

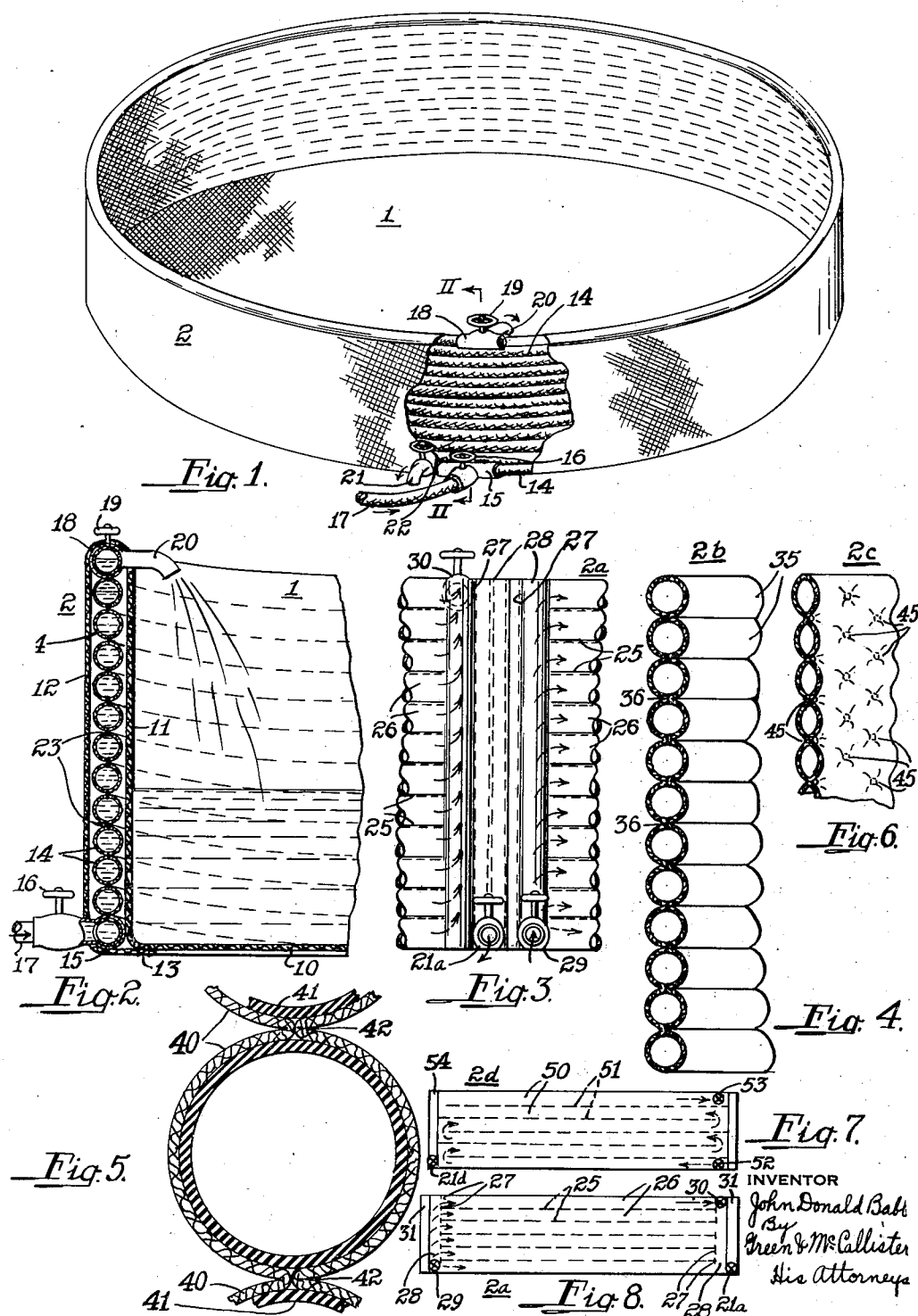
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PORTABLE RESERVOIR

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PORTABLE RESERVOIR

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My present invention relates to a container or reservoir which is normally in a collapsed condition while not in use but which is adapted to be hydraulically erected by water pressure at the
5 desired time and place of use.

I am aware that it has been common in the past to provide pneumatically inflatable containers of various shapes and for various purposes but for the inflation of the same a source of air
10 under pressure or a pump is required. This is not only inconvenient but such pneumatically inflated containers have very limited strength and usually do not retain the inflated condition more than a short period of time. In most cases
15 such containers have been made of rubber which had to be pre-shaped in order to present a desired configuration upon inflation. This entailed considerable expense and rendered the container unnecessarily bulky when deflated for transportation or storage purposes. While to a limited
20 extent such containers have in the past been used for bath-tubs and perhaps other or related articles, they have not gone into wide use for reasons which will be understood from the foregoing
25 and as a result there is still a definite need for a portable container which is, so to speak, inflatable and collapsible.

It is accordingly one of the objects of my present invention to produce a portable reservoir or
30 container which has new and useful features and characteristics and which is easily and simply constructed and used.

Another object of my invention is the provision of a portable reservoir or container comprising
35 a bottom portion and a sides portion but wherein the sides portion is hydraulically erected on the bottom and wherein after the erection of the sides by the hydraulic pressure the interior of the container may be automatically filled to the desired level from the same source, if preferred, or
40 from a separate source of water or other liquid.

An additional object of my invention resides in the provision of a tubular or compartmented container sides portion which is caused to assume
45 its desired position by passing water therinto under pressure and which when hydraulically erected shall have ample strength and rigidity for the purposes for which it was designed.

Other objects and advantages lie in the details of construction and operation which will be hereinafter apparent or pointed out and in such other and further objects and advantages as will be understood by those skilled in this art.

In the accompanying drawing, Figure 1 illustrates a preferred form of the present invention

in perspective with a portion thereof broken away to expose the interior construction;

Figure 2 is a sectional view taken on the line II—II of Figure 1;

Figure 3 is a fragmentary elevational view of
5 a modification of my invention;

Figure 4 is a detail of a further modification of my invention wherein the tubular sides portion is formed by appropriate stitching of the sides
10 material;

Figure 5 is an enlarged detail view showing in vertical section one form of tubular construction of the sides portion;

Figure 6 is a view similar to Figure 4 but wherein the sides portion is "quilted" or "tufted", thus
15 providing a compartmented structure;

Figure 7 is a schematic vertical elevational view of a flow modification of Figure 1 with the sides portion here shown in unrolled or flattened condition to illustrate the hydraulic passages there-
20 through; and

Figure 8 is a view similar to Figure 7 of the form of the invention shown in Figure 3.

Similar numerals designate corresponding parts throughout the various views of the drawing.
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In general, my present invention is capable of a variety of uses. It is suitable, for example, as a wading or swimming pool for children, as a tank or source of water supply for a camp or isolated settlement, for ship deck pools and for
30 other purposes which will occur to users thereof. Broadly speaking, my invention concerns what will herein be termed, for brevity, a reservoir, and which comprises two main portions, a bottom portion 1 and a sides portion 2. The sides portion
35 is characterized by the fact that it has a tubular or compartmented construction and is "inflated" or as I prefer to term it, hydraulically erected, by means of water or other liquid such as oils, acids, waste liquors, etc. Water passing into
40 the sides portion fills the same with water under pressure, thus causing the same to take its proper position and then after the water has been used to hydraulically erect the sides portion, additional water flows from the same source (or from a
45 separate source) into the central portion to fill it to the desired level. I believe that I am the first to hydraulically erect a portion of a structure so as to automatically form its own container and then to utilize the same source of water under
50 pressure for filling the container.

The construction and operation of my present invention in its various forms will be clearly understood from the accompanying drawing taken in connection with the following explana-
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tion. As will be observed from Figure 1, the reservoir is made from a woven material such as canvas or a canvas-like material or from rubber or a rubberized fabric or material which is impervious to water. As shown in Figure 2 particularly, the material extends from the central bottom portion 10 vertically to form an inner side or wall 11 and then downwardly parallel to but spaced from the inner wall to form an outer wall 12, thereby producing a hollow casing, the material terminating by passing beneath the central portion 10 in overlapping relation thereto and being firmly stitched or otherwise fastened at 13.

The two parallel vertical walls 11 and 12, as shown in Figure 2, constitute the sides portion and these are circular as will be apparent from Figure 1, although I wish it to be understood that the reservoir may be made if so desired in shapes other than circular. Disposed within the said hollow casing is a continuous spiral tube 14 of a material which, like a fire hose, is impervious to water and normally in collapsed condition. This spiral tube 14 is therefore capable of being "inflated" by the passage of water therethrough. In Figure 1 (shown inflated) the spiral tube starts within the metal fixture 15 which is provided with a valve 16 and which is connected as by a hose or other suitable tube 17 to a source of water under pressure such as an ordinary house water system. The spiral tube then rises layer upon layer until it reaches its full height. The height of any particular unit depends upon the number of convolutions. The number of convolutions depends upon the particular use to be made of the reservoir. For example, if the device is to be used for a child's swimming pool the water may be about $2\frac{1}{2}$ -3 feet high and if used for a wading pool it may be lower, e. g., 1-2 feet. The spiral tube ends within the metal fixture 18 which is provided with a valve 19 and which, for illustrative purposes, is shown as having a discharge or delivery nozzle 20, although in actual practice I reserve the right to vary from the particular type of nozzle shown.

As will also be observed from Figure 1 a discharge valve or nozzle 21 is provided for draining the central body of water and this is appropriately connected into the space where the tube rises to commence second spiral layer, thus forming a space 22 which is utilizable for such purposes. If so desired the various layers of the spiral tube may be secured to each other in any suitable or desired manner. I may, for example, stitch or sew the layers together at spaced points such as indicated at 23 or I may cement, vulcanize or clamp them together at a suitable number of points or continuously. Merely for illustrative purposes this securing may take place at four spaced points 90 degrees apart, but the securing depends upon the strength and rigidity of the materials used and in some cases will not be necessary at all, although lack of securing means may cause the casing or sides portion to assume a slightly different configuration when erected.

Referring to Figures 1 and 2 again, it will be apparent that when it is desired to utilize the reservoir it is unrolled and a hose attached to the valve 16. At the same time valve 19 is slightly opened to permit the escape of air within the spiral tube and the valve 21 is preferably closed. The source of water supply need only be the usual water available in a house or dwelling which provides sufficient pressure to insure the successful use and operation of the present

invention. I understand, for example, that ordinary house water pressure is in the neighborhood of about 30 pounds per square inch and this is sufficient for the practice of the present invention. Water, therefore, passes upwardly through the spiral tube 14 forcing air from the spout 20 and as the water rises through the spiral the tube expands and becomes relatively rigid and gradually erects the sides or wall so that by the time the water has reached the topmost layer of the spiral tube the wall is then standing erect. It will be clear that when the water reaches valve 19 it will then begin to discharge from the spiral tube into the central portion of the reservoir and when the water starts to come out of nozzle 20 the valve 19 is then either manually or automatically opened to permit the practical maximum flow of water so as not to unduly increase the time required for filling the reservoir. Water is allowed thus to flow into the central portion until it stands to the required level therein and then valve 19 is closed but valve 16 remains open and also the water is left "turned on" at the source connected to hose 17 so that the hydraulic pressure continuously acts to maintain the sides or wall in erected position.

I have found that even 30 pounds of pressure from an ordinary house water system gives ample strength and rigidity to the wall or sides portion and that children can sit upon the same without collapsing it since even though a child may weigh somewhat more than 30 pounds, this weight is distributed over a considerable area so that at no time does crushing pressure reach 30 pounds per square inch. Furthermore, because of the fact that water at ordinary pressures is not compressible my device will maintain rigidity even after all valves have been closed including 16 from the source of water supply and pressure. When it is desired to "deflate" the reservoir and to store it or pack it away, the water is drained from both the central portion and from the sides portion by proper use of the valves. Most rapid drainage can be accomplished by so manipulating the valves as to permit the pressure of the central body of water against the sides portion to facilitate evacuation of the sides portion. After drainage the reservoir can be rolled or folded into a pack of very moderate bulk.

In Figures 3 and 8 I have illustrated a modification of my present invention wherein the tubular construction of the sides portion of the reservoir takes a somewhat different form. As will be particularly apparent from Figure 8 in this form of the invention, the sides portion 2a is provided with stitching 25 which provides a plurality of parallel tubular portions 26. The stitching is also such, as indicated by the numerals 27, as to in effect form two vertical headers or tubes 28 which provide filling and discharge means for the parallel tubes 26. In other words, referring to Figures 3 and 8, the vertical stitching 27 provides a means for introducing water via valve 29 into the parallel tubes 26, the tubes all filling more or less simultaneously and when the water reaches the opposite end of the sides portion it enters into the other vertical tube 28 and thence discharges through the valve 30 into the central portion of the reservoir as described above in connection with Figure 1. The parts or flaps 31 of the sides portion are stitched together securely or otherwise suitably secured or fastened in overlapping relationship as is shown in Figure 3 and the use and operation of such form of the invention is the same as in Figures 1

and 2 with the exception that instead of a single spiral tube a plurality of parallel tubes are provided, each of which is formed by the stitching aforesaid. However, these parallel tubes may be separate from the casing and may be like the tubing of Figures 1 and 2, i. e., separate or independent tubes as contrasted with tubes formed by stitching.

In Figure 4 I have illustrated a plurality of tubes 35 of textile or other material formed by stitching casing 2b through and through wherein the rigidity and relative positioning of the tubes is maintained by securing them together vertically at points 36 either by stitching or by any other fastening instrumentalities so long as the function of the tubes and their imperviousness to water are not impaired or destroyed. The tube formation in Fig. 4 may be either that of Fig. 2 or 3, in other words, the tubes of Fig. 4 may be either spiral or parallel tubes.

In Fig. 5 I have shown an enlarged section through a tube and adjacent tubes 40 showing the use of a rubber or rubberized inner surface or liner 41 and one mode of securing the tubes to each other as by stitching, vulcanizing or cementing 42 for the purposes of strength and rigidity when in the erected condition. The numeral 40 represents the fabric or other material which forms the outer surface but if I so desire I may dispense with the use of two distinct layers of material and so to speak combine them by utilizing a rubberized fabric or other material and such is to be considered as a part of my present invention.

In Fig. 6, I have illustrated a compartmented or chambered sides portion 2c as contradistinguished from a tubular sides portion such as 2, 2a or 2b. In the construction of Fig. 6 the appearance is that of a "quilted" or "tufted" construction and this arrangement not only admirably produces the strength and rigidity required but it fills or erects somewhat more rapidly than the other forms due to the fact that there is less restriction to the flow of water therethrough. The modification of Fig. 6 is simply made by stitching through, cementing or vulcanizing the sides portion 2c at spaced and/or staggered points 45 of a double thickness of water impervious fabric or other material and when this modification of the device is "inflated" or erected it has the appearance illustrated in Fig. 6.

In Fig. 7 the tubes 50 are likewise made by stitching or other fastening indicated at 51 but in such manner that a different type of water passage is formed than in Figs. 1 and 2. Since Fig. 7 represents on a diminished scale the full length of the sides section 2d of the reservoir it will be apparent that water entering via valve 52 first passes in one direction along the lowermost tubular passage and then reverses and returns at a higher level to a point adjacent but separated from the inlet and then subsequently the water continues to alternate in direction layer upon layer until it reaches the top tube where it discharges into the central portion via valve 53 as already described. This tubular passageway of parallel and reversed nature of Fig. 7 is produced by alternately stitching or otherwise securing 2d to the end as will be understood from an inspection of this figure. Parts 54 are provided for fastening purposes as is 31 in Fig. 8. Valve 21d (Fig. 7) and 21a (Fig. 8) are used to discharge water from the central portion as 21 in Fig. 1.

It will therefore be apparent that while my in-

vention may take a number of specifically different forms it essentially provides for the introduction of a stream of water under pressure into a casing or sides portion, causing the water to pass through the casing and to the top thereof, thereby hydraulically erecting the same, and then discharging water into the central portion to fill the reservoir to the desired depth. Finally, the water is turned off so that no additional flow into the reservoir is permitted but the hydraulic head may be maintained within the casing or sides portion. When not in use the reservoir may be emptied and rolled up as previously described. In the above illustration and description it is my intention that the same should be considered as exemplary and not limitative or restrictive and so long as I adhere to the principles and operation hereinabove outlined I may make various modifications, variations, substitutions or omissions without departing from the scope hereof which is rather to be measured by the subjoined claims. I do not of course restrict myself either in the matter of size or shape and while I have illustrated a round reservoir I may make this square, rectangular or any other polygonal shape and this can be readily done not only by pre-cutting the material in the correct manner but in utilizing metal fixtures at portions which become corners or angles or by providing pre-formed non-metallic corner or angle pieces of hard rubber, bakelite, etc., as will be understood by those versed in these matters. As I have already stated, the valves and connections are purely illustrative and may be either manual or automatic. In cases where I use an automatic valve this would be of the type known as a spring loaded valve which can be pre-set to open at a predetermined pressure and this would be particularly valuable in connection with valve 19 of Fig. 1, although after the reservoir is filled to the desired level it will be necessary to turn the valve off manually. However, both manual and automatic valves are to be considered within the purview of my invention. Nor do I deem myself limited in connection with the material which may be utilized either for the individual tubes or the casing or sides portion. While at the present time I believe that material similar to that now use for fire hose would be preferred where a separate tube is used or for the sides portion or casings themselves, nevertheless I propose to use any textile or other material which is impervious to water and which will withstand normal water pressures for a reasonable length of time.

As above indicated, the central portion of the reservoir may be filled either from the sides portion or by means of a separate connection. I may also fill the central section through valve 21 (Fig. 1) or by corresponding valves in the other forms of the invention. It is also within the purview of my invention to provide a shower or fountain in connection with the reservoir. This may be accomplished by applying a suitable fitting or extension to nozzle 20 or to any other part of the reservoir to give this effect, or a suitable fitting, connected to the water supply, may be installed as an accessory to or made a part of the reservoir to produce a showering or spraying action.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A portable reservoir comprising a bottom portion and a wall portion, said wall portion be-

ing normally collapsed but adapted to be erected under water pressure, the water acting to fill the reservoir after erecting the wall as aforesaid, the wall portion being provided with means for this purpose.

5 2. A liquid reservoir of the kind described comprising a sides portion and an integral bottom portion, means for hydraulically erecting the sides portion and means for filling the reservoir to the desired level from the sides portion.

10 3. A portable reservoir of the type described comprising a unitary bottom and sides portion made up of water-proof material which lacks sufficient inherent rigidity to maintain it in a predetermined shape, means for hydraulically
15 erecting the sides portion on the bottom portion and means for filling the thus formed container through the erected sides portion, thereafter preventing further discharge into the reservoir while maintaining the pressure on the sides portion.

20 4. In a reservoir of the kind described, a double-walled water-proof casing, stitching therethrough forming a vertical header, other stitching therethrough forming a plurality of parallel tubular passages and stitching forming a vertical
25 tubular discharge passageway, the vertical passageways being parallel and adjacent whereby the casing may be hydraulically erected by the introduction of water therethrough.

5. In a reservoir of the type described, a double-walled casing of water-impervious material which is fastened or secured at spaced points thereby providing a compartmented casing and which, when hydraulically erected, has the appearance of a quilted or tufted construction.

6. A reservoir of the kind described comprising integral tube-containing sides and central portions of flexible, collapsible water-impervious material, the sides portion being so constructed as to be capable of being hydraulically erected when water under pressure is introduced therein, the reservoir normally being in a collapsed or deflated condition wherein it can be formed into a compact roll for storage and transportation purposes.

7. A reservoir as set forth in claim 6 wherein the sides portion encloses a spiral or spiral-like tube the layers of which are suitably secured in predetermined relationship.

8. A reservoir as set forth in claim 6 wherein the sides portion encloses a series of parallel horizontal tubes and a series of vertical tubes, the horizontal tubes communicating with the vertical tubes.

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