R. H. CAMPBELL.

CONTAINER OR CYLINDER FOR COMPRESSED OR LIQUEFIED GAS.

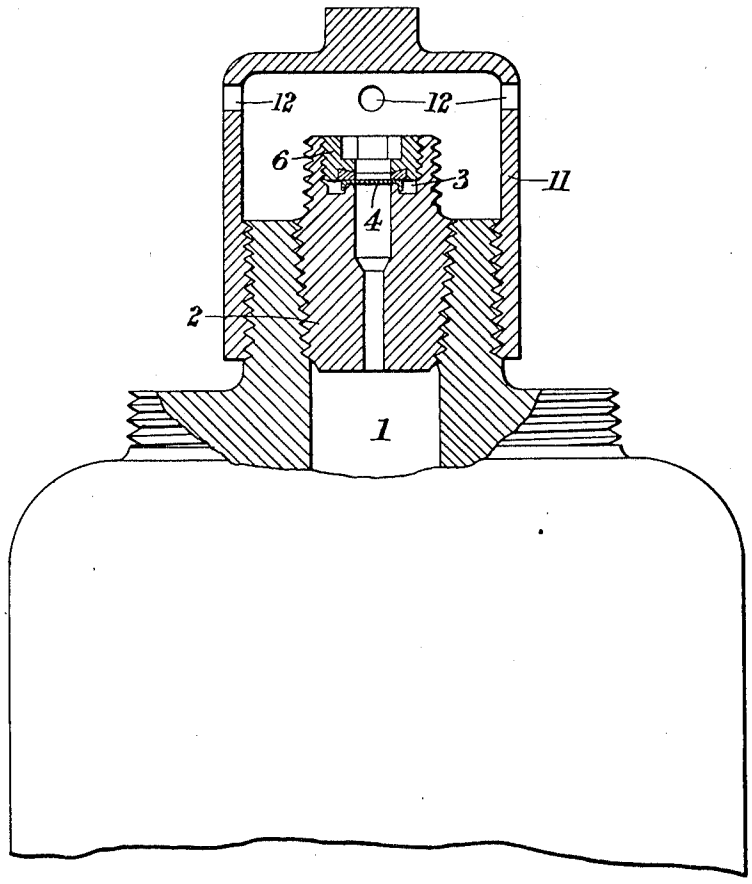
APPLICATION FILED MAY 13, 1910.

**1,022,301.**

Patented Apr. 2, 1912.

2 SHEETS—SHEET 1.

*Fig. 1.*




WITNESSES

L. H. Grote

W. E. Keir

INVENTOR

Robert H. Campbell

BY

Howson and Howson

ATTORNEYS

R. H. CAMPBELL.

CONTAINER OR CYLINDER FOR COMPRESSED OR LIQUEFIED GAS.

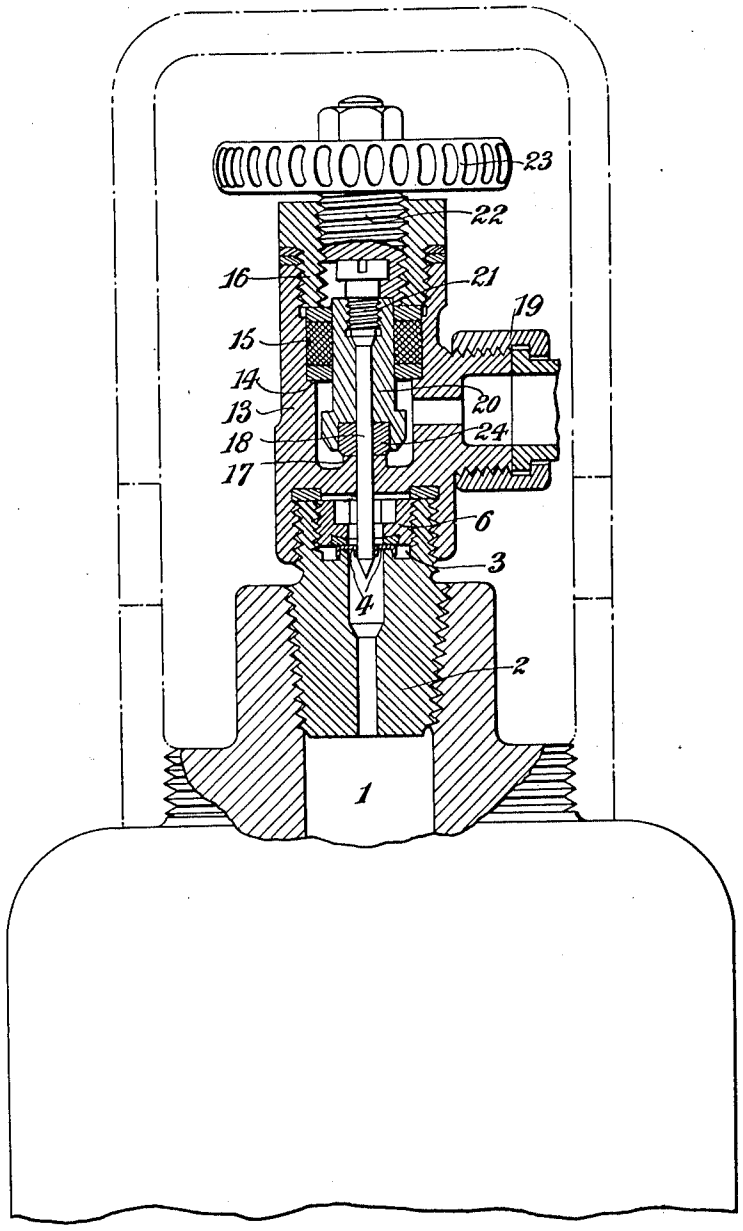
APPLICATION FILED MAY 13, 1910.

**1,022,301.**

Patented Apr. 2, 1912.

2 SHEETS—SHEET 2.

*Fig. 2.*




WITNESSES

L. H. Grote

M. E. Keir

INVENTOR

Robert H. Campbell

BY

Howson and Howson

ATTORNEYS

# UNITED STATES PATENT OFFICE.

ROBERT HUNTER CAMPBELL, OF EDMONTON, ENGLAND, ASSIGNOR TO AERATORS LIMITED, OF EDMONTON, ENGLAND.

## CONTAINER OR CYLINDER FOR COMPRESSED OR LIQUEFIED GAS.

1,022,301. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed May 13, 1910. Serial No. 561,061.

*To all whom it may concern:*

Be it known that I, ROBERT HUNTER CAMPBELL, a subject of the King of Great Britain and Ireland, of Angel Road, Edmonton, in the county of Middlesex, England, have invented new and useful Improvements in Connection with Containers or Cylinders for Compressed or Liquefied Gas, of which the following is a specification.

My invention relates to containers, or cylinders, for compressed or liquefied gas, the said containers or cylinders being of the trade kind that are in common commercial use, and are comparatively of large capacity, from which considerable quantities of such gas are obtained as required. Hitherto containers or cylinders of this kind (which I will hereinafter refer to as trade containers) have each been provided with a valvular closing and drawing-off device, but for small tubes of comparatively small capacity, being intended to contain only a charge of liquefied gas sufficient for filling one automobile tire, it has been proposed in the specification of British Letters Patent No. 16330, A. D. 1909, to provide the said tube with a plug having secured thereto a perforable disk which acts as a closure and safety-valve, the said plug being provided with a perforating and drawing-off device which is adapted to be detached therefrom and attached to the plug of another tube so as to avoid the necessity of providing a perforating and drawing-off device for each tube, and the object of my invention is to provide an improved arrangement of this character for use with trade containers.

According to my invention the plug, which has a passageway for gas through it, is adapted to be screwed into the neck of a trade container, and the said passageway is closed by a loose perforable metal washer, or cap, which is secured in place by a piece (with but one passage-way through it for gas) screwed into the said plug, the said loose washer, or cap, being so shaped that it will allow gas to pass over, around, and under it when the trade container is being charged with gas and afterward be pinched or compressed between the said screwed piece and a shoulder in the plug, when the said screwed piece is screwed home, so as to cause the loose washer, or cap, to constitute a gas-tight closure which will act as a safety-valve by being fractured by dangerous excess of pressure which may occur in the trade container. The aforesaid closure is capable of being opened by being perforated by a renewable piercer carried by a valvular device which can be readily screwed by the user, on to an externally screw-threaded projecting part of the aforesaid plug when it is required to draw off the contents of the trade container without the necessity for the said container being sent out each with a valve, or such a perforating and drawing-off device attached thereto as has hitherto been customary. The valve of the said device is renewable and is made of ebonite, or other suitable material, which is not liable to become clogged by the formation of ice thereon.

By my invention I effect economy in cost and in space occupied by dispensing not only with the valve, or a perforating and drawing-off device for each trade container, but also, if desired, I can dispense with the large protective cap or cover, which has hitherto been screwed on the neck of the said containers, to inclose the valve, or perforating and drawing-off device. This large protective cap, or cover, can, however, be used, if desired, as hitherto has been customary, or it can be replaced by a small cap, or cover, applied to the projecting part of the plug, or the exterior of the neck of the trade container, these protective caps, or covers, being perforated, as usual, at their sides for the escape of gas if the aforesaid loose closing washer, or cap, should burst, and thus prevent recoil of the said container owing to the sidewise issue of the gas.

The accompanying drawing shows an apparatus made in accordance with my invention.

Figure 1 is a vertical section showing the upper part of a trade container closed, and

with the closure protected by a small cap, or cover, and Fig. 2 is a similar section showing the perforating and drawing-off device applied after the cap, or cover, has been removed and the said device has been applied and the loose closing washer or cap perforated and the drawing-off valve closed.

In Fig. 2 I have shown, in dotted and dash lines, an ordinary large protective cap, or cover, screwed on, and it will be understood that this may be used in Fig. 1 instead of the small protective cap, or cover, illustrated.

The neck 1 of the trade container has the plug 2 screwed into it. Placed over a shoulder in a recess 3 surrounding the said passage-way through the said plug, is a loose washer, or cap 4 made so that when in place before the trade container is charged it will leave passages for gas from above, around and to beneath it, and thence into the said container. Into the recess 3 is screwed a piece 6 which has a passage-way through it for gas, and which, when the trade container has been charged is screwed fully home so as to pinch or compress the loose washer, or cap 4 gas-tightly between the said piece 6 and the shoulder in the recess 3. The small cap, or cover, 11 is then screwed onto the neck of the trade container as shown, or onto an external screw on the projecting part of the plug 2, if desired, or, if the large protective cap or cover be used, it is screwed on as indicated in dotted lines, the said cap, or cover, having the aforesaid sideway openings 12 in it for the escape of gas should the loose closing washer, or cap, 4 burst under any dangerous excess of pressure which may arise in the trade container, the said loose washer, or cap, 4 thus acting as a safety-valve and the sideway-openings 12 allowing gas to escape without recoil of the said container. The exterior of the protective cap, or cover, may be made of a shape to receive a spanner for screwing it on and off, or a tool to engage the openings 12 may be used for this purpose. When the gas is to be used, the protective cap, or cover, is screwed off and the perforating and drawing-off device shown in Fig. 2 is screwed on the externally screwed projecting part of the plug 2. This device consists of a casing 13 shouldered at 14 for a stuffing-box 15 to bear against, which stuffing-box is retained in place by the piece 16 screwed into the upper part of the casing 13. The casing 13 is provided with a valve-seat 17 around a passage for the gas (through which passage the renewable piercer 18 passes) and with a nozzle and screw attachment at 19 for the connection of the pipe leading to the place to which the gas is to be supplied. Passing through the stuffing-box 15 is a valve-stem 20 in which the piercer 18 is confined by a screw 21 screwed into the upper end of the said stem and bearing on a head formed on the upper end of the said piercer 18, or by other suitable means. This valve-stem is connected to a screw 22 (provided with a head 23 for rotating it) working in a screw in the piece 16, the connection being preferably made, in the usual way, so that the valve and valve-stem do not rotate when the screw 22 is rotated by forming the screw 21 with a head which engages in a recess in the said screw 22, the contracted part of the said recess taking under the head of the screw 21, and there being a sideway slot from the said recess so that the screw 21 can be engaged in the said recess by being passed in from the side. When the perforating and drawing-off device is screwed onto the projecting part of the plug 2, the valve and piercer are in their elevated position and, by operating the head 23, so that the screw 22 is screwed inward, the valve and piercer are moved inward so that the piercer pierces the loose closing washer, or cap 4, and the valve closes. When the gas is to be drawn off, the screw 22 is screwed up so that the valve opens and the piercer rises until a perforation, or slot, in it opens communication between the interior of the trade container and the interior of the casing where it opens to the connection 19.

I am aware that it has been proposed to provide valvular drawing-off devices for trade containers with a safety-valve consisting of or comprising a disk of copper, or other material, which is sufficiently strong to bear the normal pressure inside the said container, but which on a dangerous elevation of pressure occurring inside the said container will burst and the pressure will be relieved before the container can be ruptured by the excessive pressure.

The parts of the piercing and drawing-off device can be very readily separated for cleaning, or repair, such as for renewing the ebonite or other suitable material forming the face 24 of the valve, or for replacing the piercer 18.

I claim as my invention:—

A trade container for compressed gases having an internally threaded neck, a perforated plug screwed into said neck, a perforable washer or cap within said plug acting as a closure and safety valve, said plug having an externally threaded nipple portion projecting above the neck of said container to receive a perforating draw-off device adapted to be screwed on said projecting portion, in combination with a combined perforating and draw-off device, comprising a casing with inlet and outlet ports, means for securing the same to the projecting portion of said plug with the inlet port communicating with the perforation of the plug, a valve with renewable

face closing said inlet port, a piercer passing through said valve and adapted to rupture said closure in the plug and means for moving said valve and piercer in said casing to perforate said closure and control the escape of gas from the container, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT HUNTER CAMPBELL.

Witnesses:

RIPLEY WILSON,

WILLIAM GERALD REYNOLDS.