No. 645,281. Patented Mar. 13, 1900.

W. C. VAJEN.

FIREMAN'S HELMET.

(Application filed Aug. 7, 1896.)

(No Model.)

Fig. 1.

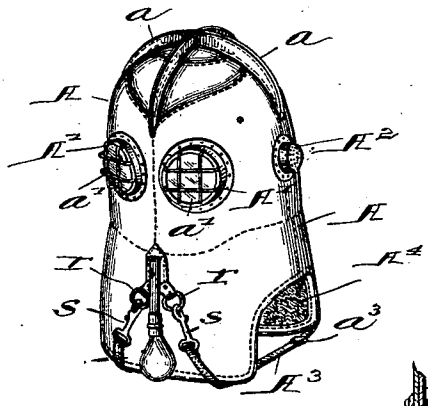


Fig. 2.

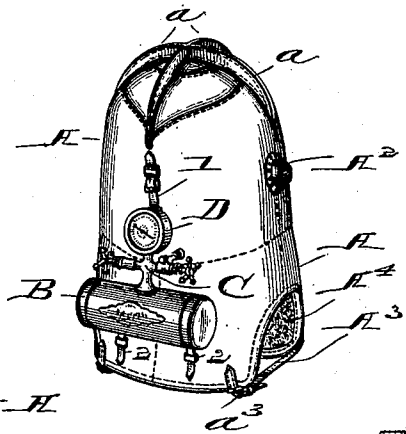


Fig. 7.

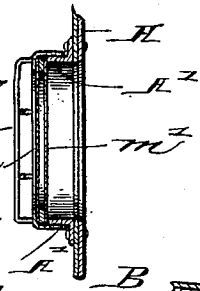


Fig. 8.

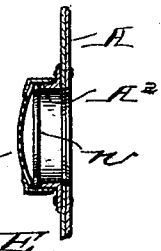


Fig. 3.

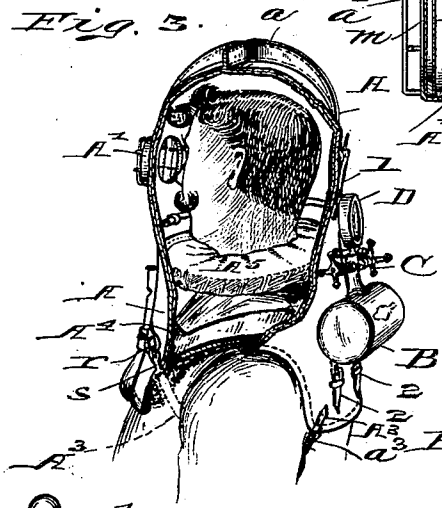


Fig. 4.

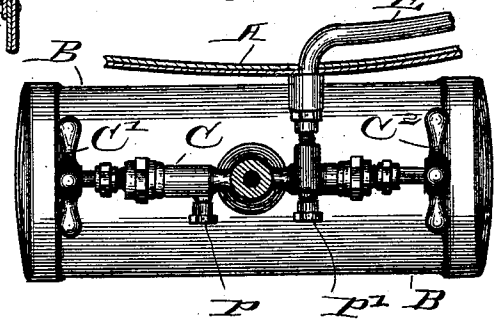


Fig. 5.

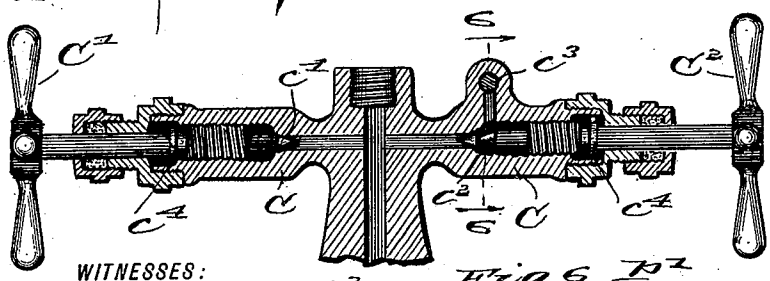
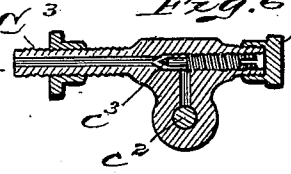


Fig. 6.



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FIREMAN'S HELMET.

SPECIFICATION forming part of Letters Patent No. 645,281, dated March 13, 1900.

Application filed August 7, 1896. Serial No. 602,010. (No model.)

To all whom it may concern:

Be it known that I, WILLIS C. VAJEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Firemen's Smoke-Protectors, of which the following is a specification.

My present invention consists in certain improvements upon a device for protecting those who are required to be subjected to smoke or fumes, especially firemen, from the effects thereof of that character which is shown and described in Letters Patent of the United States No. 456,687 to William Bader, dated July 28, 1891, as will be hereinafter more particularly described and claimed. Said improvements are the result of extensive experiments and of much observation of requirements in situations where the apparatus has been subjected to practical use.

Referring to the accompanying drawings, which are made part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a perspective view of the apparatus separately as seen from the front; Fig. 2, a similar view as seen from the rear; Fig. 3, a view of the apparatus in use as positioned upon the upper portion of the person of the user, one side of the casing of said apparatus being broken out to show the interior; Fig. 4, a top or plan view of the air-reservoir and a sectional view of a fragment of the casing of the device; Fig. 5, a vertical sectional view of the valve structure; Fig. 6, a detail transverse sectional view as seen from the dotted line 6 6 in Fig. 5; Fig. 7, a detail sectional view through one of the eyepieces, and Fig. 8 a detail sectional view through one of the earpieces.

In said drawings the portions marked A represent the outer wall or casing of the headpiece of the device; B, the air-cylinder; C, the valve structure; D, a gage; E, a pipe or tube running from the air-cylinder to the interior of the headpiece.

The casing or wall of the headpiece is, as described in the above-mentioned Letters Patent, preferably formed of leather. I have, however, discovered that it is desirable to form said casing of two thicknesses of different qualities. The outer thickness should be tough and close-grained, such as leather, and treated with a fire-resisting preparation, while the inner thickness is to be of a porous quality, adapted to absorb moisture to some extent, thus counteracting the breath of the wearer in the matter of creating a vapor within said casing. I have also improved the form and construction of the lookouts A′ by making them separate and tubular, as shown, and inserting therein two sheets $m\,m'$ of transparent material, such as mica. The dead-air space between these two mica sheets prevents the lookouts from being obscured by the vapor of the breath, and thus the swabs shown in the above-mentioned patent are enabled to be dispensed with. I also preferably protect the panes of the lookouts with wire guards a', as shown most plainly in Fig. 1. The earpieces A^2, I have improved somewhat by covering them with screw-caps a^2 at the outer ends of the tubular portions thereof, which caps contain the perforations instead of the casing A of the head-piece proper. Sounding-plates n are inserted immediately below said caps. The straps A^3, by which the device is held in place, I have divided into two parts and provided with buckles a^3, whereby they are enabled to be adjusted in length. They are provided with snap-hooks s at one end, which are adapted to hook into rings r, secured to the casing A, so that speedy attachment and detachment are provided for.

The means provided for excluding air, (shown and described in the prior art,) while valuable and sufficient in many cases, has proved to be not always completely effective, inasmuch as in thick stifling smoke, especially such as is produced from the burning of substances of a sulfurous character, some portion of such smoke occasionally penetrates it to within the headpiece. To overcome this, I have adopted a lining A^4, composed of sheepskin tanned with the wool on, adapted to rest closely over the shoulders of the wearer, and have also made the flexible fold A^5, which is to be gathered around the neck of the wearer, of similar material. By this means I have secured a union between this structure and the body of the wearer which is for all practical purposes smoke and vapor proof, so that any intrusion of the surrounding vapors is rendered impossible, while the gradual escape of consumed air from the inside through

the wool is not unduly obstructed. The substitution of this wool fabric for the thin flexible material formerly used and the addition of the wool lining to rest upon the shoulders, thus providing an intermediate space in which the air is practically "dead," I regard as one of the most valuable of my improvements.

The air-cylinder B and the gage D do not embody any special novel features. They are simply adapted in form and size to this particular use. I have found in practical use that these parts may be made considerably smaller in proportion to the headpiece than those shown in the above-mentioned Letters Patent, and they are shown in the drawings of the shape and proportionate size actually employed. These, as well as the valve structure C, are all secured together and are attached to the headpiece A by the straps 1 and 2.

The exterior form of the valve structure C is best shown in Fig. 4, while its construction is shown in detail in Figs. 6 and 7. This structure contains a main ingress-valve c' at one end and an egress-valve c^2 at the other end, which are operated, respectively, by the handles C′ and C². The nipple leading from the outside to the valve c' is preferably covered by a cap p, as shown in Fig. 4. When it is desired to charge the cylinder with compressed air, this cap p is removed and a hose from an air-pump (not shown) is connected. When the cylinder is sufficiently charged, the valve c' is closed, the air-pump detached, and the cap p restored to place. Air is admitted to the headpiece from the cylinder by opening the valve c^2 by means of its handle C², as will be readily understood upon an inspection of Fig. 5. In order that the air may pass in exactly the quantity desired and that the operator need not be obliged to spend the time necessary to secure this result, I have provided a regulating-valve c^3, running transversely of the valve c^2 and located above said valve, which may be adjusted to any predetermined point, so that the valve c^2 may be fully opened without permitting more than the predetermined quantity of air to pass. The construction of this valve c^3 is best illustrated in Fig. 6, where it is shown as a small screw-threaded rod inclosed entirely within a perforation, which perforation is covered with a cap p', as shown in said Fig. 6 and also in Fig. 4. When it is desired to change the position of this valve c^3, the cap p' is removed and a fine screw-driver inserted into the perforation, the valve c^3 turned to the position desired, after which the cap p' is restored, covering and completely protecting said valve. Obviously a very fine graduation can thus be obtained. In order to prevent leakage and also to provide a stop at the proper point, I have made these valves double-seated valves by providing the valve-stems with collars c^4, which when the valves are entirely opened seat back against shoulders formed in the surrounding structure to receive them, as clearly shown in Fig. 5. Outside of said shoulders said valve structure is provided with stuffing-boxes of a usual construction. This second valve-seat, however, is of great value in preventing possible leakage. As will be readily understood, it is highly desirable that none of the air in the cylinder should be wasted.

The tube E leads from the nipple c^3 through the wall or casing A to the interior of the headpiece and to a suitable point near the nostrils of the wearer, much as in the above-mentioned Patent No. 456,687.

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

1. The combination, in a fireman's smoke-protector, with the casing, of the earpieces, said earpieces being composed of tubular projections, screw-caps covering said projections and having numerous perforations therein, and sounding-plates within said caps immediately under said perforations, substantially as shown and described.

2. In a fireman's smoke-protector, the combination, with the casing, A, forming the head-covering of the lining A⁴ adapted to fit closely over the shoulders of the wearer, and the flexible fold A⁵ adapted to be secured around the neck of the wearer, said lining and said fold being composed of sheepskin tanned with the wool on, the wool being upon that surface arranged to come in contact with the person of the wearer, all substantially as shown and described.

3. The combination, with a fireman's smoke-protector, and its air-supplying cylinder, of a valve structure containing the ingress-valve c' at one end, the egress-valve c^2 at the other end, and a regulating-valve c^3 located in the path leading from the valve c^2 toward the interior of the headpiece of the smoke-protector, said several parts being arranged and operating substantially as set forth.

4. The combination, with a fireman's smoke-protector, and its air-supplying cylinder, of a valve structure containing ingress and egress valves provided with double seats, the second seat being in each case arranged to prevent any escape of air around the valve-stem while the valve is open, and a regulating-valve in the path of the egress-valve, all substantially as shown and described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 5th day of August, A. D., 1896.

WILLIS C. VAJEN. [L. S.]

Witnesses:

CHESTER BRADFORD,

JAMES A. WALSH.