(No Model.)

J. E. HOLMES.

APPARATUS FOR TRANSPORTING AND TRANSFERRING GASES OR LIQUIDS UNDER PRESSURE.

No. 382,610. Patented May 8, 1888.

Fig. 1.

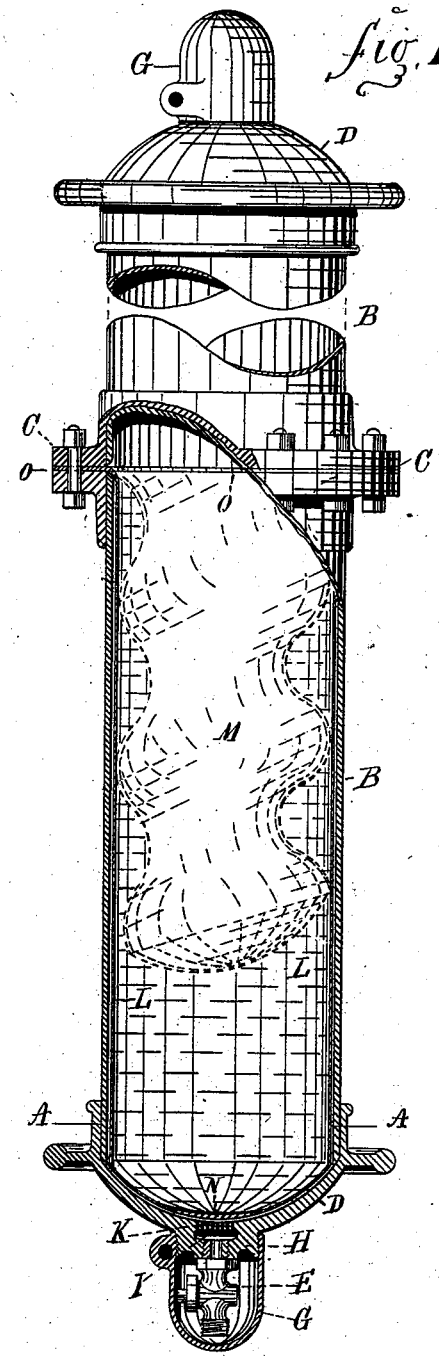


Fig. 3.

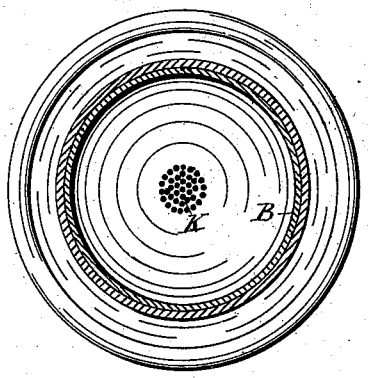
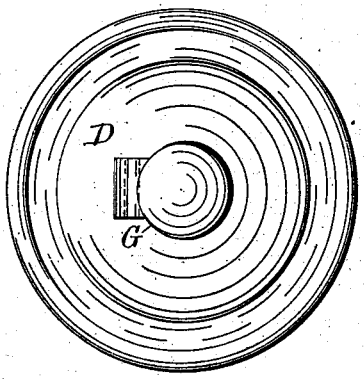


Fig. 2.



WITNESSES.

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APPARATUS FOR TRANSPORTING AND TRANSFERRING GASES OR LIQUIDS UNDER PRESSURE.

SPECIFICATION forming part of Letters Patent No. 382,610, dated May 8, 1888.

Application filed April 20, 1887. Serial No. 235,515. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ELLICOTT HOLMES, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Transporting and Transferring Gases or Liquids Under Pressure; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in appliances or apparatus for transporting and transferring gases, especially when under pressure or in a liquid form.

The objects of my invention are, first, to overcome a difficulty which has long been had in transferring gases from one holder to another without a reduction of pressure corresponding to the additional amount of area or volume of the holder to be filled, or to maintain the same pressure after the transfer as that in the original holder, and to increase the pressure, if desired; second, to form a gas-holder of sufficient capacity to contain and transfer any desired quantity of compressed gas or liquefied gas from the manufactory to any point where gas under pressure is required, such as combined refrigerating-safes where the fixed gas-holders are to be supplied with compressed or liquefied ammoniacal gas, and to ships and torpedo-boats when carbonic-acid gas is employed as a motive force for submarine navigation, or apparatus for aerating beverages, and for extinguishing fires. I attain these objects by introducing into the gas-holder (which may be of the usual form to contain gases under pressure) an elastic flexible diaphragm, preferably formed of rubber, and of half of the length of the gas-holder, the body or cylindrical portion of which is made sufficiently thin to be thoroughly flexible, one end being closed by a head of sufficient thickness to be self-supporting and to conform to the shape of the end of the gas-holder. Upon the other end of this diaphragm is formed a flange turning outward, extending into and forming a gasket for a flanged joint connecting the two halves of the holder. This diaphragm constitutes a division between the two heads of the holder, separating any substances that may be contained therein, and by its flexibility can be transferred from one end to the other by the introduction of any gaseous or liquid substance introduced into either end of the holder, causing a displacement or transfer of whatever substance may be contained in the opposite end. Thus for the transportation and transfer of gas (the diaphragm being forced to the end to be filled to displace all air or other matter) the holder is filled in the ordinary manner by the use of force-pumps or other devices at the manufactory and conveyed to different points where compressed gas is required and connection formed between the receptacle or holder containing the gas and one to be filled. The reduced pressure caused by the discharge is restored to the original amount by liquid being forced into the opposite end of the holder and back of the diaphragm or piston by means of a force-pump, the flexible diaphragm or piston moving just in proportion to the displacement.

That my invention may be better understood, reference is had to the accompanying drawings, in which—

Figure 1 represents a gas holder or receptacle, partly in section, made in conformity with my invention, showing its general construction. Fig. 2 is an end view, and Fig. 3 is a cross-section at A A, Fig. 1, of the holder.

B B indicates the shell, cylindrical in form, which is made in two equal sections and provided with strong flanges C, by which the two sections are secured or bolted together; D, the heads, which are made convex outward and securely attached to and closing the ends of the cylinder. In these heads at each end of the holder are arranged valves E, for charging and discharging, which are protected from injury by guards G G, which are secured on projections H, formed on the heads.

I is a chamber formed in the projections H, which are open to the valves E and communicate with the interior of the holder by means of small holes or perforations K, the combined area of which is not less than one and one-half time the area of the passage through the valves E.

L L indicate the flexible hollow diaphragm, (shown distended and filled with fluid or liquid,) and M the diaphragm (shown in broken lines) when the holder is in the process of being charged or discharged of its contents.

N indicates the re-enforcing or strengthening of the end of the diaphragm by introducing strong canvas or wire-cloth to prevent its being pressed into the perforations K in the heads of the holder and being injured thereby.

O is a flange formed on the open end of the diaphragm, which forms a gasket in the joint between the sections of the cylindrical holder and the medium of connection between the diaphragm and the holder.

I am aware that prior to my invention flexible hollow diaphragms have been used in connection with holders of various kinds for different purposes—such as the discharge of gas with a uniform pressure for illumination, also for the administration of gases in dental or surgical operations, but with slight pressure—which I do not broadly claim; but

What I do claim as new and useful and my invention is—

The sectional cylindrical holder B for liquefied ammoniacal gas or other like fluids under pressure, consisting of two sections each having a flanged portion, C, with means for fastening the sections together, and heads D, which are provided with inlet and outlet pipes with valves E, chamber I, and perforated passage K, in combination with the flexible elastic diaphragm L, having a re-enforcement, N, arranged in said holder, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH ELLICOTT HOLMES.

Witnesses:

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A. S. YANTIS.