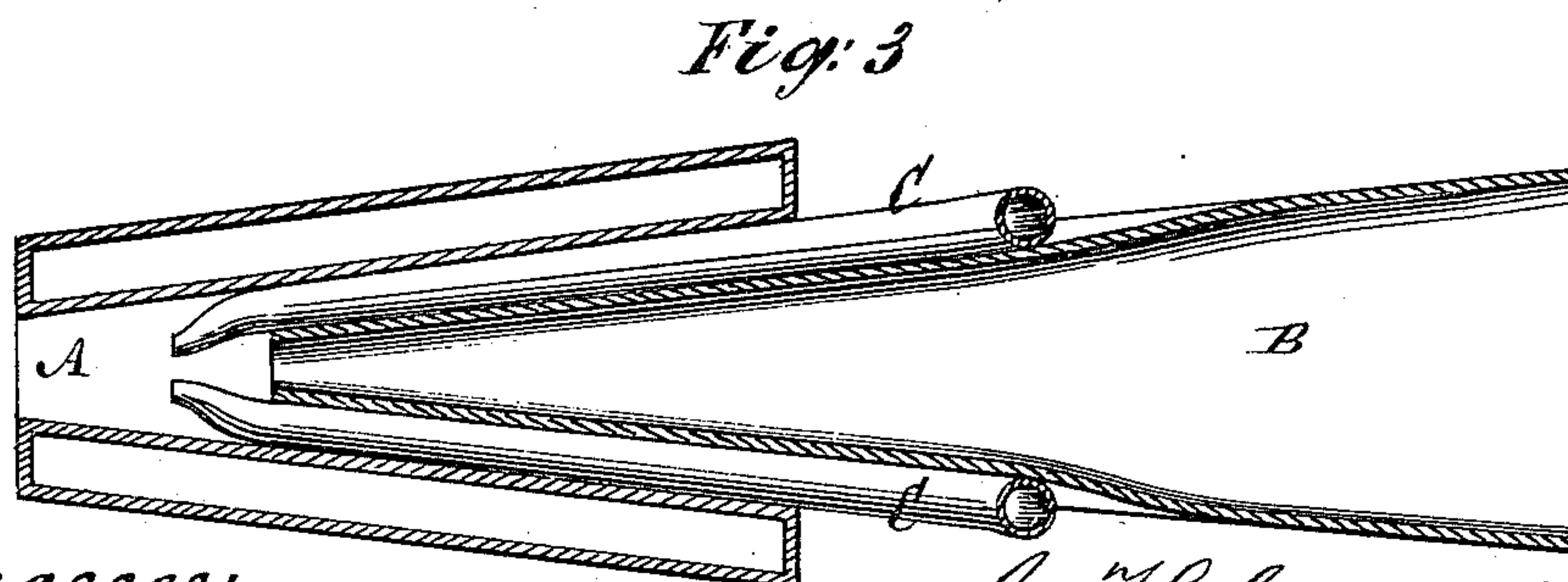
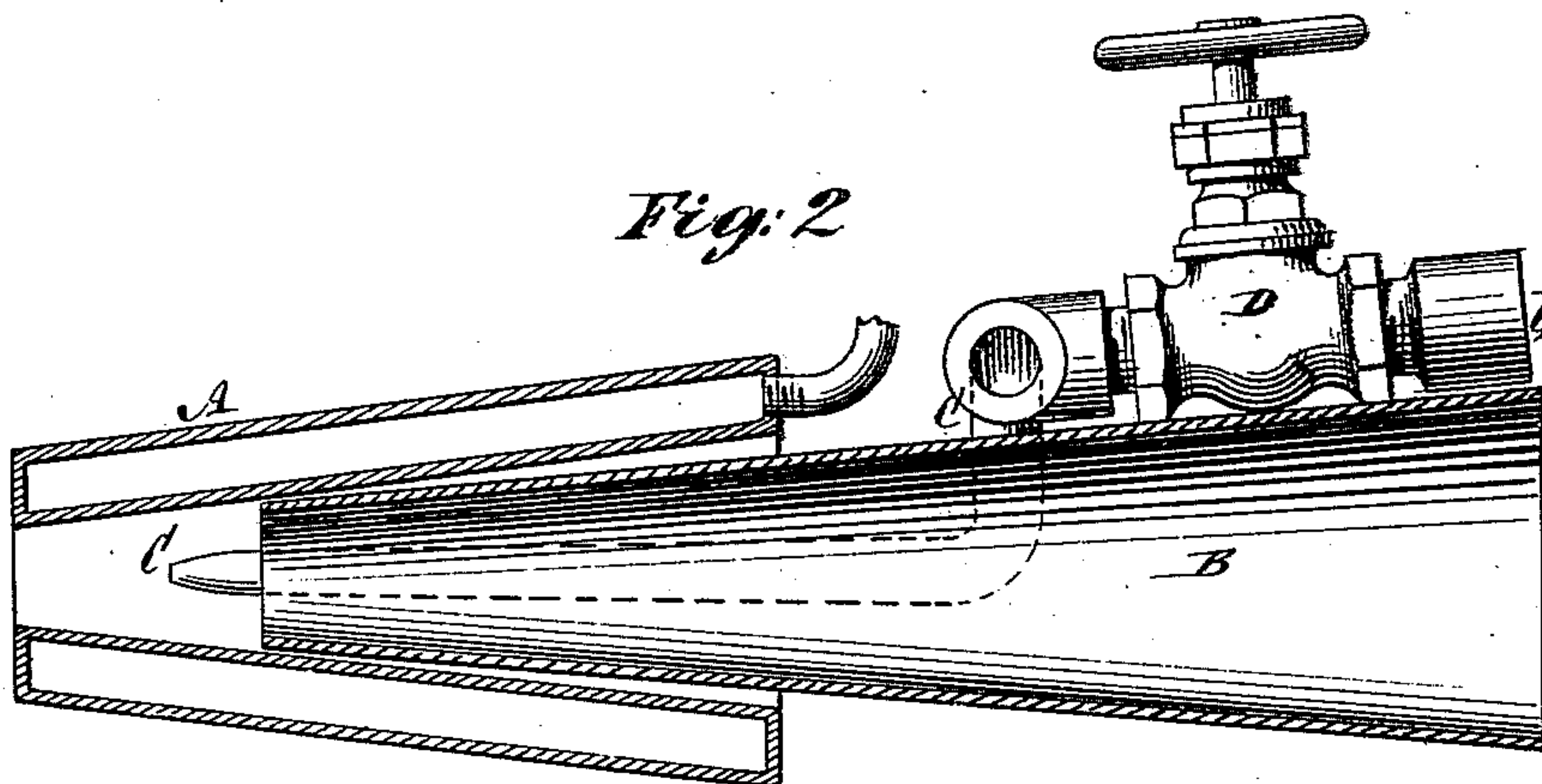
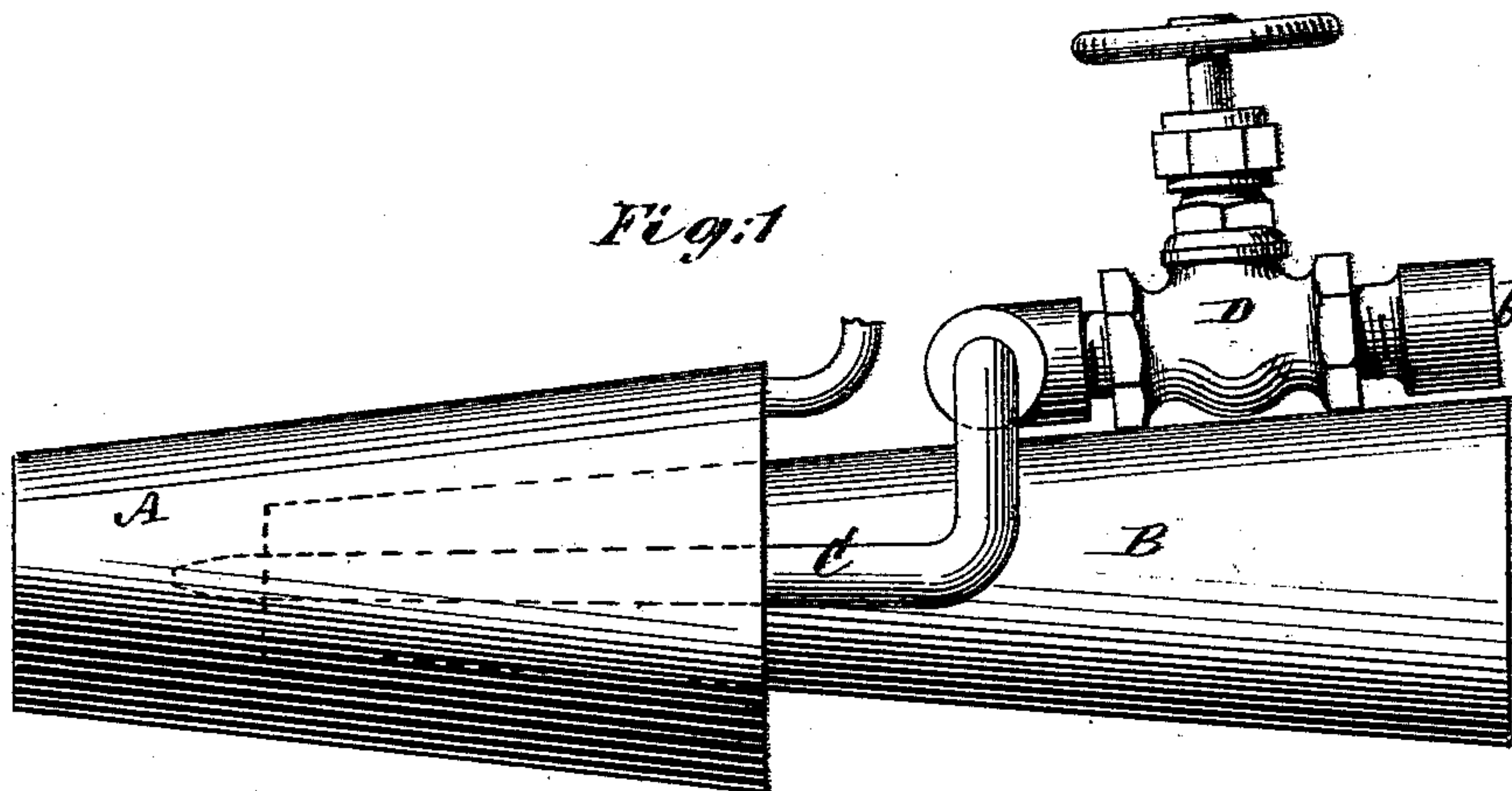


G. H. GOODSSELL.

Steam, or Gas and Air Blast-Pipe for Furnaces

No. 165,561.

Patented July 13, 1875.



Witnesses:

Michael Ryan.
Jos Haynes

G. H. Goodsell
by his Attorney
Brown & Allen

UNITED STATES PATENT OFFICE.

GEORGE H. GOODSSELL, OF LEECHBURG, PENNSYLVANIA.

IMPROVEMENT IN STEAM OR GAS AND AIR BLAST PIPES FOR FURNACES.

Specification forming part of Letters Patent No. **165,561**, dated July 13, 1875; application filed May 17, 1875.

To all whom it may concern:

Be it known that I, GEORGE H. GOODSSELL, of Leechburg, in the county of Armstrong and State of Pennsylvania, have invented a new and useful Improvement in Combined Gas or Steam and Air Blasts for Furnaces for metallurgic and other purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

This invention is applicable to blast-furnaces of different kinds, including furnaces for the reduction of ore, iron-refineries, puddling-furnaces, and, in fact, any furnaces in which a blast is used and an intense heat is required, as in the manufacture of iron, for which purpose the invention will here be described as applied to.

The invention consists in the combination, with the air-blast pipe, of one or more steam or gas pipes arranged to conduct a current or currents of steam or gas, or both, in front of the air-blast as it issues from its pipe, whereby a more intense heat is produced, also a more perfect combination effected and the product of the furnace improved.

Figure 1 is a side view of a furnace-tuyere, with air-blast pipe and steam or gas pipe combined; Fig. 2, a longitudinal vertical section of the same, and Fig. 3 a horizontal section thereof.

A is the tuyere, which may be of the ordinary construction, the improvement being capable of application to tuyeres now in use without altering the same. B is the air-blast pipe inserted in the tuyere. C C are tubes arranged to enter the tuyere on either side of the air-blast pipe, and with their delivery ends made to project in front of said blast-

pipe within the tuyere. These tubes serve to conduct steam or gas, or both, in advance of the air-blast, and so that the steam or gas is caused to mingle with the air of the blast at the most efficient point to bring them and the air in contact with the fire. Said tubes C C may be connected outside of the tuyere with a valve, D, common to both, for regulating the supply of steam or gas, or for shutting off the same when the air-blast alone is required to be used; or the steam or gas may be used alone, or in combination with the air, as circumstances require. The valve D is connected at *b* with the gas-supply pipe, or, by removing the latter, with a steam-supply pipe of the same size, by means of a union coupling. Coal or any other suitable gas may be used. The tubes C C, instead of being arranged outside of the blast-pipe B, as represented, may pass through the interior of said pipe. The gas or steam being conducted through or inside of the tuyere to a point in front of the blast-pipe nearest to the furnace, the force of the blast will drive the steam or gas to its proper point of contact with the fire. By this mode of introducing the steam or gas, or both, in common with the air of the blast, a more intense heat may be obtained, and more perfect combustion, also a much superior quality of iron be produced.

I claim—

The combination of the tuyere A, air-blast pipe B, arranged therein, and steam-tubes *c c* on the exterior of, and projecting in front of, the air-blast pipes, substantially as shown and described.

GEORGE H. GOODSSELL.

Witnesses:

BENJAMIN W. HOFFMAN,
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