

E. E. SLICK & J. H. NICHOLSON.
 METHOD OF MAKING CONTAINERS FOR GAS AND THE LIKE.
 APPLICATION FILED JUNE 7, 1911.

1,084,115.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

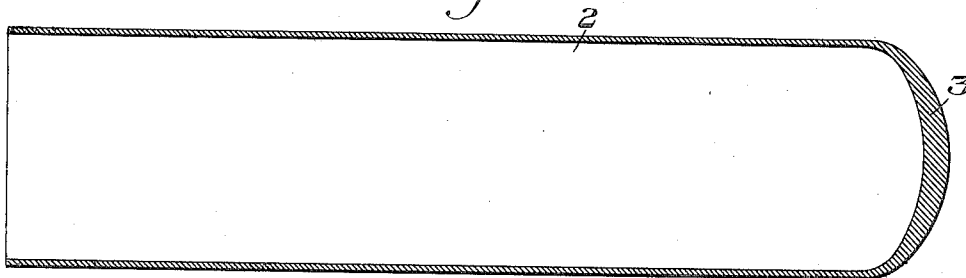


Fig. 2.

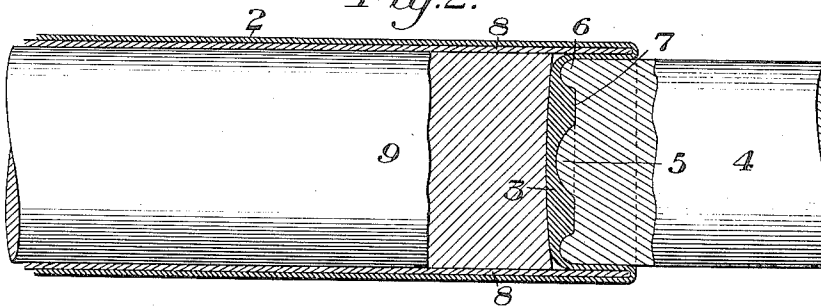


Fig. 3.

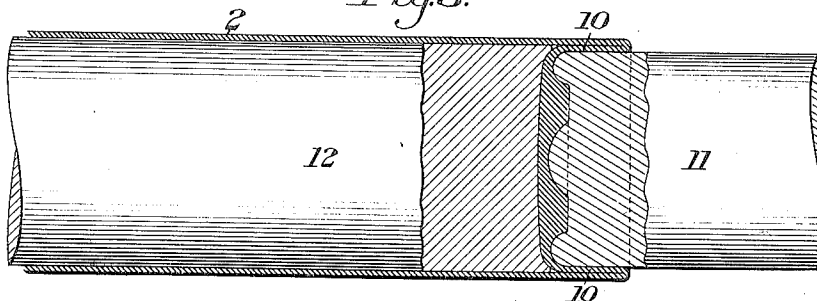
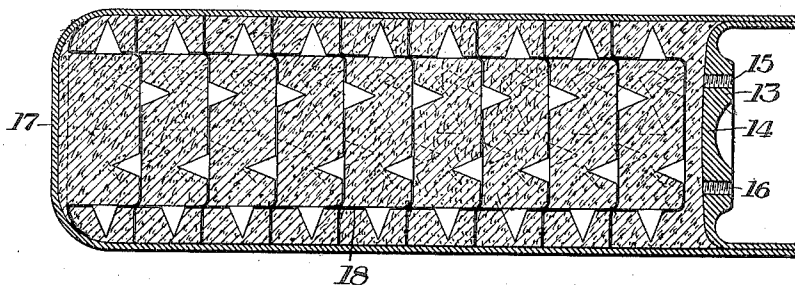


Fig. 4.



WITNESSES

R. A. Balderson
W. J. Farnsworth

INVENTORS

E. E. Slick
J. H. Nicholson
 by *Darius Ames & Partners*
 their attys.

E. E. SLICK & J. H. NICHOLSON.
METHOD OF MAKING CONTAINERS FOR GAS AND THE LIKE.
APPLICATION FILED JUNE 7, 1911.

1,084,115.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 2.

Fig. 5.

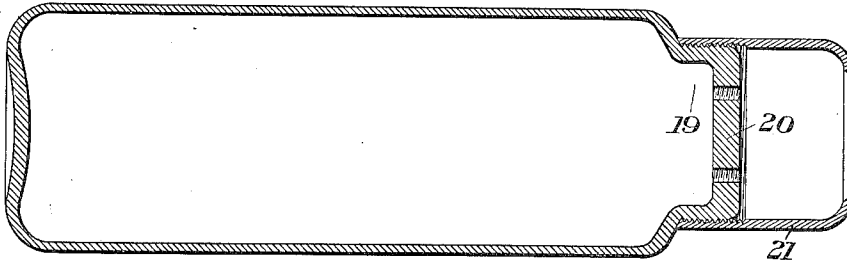


Fig. 6.

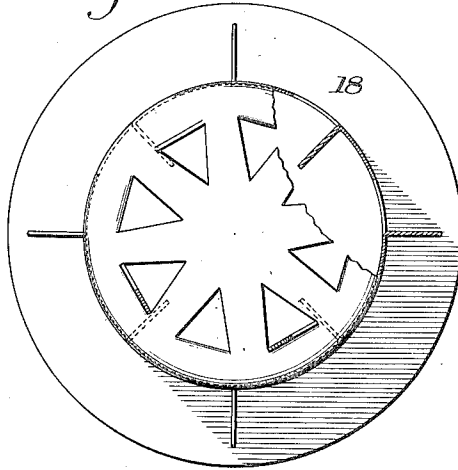
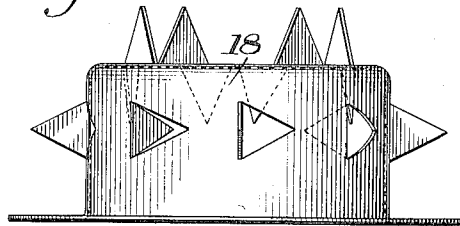


Fig. 7.



WITNESSES

R. A. Balderson
W. J. Lariss

INVENTORS

E. E. Slick
J. H. Nicholson
by Darius H. Hines & Son
their attys

UNITED STATES PATENT OFFICE

EDWIN E. SLICK AND JOHN H. NICHOLSON, OF PITTSBURGH, PENNSYLVANIA, ASSIGNORS TO SHENANGO MANUFACTURING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

METHOD OF MAKING CONTAINERS FOR GAS AND THE LIKE.

1,084,115.

Specification of Letters Patent.

Patented Jan. 13, 1914.

Application filed June 7, 1911. Serial No. 631,871.

To all whom it may concern:

Be it known that we, EDWIN E. SLICK and JOHN H. NICHOLSON, both of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Method of Making Containers for Gas and the like, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a blank which we prefer to employ; Figs. 2 and 3 are partial longitudinal sections, showing successive steps in one form of our process; Fig. 4 is a longitudinal section of the completed container resulting from such form of the process; Fig. 5 is a view similar to Fig. 4, showing a modified form of the container; and Figs. 6 and 7 are enlarged plan and side elevation views, showing the preferred form of partition which we employ.

Our invention relates to the manufacture of gas containers, especially steel cylinders for storing acetylene gas, which may be absorbed by acetone or other absorbent and supplied to a cylinder containing porous or fibrous filling.

In the manufacture of such containers or cylinders as are extensively used at the present time, the body or cylindrical portions of the cylinder containing an integral bottom or end, is stamped or cupped up from a suitable circular plate or sheet. A molded filling of porous or fibrous material of required shape with stiff exterior is then inserted into the open end cylinder and a suitable shaped shallow cupped head is brazed into the open end. In such a method of manufacture great difficulty has been experienced in making tight the brazed joint between the inserted head and the open end portion of the cylinder shell. Our invention is designed to overcome this difficulty of leakage and at the same time provide a stronger and safer container. This is accomplished by making both heads of the container or cylinder integral with the sides without brazing, soldering, welding or other forming of joints. If the container is made from a blank closed at one end, we close in the side walls at the other end, after putting in the filler. If made from a blank open at both ends then we form both heads from the

cylindrical portion or shell of the container. This closing in to form the integral end or ends is preferably carried out by a spinning operation, which consists in revolving at a high rate of speed an open end tube chucked in a suitable lathe or machine, and forcing inwardly the edges of the open end tube by a blunt nosed tool into a partially spherical shaped closure. The blank may be preheated to a chill red heat, and the heat generated by the friction contact of the rapidly revolving tube and the blunt nosed tool draws in and welds the spherical end at the center, making it integral with the sides or body of the shell of the container. This forming of the integral head or heads may also be performed by forcing the end portions of the walls of a preheated open tube or shell into dies of hemispherical shape, which will reform the open ends into integral hemispherical heads. While in the ordinary practice of our invention, it is contemplated that a tube open at both ends shall be used for the manufacture of this gas cylinder, the two integral ends being formed from the walls of the tube, we can, however, use a blank with one integral end, which has been stamped up from a sheet or plate, similar to that heretofore described and now generally used with a brazed or soldered inserted end. After inserting the porous or fibrous filling in such a tube, we can spin in and close the open end, making the closure integral with the sides of the cylinder or tube. In such a case it would be necessary to make some changes in the shape or design of this end to give proper protection to valve and gage.

Our improved container therefore comprises a cylinder having both heads integral with the side walls and containing the absorbent filling, which of course is placed in the cylinder before the final closing of the open end.

In Figs. 1, 2 and 3, we show successive operations in one form of our process.

Fig. 1 shows the steel blank consisting of a cylinder 2, having an integral head 3 at one end which may be formed by spinning or closing in an open end by dies or may be formed by cupping a tube from a sheet or plate. In order to protect the pressure gage and the valve from injury, the head at one end of the cylinder is inset

within the side walls. In this head, also, it is required that the portions tapped for attachment of the pressure gage and outlet valve shall be of a certain depth to give the requisite length of screw thread connection. To effect these results, in the form of Figs. 2 and 3, we show a hydraulic press apparatus, in which 4 is the plunger of a hydraulic press, having its forging end provided with a central projection 5 and an outer annular projection 6, with an annular recess 7 between them. 8 is a hollow former of tubular shape which fits around a resistance core 9, preferably of steel. The head 3 being heated, is forged by the hydraulic plunger 4 into the form shown in Fig. 2. The blank thus formed is then taken into another press, the parts 8 and 9 being removed, and the inner wall portion 10 is pressed out against the side wall by use of hydraulic plunger 11 and core 12 which fits the inside of the cylinder. The thickened annular portion 13 of the inset integral head 14 thus formed is of the proper depth for the screw-threaded holes 15 and 16 to receive the pipe connections for the gage and valve. The filling material is then put in through the open end of the cylinder; this material is usually in molded form of porous asbestos of proper form and length, which may be slid in through the open end of the receptacle and fills the space therein. The open end of the receptacle is then closed by spinning the material of the side walls inwardly, thus forming the integral closed head. During this spinning operation, the heat developed is found in actual practice to effectually weld and close the central portion of the head as the portions of the side walls are spun inwardly. The spinning machine used for this purpose may be of the type described; and instead of spinning we may force the end of the cylinder, which is preferably heated in this case, into a series of dies, which will force the material of the side walls inwardly and thus form the integral head. This head as formed in such operation will usually be of dome-shape, and it may then be flattened down to form a substantially flat head, as shown at 17 in Fig. 4. This action causes this head to fit against the filling and avoid any unfilled spaces which are dangerous in this class of receptacles. Instead of a molded filling of asbestos, we prefer to divide up the space in the cylinder by a series of transverse partitions which are fixed against longitudinal movement in the cylinder. In the form shown in Figs. 4, 6 and 7, the partitions 18 are in the form of a straw-hat, the top and sides of the hat-body being slotted and pressed outwardly and inwardly, as shown in Figs. 6 and 7, to provide holding tongs for the fibrous filling material. These partitions are pushed in endwise with the

material, such as fibrous asbestos, packed firmly between them, the space in the container thus being filled. The partitions interfit with each other as shown, and serve to more effectually prevent any sagging or displacement of the filling which is liable to leave a space sufficiently large to cause danger. If any slight space is formed in one of our compartments it does not affect another compartment, and hence formation of a large and dangerous space is avoided.

In Fig. 5 we show another form of our improved container, in which instead of inset setting the integral head of the blank, as shown in the first figures, we form the portion 3 of the blank into a reduced bottle neck form, as shown at 19, the integral head 20 of this neck being sufficiently thick to give the requisite depth of hole for the threaded connection. To protect the pressure gage and valve in this form, we secure around the bottle neck a sleeve protector 21. This protector may be screw-threaded to the exterior of the neck, or secured thereto in any desirable way, its overhang being sufficient to protect the attachment. The absorbent material is then filled in through the open end; and this end is then closed by a spinning or die-necking operation.

The advantages of our invention will be obvious to those skilled in the art, since a container is provided which is seamless throughout, the heads being integral with the side walls, while at the same time the cylinder contains the absorbent or filling material adapted to receive the absorbent for the acetylene gas.

The containers may be rapidly and cheaply made, and all liability to leakage at the joint with the separate head is avoided. The use of the partitions reduces liability to a dangerous cavity, and these partitions may be cheaply made and assembled with the packing, they interfitting with each other in the form shown.

Many changes may be made in the process and apparatus employed for the manufacture of the cylinders, the form of the container may be varied, and other changes may be made without departing from our invention as defined in the appended claims.

The novel method of construction herein shown and described forms the subject-matter of a divisional application.

We claim:

1. The herein described method of making a gas container, which consists in inserting a porous or fibrous filling into a cylinder, tube or shell, having one closed end, and then closing the open end by drawing in the end portion to form a solid integral head and forcing said head inwardly against the filling to compress it and eliminate void spaces therein; substantially as described.
2. The herein described method of making

a gas container, which consists in inserting a porous or fibrous filling into a cylinder, tube or shell having one closed end, then closing the open end by spinning the end
5 portion to form a solid integral head, and after the head is formed, forcibly deforming it inwardly against the filling; substantially as described.

3. The herein described method of making
10 a gas container, which consists in inserting a porous or fibrous filling in a cylinder-tube or shell having an open end, closing the open end, and then insetting or deforming one end of the tube against the filling to compress it and eliminate void spaces therein;
15 substantially as described.

4. The herein described method of making a gas container, which consists in taking a tube or shell and closing one end thereof by
20 an integral portion of the tube or shell, then inserting a porous or fibrous filling through

the open end of the tube or shell, then closing said open end, and then insetting or deforming one end of the tube against the filling to thereby eliminate void spaces therein; 25 substantially as described.

5. In the manufacture of gas containers, the improvement consists in taking a tube or shell, forming an inset head from one end portion of said tube or shell, then inserting
30 porous filling into the tube or shell through its open end, then closing said open end, and finally pressing or deforming one of the closed ends to eliminate void spaces within the tube or shell; substantially as described. 35

In testimony whereof, we have hereunto set our hands.

EDWIN E. SLICK.

JOHN H. NICHOLSON.

Witnesses:

GEO. B. BLEMING,

H. M. CORWIN.