H. BUSHNELL.

RESERVOIRS FOR COMPRESSED AIR.

No. 194,217. Patented Aug. 14, 1877.

Fig. 1.

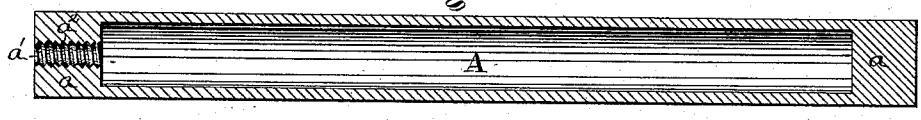


Fig. 2.

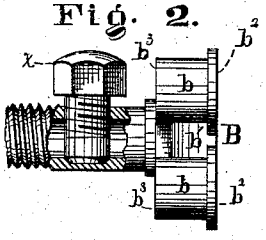


Fig. 3.

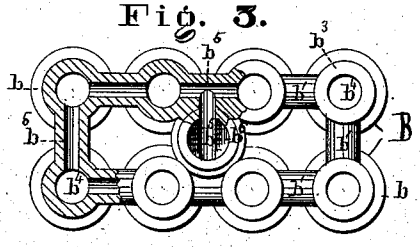


Fig. 4.

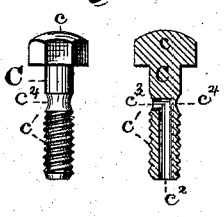


Fig. 5.

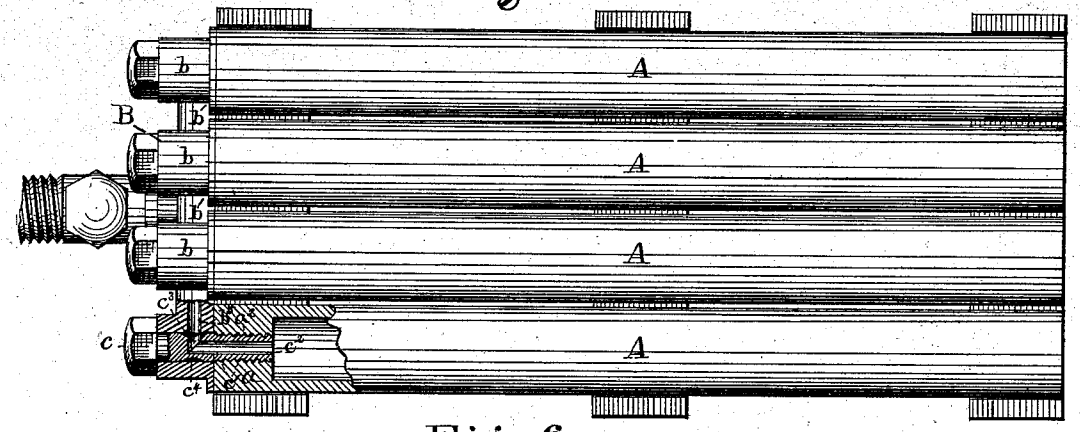
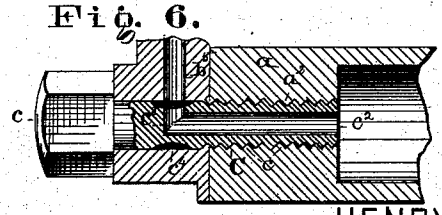


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY BUSHNELL, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN RESERVOIRS FOR COMPRESSED AIR.

Specification forming part of Letters Patent No. **194,217**, dated August 14, 1877; application filed July 21, 1877.

To all whom it may concern:

Be it known that I, HENRY BUSHNELL, of the city of New Haven and State of Connecticut, have invented a new and useful Reservoir for Compressed Air; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

This invention consists, mainly, first, in the employment, as a reservoir for compressed air, of a lap-welded tube, provided at its ends with solid heads, welded in place, the construction being such that a reservoir is obtained which possesses great strength, and is wholly without seam; and, second, in the special means employed, in connection with two or more single tubes, for uniting the same to form a cluster.

In the drawing, Figure 1 represents a longitudinal section of a single tube; Figs. 2 and 3, respectively, side and front elevations, partly in section, of the block or casting by means of which several tubes are connected; Fig. 4, detail views of one of the bolts by which each tube is connected to the block; Fig. 5, a plan view of all the parts united and in position, and Fig. 6 a partial sectional view enlarged.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A represents a tube of suitable material and size, which is formed by lapping the edges of a sheet and welding the same together, in the usual well-known or other proper manner. *a a* represent heads, consisting of solid metal cylindrical blocks of proper diameter and length, which are inserted into the ends of the tubes and welded therein, in the usual well-known or other proper manner. By this means a reservoir is obtained which is wholly without seam, and possesses great strength, the structure, when completed, consisting, in fact, of a single piece of homogeneous metal. Two or more of these tubes may be united to form a cluster in the following manner: a^1, Fig. 1, represents an opening drilled in one end of the tube, which opening is provided with screw-threads a^2, as shown. B, Figs. 2, 3, and 5, represents a casting or metal block, consisting of a proper number of similar sections, *b b*, united by pipes b^1 b^1, each of which sections is adapted to connect with an independent tube, A, as shown. b^2 represents the inner face portion of each section, preferably corresponding in area with the adjacent end of the tube, as shown. b^3 represents the outer face, which is adapted to form a proper bearing for the head of the bolt C, as shown. b^4, Fig. 3, represents a central opening of proper diameter to receive the bolt, as shown; and b^5 b^5, branch openings, by means of which communication is made with the adjacent sections and the central main b^6. By means of this construction the air may be received from any suitable source, or be delivered to any desired point.

C, Figs. 4 and 5, represents a bolt, having at one end the head *c*, and at the other the threaded portion c^1, adapted to engage with the threaded portion a^2 of the tube's opening, as shown. c^2 represents a longitudinally central opening, extending from the front end of the bolt to a point near its center, which communicates with a branch or side opening, c^3, as shown. c^4 represents an annular groove formed about the bolt for the purpose of providing a proper passage-way for the flow of air.

If desired, copper or other proper packing may be interposed between the face b^2 and the tube end and the face b^3 and the bolt-head. A suitable valve, *x*, or valves, may be applied at at any proper point or points.

The operation will be readily understood. All the parts being in place, as shown in Fig. 5, air may be forced through the main b^6 and branches b^1 to the various sections and tubes.

By means of the construction shown a perfectly-tight joint is made by simple means. The bolt being tapped into the heads, an accurate fit is readily obtained. By means of the bolt, also, connection is made with the passages of the casting, but without affording any opportunity for leakage. The bolt, it will be understood, is adapted, by means of its annular groove, to be screwed into the tube any desired distance without danger of closing the passage-way for the air. This feature is important, because it is essential that a perfectly-

tight joint should be made, and this cannot be accomplished if the bolt is limited in its movement to any special distance.

Any suitable compressed fluid may be held by my reservoir; but only the use of compressed air is contemplated.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The described reservoir for compressed air, consisting of a lap-welded tube with welded heads, substantially as described.

2. In combination with the tubes A and casting B, a series of bolts, C, having the annular grooves and perforations, as described.

3. In combination with a tube and intermediate casting, a bolt, substantially as described, adapted to unite the casting to the tube, and to permit the passage of the air through the casting, as and for the purpose set forth.

This specification signed and witnessed this 20th day of July, 1877.

HENRY BUSHNELL.

Witnesses:

CHARLES IVES, Jr.,

CHARLES IVES.