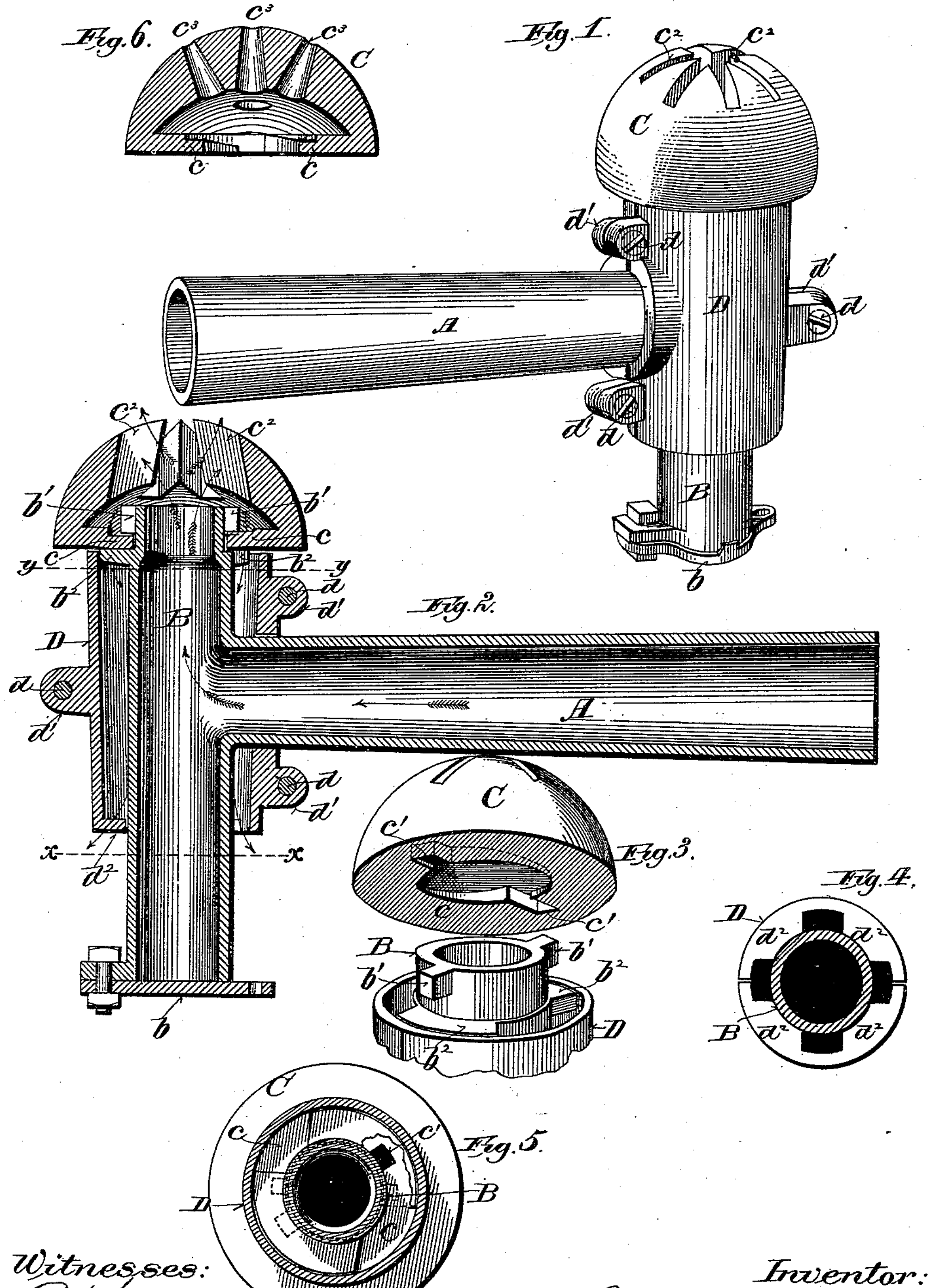
(No Model.)

J. STOLL.
TUYERE.

No. 420,286. Patented Jan. 28, 1890.



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UNITED STATES PATENT OFFICE.

JACOB STOLL, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO GEORGE SCHWEICKHART, OF SAME PLACE.

TUYERE.

SPECIFICATION forming part of Letters Patent No. 420,286, dated January 28, 1890.

Application filed June 26, 1889. Serial No. 315,571. (No model.)

To all whom it may concern:

Be it known that I, JACOB STOLL, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Tuyeres; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to spread the air-blast at the point of discharge, to allow the gases which enter the tuyere from the forge to escape and to prevent the same from passing into the bellows, to prevent the escape of air through the shell or jacket of the tuyere, and to produce and maintain a strong, steady, and uniform air-blast, and so direct the same as it enters the forge as to produce and maintain the most advantageous flame or combustion.

It consists, essentially, of certain peculiarities of construction and arrangement, hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a perspective view of my improved tuyere. Fig. 2 is a vertical medial section of the same. Fig. 3 is a perspective view of the discharging end of the tuyere and of the cap detached therefrom. Fig. 4 is a cross-section on the line $x\ x$, Fig. 2, looking upwardly. Fig. 5 is a cross-section on the line $y\ y$, Fig. 2, also looking upwardly; and Fig. 6 is a vertical medial section of a modified form of the cap.

A is a tapering horizontal blast-pipe communicating at its smaller end with a vertical pipe B, the upper end of which constitutes the nozzle. This blast-pipe and nozzle are preferably cast integrally, as shown in the drawings. The nozzle-pipe B extends below its junction with the blast-pipe A, and is open at its lower end, which is provided with a gate b. At its upper discharging end the nozzle B is slightly contracted and is formed with outwardly-projecting lugs $b'\ b'$, and a little below them with segmental flanges $b^2\ b^2$, which afford means for the support and attachment of the cap. The downwardly-projecting extension of the nozzle B, with its gate b, affords means for removing any cinders, dirt, &c., which may drop into the nozzle from the forge, and any metal which fuses at a lower temperature than the iron to be heated will melt and run into the tuyere and be caught and held in the lower end of said pipe B, whence it may be removed by opening the gate b.

The upper portion of the nozzle-pipe B is surrounded by a shell or jacket D, which is made in sections fastened together around said nozzle by means of bolts, rivets, or screws $d\ d$, passing through perforated ears $d'\ d'$, formed on said sections. This shell or jacket is held concentrically around the nozzle B by means of the flanges $b^2\ b^2$ near the upper end of the nozzle and by means of inwardly-projecting lugs $d^2\ d^2$ at the lower end of said jacket, as shown in Figs. 2 and 4, and it is supported in place by means of the pipe A, which passes through it.

C is a hemispherical or rounded chambered cap, formed with an inwardly-projecting flange c, having notches $c'\ c'$ on opposite sides thereof, through which the lugs $b'\ b'$ pass in placing the cap in position. The flange c is formed on the upper side between said notches with inclines, which engage with said lugs b' on the upper end of the nozzle, and force the cap, when it is turned in the proper direction, snugly down against the flanges $b^2\ b^2$, as shown in Fig. 2. When the cap C is secured in place, the notches $c'\ c'$ will come over the flanges $b^2\ b^2$, and the air-blast will thus be prevented from escaping through said notches between the jacket D and nozzle B. A small space, however, is left between the inner edges of the flange c and the nozzle, through which gases entering the cap from the forge can escape into the jacket D and out through the openings at its lower end, as shown by the arrows in Fig. 2. The discharging end of the nozzle projects into the chamber in the cap C above the flange $c\ c$, but does not at any point come in contact with the top of said chamber. This arrange-

ment tends to prevent the deflection of any part of the air-blast through the passages designed for the escape of gas, and at the same time affords a direct exit for the gases outside of and around the nozzle.

The cap C is made of greater diameter than the jacket D and projects over its upper edge, covering the joint between it and the masonry of the forge. The chamber in the cap communicates with the forge through a radially-slotted opening or aperture c^2 in the top of the cap. This form of opening, as well as the peculiar shape of the cap, spreads and diffuses the blast as it enters the forge and produces a large, hot, and uniform fire and complete combustion, thereby increasing the efficiency of the forge and saving fuel. It also tends to conduct the gases entering the cap into the outer edges of the chamber therein outside of the nozzle B, whence they escape through the jacket D, as previously explained, and are thus prevented from entering the nozzle and blast-pipe. The rounded top surface of the cap forming sharp edges around the aperture c^2 tends to carry the ashes and dust falling thereon away from said aperture, thereby preventing the same from falling into the tuyere.

In place of the cap C, having the radially-slotted openings, (shown in Figs. 1 and 2,) I may employ a cap C′, provided with a number of perforations c^3 c^3, which diverge from each other, and are contracted toward their discharging ends, as shown. I prefer, however, the form of opening previously described.

I claim—

1. In a tuyere, the combination of the nozzle, blast-pipe, and a chambered cap having a radially-slotted aperture, substantially as and for the purposes set forth.

2. In a tuyere, the combination, with the nozzle and blast-pipe, of a chambered hemispherical cap having a spreading aperture, substantially as and for the purposes set forth.

3. In a tuyere, the combination, with the blast-pipe and nozzle having outwardly-projecting lugs at its discharging end and flanges a little below said lugs, of a removable chambered cap having an inwardly-projecting flange, with notches therein adapted to pass over said lugs, and when turned to rest upon and be closed by the flanges on the nozzle, substantially as and for the purposes set forth.

4. In a tuyere, the combination, with a blast-pipe and a vertical nozzle-pipe communicating therewith, of a vertical jacket surrounding the nozzle-pipe and open at its lower end, substantially as and for the purposes set forth.

5. In a tuyere, the combination, with a blast-pipe and a vertical nozzle-pipe communicating therewith at one side and provided at its upper end with outwardly-projecting flanges a little below said lugs, of a removable cap having an inwardly-projecting flange at its base, with notches therein arranged to pass over said lugs, and when the cap is turned to rest upon and be closed by the flanges on the nozzle, and a vertical jacket inclosing said nozzle-pipe and having openings at its upper and lower ends, substantially as and for the purposes set forth.

6. In a tuyere, the combination, with a blast-pipe and a vertical nozzle-pipe communicating laterally therewith open at its lower end, which is provided with a gate and provided at its upper end with outwardly-projecting lugs and a little below said lugs with outwardly-projecting flanges, of a removable chambered cap having a rounded upper surface, a radially-slotted aperture, and an inwardly-projecting flange at its base, with notches therein which pass over said lugs and rest upon and are closed by the flanges on said nozzle-pipe when the cap is turned, the upper side of said inwardly-projecting flange being formed with inclines which engage the lugs on the nozzle and draw the cap snugly down against the flanges thereon, and a vertical jacket surrounding said nozzle-pipe communicating at the upper end through the space between the nozzle and the edges of the flange on the cap with the chamber therein and open at the lower end, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JACOB STOLL.

Witnesses:
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