

M. BOYNTON.

HYDRO-CARBON INJECTOR FOR FURNACES.

No. 177,370.

Patented May 16, 1876.

Fig. 1.

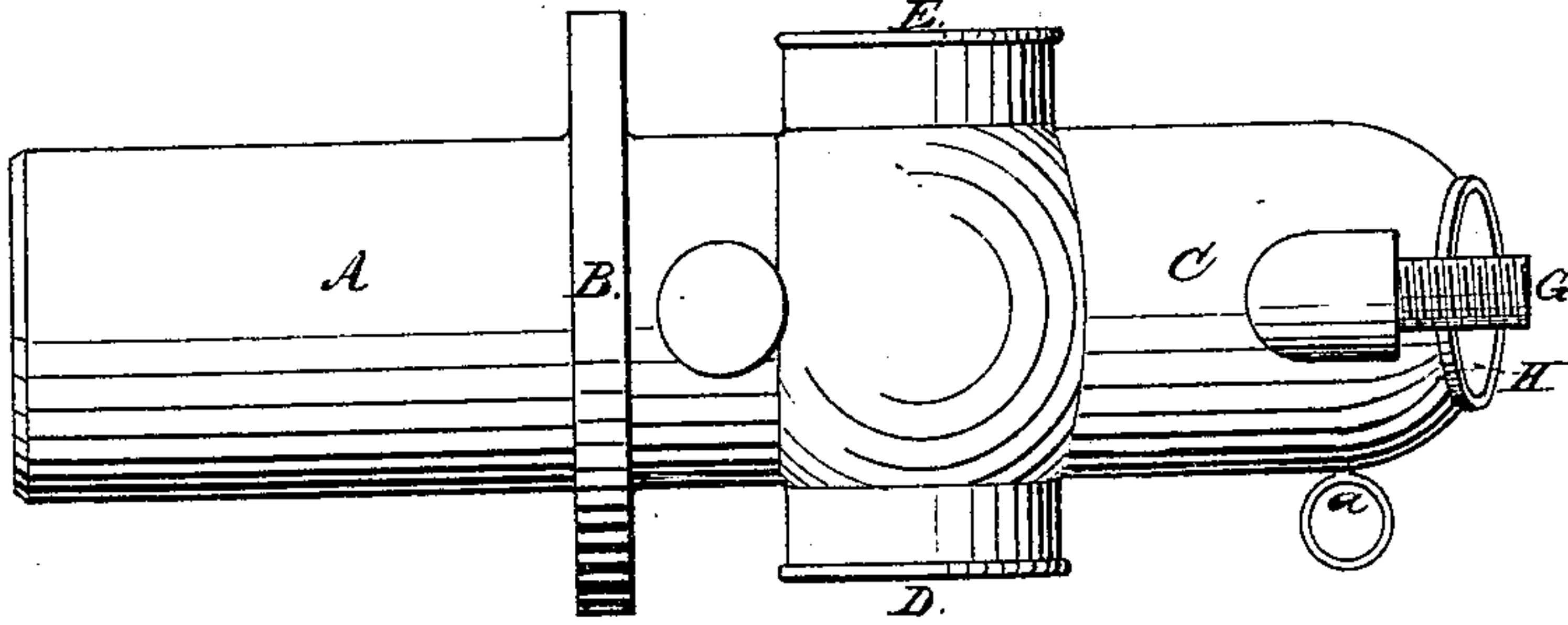


Fig. 2.

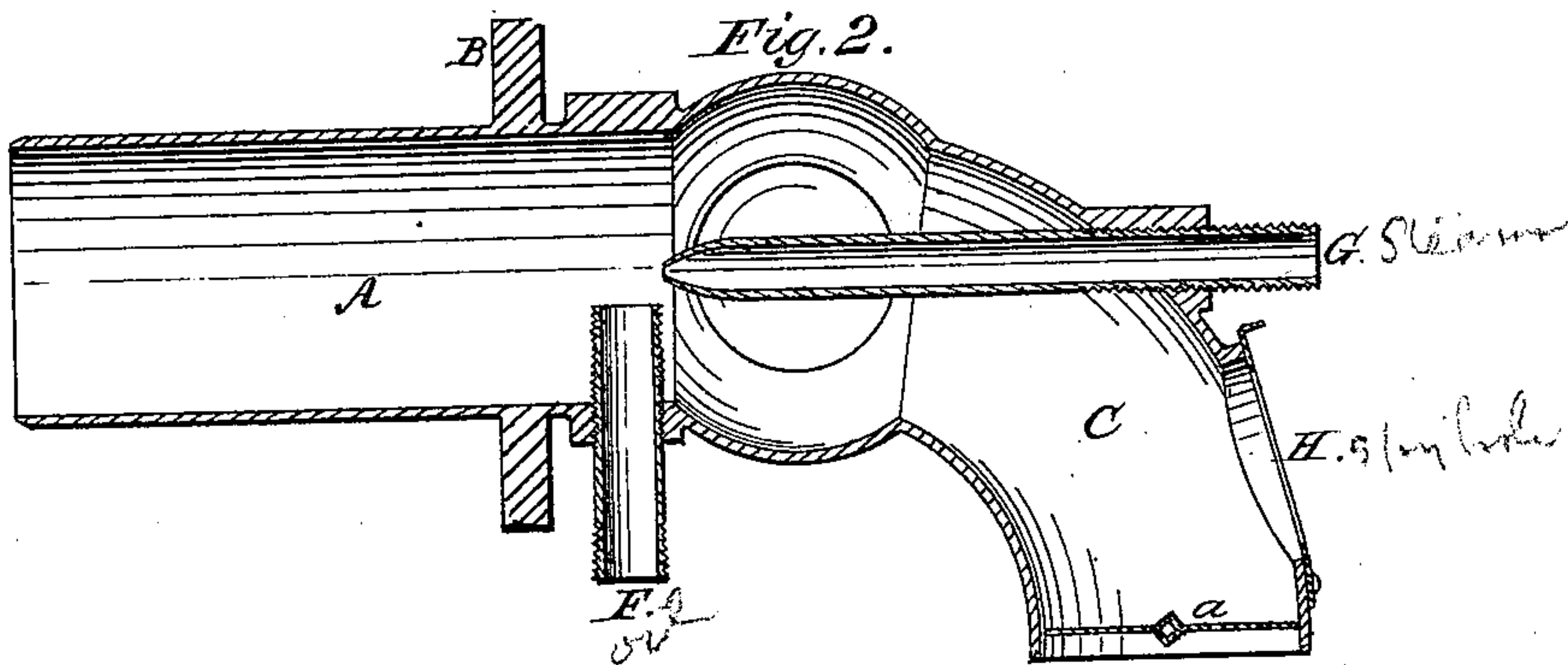


Fig. 3.

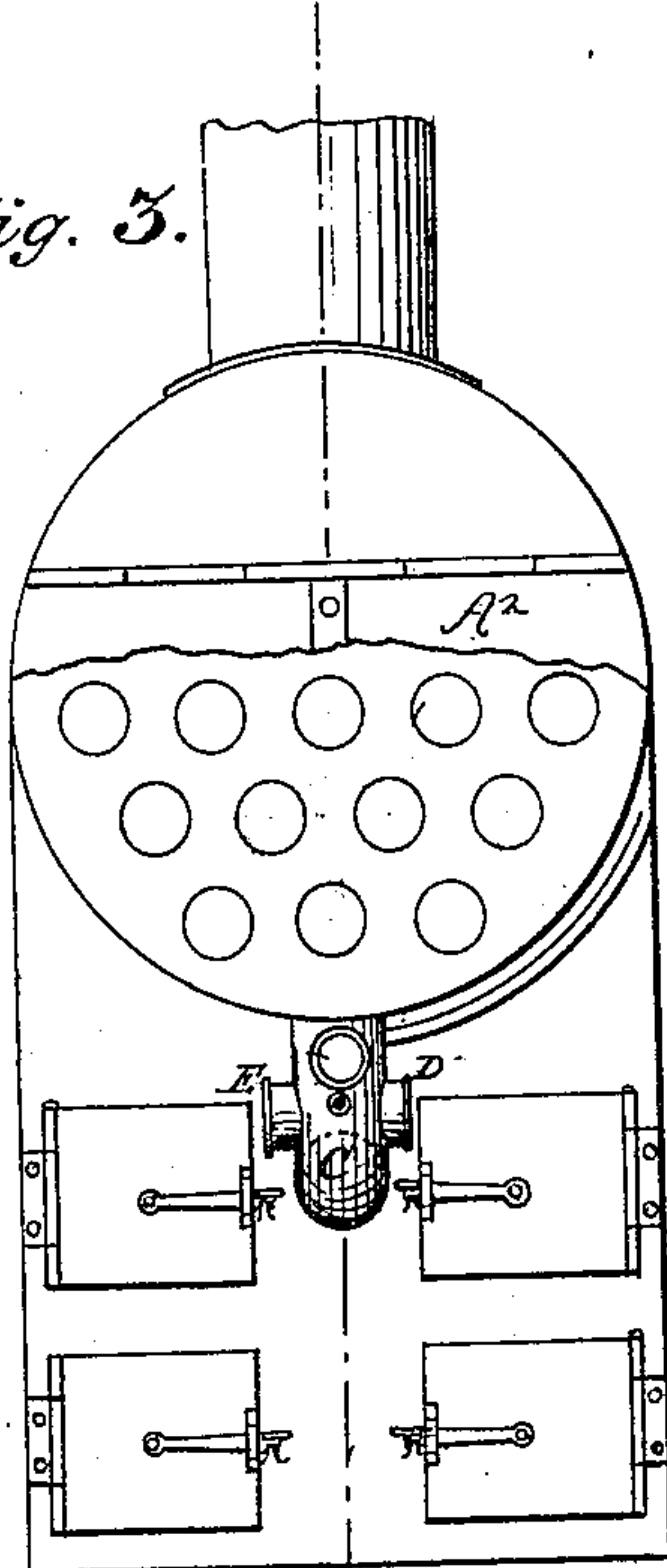
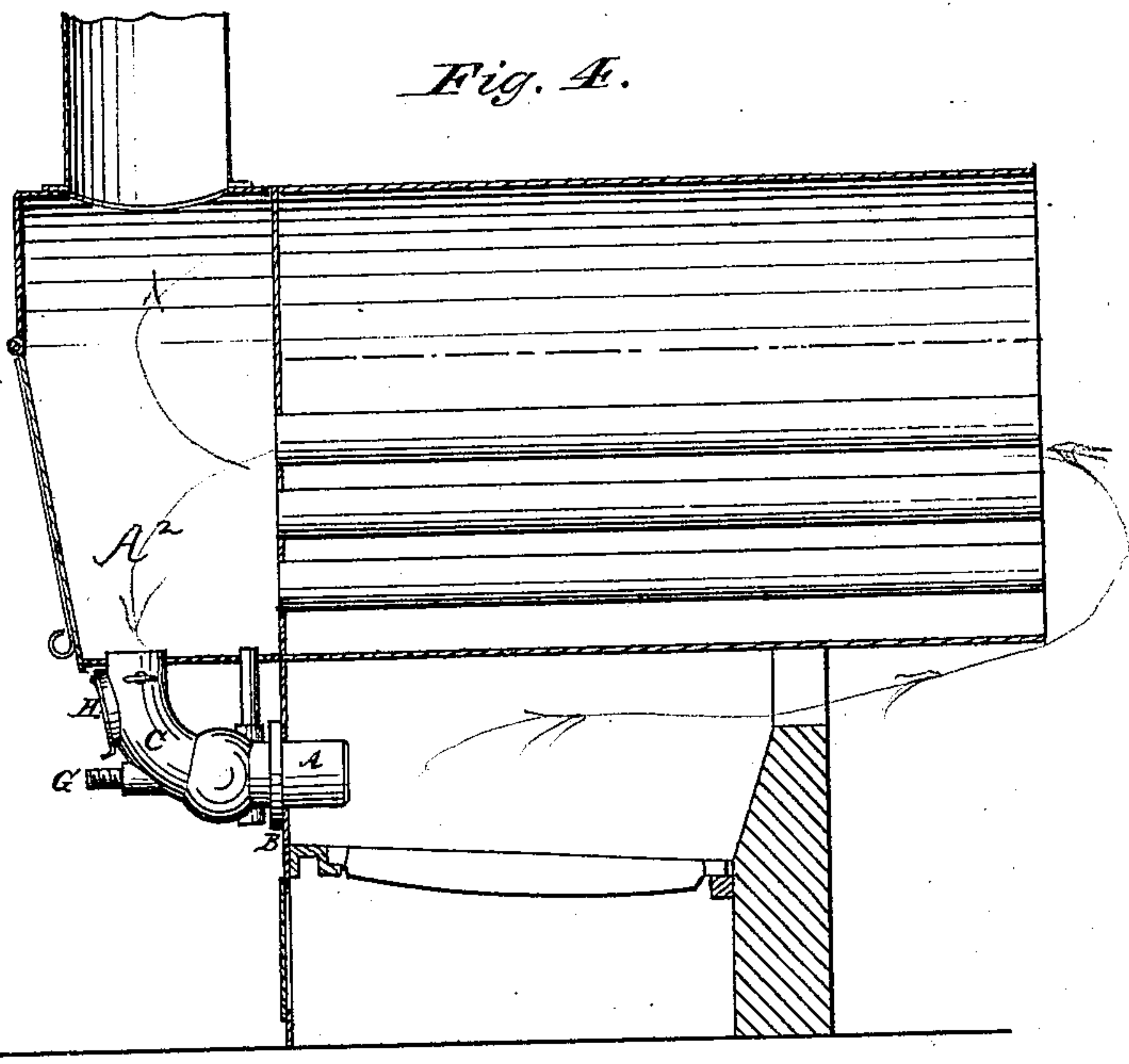


Fig. 4.



Witnesses:

J. L. Hummer  
Wardner.

Inventor:

Matthew Boynton  
by James W. Mandeville,  
his attorney.



# UNITED STATES PATENT OFFICE.

MATTHEW BOYNTON, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN HYDROCARBON-INJECTORS FOR FURNACES.

Specification forming part of Letters Patent No. **177,370**, dated May 16, 1876; application filed February 23, 1876.

*To all whom it may concern:*

Be it known that I, MATTHEW BOYNTON, of the city of Chicago, in the State of Illinois, have invented, as an attachment to furnaces, a new and useful Improvement in Hydrocarbon-Injectors, of which the following specification and its accompanying drawing are a full, clear, and exact description.

My invention consists in placing the injector in direct communication with the smoke-stack, so that only hot air passes through into the furnace.

In the drawing, Figure I is an external view, and Fig. II a longitudinal section, of the injector. Figs. III and IV are front and side elevations of a furnace, showing the injector in position.

The inner portion A of the injector may be termed an atomizer. It is inserted into the furnace under the bonnet of the smoke-stack A<sup>2</sup>, and, by means of the flange B, it is bolted fast in place.

Heretofore, in some constructions of furnaces, on account of the atomizer not projecting into the furnace, much of the hydrocarbon has dripped down upon the sides of the fire-box, where it smoked away instead of being atomized and burned with the steam.

The atomizer is cast in one piece, with a receiver, C, which has connection with a hot-air flue, or directly with the bonnet of the smoke-stack, whence hot air is inducted and regulated, by a damper, *a*, into the injector, for increasing the combustion of the hydrocarbon, and to preserve the boiler from cracking, which is certain to ensue if cold air be used with the elements of combustion. One or more side ports, D E, are made, so as to permit the use, if desired, of hot air in a large quantity. These ports, when not use, are preferably covered with caps of isinglass, through which the process of combustion may be observed the same as through the spy-hole H in the hot-air receiver.

Hydrocarbon is fed to the injector through the pipe F, and steam through the pipe G. These independent pipes are both adjustable, so as to regulate the flow of the steam and hydrocarbon. The steam drives the stream of hydrocarbon into the furnace, and also draws in hot air through the receiver. Owing to the length of the atomizer the hot air, steam, and hydrocarbon are thoroughly mixed and atomized while passing through it.

The use of hot air saves a large amount of oil by supporting a steady, moderate flame with an even temperature in the furnace.

Although the air-current would be naturally upward at this point, the jet of steam is so powerful, and it creates such a vacuum, that a large quantity of hot air is drawn into the furnace through the injector. It is drawn in so strongly as to produce a red flame for a large part covering a space underneath the boiler; and, although the air-current is only in part fresh air, (it being largely mixed with the products of combustion,) the flame is perfectly and steadily supported. If sufficient fresh air for this purpose should not come down the smoke-stack the bonnet underneath could be pierced with a few small holes, care being taken to pierce them in such a place that the cold air which enters through them should be converted into hot air before the current reaches the injector. Upon no account must cold air enter the furnace, because it is changes of temperature which cracks the boiler.

In this invention, as the flame is so steady, and the temperature so even, it may be safely used on a furnace for melting glass. In glass-melting a gust of cold air would break a melting-pot. Therefore, for this delicate operation the temperature always must be even.

It will be seen that the spy-holes, which are covered with glass or isinglass, are a valuable feature, as the process of combustion may be observed without opening the injector, thereby saving the boiler from injury by a current of cold air.

I claim as new and desire to secure by Letters Patent—

In combination with a hydrocarbon-injector, the receiver C, directly connected with the smoke-stack of the furnace, by means of which hot air is conveyed from the smoke-stack into the injector, the parts being constructed substantially as described.

In testimony whereof I hereunto set my hand and seal this 22d day of December, A.D. 1875, in the presence of two attesting witnesses.

MATTHEW BOYNTON. [L. S.]

Witnesses:

J. D. BOARDMAN,  
E. T. SUMWALT.