June 3, 1947. H. MERKER ET AL 2,421,460

COMPRESSED GAS CONTAINER

Filed March 20, 1944

Fig. 1.

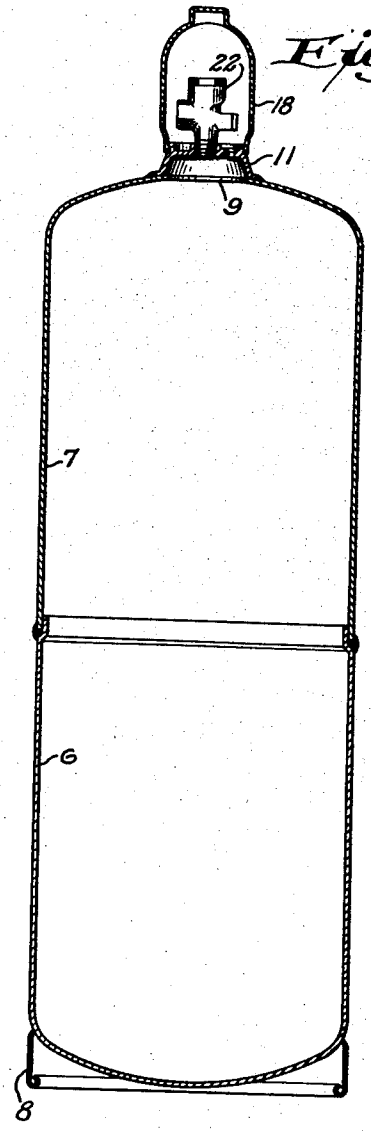


Fig. 3.

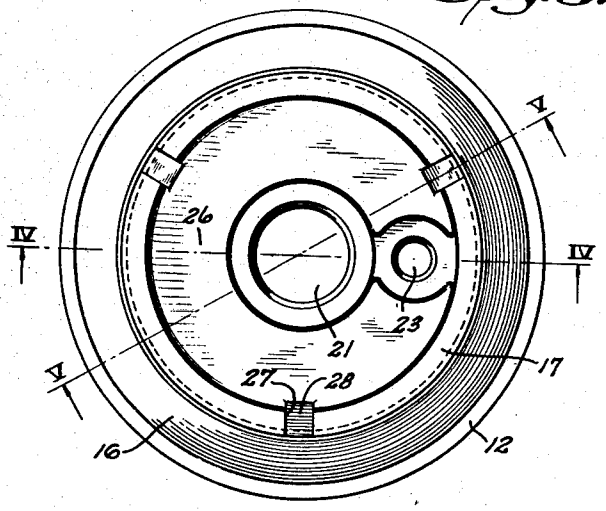
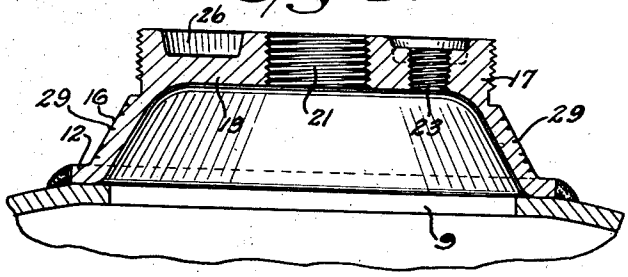


Fig. 4.



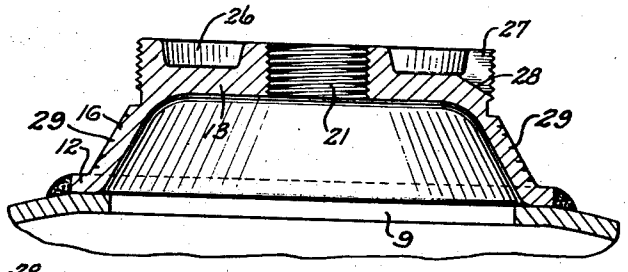


Fig. 5.

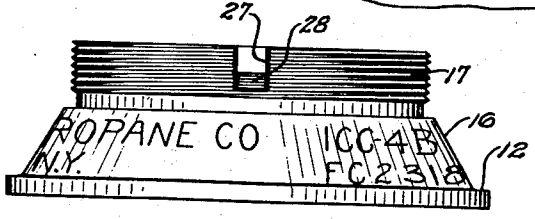


Fig. 2.

INVENTORS
HERMAN MERKER
JOHN L. GRAHAM
BY John W. Michael
ATTORNEY.

Patented June 3, 1947

2,421,460

UNITED STATES PATENT OFFICE

2,421,460

COMPRESSED GAS CONTAINER

Herman Merker and John L. Graham, Milwaukee, Wis., assignors to Pressed Steel Tank Company, Milwaukee, Wis., a corporation of Wisconsin

Application March 20, 1944, Serial No. 527,156

1 Claim. (Cl. 220—3)

1

This invention relates to improvements in containers for handling and particularly for shipping compressed gases.

Vessels for shipping compressed gases must bear certain information required by interstate commerce regulations which also require that the information be permanently stamped on a plate attached on all edges to the cylinders or on a part of the vessel itself. Regulations forbid stamping the markings in the container walls because wall strength is decreased by the impressions made by the stampings.

If a ring is placed about the neck of a thin-walled container to act as a reinforcement of the neck or is used in combination with a spud secured to the container for receiving the discharge valve thereof, the outer peripheral surface of the ring must be threaded for attachment of a cap protecting the valve during handling of the container. Such ring accordingly does not provide any surface in which the required markings may be impressed. When a spud is mounted on the container and a neck ring is attached to the spud, the neck ring can be fastened only at one of its edges. Moisture is accordingly trapped under the ring which leads to corrosion of both the container and the ring. The ring covers the weld between the cylindrical portion of the container and the spud and must be removed to detect and repair leaks in the weld. And regulations will not permit placing the required markings on the neck rings because the rings can be attached at only one edge.

Even if the vessel walls are sufficiently heavy to have the markings impressed thereon without affecting the wall strength, the impressions are frequently obliterated by damage or the markings become illegible by filling of the impressions with paint used to coat the vessels. Unless the markings are clearly legible at all times, the vessel cannot be re-used for handling compressed gases and must be scrapped or converted to other uses.

It is therefore an object of the present invention to provide a container for handling compressed gases in which special means are provided for carrying the permanently impressed markings required by interstate commerce regulations.

Another object of the invention is to provide a compressed gas-shipping vessel with special means on which the required markings are so impressed that removal thereof destroys the utility of the vessel for its intended purpose.

Another object of the invention is to provide a compressed gas-shipping container in which a combined closure and identification fitting or boss

2

closes the opening in the container, receives the discharge valve, and provides a space on which the permanent markings may be impressed without danger of obliteration thereof during use.

Objects and advantages other than those above set forth will be apparent from the following description when read in connection with the accompanying drawing, in which:

Fig. 1 is a vertical cross sectional view of a container for handling compressed gases and somewhat diagrammatically shows the combined closure, fitting and boss of the present invention;

Fig. 2 is a side elevation on an enlarged scale of the closure, fitting, and boss;

Fig. 3 is a top view of the closure, fitting, and boss;

Fig. 4 is a cross section taken on the plane of line IV—IV of Fig. 3; and

Fig. 5 is a cross section on the plane of line V—V of Fig. 3.

Referring more particularly to the drawing by reference numerals, 6 and 7 designate the upper and lower portions of a cylindrical vessel made of sheet metal, the lower portion 6 having a ring 8 secured thereto to form a base for the vessel and the upper portion 7 of the vessel having an opening 9 therethrough. The opening 9 is closed by a combination closure, valve fitting and identification boss, generally designated 11, which is either a casting or a forging formed substantially as a frustum of a hollow cone with a peripheral flange 12 about the base of the cone and with the upper end of the frustum closed by a disc 13. The conical surface between the flange 12 and the disc 13 is designated by the numeral 16. The upper portion of the combination closure and boss 11 is formed with a cylindrical portion 17 threaded on the periphery thereof to receive a cap 18. The disc portion 13 of the closure and boss has an aperture 21 which is threaded to receive a discharge valve indicated at 22 and may or may not be provided with a second aperture 23 for the reception of a fusible plug or other safety device. The cylindrical portion of the closure and boss forms a flange 26 extending above the surface of the disc portion 13 and the flange is provided with a plurality of notches 27 having the bottoms thereof cut, as indicated at 28, down to or below the upper surface of the disc portion 13 to provide for drainage therefrom. It will be noted that the closure and boss forms a part of the tank wall and that the inner surface thereof defines a substantially bowl shaped cavity devoid of flanges or other projections which might interfere with drainage of the vessel after the hydrostatic testing thereof.

The structure above described provides for placing the required markings on a permanent portion of the container itself, which avoids the use of a separate name or marking plate and avoids the disadvantages of a special neck ring used either with or without a spud. There is no danger of damage to the vessel by brazing or welding on of a plate or a neck ring and the combination closure, fitting and boss can be made as heavy as desired to avoid all possibility of damage during marking. The above structure is accordingly not subject to possible damage which may occur even with the manner of marking now permitted by the regulations.

It will be seen from the above that the combined closure, fitting and boss disclosed in the present application provides a surface **16** which is recessed or reentrant so that the surface is beneath the curvilinear plane tangent to the upper peripheral edge of the flange **26** and the shoulder of the cylinder portions **6, 7**. The required markings may accordingly be placed on such surface without danger that the markings can be obliterated by accidental damage during use. The marked surface of the closure and boss is at an angle with the vertical center line of the container so as to be normal to the sight line of the average person looking for the markings, which makes the markings more readily visible and more easily legible. The marked surface of the closure and boss may, of course, be treated either before or after marking by plating or spraying with a corrosion resistant metal, thereby making painting unnecessary.

Particular advantages result from placing the markings on the closure and boss due to the fact that the impressing or stamping of the markings may be done after testing the completed container without danger of damage to the container walls. Containers are purchased in lots which must be correctly serially numbered and with each numbered container identified with the lot of steel from which it is made. Good manufacturing practice requires that the containers be loaded in cars for shipping as soon as tested. Heretofore the vessels had to be marked before testing, with all the required data including the serial number, and the test failure of a single vessel destroyed the sequence of serial numbering. It was then necessary to examine all the previously tested and loaded vessels to insure correct serial numbering before shipment. But marking after testing without incurring danger of damage to the containers allows records to be kept identifying a particular portion of the serially numbered containers with a particular lot of steel even though one or more containers fail on test after all of that particular lot of steel has been used in manufacture. Replacement of an already numbered container, which has failed on test by another container made from a different lot of steel, is accordingly avoided and the chances of errors in keeping records identifying each particular container are greatly reduced. Finished containers may accordingly be loaded into cars after testing and after marking, in the sequence of their serial marking, thus also avoiding the rehandling of a large number of containers to check the accuracy of records.

Referring to Figs. 4 and 5, the numeral **29** indicates indentations made in the metal by impressing the required markings into the closure and boss. The closure and boss are subjected to the pressure of the gas in the vessel and the impressions destroy the tensile strength of the metal

for their entire depth. If the materials of the closure and boss and the other walls of the vessel have the same tensile strength, the closure wall **16** must be made heavier than the wall of vessel portions **6** and **7**, by the amount necessary to compensate for weakening of the wall caused by the indentations, thus enabling all parts of the finished vessel to withstand the same pressure. However, if the walls of vessel portions **6** and **7** and the closure and boss wall portion **16** are made of material having different tensile strengths, the wall **16** need be made only sufficiently thick so that the tensile strength remaining after marking is just equal to the strength of the vessel wall portions **6** and **7**. Any attempt to remove markings, followed by re-marking of the container, will decrease the closure and boss wall strength below that of the walls of portions **6** and **7** and the vessel will no longer be able to withstand the required pressure. Such changing of the markings, therefore, destroys the utility of the container for the pressure for which it was designed and prevents theft or the use of the re-marked container. The above balancing of the tensile strengths of the closure and boss wall and the container walls produces a structure requiring the minimum of metal for a given pressure and hence reduces the cost of manufacture and the labor required in handling the containers.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claim.

We claim:

A container for gases under pressure comprising a cylinder having an opening in one end thereof and a combined closure fitting and identification boss mounted on the cylinder about the opening therein, the fitting and boss being formed as a frustum of a hollow cone with an apertured transverse wall across the apex thereof, the wall of the hollow cone being of substantially uniform thickness, and a peripheral flange at the base of the cone attached to the cylinder about the opening therethrough, the inner surface of the closure fitting and boss defining a substantially bowl-shaped cavity surrounding said opening for facilitating drainage of all liquids from the container, said transverse wall having an upstanding cylindrical flange provided with drainage ducts extending therethrough for draining the space above said transverse wall surrounded by said flange.

HERMAN MERKER.
JOHN L. GRAHAM.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,076,585	Merker	Apr. 13, 1937
1,413,502	Stenmetz	Apr. 18, 1922
1,753,259	Badger	Apr. 8, 1930
2,234,458	Underhill	Mar. 11, 1941
1,248,720	Rosenfeld	Dec. 4, 1917

FOREIGN PATENTS

Number	Country	Date
494,796	Great Britain	Nov. 1, 1938
503,537	France	Mar. 20, 1920