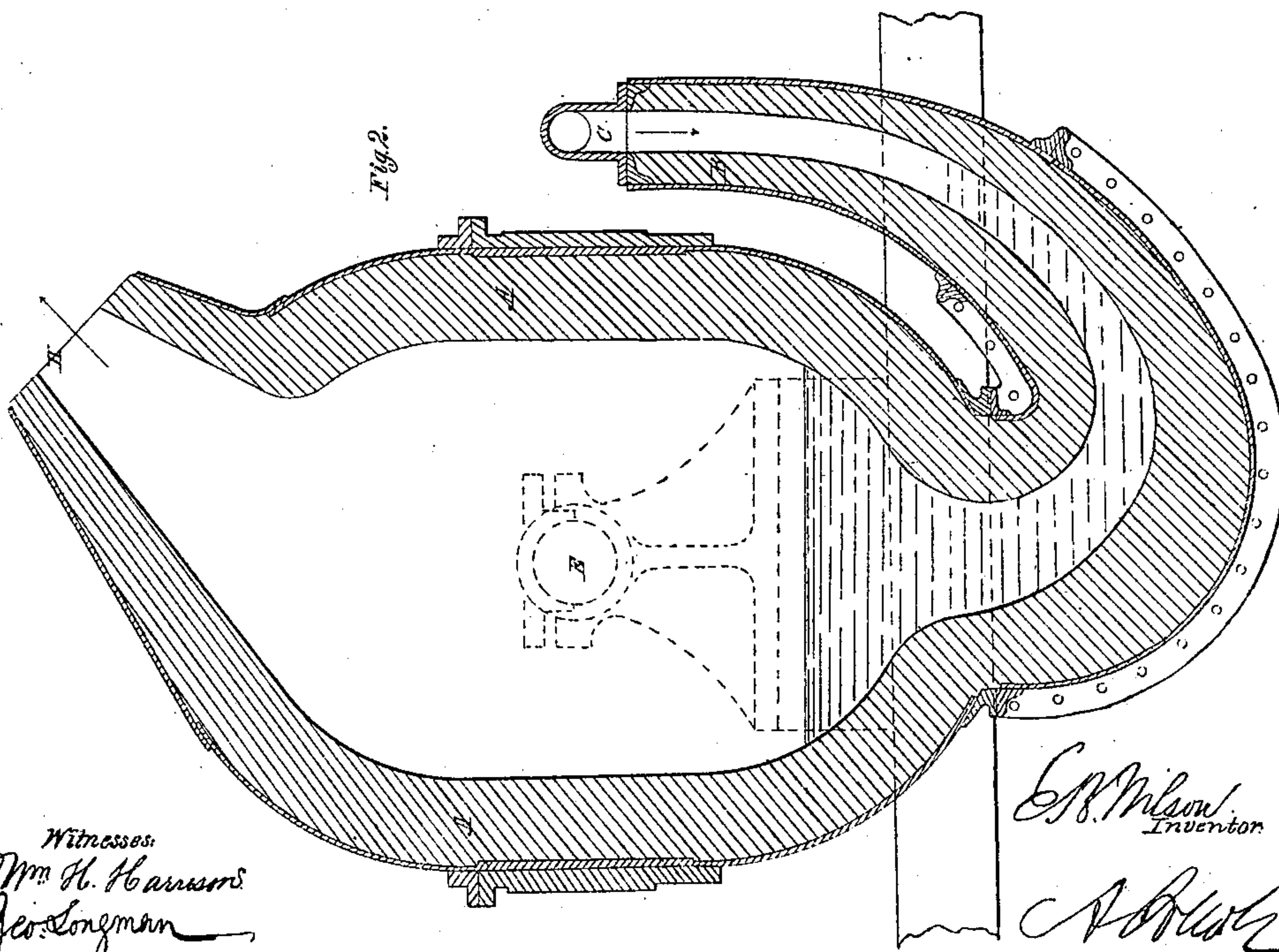
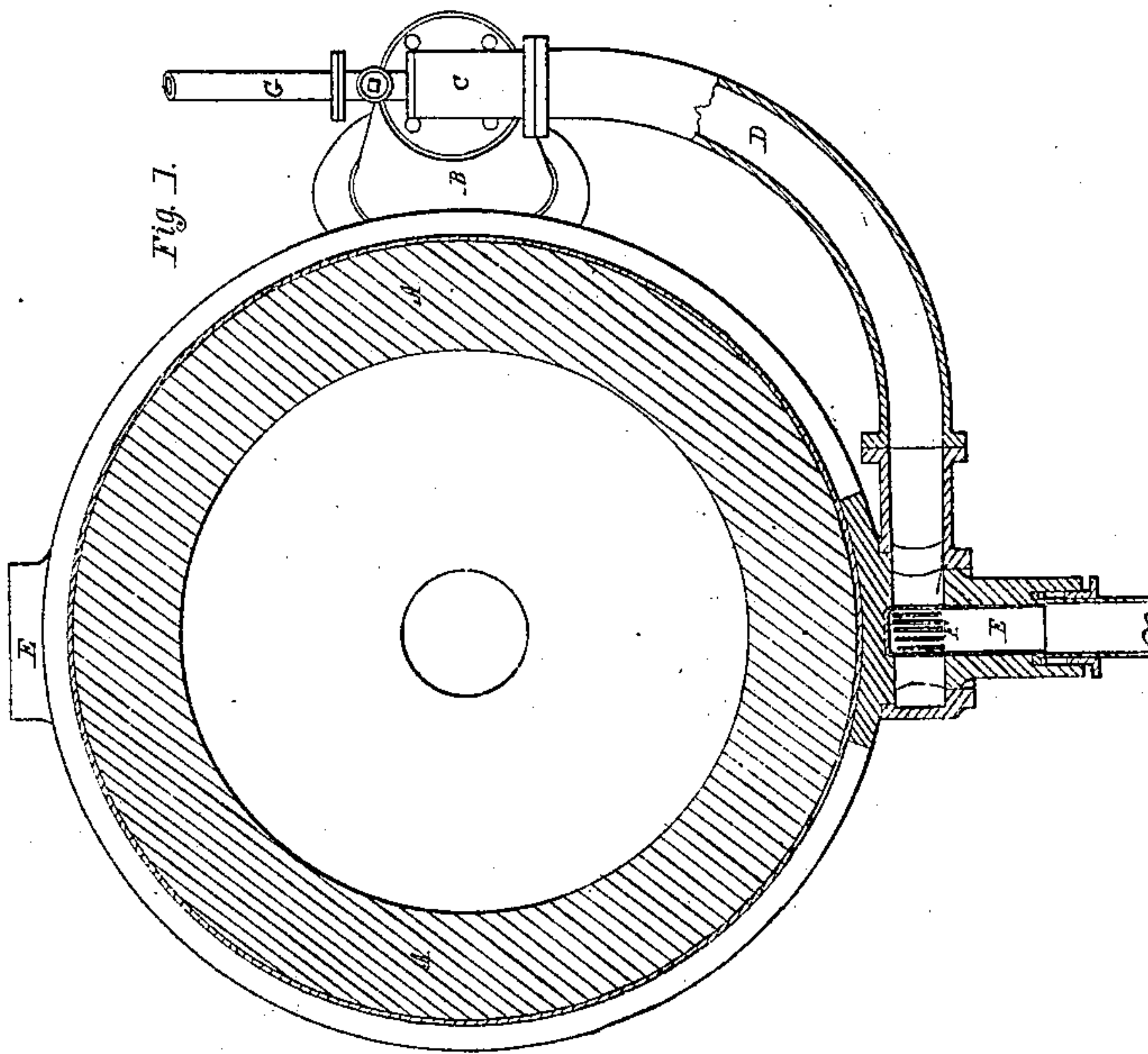


E. B. WILSON.

MANUFACTURE OF MALLEABLE IRON AND STEEL.

No. 39,364.

Patented July 28, 1863.



Witnesses:
Wm H. Harrison
Geo Longman

E. B. Wilson
Inventor

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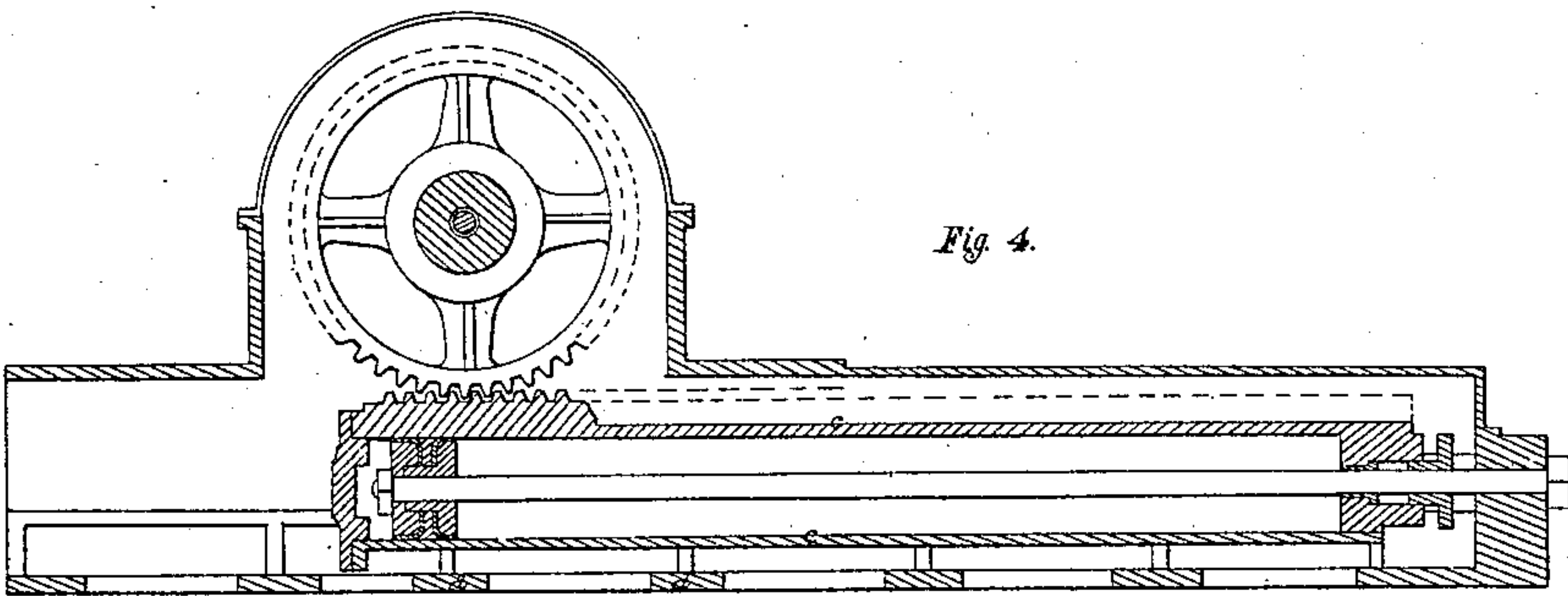


Fig. 4.

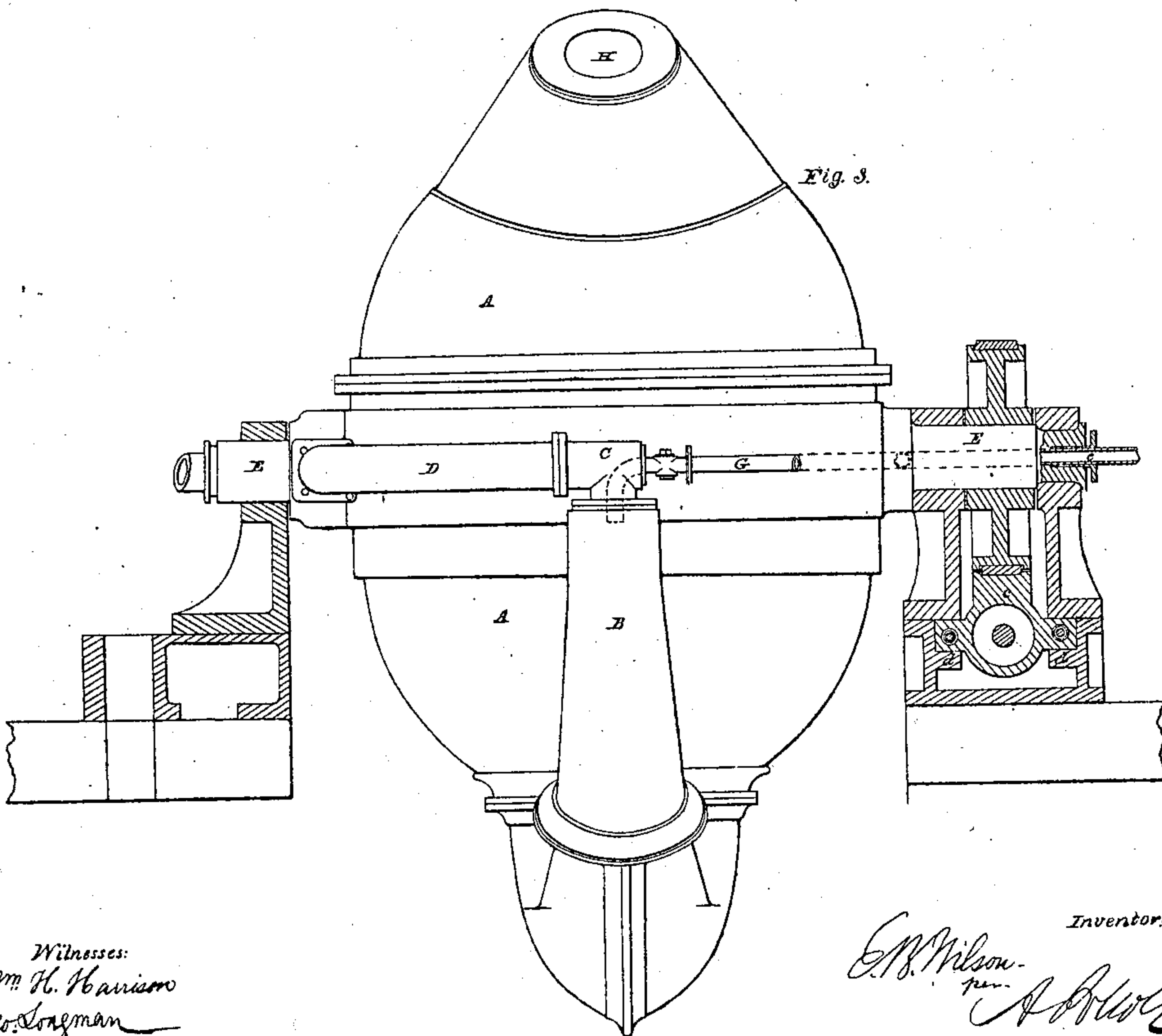


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWARD BROWN WILSON, OF WESTMINSTER, COUNTY OF MIDDLESEX,
ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF MALLEABLE IRON AND STEEL.

Specification forming part of Letters Patent No. 39,364, dated July 28, 1863

To all whom it may concern:

Be it known that I, EDWARD BROWN WILSON, of Westminster, in the county of Middlesex, England, have invented certain new and useful Improvements in the Manufacture of Malleable Iron and Steel; and I hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to certain peculiar constructions and arrangements of apparatus employed in the manufacture of malleable iron and steel by what is known as the "atmospheric process."

In the manufacture of malleable iron and steel by the well-known process of forcing atmospheric air beneath the surface of the molten metal, it has been found that, by reason of the tuyeres or air-pipes being situate at the bottom of the converting-vessel, and being consequently always, when in action, covered by the molten metal, they are quickly destroyed and rendered unfit for service. Their renewal is a serious inconvenience, and occasions a considerable loss of time, as the converting-vessel at each renewal must be allowed to cool down before a fresh tuyere or set of tuyeres can be introduced.

Now, the object of this invention is to obviate this difficulty by placing the tuyere or tuyeres of the converting-vessel above the molten metal, so as to be entirely out of contact therewith, and to blow down upon and through the metal in place of blowing up through the same, as heretofore. In some cases, it is proposed to use, in conjunction with the blast of air, a jet or jets of chlorine or other gas capable of destroying the sulphur, phosphorus, and other similar deleterious matters contained in the molten metal, a separate pipe being connected to the air-pipe or tuyere for the admission of such gas, and for causing it to mingle with the air as it passes down into the molten metal.

Figure 1 of the annexed sheet of drawings represents a sectional plan of one form of the improved arrangement of converting-vessel and tuyere. Fig. 2 is a longitudinal vertical section of the same, and Fig. 3 is an end elevation thereof.

The main or principal part A of the vessel may be either cylindrical, spherical, oval, or

of any other suitable form; but its lower part is curved upward, as shown at B, and is closed at the top, the other or main orifice or mouth of the vessel being always left open.

C is the nozzle of the tuyere or blow-pipe. It is fitted onto the closed end B of the vessel, as shown in the drawings, and connected with an air-pipe, D, which is carried round the side of the vessel, and forms one of the two trunnions or centers of suspension E E of the vessel.

A, Fig. 3, is a spur-wheel, fast on one of the trunnions, and gearing into a straight rack, b, cast along the top of a horizontal hydraulic cylinder, c, fitted so as to slide freely in guides d. The piston of this cylinder is stationary, so that when water is forced into one end the cylinder is caused to travel along its guides, and consequently imparts a rotatory motion to the spur-wheel a and to the vessel in connection therewith.

Fig. 4 represents a longitudinal section of the arrangement above referred to. By this arrangement the vessel may be readily turned over on its centers for the purpose of emptying the same, such reversion of the vessel not interfering with the air-pipe and tuyeres.

The blast is regulated by any convenient arrangement of stop-cock or valve at F, and the chlorine or other gas employed with the atmospheric air is introduced into the nozzle of the blow-pipe by a separate smaller pipe, (shown at G,) and passing through the opposite trunnion at e to that which receives the blast-pipe. The vessel itself is composed of wrought or cast iron, steel, or other metal, and is thickly lined inside with fire-clay, gault, loam, or other suitable refractory material. The surface of the molten metal is kept some distance below the orifice of the blast-pipe or tuyere. The blast of atmospheric air or air and gas is then turned on, and, being blown down upon the surface of the metal in the part B of the vessel, it forces its way down the part B and through the molten metal therein, escaping upward through the mass of metal in the main body of the vessel A, and passing out with the gases and products of combustion through the open mouth at H. It is thus evident that no burning of the tuyere can possibly take place, as it is never in con-

tact with the metal. Although I prefer the peculiar form of vessel which I have illustrated, it may be otherwise constructed, so as to fulfill the same end—namely, the saving of tuyeres—as, for example, the vessel may be curved in the form of a crescent, one of the horns of the crescent being left open and the other closed by the introduction therein of the nozzle of the blow-pipe, the level of the molten metal being some distance below the blow-pipe, so as to be entirely out of contact therewith. The vessel would be supported at its center on trunnions, which would admit of it being tipped over for the purpose of emptying the same; or, if preferred, the vessel may be made of a circular or other form, and provided with a central exit for the air and gases, such central exit-passage dripping at its lower edge or lip into the molten metal contained in the vessel. A space would be left all round between the exterior sides of the exit-pipe and the inner sides of the vessel, with the exception of a portion which is left to form the outlet for the metal. The top of the vessel is closed in all round the central exit-pipe, and the air or air and gas is blown down and through the metal from a tuyere or tuyeres placed above it in the cover of the vessel, such air or air and gas passing under the immersed

lip of the exit-pipe, and escaping upward through the open top thereof.

Although I have described the converting-vessels as being suspended on centers for the purpose of facilitating the emptying of the same, it is obvious that the same arrangement of tuyeres and gas jet or jets is equally applicable to stationary vessels provided with tapping-holes.

Having now fully described my said improvement, I claim—

The peculiar construction and arrangement of apparatus for manufacturing malleable iron and steel, as hereinbefore described, and illustrated in the annexed drawings, so that the tuyere or tuyeres may be out of contact with the molten metal, and blow the air or gases down upon and through the metal in place of blowing up through or around the same, as heretofore.

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

EDWD. B. WILSON.

Witnesses:

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