

H. W. ADAMS.

Improvement in Steam-Boiler Furnaces.

No. 132,192.

Patented Oct. 15, 1872.

FIG. 1.

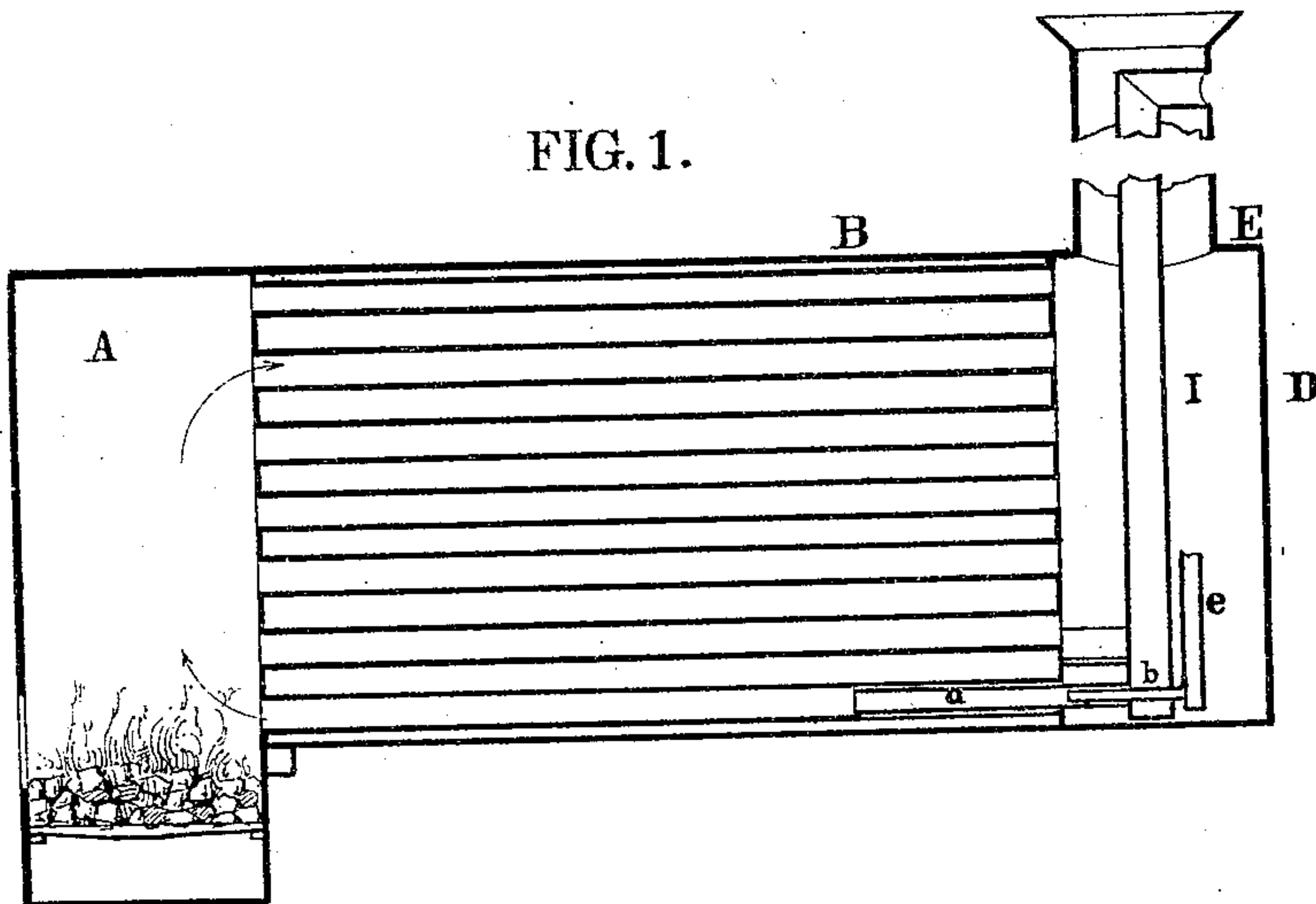


FIG. 2.

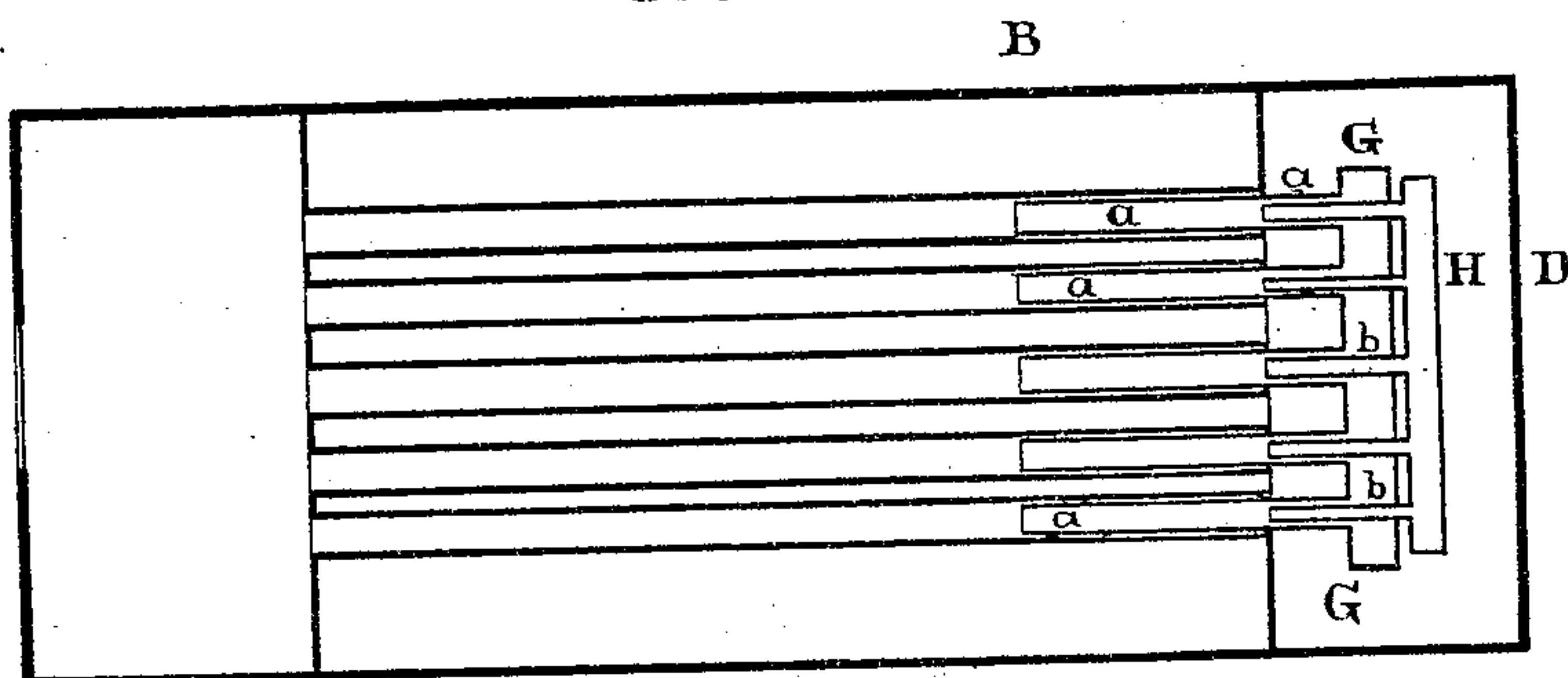
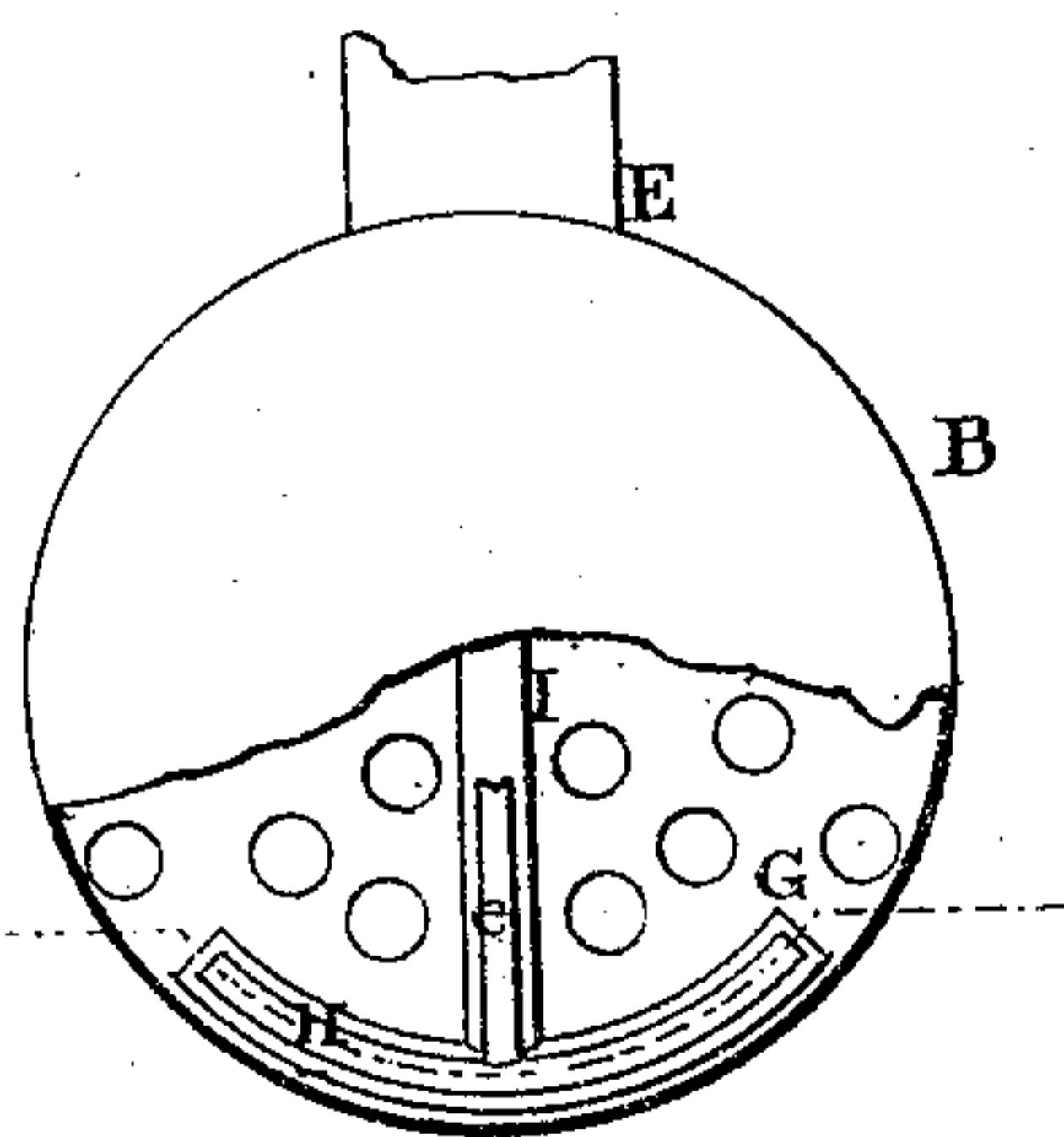


FIG. 3.



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By his atty.

Horner and Son

UNITED STATES PATENT OFFICE.

HENRY W. ADAMS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. **132,192**, dated October 15, 1872.

To all whom it may concern:

Be it known that I, HENRY W. ADAMS, of Philadelphia, Pennsylvania, have invented an Improvement in Smoke-Consuming Steam-Boiler Furnaces, of which the following is a specification:

The objects of my invention are to thoroughly ignite the unconsumed products of combustion in the furnaces of steam-boilers, to increase the heat of the fuel, and to reinforce the same by the addition to it of combustible gases. I attain these objects by forcing from the smoke-box end to the fire-box of the boiler, through the lower tubes of the same, blasts of combined air and steam.

A mode of carrying out my invention is illustrated in the accompanying drawing, in which—

Figure 1 represents a vertical section of a boiler; Fig. 2, a sectional plan; and Fig. 3 a view of the smoke-box end of the boiler, partly in section.

A is the fire-box of the boiler; B, the body of the same, with its usual system of tubes; D, the smoke-box; and E the chimney. In the bottom of the smoke-box is a casing, G, forming an air-chamber, from which projects a number of tubes, *a*, (five in the present instance,) into as many of the lower tubes of the boiler. Adjacent to this air-chamber G is a chamber, H, supplied with steam through a pipe, *e*, and having a series of small tubes or nozzles, *b*, each of which passes through the air-chamber and projects into one of the tubes *a*. Air is furnished to the chamber G, in the present instance, through a pipe, I, passing upward into the chimney, and communicating with an opening in front of same. On admitting steam to the chamber H forcible jets will escape from the nozzles *b* into the tubes *a*, and thence into the tubes of the boiler. At the same time the jets of steam induce forcible volumes of air to rush from the chamber G into the tubes *a*, and thence into the said boiler-tubes. The result is a constant rush

into the fire-box, above or near the fuel, of blasts of combined air and steam, which tend to ignite the unconsumed gases emanating from the fuel, increase the heat of the fuel itself, and reinforce it by adding to the same combustible gases. Most efficient results are attained in the above respects, owing to the position of the orifice whence the above mentioned blasts escape into the fire-box, the force of the blasts being exerted in a direction opposite to that in which the products of combustion escape into the tubes of the boiler; hence this escape is in a measure retarded by these blasts, only, however, to enable the latter to perform their duty effectually by their intimate contact with the fuel, and their intimate admixture with the products of combustion.

I prefer to leave an annular space between each tube *a* and the boiler-tube into which it projects, so that in addition to the combined air and steam the smoke and gases in the smoke-box may rush through the boiler-tubes into the fire-box, and thus contribute to the reinforcement of the fuel, at the same time heating the air in its passage through the tubes.

I claim as my invention—

1. A tubular boiler in which an injector or injectors are arranged at the smoke-box end of the boiler, so as to force a jet or jets of combined air and steam into the furnace above the fuel.

2. The combination, with the lower tubes of a steam-boiler, of a steam-injecting nozzle or nozzles, arranged substantially as described, so as to impel a current of combined air and steam through said tubes into the fire-place.

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

HENRY W. ADAMS.

Witnesses:

WM. A. STEEL,
JOHN K. RUPERTUS.