009] A first inventive aspect provides a pressurizable container for used tennis and paddle tennis balls, the pressurizable container comprising:

an opening suitable for allowing the balls to enter the inside of said pressurizable container,
a lid arranged on the opening such that the opening is completely covered by the lid,
an injection valve adapted so as to allow injecting pressurized air into the pressurizable container, and
a gauge configured for indicating the pressure existing inside the pressurizable container,

wherein

the injection valve and the gauge are both in fluid connection with the inside of the pressurizable container,
the lid is configured for exerting pressure towards the outside of the pressurizable container when the injection valve injects pressurized air into the pressurizable container, and
the pressurizable container is configured for being subjected to pressure in order to maintain the balls

with a required pressure.

[0010] The main object of the present invention is to considerably prolong the service life of balls in optimal conditions, where maintaining the pressure inside said balls is fundamental, as this is the reason for disposing of them. Furthermore, taking into account that the balls intended for tennis or paddle tennis training classes are used for several hours on one and the same day, after one day of use these balls can lose up to 40% of their internal pressure. So after that point, the player is no longer training with a ball that has a suitable bounce, which is a hindrance to learning. Therefore with the present pressurizable container, once the balls are used they can all be immediately deposited inside the pressurizable container in order to thus introduce inside said container a pressure compliant with game rules. The balls therefore recover the pressure lost during use and the service life of the used balls until being disposed of due to wear is prolonged, thereby extending the service life up to 10 times more than it would be without the present pressurizable container. The desired pressure inside the container is understood as being the pressure compliant with game rules of the sport for which these balls are intended.

[0011] Throughout the present invention, the pressurizable container will be understood as a vessel that can be pressurized by injecting pressurized air therein, where this container has been sized to have a capacity that is sufficient and required for holding balls used by tennis and paddle tennis teachers and/or players during training. Furthermore, this vessel has the volume required for the balls to recover and reach the standard pressure for playing the sports of tennis and paddle tennis. Furthermore, throughout the present invention, the pressurizable container is understood to comprise an upper portion and a lower portion, upper and lower being understood as the portions defining said container when it is in its correct position of being supported on a surface. In other words, when the pressurizable container is supported on a surface, this container comprises a lower portion or base which would correspond with the portion of the container close to the support surface, and an upper portion, or opening, which would correspond with the portion opposite said lower portion, and in turn with the portion of the container where the balls are introduced and taken out.

[0012] In a particular embodiment, the pressure required inside the pressurizable container is injected through an injection valve by means of an electric compressor, particularly a small electric compressor.

[0013] Advantageously, as a result of the lid arranged on the opening, the completely closed pressurizable container allows maintaining the desired pressure therein. To achieve this desired pressure inside the container, the latter advantageously has an injection valve to allow injecting pressurized air into the container. When pressurized air starts to be injected through said valve into

the pressurizable container, this pressurized air starts to exert pressure on the lid, driving it towards the opening of the container. The lid, pressed by injected pressurized air, thereby exerts pressure towards the outside of the pressurizable container until the opening is completely covered by said lid. As indicated above, to get the balls contained in the pressurizable container to recover the desired pressure, said pressure is injected through the injection valve as a result of the help of a compressor.

[0014] In the present invention, the fact that the lid is configured for exerting pressure towards the outside of the pressurizable container is understood as the pressurized air injected inside the pressurizable container exerting pressure on the lid such that said lid in turn exerts pressure towards the outside of said container. The lid is thereby configured for being directed towards the opening until this opening is completely covered and/or closed by the lid.

[0015] The pressurizable container comprises therein a space defined by a base, at least one side wall, a projection and a lid. Throughout the present invention, the inside of the pressurizable container will be understood as the space defined inside said container. Furthermore, throughout the present invention, "towards the outside" of the pressurizable container will be understood as the path travelled and/or the movement from the inside of the pressurizable container towards its opening communicated with the outside of said container.

[0016] In another particular embodiment, the injection valve furthermore has an adaptor which allows easily and safely introducing and removing pressure existing inside the pressurizable container.

[0017] Furthermore, the pressurizable container for recovering tennis and paddle tennis balls has a gauge which advantageously allows measuring the pressure existing inside the pressurizable container. In a more particular embodiment, the gauge comprises an indicator displaying the pressure inside the container once it has been pressurized.

[0018] The fact that the injection valve and the gauge are both in fluid connection with the inside of the pressurizable container allows pressure to be injected into the container through the valve and it also allows the gauge to measure the pressure inside said container.

[0019] In a particular embodiment, the pressurizable container comprises a closed position in which the lid keeps the opening of the pressurizable container closed by means of a hermetic and leak-tight closure comprising a gasket. Furthermore, the pressurizable container comprises an open position in which the inside of the pressurizable container can be freely accessed through the opening.

[0020] The hermetic and leak-tight closure with a gasket advantageously allows the pressurizable container to maintain therein the desired pressure for the balls.

[0021] In a particular embodiment, the pressurizable container comprises fixing means configured for fixing the lid to the pressurizable container. These fixing means

are arranged on the upper surface of the lid and are suitable for keeping the lid fixed to the pressurizable container while pressurized air is injected into the container. The fixing means, for example, are understood to be a screw and a stop piece.

[0022] In a particular embodiment, the pressurizable container comprises a projection around the opening, wherein the projection has a first recess arranged from one end of the projection closest to the opening to a side wall of the pressurizable container, wherein the first recess defines in the projection a cantilevered segment and a gap located below said cantilevered segment.

[0023] In a more particular embodiment, the lid has a central portion comprising at one end a second recess defining a cantilevered portion of the lid, wherein in the closed position of the pressurizable container, the lid central portion fits into the opening of the pressurizable container, and the lid cantilevered portion fits into the gap of the projection of said pressurizable container. The gasket is housed on the lid cantilevered portion and configured for contacting with the cantilevered segment of the projection of the pressurizable container.

[0024] Advantageously, the presence of a first recess in the projection and a second recess in the lid helps to fit the lid into the opening of the pressurizable container and to close it when it is pressed against by the injected pressurized air, in a hermetic and leak-tight manner with the help of the gasket arranged between the two recesses.

[0025] In a particular embodiment, the injection valve is a check valve.

[0026] In another embodiment, the pressurizable container is configured for receiving therein pressurized air injected by a compressor through said injection valve.

[0027] In a particular embodiment, the pressurizable container comprises an expansion/safety valve. This expansion and/or safety valve is tared at a given pressure for the purpose of preventing excess pressures therein which may damage the balls. Therefore, in the event of excess pressure inside the pressurizable container, this safety valve would advantageously be opened, allowing the excess pressure out.

[0028] In a particular embodiment, the injection valve, the gauge and the expansion valve are located in the projection of the pressurizable container, all of which are in fluid connection with the inside of the pressurizable container.

[0029] In another particular embodiment, the injection valve, the gauge and the expansion valve are located in the lid of the pressurizable container, all of which are in fluid connection with the inside of the pressurizable container.

[0030] In a particular embodiment, the pressurizable container is configured for withstanding a maximum pressure of 3 atm therein.

[0031] In a particular embodiment, the pressurizable container has a capacity of 30 liters.

[0032] In a particular embodiment, the gauge is con-

figured for indicating three pressure positions, low pressure, adequate pressure and excess pressure. More particularly, the gauge indicates said pressure positions in two ranges, one for paddle tennis and the other one for tennis.

[0033] Furthermore, the gauge indicates two different pressure ranges, one for paddle tennis and the other one for tennis.

[0034] These three pressure positions correspond with three areas, respectively, i.e., Left ORANGE, Center GREEN and Right RED. When pressure is introduced inside the container through the injection valve, the gauge needle or gauge indicator will start to move up through the ORANGE area on the left, such that when it reaches the GREEN area, pressure will no longer be introduced for the purpose of keeping the needle in this GREEN area, without reaching RED area on the right. Nevertheless, given that the balls are made of a porous material, the internal pressure of the pressurizable container will compensate for the internal pressure of said balls lost due to hitting, use and time, and advantageously, the balls used for many hours of play will be maintained with adequate pressure.

[0035] In a particular embodiment, the pressurizable container comprises container guiding means, and the lid comprises lid guiding means, wherein these guiding means are configured for coinciding or matching up with one another when the opening of the pressurizable container is closed by the lid, i.e., when the pressurizable container is in its closed position. More particularly, the container guiding means comprise a first and second position of the pressurizable container; and the lid guiding means comprise a first and second position of the lid. Therefore, in the process of closing the pressurizable container, the lid will be arranged in its closed position when the first positions of the lid and container guiding means match up, respectively; and furthermore, when the second positions of the lid and container guiding means match up, respectively. Advantageously, these guiding means help the player to position the lid in its correct position in order to close the pressurizable container.

[0036] In a particular embodiment, the lid comprises at least one handle configured for driving the lid in its opening and/or closing movement for opening and/or closing the opening of the pressurizable container.

[0037] The handle of the lid advantageously allows the player to hold and move or drive the lid to open and close the pressurizable container.

[0038] In a particular embodiment, the opening of the pressurizable container is oval-shaped, and furthermore, the lid seen from above and/or below, i.e., in its plan view, is also oval-shaped. So when the pressurizable container is in its closed position, the shape of the lid fits or is fitted into the shape of the opening.

[0039] Therefore, the process for closing the pressurizable container comprises:

i) introducing the lid on the inside of the opening of the pressurizable container by tilting it towards said inside and then immediately placing the first position of the lid guiding means opposite the second position of the container guiding means of the pressurizable container;

ii) rotating the lid 90° inside the container, where said lid is now arranged through the opening of the pressurizable container, and making the first and second positions of the first and second container and lid guiding means, respectively, coincide with one another;

iii) placing and adjusting the fixing means on the projection of the pressurizable container, such that said cross-shaped fixing means are slightly tightened (i.e., first sequentially adjust two diametrically opposed fixing means, and then the other two diametrically opposed fixing means) to thus achieve homogenous adjustment;

iv) connecting a compressor to the injection valve and tightening the screws of the adjustment means until the pressure that is reached inside the container is enough to secure the lid by itself (it is reached in a few seconds); it is accordingly observed that the screws of the adjustment means are no longer tightened by the action of the internal pressure of the container, and they should not be tightened given that their function is to only secure the lid at the beginning and before injecting pressure into the container.

[0040] Furthermore, once the balls have been introduced in the pressurizable container for recovering their pressure, and said container is closed according to the preceding process, the pressure indicated by the gauge will have to be observed so as to not exceed the levels allowed in the sport (tennis or paddle tennis) and thereby prevent excess pressure. Advantageously, through the present pressurizable container, the balls introduced in the pressurizable container will recover the required pressure values in a short period of time. Nevertheless, this recovery is something that can be done directly in the area where the sport is played because this pressurizable container can be displaced through the movable structure.

[0041] A second inventive aspect provides a movable recovery unit for used tennis and paddle tennis balls, characterized in that it comprises:

a movable structure comprising a first support structure and displacement means, and
at least one pressurizable container according to the first inventive aspect,
wherein the pressurizable container is supported by the first support structure of the movable structure.

[0042] The movable structure supporting the pressurizable container allows said container to be displaced to

the training site in order to use same immediately. Therefore, advantageously, when training for or playing tennis or paddle tennis, one does not have to leave the court and/or training site to introduce used balls or to retrieve already recovered balls, but rather as a result of the movable structure, the invention allows at least immediately having a pressurizable container available.

[0043] Accordingly, the present movable recovery unit allows introducing used balls and/or having the recovered balls available immediately at the training site, such that it maintains the pressure the balls require in a comfortable and practical pressurizable container housing a plurality of balls.

[0044] In a more particular embodiment, the movable recovery unit comprises two or more pressurizable containers supported by the first support structure and/or by additional support structures. This more particular embodiment advantageously allows providing for a large number of players, and for more than one training class, for example.

[0045] In a particular embodiment, the movable structure comprises a support arm suitable for transporting objects, preferably sports-related material.

[0046] In a particular embodiment, the movable recovery unit comprises at least one second support structure suitable for supporting a ball-collecting tube. In a more particular embodiment, the second support structure is fixed to the first support structure. In another particular embodiment, the second support structure is fixed to the movable structure. Advantageously, the presence of this second support structure allows carrying in one and the same movable recovery unit, in addition to the pressurizable container, at least two ball-collecting tubes as ancillary material for playing tennis or paddle tennis.

[0047] Furthermore, this second support structure arranged in the movable structure advantageously allows transporting additional sports-related material required for training for tennis and paddle tennis, together with the pressurizable container and the balls therein.

[0048] In a particular embodiment, the means of movement of the movable structure are wheels.

[0049] Advantageously, these displacement means, more particularly wheels, allow the present recovery unit to be taken from one place to another in a practical and simple manner, according to the player's needs.

[0050] In a particular embodiment, the first support structure of the movable structure is height-adjustable, such that the pressurizable container can be positioned at the desired height.

[0051] The first support structure of the movable structure comprises means regulating its position in height along said movable structure of the movable recovery unit. Advantageously, the player can position the structure support at a given height for the purpose of arranging the pressurizable container at a comfortable height, thereby preventing the player from having to adopt uncomfortable postures in order to use said pressurizable container.

[0052] In another particular embodiment, the support arm of the movable structure is height-adjustable, such that all the material that is stored in said support arm could be positioned at a desired height.

[0053] In a particular embodiment, the movable structure comprises locking means configured for keeping the movable structure stationary such that it does not allow the displacement means to act.

[0054] These locking means arranged in the movable structure allow immobilizing said structure, and they particularly allow stopping the movement of the movable recovery unit in order to park it where the player wants.

[0055] In a particular embodiment, the movable structure comprises driving means suitable for driving said movable structure.

[0056] These guiding means arranged in the movable structure, advantageously help the player drive the movable recovery unit to the desired site.

[0057] In a particular embodiment, the movable recovery unit comprises a compressor, preferably a non-return injection compressor, configured for injecting pressurized air into the pressurizable container through the injection valve thereof. In a more particular embodiment, the compressor comprises a sleeve configured for helping to inject pressurized air through the injection valve into the pressurizable container.

[0058] The use of a non-return injection compressor advantageously allows completely closing the passage of a fluid circulating from the inside to the outside of the container, and it furthermore allows leaving a free passage in the opposite direction, from the outside to the inside of the pressurizable container.

[0059] All the features and/or method steps described in this specification (including the claims, description and drawings) can be combined in any combination, with the exception of the combinations of such mutually excluding features.

Description of the Drawings

[0060] These and other features and advantages of the invention will become clearer based on the following detailed description of a preferred embodiment, given solely by way of illustrative and non-limiting example, in reference to the attached drawings.

Figure 1 shows a schematic side view of the movable structure according to an embodiment of the present invention.

Figure 2 shows a schematic front view of the movable structure according to an embodiment of the present invention.

Figure 3 shows a schematic perspective view of the pressurizable container according to an embodiment of the present invention.

Figure 4 shows a schematic top view of the pressurizable container according to an embodiment of the present invention.

Figure 5 shows a schematic detail of the closure of the pressurizable container according to an embodiment of the present invention.

Figure 6 shows a schematic detail of the closure of the pressurizable container according to an embodiment of the present invention.

Figure 7 shows a side perspective view of the movable recovery unit according to an embodiment of the present invention.

Figure 8 shows a schematic top view of the movable structure according to an embodiment of the present invention.

Detailed Description of the Invention

[0061] Figures 1 and 2 show a movable structure (1) having a first support structure (1.1), and a support arm (1.3) located below the first structure support (1.1); it furthermore comprises a central pole or shaft (1.6) to which the first support structure (1.1) and the support arm (1.3) are fixed. As can be seen, the central shaft (1.6) comprises at its lower end a horizontal shaft (1.7) going through the central shaft (1.6) in a perpendicular manner. This horizontal shaft (1.7) has a wheel (1.2) at each of its ends, such that, as shown in Figure 2, each wheel (1.2) is arranged equidistantly from each side of the central shaft (1.6) of the movable structure (1).

[0062] Furthermore, Figures 1 and 2 show how the movable structure (1) has locking or stopping means (1.5) arranged at the end of the support arm (1.3). The movable structure (1) furthermore has driving means (1.4) arranged at the upper end of the central shaft (1.6).

[0063] The movable structure (1) further comprises height control means for controlling the height of the first support structure (1.1). These control means (not shown in the drawings) are in contact with the central shaft (1.6) of the movable structure (1). Figure 1 partially shows how the height control means would correspond with a telescopic movable structure (1). It can particularly be seen how the upper portion of the vertical shaft (1.6) of the movable structure would be height-adjustable in a telescopic manner with respect to the lower portion of said vertical shaft (1.6) (Figure 1 does not show the braking element or the element for fixing these height control means by means of a telescopic shaft).

[0064] Figures 1 and 2 also show a housing structure (1.11) which is fixed to the support arm (1.3) and is suitable for transporting objects, particularly sports-related material.

[0065] In the particular examples shown in Figures 1 and 2, the first support structure (1.1) is seen to not be supporting the pressurizable container (2).

[0066] The particular example of Figures 1 and 2 shows the mesh-type rectangular housing structure (1.11). In another particular example (not shown in the drawings), the housing structure (1.11) is a basket-type oval-shaped structure.

[0067] Figure 1 particularly shows how the movable

structure (1) has a hook structure (1.10) fixed to the vertical shaft (1.6). This hook structure (1.10) is adapted so as to secure the lid (5) of the pressurizable container (2) when it is in its open position. The lid (5) thereby remains secured in the movable recovery unit while access to the inside of the container (2) is allowed for either taking the recovered balls out or for introducing them therein so that they can be recovered.

[0068] Figure 3 schematically shows a cylindrical-shaped pressurizable container (2). This pressurizable container (2) has an oval-shaped opening (2.1) at its upper end which allows free entry into said container (2), and it furthermore has a ring-shaped projection (2.2) arranged in the upper portion of the pressurizable container (2) surrounding the entire opening (2.1).

[0069] The pressurizable container (2) has an injection valve (3), a gauge (4) and a safety valve (7), all of which are arranged on the outer surface of the projection (2.2), so that they can be handled from the outside, and furthermore they are all in fluid connection with the inside of the pressurizable container (2).

[0070] Said Figure 3 further shows the pressurizable container (2) in its open position, in which said container (2) is freely accessed. The pressurizable container (2) has a base (2.6) at its lower end on which tennis and/or paddle tennis balls are stacked. The pressurizable container (2) furthermore has at least one side wall (2.3) between its upper and lower end; in this particular example, since the container is cylindrical, it only has one side wall (2.3) which is continuous and cylindrical.

[0071] In this particular example of Figure 3, the pressurizable container (2) having a cylindrical shape similar to a bucket, has an internal capacity of 30 liters. Furthermore, in this particular example the pressurizable container (2) is made of a metallic material, being capable of withstanding a maximum pressure of 3 atm therein. This pressurizable container (2) can contain around 72 balls therein, which will usually correspond with a number of balls from 24 cans of balls during training. Furthermore, in this particular example the pressurizable container (2) has a height of 34 cm and a diameter of 32 cm.

[0072] Figure 4 shows a schematic top view of the pressurizable container (2) in its closed position, preventing access to the inside thereof, and accordingly maintaining the desired pressure therein to recover balls which had been disposed of and placed inside the pressurizable container (2). It further shows how the injection valve (3), the gauge (4) and the safety valve (7) are all arranged in the projection (2.2) towards the outside of the pressurizable container (2). Figure 4 also shows how the lid (5) has a handle (5.3) fixed to the outer surface of the lid (5) and arranged towards the outside of the pressurizable container (2), such that the lid (5) can be secured from the outside when the pressurizable container (2) is in the closed position.

[0073] Figure 4 shows how the pressurizable container (2) has fixing means (11) (shown in detail in Figure 6) which keep the lid (5) fixed in the opening (2.1) of the

container (2). Furthermore, Figure 4 shows container guiding means (9) and lid guiding means (10). In this particular example, these guiding means (9, 10) consist of visual markings arranged on the projection outer surface (2.7) and on the lid outer surface (5.4). The visual markings of the container (9) are different from the visual markings of the lid (10), thereby facilitating the direction to be taken by the lid (5) in its path travelled towards the closed position of the pressurizable container (2).

[0074] Taking into account that the present movable recovery unit is based not only on the desired pressure that the balls must have but also based on a balance between pressures and volumes, as well as the pressure of the used ball, the pressure inside the container (2), the required recovery capacity for recovering the pressure of the used ball, the volume or space taken up by the balls inside the container (2) and the free spaces of the chamber where the pressure is higher. The relationship between pressure and volume is directly related with the recovery of the pressure of the balls, such that when balls with a low pressure are introduced in the pressurizable container (2), they are compensated with the pressure from inside the pressurizable container (2). In addition to this compensation, the pressure inside said pressurizable container (2) drops. Therefore, the excess volume inside the pressurizable container (2) has to be enough for the pressure inside the container to not drop below the levels indicated in the gauge.

[0075] Figure 5 shows a schematic detail of the closure of the opening (2.1) of the pressurizable container (2) by means of the lid (5). This figure shows the pressurizable container (2) in its partially closed position, and a hermetic and leak-tight closure (6).

[0076] As can be seen in said Figure 5, the projection (2.2) of the pressurizable container (2) has a first recess going from the end of the projection (2.2) closest to the opening (2.1) to the side wall (2.3) of the container (2) or the end of the projection (2.2) farthest away from the opening (2.1). This first recess defines in the projection (2.2) a cantilevered segment (2.4) and a hollow portion or gap (2.5) which is located below said cantilevered segment (2.4).

[0077] Figure 5 further shows how the projection (2.2) comprises two surfaces, a projection outer surface (2.7) and a projection inner surface (2.8), wherein this projection outer surface (2.7), as indicated by its name, is facing the outside of the pressurizable container (2), and wherein the projection inner surface (2.8) would be facing the inside of the pressurizable container (2). The cantilevered segment (2.4) of the projection (2.2) would thereby have both part of the projection outer surface (2.7) and part of the projection inner surface (2.8), whereas the gap (2.5) of the projection (2.2) would only have part of the projection inner surface (2.8).

[0078] Said Figure 5 also shows the lid (5), having a second recess at the end thereof defining a lid central portion (5.1) and a lid cantilevered portion (5.2) in the lid (5). Furthermore, the lid (5) has two surfaces, a lid outer

surface (5.4) and a lid inner surface (5.5), wherein this lid outer surface (5.4) is facing the outside of the pressurizable container (2), and wherein the lid inner surface (5.5) would be facing the inside of the pressurizable container (2), when said pressurizable container (2) is in its closed position. The lid cantilevered portion (5.2) would thereby have both part of the lid outer surface (5.4) and part of the lid inner surface (5.5).

[0079] Figure 5 further shows how the lid (5) would be arranged in the opening (2.1) of the container (2) when said pressurizable container (2) is partially closed. As can be seen, there is a gasket (6.1) arranged in the lid cantilevered portion (5.2) of the lid. Furthermore, it can be seen how in this partially closed container position the lid (5) fits with the projection (2.2), such that the first recess of the projection (2.2) and the second recess of the lid (5) fit between them. More specifically, it can be seen how part of the lid cantilevered portion (5.2) of the lid would fit in the gap (2.5) of the projection (2.2). Therefore, when the pressurizable container (2) is in its closed position, the gasket (6.1) is in contact with the projection inner surface (2.8), in the area of the gap (2.5), and with the lid outer surface (5.6), in the lid cantilevered portion (5.2).

[0080] The lid (5) with a hermetic and leak-tight closure (6) perfectly fits the pressurizable container (2) to the lid (5) with the arrangement of the gasket (6.1), such that when the pressurizable container (2) is closed, it is done in a hermetic and leak-tight manner to prevent pressure losses inside said container (2). When the lid (5) closes the pressurizable container (2) in a hermetic and leak-tight manner, this lid (5) projects with respect to the projection (2.2) of said pressurizable container (2) (shown in Figures 6 and 7). However, Figure 5 shows in detail the partially closed pressurizable container (2), particularly showing how the lid (5), particularly its central portion (5.1), does not project with respect to the projection (2.2) of the pressurizable container (2). Nevertheless, once the lid (5) completely closes the pressurizable container (2) in a hermetic and leak-tight manner (6), this lid (5) will project with respect to the projection (2.2) of said pressurizable container (2).

[0081] Figure 5 further schematically shows how the gauge (4) is arranged on the projection (2.2) and in communication with the inside of the pressurizable container (2). Like the gauge (4), the injection and safety valves (3, 7) would also be in communication with the inside of said pressurizable container (2) (not shown in the drawings).

[0082] Figure 6 shows a detail of the closure of the pressurizable container (2), particularly showing how the lid (5) comprises one housing (5.6) for each fixing means (11). The projection (2.2) of the pressurizable container (2) has a surface forming an angle greater than 0 with the surface of the lid (5). Said Figure 6 shows in detail how the fixing means (11) consist of a screw and a stop piece, such that for fixing the lid (5) with the pressurizable container (2) said stop piece is screwed on until contact-

ing the outer surface of the projection (2.2).

[0083] Figure 6 further shows how one of the fixing means (11) is fixing the lid (5) to the pressurizable container (2), and how another one of the fixing means (11) still do not show said fixing between the lid (5) and the container (2). Furthermore, Figure 6 partially shows how the lid (5) further comprises a handle (5.3) arranged at about the center of said lid (5) and towards the outside of the container (2).

[0084] Figure 7 shows an embodiment of the movable recovery unit in its stop position, comprising a pressurizable container (2) held by a first support structure (1.1) of the movable structure (1). It further shows how the movable structure (1) has a housing structure (1.11) arranged on the support arm (1.3), wherein said housing structure (1.11) would be in the form of a wrap-around grate.

[0085] Figure 7 further shows how the movable recovery unit further comprises a ball-collecting member (8) supported by the second support structure (1.8) and the protrusion (1.9). Figure 7 also shows a hook structure (1.10) fixed to the central shaft (1.6) of the movable structure (1), driving means (1.4) arranged at the upper end of said vertical shaft (1.6), and displacement means (1.2) arranged at the ends of the inner shaft (1.7) of the movable structure (1).

[0086] In Figures 1, 2 and 7, the first support structure (1.1) has a first cylindrical portion configured for surrounding the pressurizable container (2) around the wall (2.3), and a second U-shaped portion partially surrounding a part of the wall (2.3) and the base (2.6) of the pressurizable container (2).

[0087] In Figure 8, the first support structure (1.1) has a first portion surrounding the pressurizable container (2) around the wall (2.3), a second and third structure both partially surrounding a part of the wall (2.3) and the base (2.6) of the pressurizable container (2).

[0088] In another particular example (not shown in the drawings), the first support structure (1.1) has a rectangular basket shape and is configured for holding/supporting the pressurizable container (2).

[0089] Figure 8 shows, in a top view, a first support structure (1.1) comprising a first central cylindrical portion configured for surrounding the pressurizable container (2) around the wall (2.3), and two second U-shaped portions, which pass one another, configured for partially surrounding a part of the wall (2.3) and the base (2.6) of the pressurizable container (2).

[0090] Figure 8 shows a particular example of the movable recovery unit, in which the movable structure (1) furthermore has two second support structures (1.8) fixed to the first support structure (1.1), particularly to the central cylindrical portion of this first support structure (1.1). As shown in Figure 8, these second support structures (1.8) are fixed to the first support structure (1.1) such that when a ball-collecting member (8) (the second support structure (1.8) supporting the ball-collecting member (8)) is introduced or placed through them, this ball-collecting

member (8) would rest on the horizontal shaft (1.7) of the movable structure (1), the protrusion (1.9), which is understood as a projection, being introduced in the ball-collecting member (8) (as shown in Figure 7). Therefore the mobility of said movable structure (1) is not disrupted, and accordingly there would be no obstacle to the movable recovery unit of the present invention. Particularly, as shown in Figure 8, the protrusion (1.9) is understood as two projections each of which is fixed equidistantly with respect to the horizontal shaft (1.7) of the movable structure (1).

[0091] Figure 8 further shows a particular example of the movable structure (1) without supporting the pressurizable container (2). As can be seen, the first support structure (1.1) shows the central cylindrical portion configured for surrounding the pressurizable container (2), and two second U-shaped portions seen from above configured for supporting the pressurizable container (2).

Claims

1. A pressurizable container (2) for used tennis and paddle tennis balls, the pressurizable container (2) comprising:

an opening (2.1) suitable for allowing the balls to enter the inside of said pressurizable container (2),
 a lid (5) arranged on the opening (2.1) such that the opening (2.1) is completely covered by the lid (5),
 an injection valve (3) adapted so as to allow injecting pressurized air into the pressurizable container (2), and
 a gauge (4) configured for indicating the pressure existing inside the pressurizable container (2),

wherein

the injection valve (3) and the gauge (4) are both in fluid connection with the inside of the pressurizable container (2),
 the lid (5) is configured for exerting pressure towards the outside of the pressurizable container (2) when the injection valve (3) injects pressurized air into the pressurizable container, and
 the pressurizable container (2) is configured for being subjected to pressure in order to maintain the balls with a required pressure.

2. The pressurizable container (2) according to claim 1, **characterized in that** it comprises a closed position in which the lid (5) keeps the opening (2.1) of the pressurizable container (2) closed by means of a hermetic and leak-tight closure (6) comprising a gasket (6.1).

3. The pressurizable container (2) according to any of the preceding claims, **characterized in that** it comprises fixing means (11) configured for fixing the lid (5) to the pressurizable container (2).

4. The pressurizable container (2) according to any of the preceding claims, **characterized in that** it comprises a projection (2.2) around the opening (2.1), wherein the projection (2.2) has a first recess arranged from one end of the projection (2.2) closest to the opening (2.1) to a side wall (2.3) of the pressurizable container (2), wherein the first recess defines in the projection (2.2) a cantilevered segment (2.4) and a gap (2.5) located below said cantilevered segment (2.4) .

5. The pressurizable container (2) according to claims 1 to 4, **characterized in that** the lid (5) has a central portion (5.1) comprising at one end a second recess defining a cantilevered portion (5.2) of the lid (5), wherein in the closed position of the pressurizable container (2), the lid central portion (5.1) fits into the opening (2.1) of the pressurizable container (2), and the lid cantilevered portion (5.2) fits into the gap (2.5) of the projection (2.2) of said pressurizable container (2), and
 wherein the gasket (6.1) is housed on the lid cantilevered portion (5.2) and configured for contacting with the cantilevered segment (2.4) of the projection (2.2) of the pressurizable container (2).

6. The pressurizable container (2) according to any of the preceding claims, **characterized in that** the injection valve (3) is a check valve, and **in that** the pressurizable container (2) is further configured for receiving therein pressurized air injected by a compressor through said injection valve (3).

7. The pressurizable container (2) according to any of the preceding claims, **characterized in that** it comprises an expansion valve (7).

8. The pressurizable container (2) according to any of the preceding claims, **characterized in that** it is further configured for withstanding a maximum pressure of 3 atm therein.

9. The pressurizable container (2) according to any of the preceding claims, **characterized in that** has a capacity of 30 liters.

10. The pressurizable container (2) according to any of the preceding claims, **characterized in that** the gauge (4) is configured for indicating three pressure positions, low pressure, adequate pressure and excess pressure.

11. The pressurizable container (2) according to any of

the preceding claims, **characterized in that** it comprises container guiding means (9), and the lid (5) comprises lid guiding means (10), wherein these guiding means (9, 10) are configured for coinciding with one another when the pressurizable container (2) is in its closed position. 5

12. The pressurizable container (2) according to any of the preceding claims, **characterized in that** the lid (5) comprises at least one handle (5.3) configured for driving the lid (5) in its opening and/or closing movement for opening and/or closing the opening (2.1) of the pressurizable container (2). 10

13. A movable recovery unit for used tennis and paddle tennis balls, **characterized in that** it comprises: 15

a movable structure (1) comprising a first support structure (1.1) and displacement means (1.2), and 20
at least one pressurizable container (2) according to any of claims 1 to 12,
wherein the pressurizable container (2) is supported by the first support structure (1.1) of the movable structure (1). 25

14. The movable recovery unit according to claim 13, **characterized in that** the first support structure (1.1) of the movable structure (1) is height-adjustable, such that the pressurizable container (2) can be positioned at a desired height. 30

15. The movable recovery unit according to any of claims 13 to 14, **characterized in that** the movable structure (1) comprises driving means (1.4) suitable for driving said movable structure (1). 35

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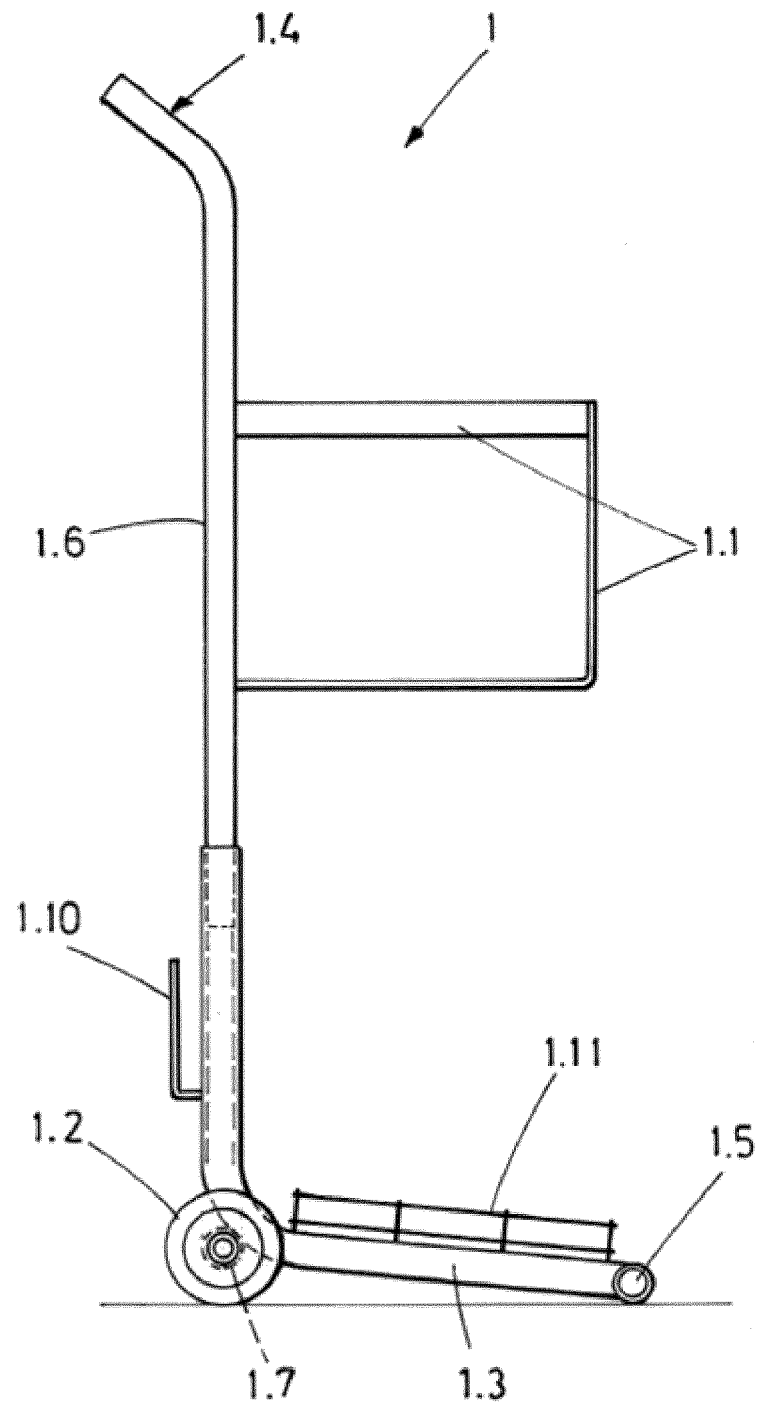


FIG.1

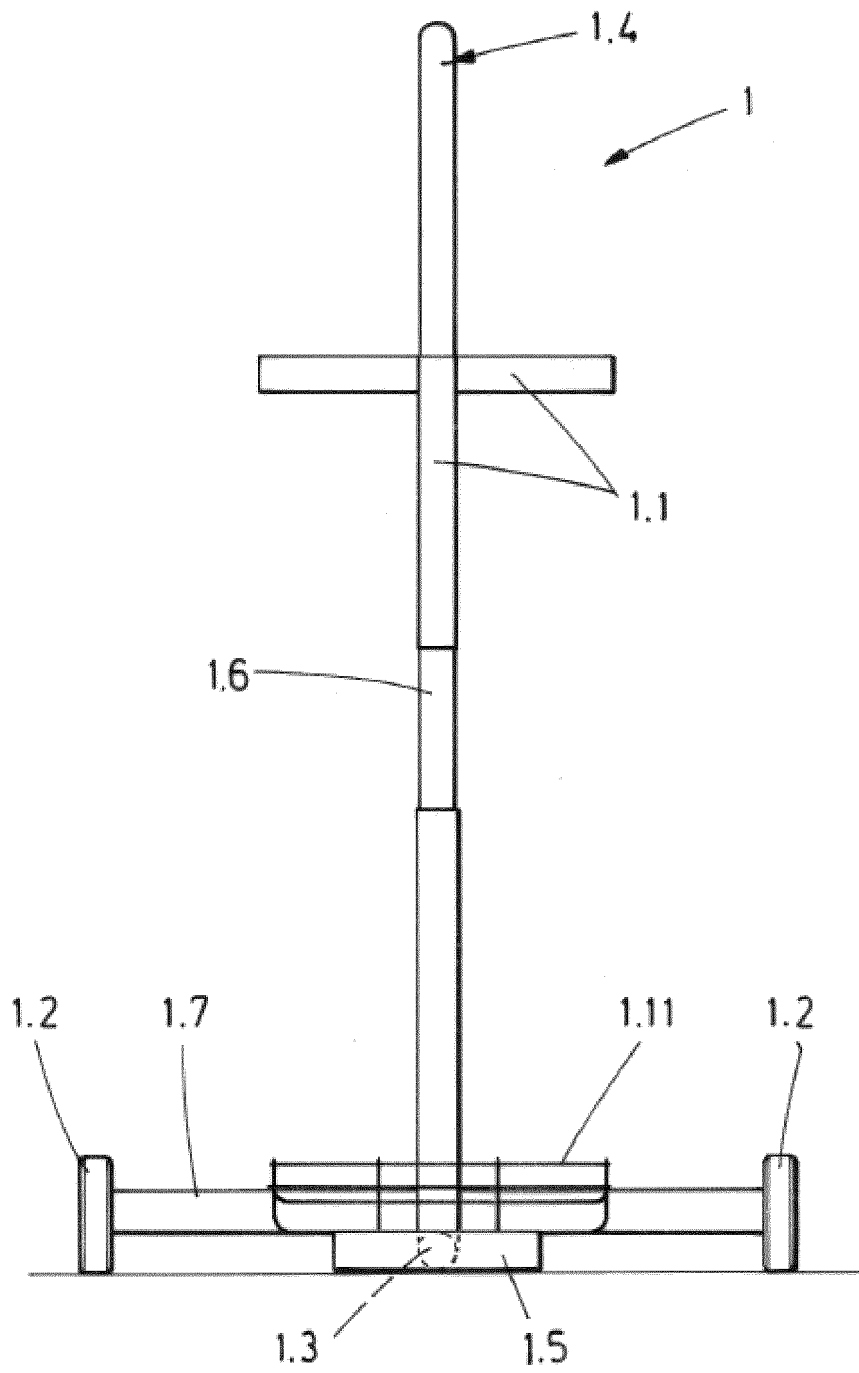


FIG. 2

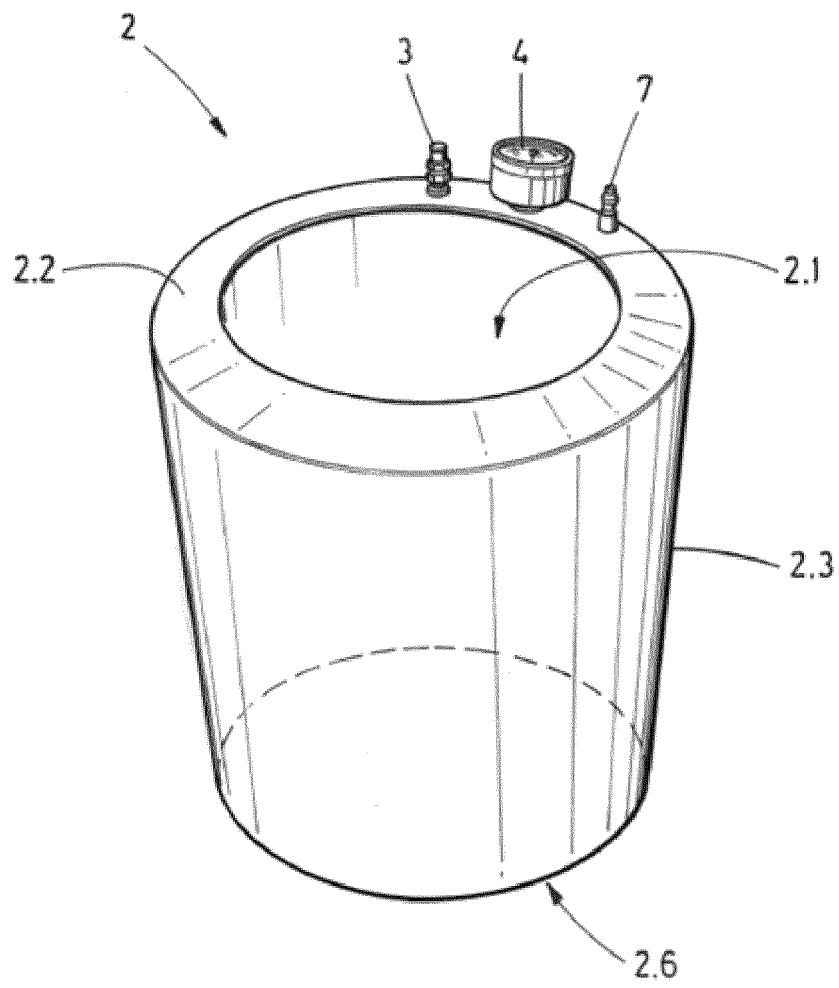


FIG.3

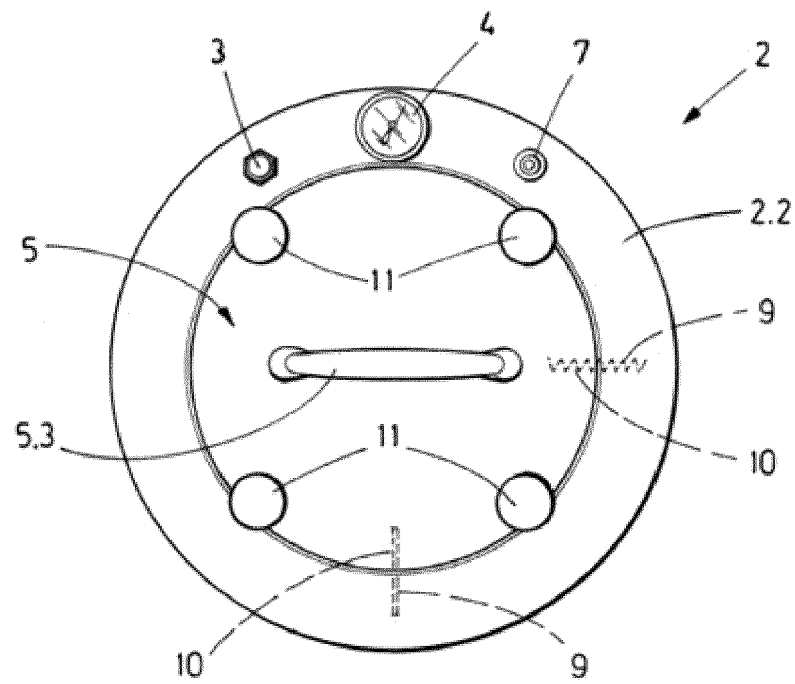


FIG. 4

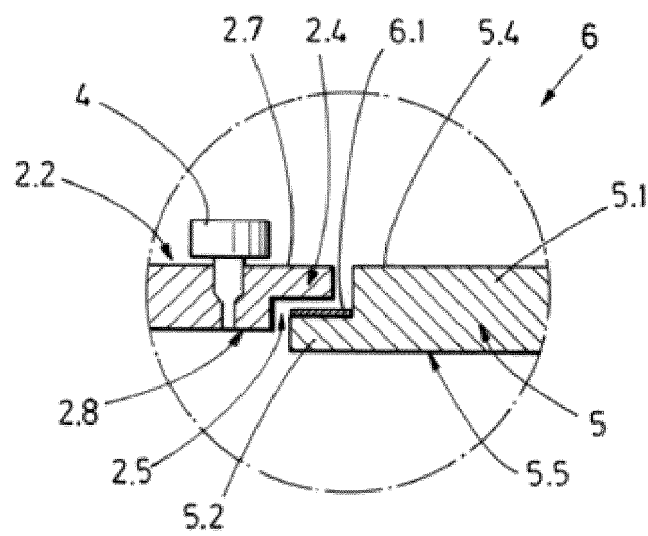


FIG. 5

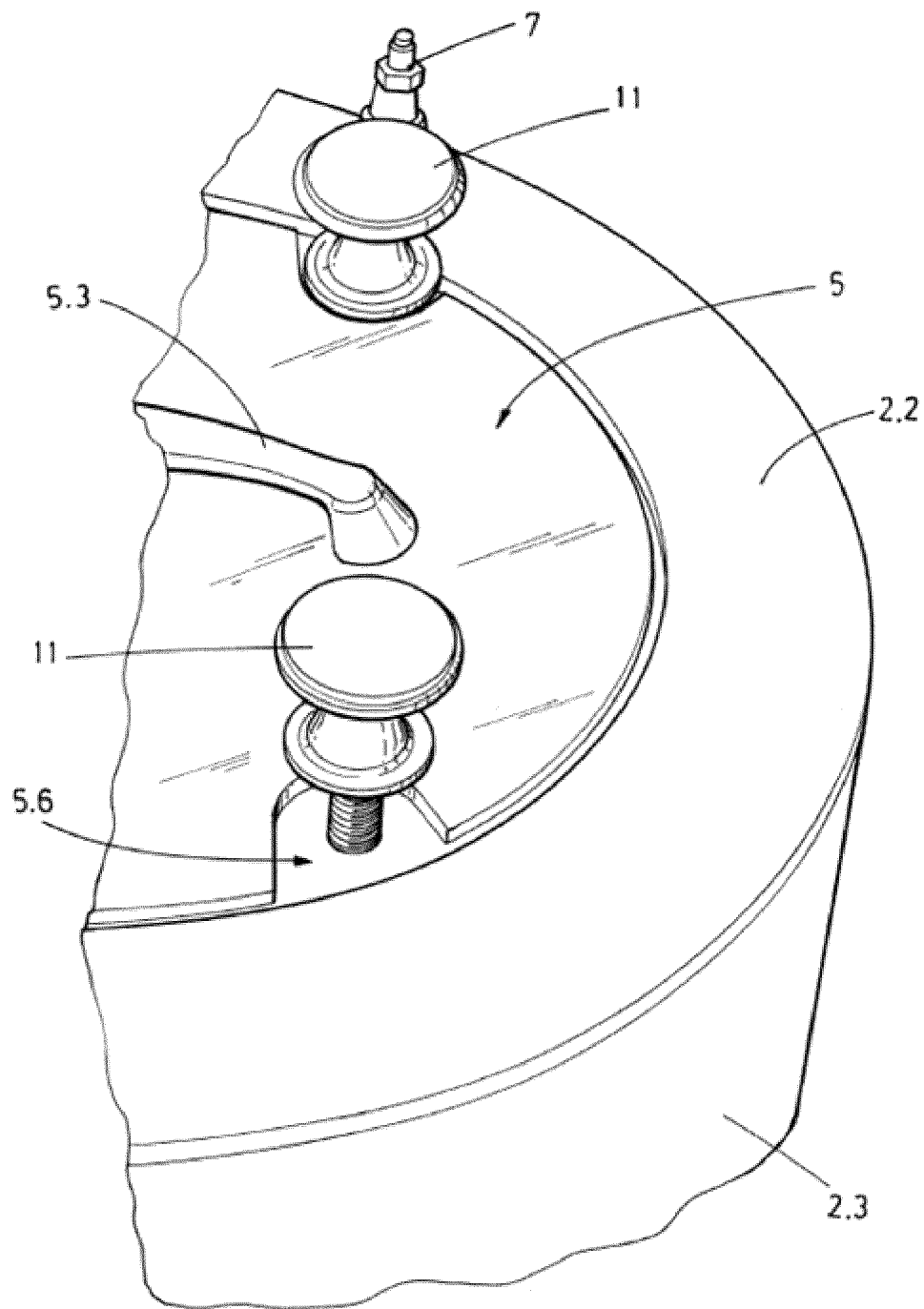


FIG.6

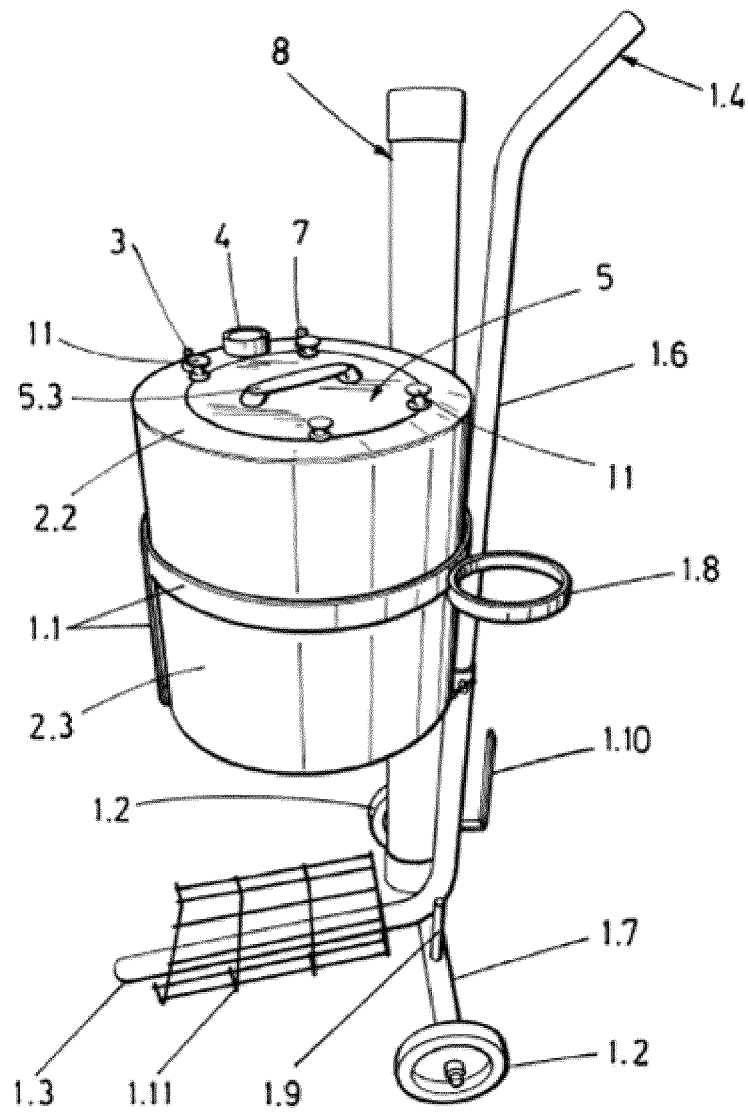


FIG. 7

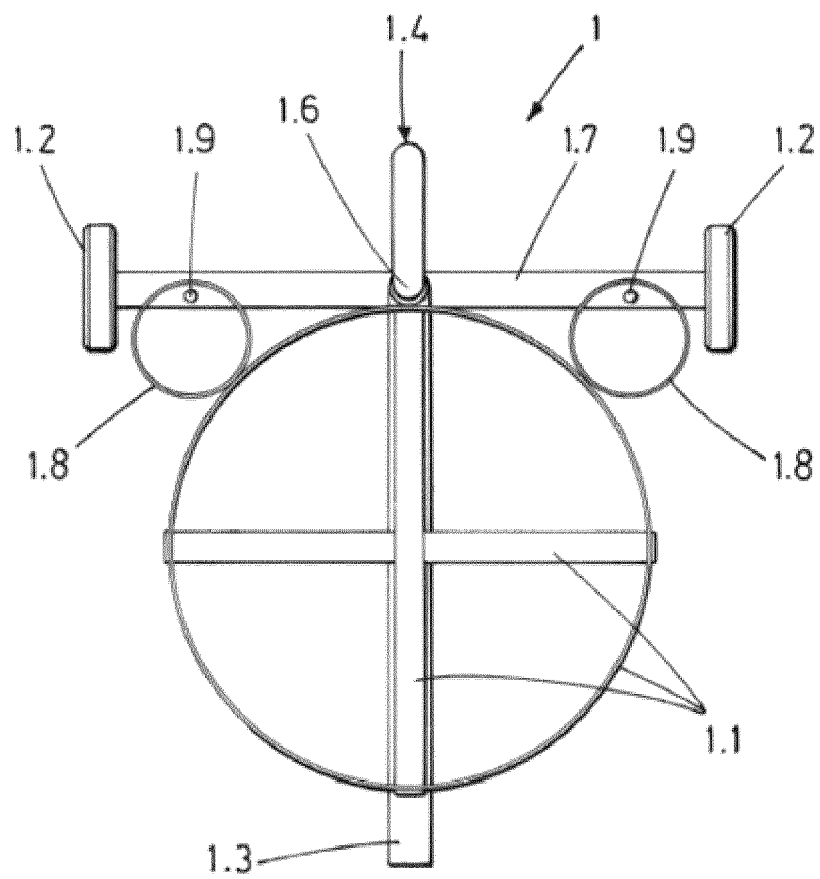


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2459

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 101 029 A (FEINBERG ROBERT S ET AL) 18 July 1978 (1978-07-18) * column 3, line 9 - column 6, line 49; figures 1-7 *	1-3,6-15	INV. A63B39/02 A63B71/02
X	DE 299 04 892 U1 (GERHOFER ERNST [DE]; ANNER STEFAN [DE]) 26 August 1999 (1999-08-26) * page 3, line 14 - page 7, line 23; figures 1-3 *	1-3,6-9, 11	
X	DE 38 05 008 A1 (STROBEL FRIEDRICH [DE]) 31 August 1989 (1989-08-31) * column 1, line 24 - column 2, line 26; figures 1-2 *	1-3,6-8, 11	
A	US 2 368 752 A (DUIS TROY F) 6 February 1945 (1945-02-06) * page 1, column 1, line 2 - page 2, column 1, line 56; figures 1-6 *	1-15	
A	US 3 415 357 A (NATTER WILLIAM J VAN) 10 December 1968 (1968-12-10) * column 2, line 46 - column 5, line 60; figures 1-7 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) A63B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 November 2017	Examiner Jekabsons, Armands
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.**

EP 17 38 2459

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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28-11-2017

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4101029	A	18-07-1978	NONE
DE 29904892	U1	26-08-1999	NONE
DE 3805008	A1	31-08-1989	NONE
US 2368752	A	06-02-1945	NONE
US 3415357	A	10-12-1968	NONE

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