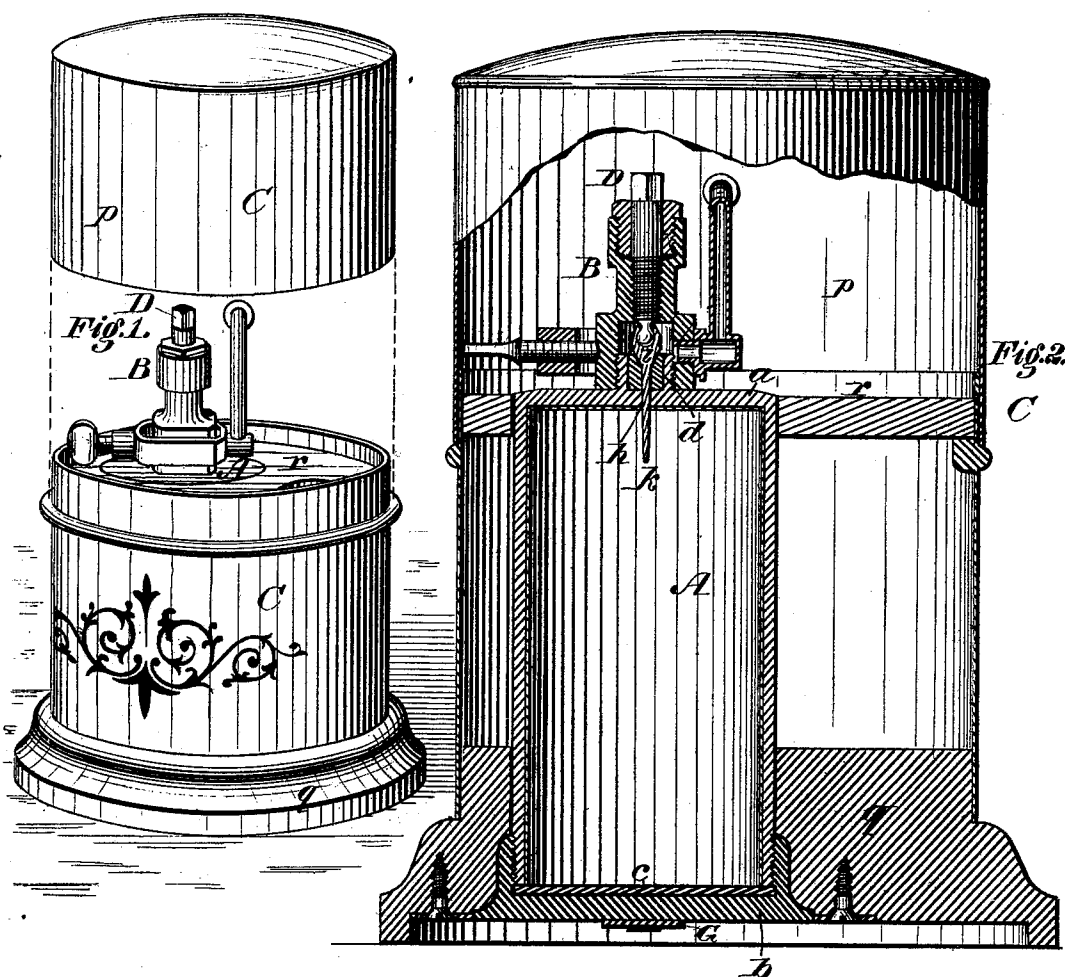
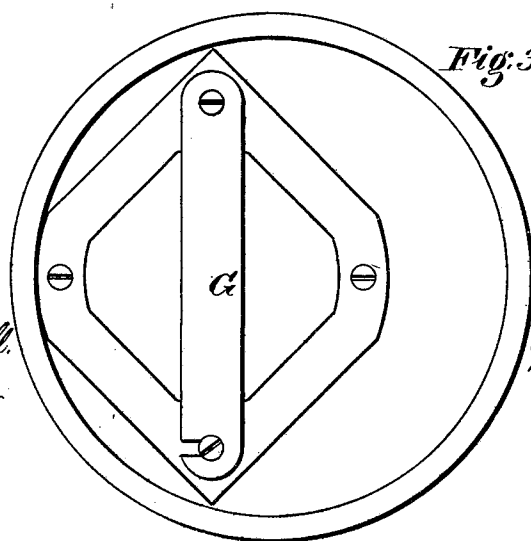


W. A. & W. F. JOHNSTON.  
Bottle for Holding Compressed Gases, and Case.

No. 213,576.

Patented Mar. 25, 1879.



Witnesses:  
L. D. Twitchell.  
Will W. Dodge.

Inventor:  
W. A. Johnston  
W. F. Johnston.  
By his atty.  
Dodgerson.

# UNITED STATES PATENT OFFICE.

WILLIAM A. JOHNSTON AND WILLBUR F. JOHNSTON, OF EDGEWATER, N. Y.

## IMPROVEMENT IN BOTTLES FOR HOLDING COMPRESSED GASES, AND CASE.

Specification forming part of Letters Patent No. **213,576**, dated March 25, 1879; application filed July 27, 1878.

### *To all whom it may concern:*

Be it known that we, WILLIAM A. JOHNSTON and WILLBUR F. JOHNSTON, of Edgewater, in the county of Richmond and State of New York, have invented certain Improvements in Bottles for Holding Compressed Gases and Case therefor, of which the following is a specification:

This invention relates to improvements in the vessels employed in the storing and shipping of compressed or liquefied gases, and also to an improved form of case for holding such vessels, together with such inhaling or other apparatus as is used in connection with them.

At the present time nitrous oxide and other gases are compressed and stored in iron bottles or cylinders under great pressure for medicinal, surgical, dental, and other uses, each cylinder being provided with a valve or cock, by the partial opening of which the gas is permitted to flow into the bag or other receptacle, from which it is inhaled or otherwise taken for use.

In the case of nitrous oxide at summer temperature, the pressure attains a very high degree, frequently from twelve to fifteen hundred pounds to the square inch, in consequence of which it is necessary that the vessel and valve shall withstand safely a considerably higher pressure than that named. Great difficulty has been found, in practice, to produce vessels and valves which would withstand successfully the required pressure of the gas and prevent the escape of the same at the joints or through the pores of the metal. The bottles most commonly in use are made by welding two ends into a strong iron cylinder or shell, and screwing the cock or valve into one of said ends.

As heretofore constructed the iron bottles or cylinders have been open to various objections, one of the most serious of which was that in welding in the ends the inside of the bottle was burned and scaled, and that as the opening of the valve was very small it was impossible to clean the interior of the bottle and remove the scale, in consequence of which it frequently happens that the scale, being loosened by the jar and concussion which the bottles receive in handling, closes the valve passage or outlet, or, entering between the

valve-plug and its seat, prevents the valve from being closed.

One of the principal objects of our invention is to construct the bottle in such manner that in the course of construction its interior may be thoroughly cleaned and all impurities and foreign matters removed therefrom; and to this end the invention consists in constructing the vessel by welding in one head or end in the cylinder, then pickling, cleaning, and tinning the interior surface, and, finally, screwing the other head or end upon the cylinder and soldering it fast, whereby the completion of the bottle or receiver is effected without subjecting it to any material degree of heat.

Another improvement consists in locating within the neck of the bottle a body of soft metal, through which the gas-outlet is made, and which serves as a seat for the valve-stem or plug. This formation of the valve-seat directly in the vessel avoids the formation of a joint between the vessel and the valve-seat, as usual, and thus avoids, in a great measure, the ordinary danger of leakage.

Another feature of our invention consists in a case or body of cylindrical form adapted to receive and hold the gas bottle or receiver, which, being located eccentrically within the case, admits of the inhaler and other apparatus ordinarily employed in connection with the bottle being placed beside the same within the case.

The invention also consists in other minor details of various parts, as hereinafter more fully described.

Figure 1 represents a perspective view of our improved case with the cover removed and the gas bottle or receiver exposed to view. Fig. 2 represents a vertical central section of the same; Fig. 3, a bottom-plan view of the case, showing the manner in which the bottle is secured and prevented from rotating therein.

Referring to the drawings, A represents the gas bottle, holder, or receiver; B, the valve at its upper end, and C the inclosing case or cabinet in which the bottle is mounted.

As shown in Fig. 2, the bottle A consists of a cylindrical or tubular body, provided at its upper end with a metal head, *a*, welded firmly and tightly therein, and provided at its lower

end with a head or cap, *b*, which is threaded and screwed over the correspondingly threaded end of the cylinder.

In constructing the bottle or holder the head is first welded into the upper end of the cylinder, and the lower end of the latter provided with an external screw-thread. At this stage the bottle is pickled in acid to loosen and remove the scale formed in consequence of the heat to which it was subjected during the welding operation. After the interior is thoroughly cleaned and all loose particles removed, it is thoroughly coated with melted tin, the effect of which is to give the body a smooth internal surface and effectually close the pores of the metal as well as any cracks or openings that may be left during the welding operation.

The cap or base *b*, having its inner surface thoroughly coated with tin and provided with an internal sheet, *c*, of rolled or forged metal, is screwed firmly upon the lower end of the cylinder, this being done while the cap is moderately heated, and the screw-threads at the same time thoroughly filled with tin or solder, which serves to insure a perfect joint between the body and cap, and also to hold the latter firmly in place.

At the time of forming the head *a* we forge or weld solidly thereon a neck, *d*, which is provided with a central opening to permit the introduction and the escape of the gas, and with an external screw-thread to receive the cock or valve. The neck *d* is bored or chambered out in the center to receive a body of soft metal, which is not readily oxidized or corroded, and which serves as a valve-seat, the central opening or throat being of course extended, as shown, through this soft metal.

It will be seen that by thus forming the neck directly upon and as an integral part of the bottle, and then placing the valve-seat within the neck, as shown, we avoid making joints between the bottle and the seat, so that there is no possibility of the gas escaping except at the valve. The valve itself, although shown in the drawings, we have made the subject of separate Letters Patent of even date herewith. It therefore will not be described in this specification further than that *B* is the valve-body screwing on the neck *d*, and carrying the valve *k* *l*, attached to stem *D*, and working in aperture *h*, and in conjunction with the soft-metal valve-seat in neck *d*.

The case or cabinet to receive the holder or bottle and its attendant apparatus consists of an upright cylindrical body of sheet metal or other suitable material provided with a movable cap or cover, *p*. The body is provided with a base-plate, *q*, and with a detachable top plate, *r*, through which openings are made to receive the bottle or holder *A*, which is inserted from below, as shown in Figs. 1 and 2, the opening to receive the bottle being made near one side of the body in order to leave a large space therein at one side of the bottle to receive the inhaler and other large

parts or pieces of the apparatus. The lower end of the bottle is made of a square or other angular form, as shown in Fig. 3, or otherwise constructed to prevent its rotation when seated in a correspondingly shaped opening in the base of the case or cabinet.

For the purpose of retaining the bottle in place the base of the cabinet or case is provided with a swinging latch or bar, *G*, as shown in Figs. 2 and 3, the latch being pivoted at one end and notched at the other to lock over a fixed stud, as shown, so that it may be secured across the bottom of the bottle after its introduction.

Other means may be substituted for securing the bottle in place, but those represented are considered the best that can be used.

The bottle being seated in the base of the case and secured by a latch, as shown, is held firmly in position thereby, so that the top plate *r* may be removed to permit the introduction and removal of the other apparatus from the body without danger of the bottles becoming displaced. After the introduction of the apparatus into the case the application of the cover or top to the body conceals the bottle from sight, and gives to the case or cabinet a finished and ornamental appearance.

The exterior of the case or cabinet being painted, plated, or otherwise ornamented, and being made of an ornamental form or design, presents a pleasing appearance, and forms a handsome ornament to the room of the surgeon or dentist.

The top plate *r*, instead of being removable bodily, may be divided transversely and have one side made detachable, or hinged in such manner as to turn upward to give access to the interior of the case, or an opening of sufficient size to permit the introduction and removal of the apparatus may be made in the plate *r*; but it is preferred to use the solid plate, for the reason that it conceals the interior of the case from view.

The form of the case or cabinet may be modified if desired; but that represented in the drawings is, for various reasons, considered the best for general use.

Having thus described our invention, what we claim is—

1. A bottle or vessel capable of containing highly-compressed gases, consisting of a wrought-metal cylindrical body, with one end or head welded thereon and the other end or head screwed thereon and sealed by tin or solder, substantially as set forth.

2. A bottle or vessel capable of containing gases under pressure of seventy-five or more atmospheres, consisting of a wrought-metal body having one head welded thereon and the other head screwed thereon, the interior of said vessel being tinned or otherwise coated to prevent oxidation, substantially as set forth.

3. As an improvement in the art of manufacturing vessels capable of holding highly-compressed gases, first welding one metal

head to the cylindrical body, then cleaning and tinning the interior of the vessel thus formed, and, finally, screwing upon the open end of said vessel the other head and sealing the screw-joint, substantially as set forth.

4. In a bottle or vessel capable of holding highly-compressed gases, the combination, with a wrought-metal cylindrical body, of a cast-metal head or end and an intermediate sheet-metal plate or washer to protect the same from contact with the contents of the vessel, substantially as set forth.

5. In a vessel for retaining highly-compressed gases, the combination, with a wrought-metal body, of a wrought-metal head welded to one of its ends, a cast-metal head screwed to the other end, and a sheet-metal plate or washer interposed between said cast-metal head and the wrought-metal body, substantially as and for the purposes set forth.

6. A metallic bottle or vessel capable of containing highly-compressed gases, provided with an externally screw-threaded tubular neck to receive the cock or valve case and to contain the valve-seat, substantially as set forth.

7. A bottle or vessel capable of holding fluids under great pressure, provided with a tubular neck and a valve-seat of soft metal in said neck, substantially as and for the purposes set forth.

8. A bottle or vessel capable of holding fluids under great pressure, provided with a tubular externally screw-threaded neck and a

valve-seat in said neck, in combination with a valve or cock which screws upon said neck and operates in connection with the valve-seat therein, substantially as set forth.

9. A bottle or vessel capable of holding fluids under great pressure, having an angular end or other angular or flattened portion to adapt it to be held from rotating, substantially as set forth.

10. In combination with a bottle or vessel capable of holding fluids under great pressure, formed with an angular end or other angular or equivalently-formed portion, as described, a containing case or cabinet provided with an opening or receptacle for said bottle, adapted to engage or fit said portion of said bottle in such manner as to prevent rotation of the same, substantially as set forth.

11. A case or cabinet, C, of cylindrical form, provided with an eccentrically-placed seat formed to receive and prevent from rotation a bottle or gas-receiver, A, substantially as set forth.

12. In combination with the case adapted to receive and hold the gas bottle or vessel, as described, the shelf r, arranged to afford access to the interior of the case at pleasure, substantially as set forth.

WILLIAM A. JOHNSTON.  
WILLBUR F. JOHNSTON.

Witnesses:

ALGERNON K. JOHNSTON,  
MELVILLE M. JOHNSTON.