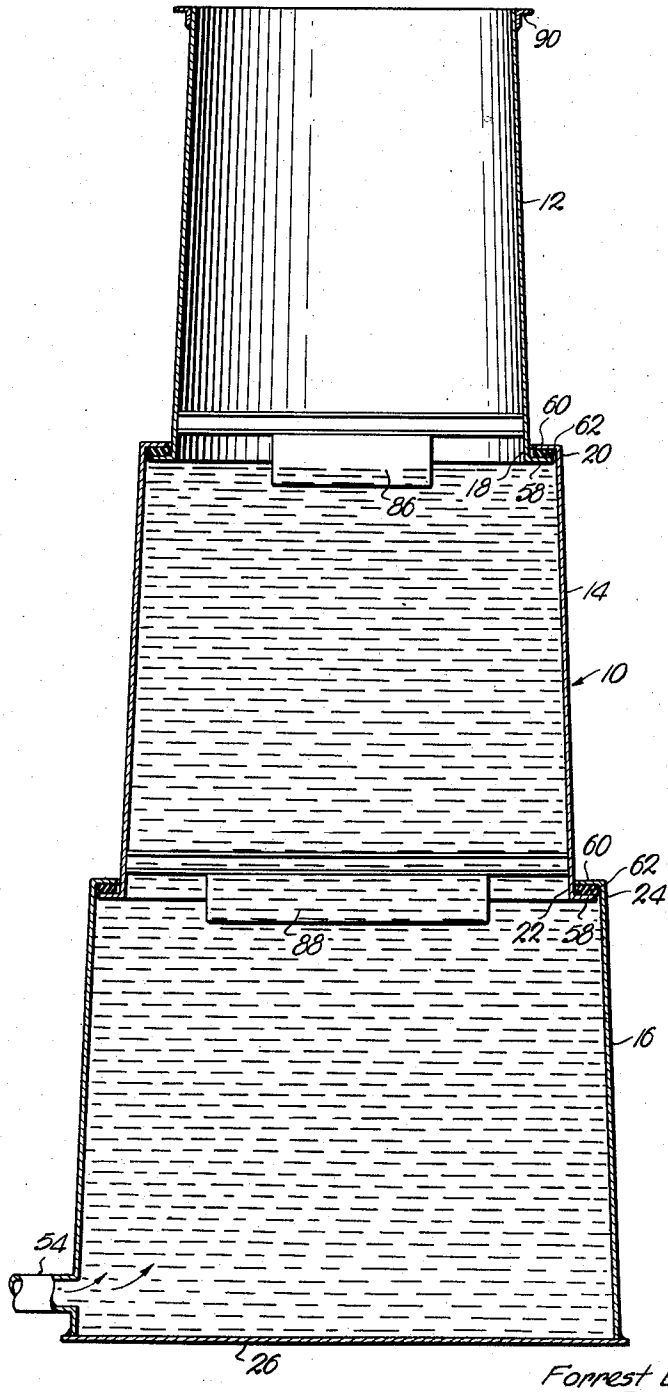
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COLLAPSIBLE TANK

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COLLAPSIBLE TANK

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8 Claims. (Cl. 220—8)

This invention relates to portable receptacle construction and more particularly, to a collapsible fluid-receiving tank which may be readily transported in its collapsed condition and then erected in an upright position ready for immediate use in a short period of time.

The collapsible tank herein presented is especially adapted for use by oil well cleaning and reconditioning contractors wherein it is necessary that they have available a large capacity liquid tank and which may be collapsed and transported from well to well in a minimum of time and at a relatively small cost.

As the producing life of a flowing or pumping well is extended, the rate of production will be reduced at a rate commensurate with reduction of reservoir pressure and gas depletion, the amount of caving that has occurred, the restriction of sand drainage which is caused by deposition of paraffin and other residues on the surfaces of the well pores, and the proximity of salt water. Many of these factors can be overcome and remedied by cleaning and reconditioning of the well and there are many companies now engaged in the full-time occupation of cleaning and reconditioning clogged and similarly constricted wells which have ceased to flow or cannot be pumped at an adequate rate.

The precipitation of mineral salts from oil field water and the deposition of mud, silt, waxy and asphalt materials cause lost production in the oil well and it is frequently necessary to remove "paraffin" from the well so that it may be brought back into normal production. The term "paraffin" as commonly applied by field men and oil well operators includes mud, silt, sand, asphalt and some water and mineral matter in addition to natural paraffin wax.

Many types of cleaning and reconditioning operations have been suggested and such processes include "blowing" the well with dynamite and nitroglycerine, as well as mechanical reconditioning including bailing, sand-pumping, re-drilling, and reaming, but in many instances these processes are completely unsatisfactory and it is more desirable to utilize methods wherein solvents or other fluids are directed into the well casing so as to loosen, dissolve, or otherwise remove the deposits from the well which are preventing normal flow and which preclude pumping of the oil from the well.

Various liquid methods of cleaning and reconditioning oil wells are known and utilized including introduction of solvents such as hot oil, kerosene, gasoline or a mixture of gas-oil and benzine into the well in order to dissolve the paraffinic substances, the introduction of steam or hot water into the well casing under pressure, circulating hot oil or water through the well, as well as the introduction of certain acids into the well between the casing and the tubing. Other methods of a similar nature which are utilized, include the introduction of heat-producing chemicals such as sodium hydroxide, calcium carbide and water, and aqueous aluminum compositions into the well.

Manifestly, these methods just referred to involving the utilization of liquids, require that the re-conditioning contractors have available relatively large liquid-receiving tanks wherein the materials may be stored for ready use at the exact moment needed. Such large tanks are frequently not available at the well site and it, therefore, becomes necessary for the contractor to transport such tanks with his equipment. This involves a considerable number of additional vehicles, as well as a number of men which are needed to erect and disassemble sectional tank assemblies. Although the operators could transport one-piece tanks of considerable volume, this has been found substantially impractical because of the fact that it is usually desirable to mount the tanks upon a tractor-trailer and this necessarily limits the over-all height of the tanks which are disposed upon the trucks because of obstructions encountered such as bridges or the like.

It is, therefore, the most important object of this invention to provide a portable tank which is constructed of a plurality of normally upright, tubular sections disposed in telescoped relationship and which are adapted to be moved to extended positions so as to present an elongated, collapsible fluid-receiving tank.

It is a further important object of this invention to provide a portable tank of the type described which includes structure for moving the telescoped sections into their extended positions under the influence of fluid pressure so that the tank may be erected in a very short period of time.

Another important object of the invention relates to the provision of a collapsible tank as referred to wherein the telescoped sections are movable to and from extended positions with proximal adjacent ends thereof disposed in partial overlapping relationship and wherein there is provided sealing means between the overlapped portions of the sections so as to prevent loss of fluid between the ends when the tank is filled with liquid or the like.

Another important object relates to the provision of interengageable means on the partially overlapped portions of the sections which operate to limit the extent of movement of the telescoped sections with respect to each other and which also receive the sealing means therebetween so as to prevent loss of liquid from the tank.

Another important object of the invention relates to structure for moving the telescoped sections into their extended positions and which includes float elements thereon so that the telescoped sections are automatically moved into their extended positions as the tank is filled with liquid.

In the drawings:

The single figure is a central, vertical, cross-sectional view of a collapsible, portable tank made in accordance with the instant invention.

A collapsible, portable tank designated generally by the numeral **10**, includes a plurality of upright, tubular sections **12**, **14** and **16** disposed in telescoped relationship, section **12** being movable to and from a position within section **14** and section **14** being reciprocable to and from a location within section **16**.

The lowermost end of section **16** is preferably closed with a circular bottom wall **26** but the uppermost end of section **12** is preferably left open to allow escape of air as liquid is directed into tank **10**. The lowermost portions **18** and **22** of sections **12** and **14** respectively are provided with relatively narrow, outwardly extending annular flanges **58** and, by the same token, the uppermost portions **20** and **24** of sections **14** and **16** are likewise provided with relatively narrow, inwardly extending annular flanges **60** disposed in a position to interengage with a corresponding flange **58** when sections **12** and **14** are moved into their extended positions as illutrated. Circular sealing rings **62** are disposed on each of the

flanges 58 in a position to be pressed between corresponding flanges 58 and 60 when the flanges are moved into proximal relationship to thereby preclude loss of liquid between adjacent ends of the sections 12, 14 and 16.

A float 86 is mounted on the lowermost portion 18 of section 12 and a somewhat larger float 88 is mounted on the lowermost portion 22 of section 14. A liquid conduit 54 is connected to section 16 and communicates with the interior thereof adjacent bottom wall 26 so that liquids under pressure may be directed into section 16. Assuming that sections 12 and 14 are disposed in telescoped relationship within section 16 and it is desired to move sections 12 and 14 into their extended positions as illustrated, liquid under pressure is directed into section 16 and when the level of such liquid rises within section 16 to a level where the buoyancy of float 88 tends to move section 14 upwardly, it can be seen that both sections 12 and 14 are initially moved upwardly under the influence of float 88. During the time that section 14 is being moved upwardly by float 88, section 12 is also lifted by section 14 because of the outwardly extending flange 90 engaging the flange 60 of section 14. When the flange 58 on section 14 engages the flange 60 on section 16, continued introduction of liquid into tank 10 causes section 12 to be moved upwardly under the influence of float 86. It can now be ascertained that the sections 12 and 14 are maintained in their extended positions by the buoyancy of floats 86 and 88 and because of the added weight which must be supported by float 88, this float must be considerably larger than float 86. It can also be appreciated that as the level of liquid falls in tank 10, the sections 12 and 14 will successively move downwardly into telescoped relationship proportional to the level of liquid within tank 10. Sealing rings 62 between each of the flanges 58 and 60 precludes loss of fluid from sections 12 and 14 and the seal will be maintained until the level of liquid falls to a position below the uppermost edge of a respective section 14 or 16. In this respect, it is to be noted that the floats 86 and 88 must be of sufficient volume so that sections 12 and 14 are maintained in their fully extended positions by the buoyancy of floats 86 and 88 so that sections 12 and 14 respectively will not move downwardly into the section therebelow until the level of liquid has fallen below the uppermost edge of the section located therebelow.

This is a division of my copending application Serial No. 678,833, filed August 19, 1957, now Patent No. 2,887,243, entitled "Telescoping Tank."

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In portable receptacle construction, a plurality of upright, tubular sections normally disposed in telescoped relationship, the lower end of the outer section being closed, and the remaining sections being movable to and from extended positions with proximal adjacent ends of the sections disposed in partial overlapping relationship, there being interengageable means on said adjacent ends of the sections for limiting the extent of movement of the remaining sections with respect to each other as the latter are successively moved to their extended positions to thereby present a collapsible, elongated tank; and float means for moving said remaining sections successively into their extended positions under the influence of fluid pressure.

2. Receptacle construction as set forth in claim 1, wherein each of said interengageable means includes an inwardly extending, annular flange on one of the sections and an outwardly extending, annular flange on the other section.

3. Receptacle construction as set forth in claim 2, wherein is provided a resilient sealing ring on one of the flanges and engageable with the other flange when corresponding sections are in their extended positions.

4. Receptacle construction as set forth in claim 1, wherein said structure includes a member for each section respectively and normally disposed in telescoped relationship, each of said members being coextensive in length with its corresponding section and the outermost and innermost members being secured to corresponding sections respectively, the members corresponding to said remaining sections being movable to and from extended positions with proximal adjacent ends of the members disposed in partial overlapping relationship, there being interengageable stops on said adjacent ends of the members for limiting the extent of movement of the movable members with respect to each other as the latter are successively moved to their extended positions under the influence of said fluid pressure.

5. Receptacle construction as set forth in claim 4, wherein said stops include an inwardly extending, annular flange on one of the members and an outwardly extending, annular flange on the other section.

6. Receptacle construction as set forth in claim 5, wherein is provided packing means between each of the members respectively to prevent loss of fluid from the members as fluid is directed thereto.

7. Receptacle construction as set forth in claim 1, wherein said float means is located within said telescoped sections.

8. In portable receptacle construction, a plurality of upright tubular sections normally disposed in telescoped relationship, the lower end of the outer section being closed, and the remaining sections being movable to and from extended positions with proximal adjacent ends of the sections disposed in partial overlapping relationship, there being interengageable means on said adjacent ends of the sections for limiting the extent of movement of the remaining sections with respect to each other as the latter are successively moved to their extended positions to thereby present a collapsible, elongated tank; float means on the lowermost end of each of said remaining sections respectively; and means for directing liquid into said outer section whereby as the level of liquid rises therein, the float means on each of the remaining sections successively moves each of the latter into its extended position.

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