No. 810,403. PATENTED JAN. 23, 1906.

W. M. FULTON & W. H. RICHARDS.

RESERVOIR FOR GASOLENE AND OTHER VAPOR BURNERS.

APPLICATION FILED FEB. 20, 1905.

2 SHEETS—SHEET 1.

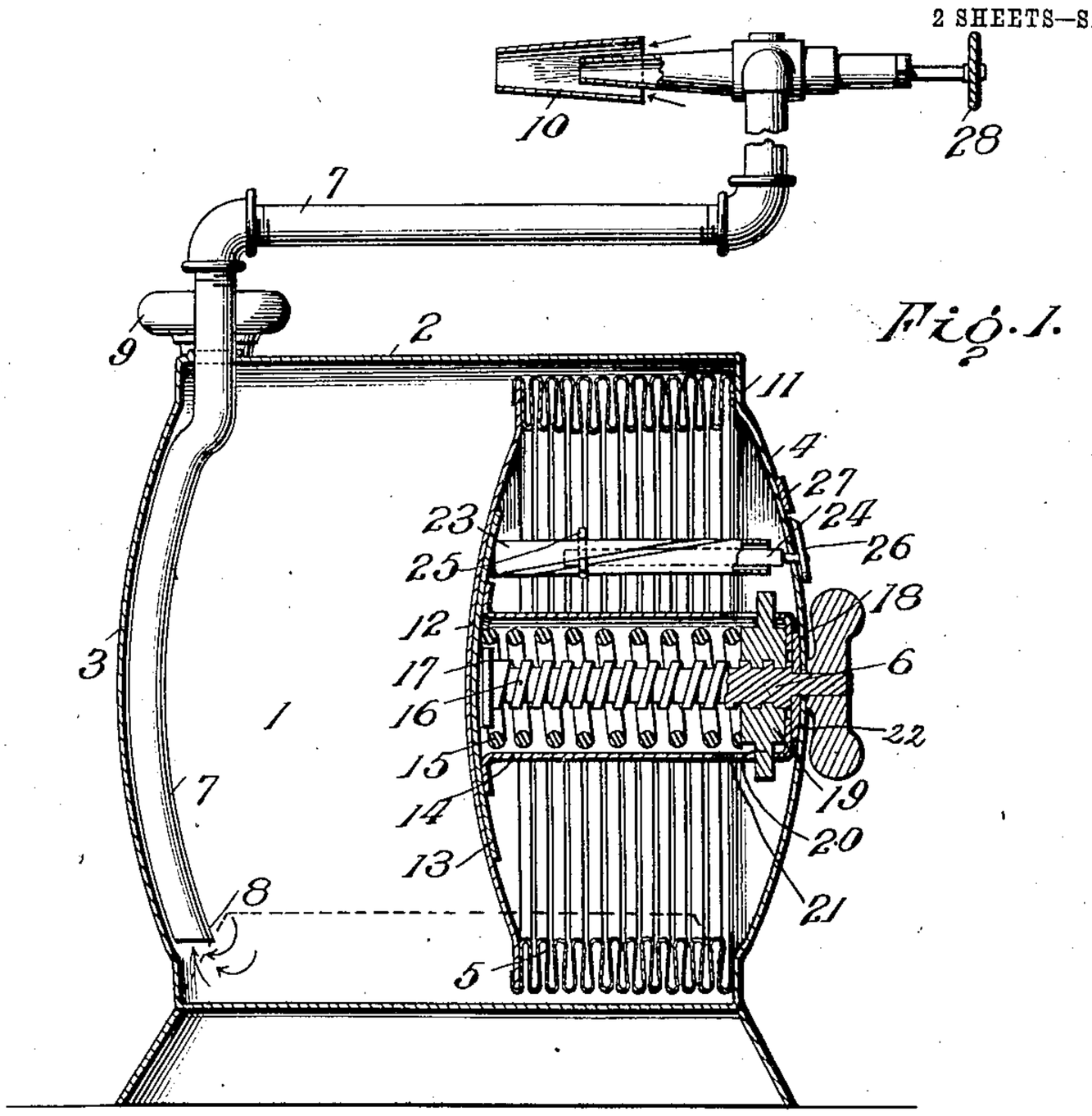

Fig. 1.

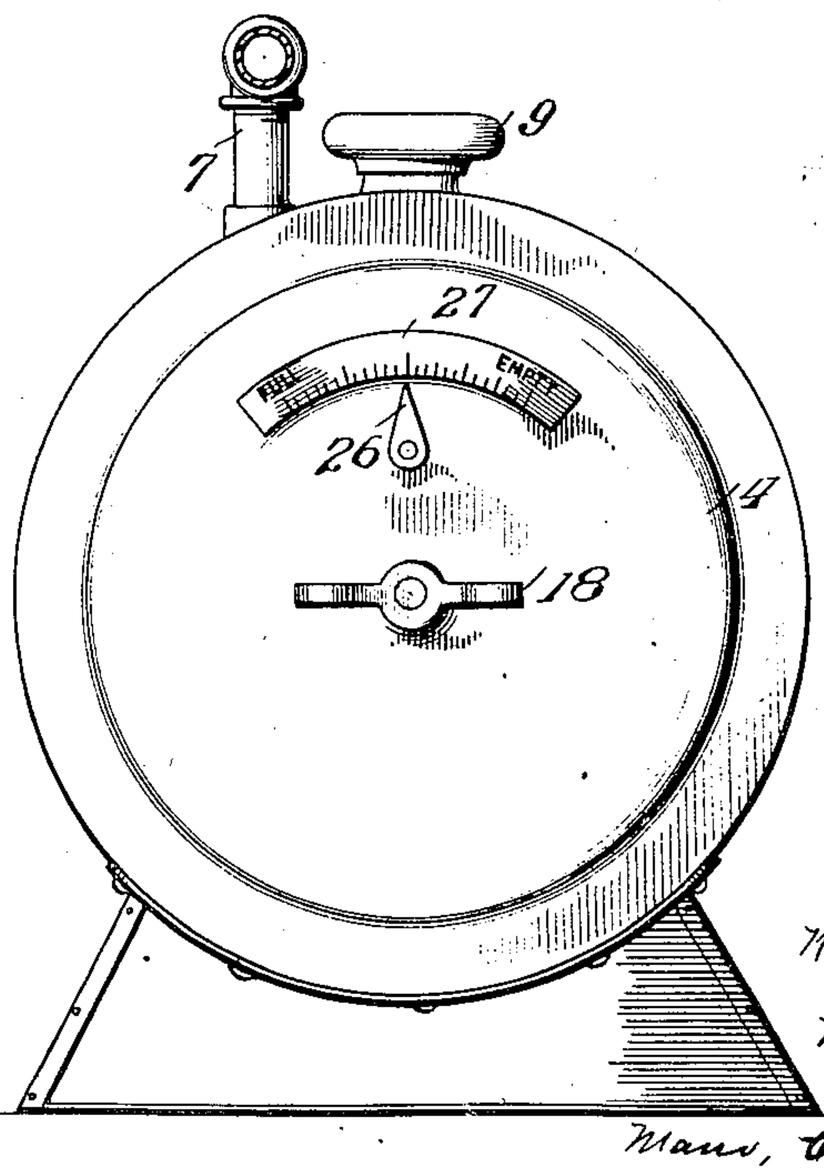

Fig. 2.

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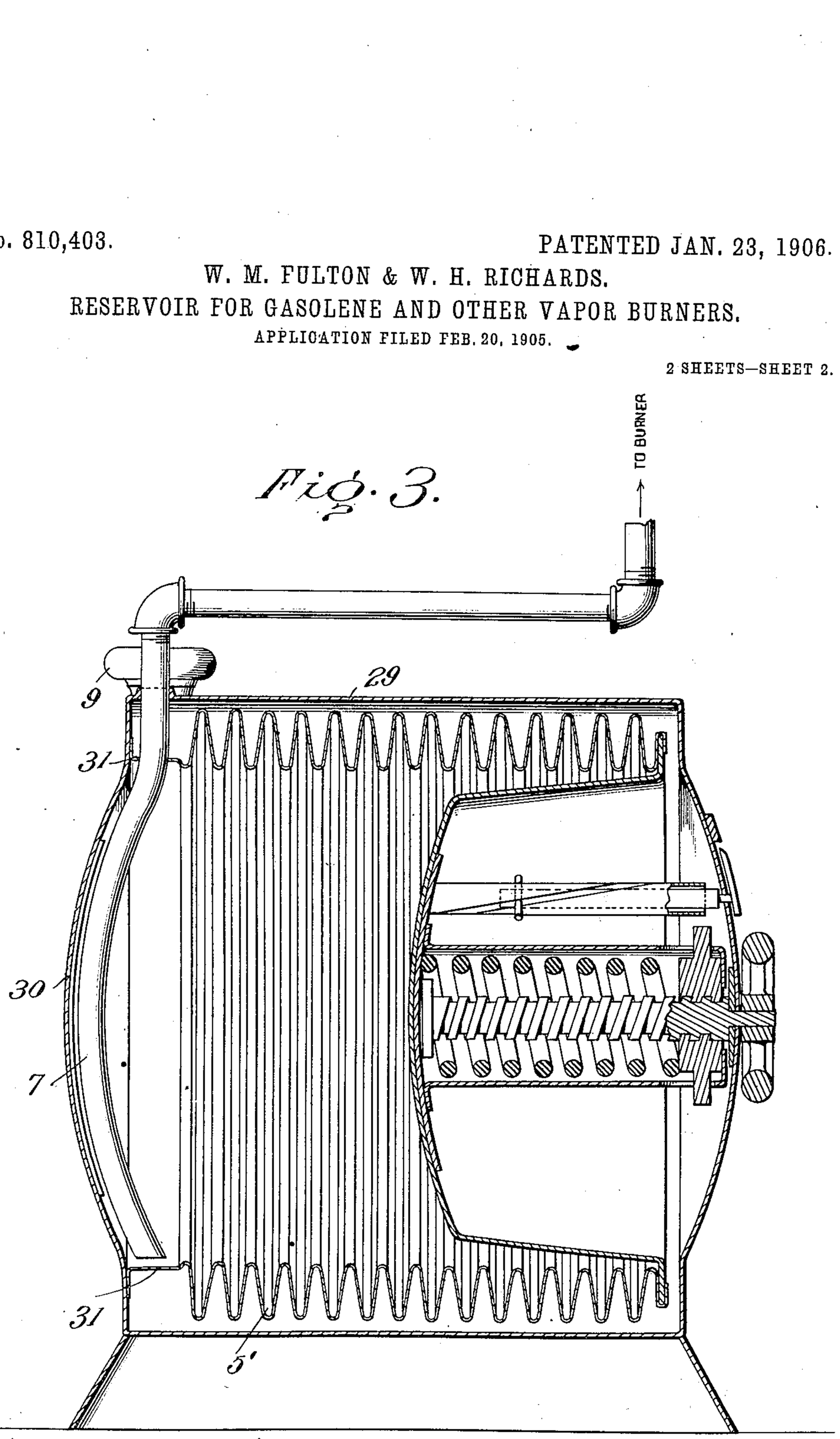
Fig. 3.



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UNITED STATES PATENT OFFICE.

WESTON M. FULTON AND WILLIAM H. RICHARDS, OF KNOXVILLE, TENNESSEE, ASSIGNORS TO THE FULTON COMPANY, OF KNOXVILLE, TENNESSEE, A CORPORATION OF MAINE.

RESERVOIR FOR GASOLENE AND OTHER VAPOR BURNERS.

No. 810,403. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed February 20, 1905. Serial No. 246,561.

To all whom it may concern:

Be it known that we, WESTON M. FULTON and WILLIAM H. RICHARDS, of Knoxville, Tennessee, have invented a new and useful Reservoir for Gasolene and other Vapor Burners, which invention is fully set forth in the following specification.

This invention relates to reservoirs for delivering liquid under pressure, and more particularly to such reservoirs as are used in connection with oil and vapor burners which require the fuel to be supplied under more or less pressure. In the usual form of such reservoirs the desired pressure for forcing the oil out of the reservoir to the burner is obtained by compressing air above the surface of the volatile liquid by means of an air-compressor, such as a pump or air-bulb. The use of air to create a pressure over volatile liquids, such as gasolene, results in producing an explosive mixture within the reservoir consisting of hydrocarbon vapor and oxygen of the air. This explosive gaseous mixture increases as the gasolene is expelled from the reservoir until it finally fills the entire space and is then under more or less pressure. When these conditions prevail, careless manipulation in refilling in the vicinity of a flame not infrequently results in serious accidents. A further objection to the use of air-pressure resides in the difficulty of securing air-tight joints, whereby the pressure may be maintained without frequent renewal.

It is the purpose of this invention to avoid the use of air in contact with the volatile fluid in expelling the fluid from the reservoir, thereby preventing the formation of any explosive vapors in the reservoir and reducing accidents which accompany the use of gasolene and like fluids to a minimum.

To effect this result and accomplish the objects of this invention, the reservoir is constructed of such material as sheet metal and is provided with collapsible sides and a movable end wall, or with rigid side walls, a rigid end wall, and the opposite end closed by a collapsible vessel, preferably made of corrugated sheet metal and arranged to telescope within the rigid side walls of the reservoir. Inlet and outlet conduits are located in the rigid walls for reception and delivery of the liquid fuel, and means, such as a spring, screw-actuated, for extending and collapsing the vessel are provided, whereby the liquid may be expelled and the vessel filled as desired. An indicator is also preferably provided which enables the operator to determine the quantity of fluid in the reservoir.

To enable a better understanding of this invention, certain mechanical expressions of the same are shown in the accompanying drawings, which are designed merely as illustrations to assist the description of the invention and not as defining the limits thereof.

Figure 1 is a vertical central section of the reservoir. Fig. 2 is an end elevation of the same, and Fig. 3 is a view of a modification.

In Fig. 1, 1 indicates a reservoir having rigid side walls 2 and an end wall 3. At the opposite end of the vessel is a closure 4, which is adapted to support a collapsible vessel 5 and its actuating means 6. Through the rigid wall 2 extends an exit-pipe 7, having its inlet 8 located near the bottom of the vessel. Although this pipe is shown as extending through the top of the vessel to the bottom, it might be fitted to the lower part of the vessel. An oil-inlet for filling the vessel is indicated at 9. The oil-exit pipe 7 communicates with any suitable vapor-burner, such as illustrated at 10.

The closure 4 is preferably provided with a flat portion or flange 11, to which is secured by soldering or welding one end of the collapsible vessel 5. This collapsible vessel 5 is provided with a rigid end wall 12, which is reinforced by a plate 13, carrying a tube 14 fast thereto. Within this tube is a spring 15, which serves to give a yielding pressure to the end wall 12 when the spring is placed under compression. Passing through the closure 4 and extending through the axis of the tube is a left-hand screw-threaded rod 16, having at one end a plate 17. This threaded rod extends through the closure 4 and is provided with any suitable handle, such as 18, for turning it. On this rod is a nut 19, provided with projections 20, which enter slots 21 cut in the side and near one end of the tube 14. A plate 22 is made fast to the closure 4 for the purpose of strengthening this portion of the same near the bearing end of the rod 16. At one side of the tube containing the spring and connecting-rod is a small cylinder 23, fast at one end to the plate 13 and provided with oppositely-disposed spiral

grooves. Within this tube or cylinder is a small spindle 24, carrying at one end a pin 25, which engages the slots in the tube. This spindle 24 extends through the closure 4 and is provided with a hand 26, which, together with a dial 27, graduated to indicate the capacity of the vessel, indicates the quantity of fluid within the reservoir.

The collapsible vessel 5 is preferably made of corrugated sheet metal and is of the character described in the application of Weston M. Fulton, Serial No. 217,287, filed July 19, 1904, one of the applicants herein. This collapsible vessel is of such a size as to completely fill the space to be occupied by the fluid which is to be expelled. In extending this vessel to expel the liquid there would be more or less danger of spreading the corrugations beyond the limit of elasticity, and to avoid this the plate 17 is placed on the rod 16 to limit the traverse of the nut 20 when the collapsible vessel is expanded to its farthest limit and, on the other hand, to prevent the vessel from being collapsed too much. The nut 20 in moving on the rod 16 meets the end wall 4, and thus prevents further movement of the wall 12 of the collapsible vessel. In order to secure these results, the length of the rod 16 is properly proportioned to the lengths of the collapsible vessel.

Having thus described the mechanical construction, its operation is as follows: Before filling the vessel with fluid the vessel 5 is collapsed by revolving the threaded rod 16 to the left, thereby causing the nut 20 to travel to the right, carrying with it the tube 14 and the rigid end wall 12 of the collapsible vessel. At the same time the movement of the wall 12 to the right causes the pin 25 to rotate the spindle 24 of the index-hand 26 to the position of "full." The space left vacant in the reservoir 1 can now be filled with any suitable fluid through the inlet 9 to displace all the air in the reservoir. When thus filled with liquid, the cap of the inlet is screwed on, and the handle 18 of the threaded rod 16 is turned to the right, thereby forcing the nut 20 against the spring 15 to place the latter under compression, thereby causing the rigid end wall 12 of the collapsible vessel to press upon the fluid contained in the reservoir. When thus placed under pressure, the oil will be forced through the pipe 7 to the vapor-burner 10 whenever the valve 28 in the latter is opened. This pressure will continue as long as spring 15 remains compressed. In addition to the pressure of the spring 15 the elasticity of the walls of the collapsible vessel itself serves to assist in expelling the liquid. When the spring-pressure is exhausted by the removal of oil and the collapsible vessel has expanded to fill the space left vacant, the oil may be again placed under pressure by again forcing the nut 20 along the threaded rod 16, renewing the tension of the spring. Just before the end wall 12 of the collapsible vessel reaches the pipe 7 the nut 20 will have reached the plate 17, and thereby prevent any further extension of the walls of the vessel.

To refill the vessel, all that is necessary is to return the collapsible vessel to its initial position by revolving rod 16. At any time during this operation the quantity of oil in the reservoir can be determined by the operator by noting the position of the hand 26 as it moves along the dial 27.

It will be seen from the construction and operation of this device that no air is permitted within the reservoir 1 which would cause the production of explosive vapors. Also there is wholly avoided any necessity for careful packing, because the joints of the vessel are all gas and liquid tight as the result of the soldering or welding of the several parts together.

Although we have described as one means of collapsing and expanding the vessel a screw and spring for creating the necessary pressure, yet other means may be employed to cause the extension of the vessel and the production of pressure—as, for example, the collapsible vessel might be actuated by the introduction of air under pressure. Such air, however, would be entirely excluded from access to the reservoir because of the separating-walls of the collapsible vessel. This form of vessel is especially useful in connection with gasolene blast-lamps, fire-pots, torches, and the like, where a very volatile fluid, such as gasolene, is used and where a pressure is to be continued for considerable time, as in the present construction there is no danger of leaky valves, as in the case where a pump is used to force air above the surface of the liquid to create pressure.

In the modification illustrated in Fig. 3 the fluid is placed within the collapsible vessel 5′. The means for collapsing and expanding the vessel may be and preferably are the same as described in connection with Fig. 1. The outer casing 29 serves to protect the corrugated vessel from injury, the end walls of which serve both to close end 30 of the collapsible vessel and to support the opposite end with the devices connected therewith.

In order to provide for the introduction of fluid into the collapsible reservoir and also for the exit of the same, the end of the vessel beyond the corrugations is provided with a plain portion 31, to which the inlet and outlet conduits are fitted, as clearly indicated in Fig. 3. The operation of this form of the device is similar to that described above and shown in Fig. 1. In the latter form, however, the fluid is contained within the collapsible vessel itself and is expelled by collapsing the vessel and filled by expanding the same.

Both forms of the device possess the advantages of safety in that air is completely excluded from access to the volatile liquid,

such as benzin, in the reservoir, thereby avoiding the presence of explosive mixtures therein. The pressure in the reservoir is under ready control and can be rapidly applied by manipulation of the pressure device, a decided advantage over the slowly-operating pneumatic-pressure devices now in use. The corrugations of the collapsible vessel are by reason of the fixed limitations of the traverse placed on the vessel by the operating-rod free from danger of exceeding the limit of their elasticity, thereby protecting the collapsible vessel from harmful strains and extending its life indefinitely.

Having thus described the invention, what is claimed is—

1. A reservoir having rigid side walls and a rigid end wall, a collapsible and expansible vessel closing the opposite end of said reservoir and movable within the latter, a rigid supporting-plate fast to the end of the reservoir, a threaded rod, one end having a bearing in said plate and provided with a nut traveling along said rod, and a member fast to the collapsible vessel and engaging said nut, whereby the rotation of said rod causes the said vessel to collapse or expand.

2. A reservoir having rigid side walls and a rigid end wall, a collapsible and expansible vessel closing the opposite end of said reservoir and movable within the latter a screw-threaded rod and supporting means for the outer end of the same, a nut on said rod engaging a member on said collapsible vessel, and a shoulder or end plate on said rod to limit the outward traverse of said vessel.

3. A reservoir having rigid side walls and a rigid end wall, a collapsible and expansible vessel closing the opposite end of said reservoir and movable within the latter, a screw-threaded rod, and supporting means for the outer end of the same, a nut on said rod, and a member connecting the nut with said vessel, and a spring intermediate said nut and vessel for placing the liquid in the reservoir under pressure.

4. A reservoir having rigid side walls and a rigid end wall, a collapsible and expansible vessel closing the opposite end of said reservoir movable within the latter and having a rigid end wall, a screw-threaded rod and supporting means for the outer end of the same, a nut on said rod, and a member connecting the nut with the end wall of said vesse , a spring intermediate said nut and wall, and a spirally-slotted tube fast to the latter and engaging a registering device.

5. A reservoir having a collapsible and expansible closure for displacing fluid from the same, a revoluble screw-threaded operating-rod provided with a traveling nut, a fluid-compression spring one end of which rests against said closure and the other end against said nut, a slotted member fast to said closure and engaging said nut to restrain the same from rotation, and to limit the extent of compression of said spring upon said fluid.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

WESTON M. FULTON.
WILLIAM H. RICHARDS.

Witnesses:
W. B. FORD,
F. M. DE ARMAND.