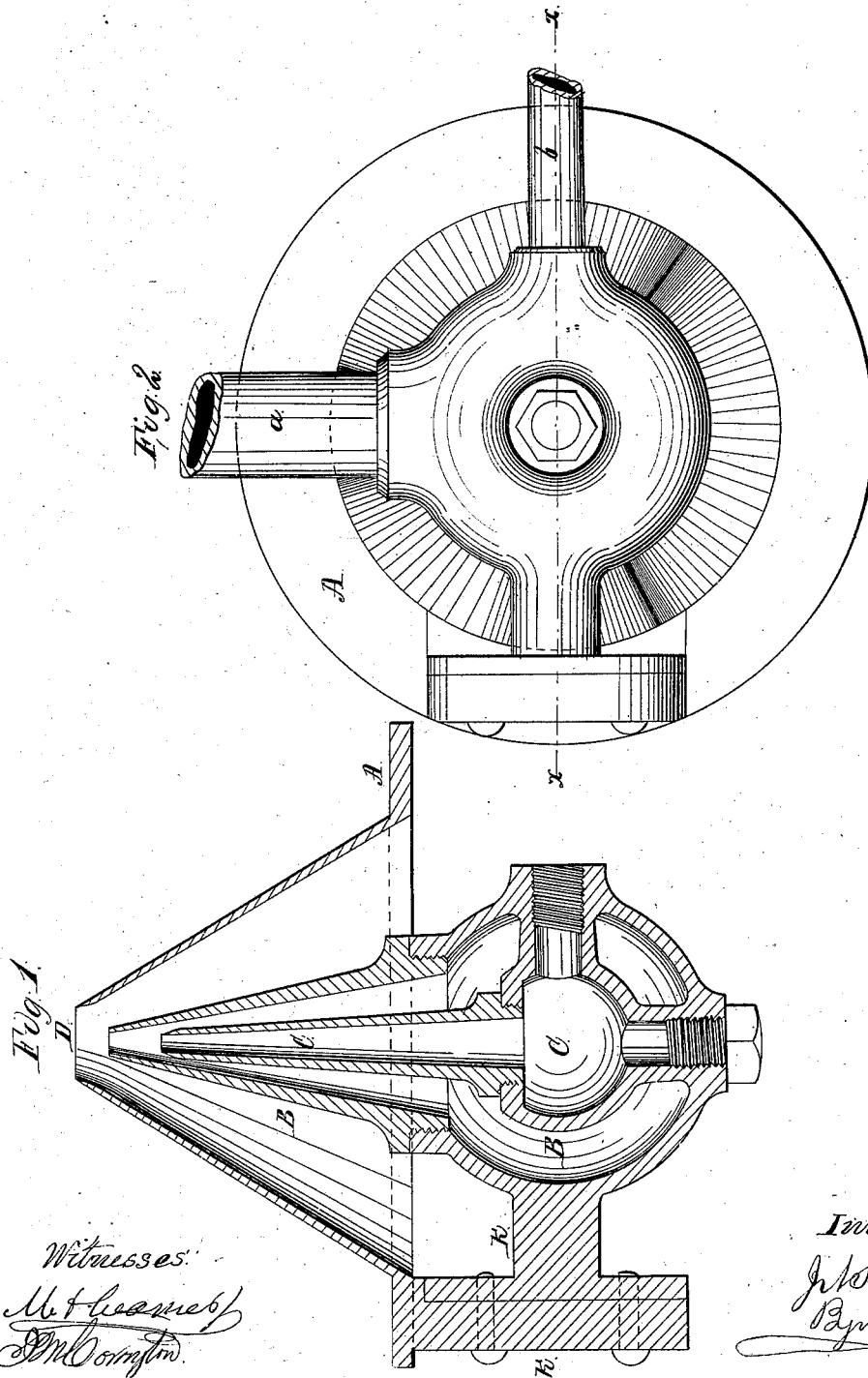


*Snowdon & Wilkins,  
Burning Hydrocarbon.*

*N<sup>o</sup> 48,218.*

*Patented June 13, 1865.*



# UNITED STATES PATENT OFFICE.

JOHN N. SNOWDON AND HENRY WILKINS, OF BROWNSVILLE, PA.

## IMPROVEMENT IN EJECTORS FOR STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. 48,218, dated June 13, 1865.

### *To all whom it may concern:*

Be it known that we, JOHN N. SNOWDON and HENRY WILKINS, of Brownsville, in the county of Fayette and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Promoting Combustion in Furnaces; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan of a horizontal section of an apparatus made according to our invention, taken on the line *x* of Fig. 2. Fig. 2 is a front elevation thereof.

Similar letters of reference indicate like parts.

This invention has for its object to promote combustion in furnaces of steam-boilers and other furnaces; and it consists in an apparatus so constructed as to inject oil or water and air by means of and along with a current of steam into a furnace, and thereby promote the more perfect combustion of the gases and products of the fuel.

In many boiler-furnaces, especially in those used in navigation, it has been common to use a blast to promote combustion, and sometimes a jet or jets of steam have been directed into the furnace for this purpose.

Our invention relates to the use of a jet or current of steam for inducing and delivering currents of air and water or oil into a furnace.

In this example of our invention we have shown a funnel, A, which is to be attached to the furnace-front, having its central opening, D, to the fire. Its base is open to the atmosphere.

B is a chamber of spherical form, whose inner side—that is to say, the side which is nearest the furnace—opens into a smaller funnel or nozzle, B', extending centrally into the funnel A nearly to its end D. The spherical chamber B is firmly connected to the funnel A by means of flanges K K, which project from them respectively, and it is connected to the steam-boiler by means of a pipe, *a*. (See Fig. 2.)

Within the chamber B is cast a smaller spherical chamber, C, which opens into a small nozzle, C', which extends within the nozzle B'

nearly to its end, as seen in Fig. 1. This chamber has a pipe, *b*, extending from it through the side of the chamber B to a reservoir of either oil or water. The funnels or nozzles A B' C' are conical in form and concentric with each other.

The operation of the apparatus is as follows: If steam is allowed to pass through the steam-chamber B, it will pass with force according to the pressure and the volume of the current through the end of the nozzle B' and through the opening D of the nozzle A into the furnace. In passing through the end of the nozzle A it will create a partial vacuum therein, and so induce a current of air in the direction of the current of steam, which air will mix more or less with the steam and be delivered with it into the furnace. If the inner chamber, C, is put into communication with a reservoir of hydrocarbon or other oil, or of any other highly-combustible substance, the current of steam, which passes the end of the inner nozzle, C', in the form of an annulus, will produce a partial vacuum in the said inner nozzle, C', and in its chamber C, and thereby induce a flow of oil through it, which will also be delivered into the furnace. Instead of oil, water can be admitted through the chamber C, if preferred.

The steam, in the invention here described, causes the air and oil or other substances to be injected or delivered into the furnace, where the steam will be decomposed so that its elements will enter into the combustion which takes place in the furnace, the decomposition of the steam being promoted by the presence of the atmospheric air drawn through the funnel A and by the burning of the oil.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The combination of the nozzle A, the nozzle B', and the nozzle C', placed concentrically one within the other, the nozzles B' C' being connected, respectively, with a steam-boiler and with an oil or other reservoir, substantially as above described.

JOHN N. SNOWDON.  
HENRY WILKINS.

Witnesses:

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J. N. JACOBS.