

G. CLARK.  
FUEL ECONOMIZER AND SMOKE AND SPARK CONSUMER.  
APPLICATION FILED JULY 1, 1909.

988,861.

Patented Apr. 4, 1911.

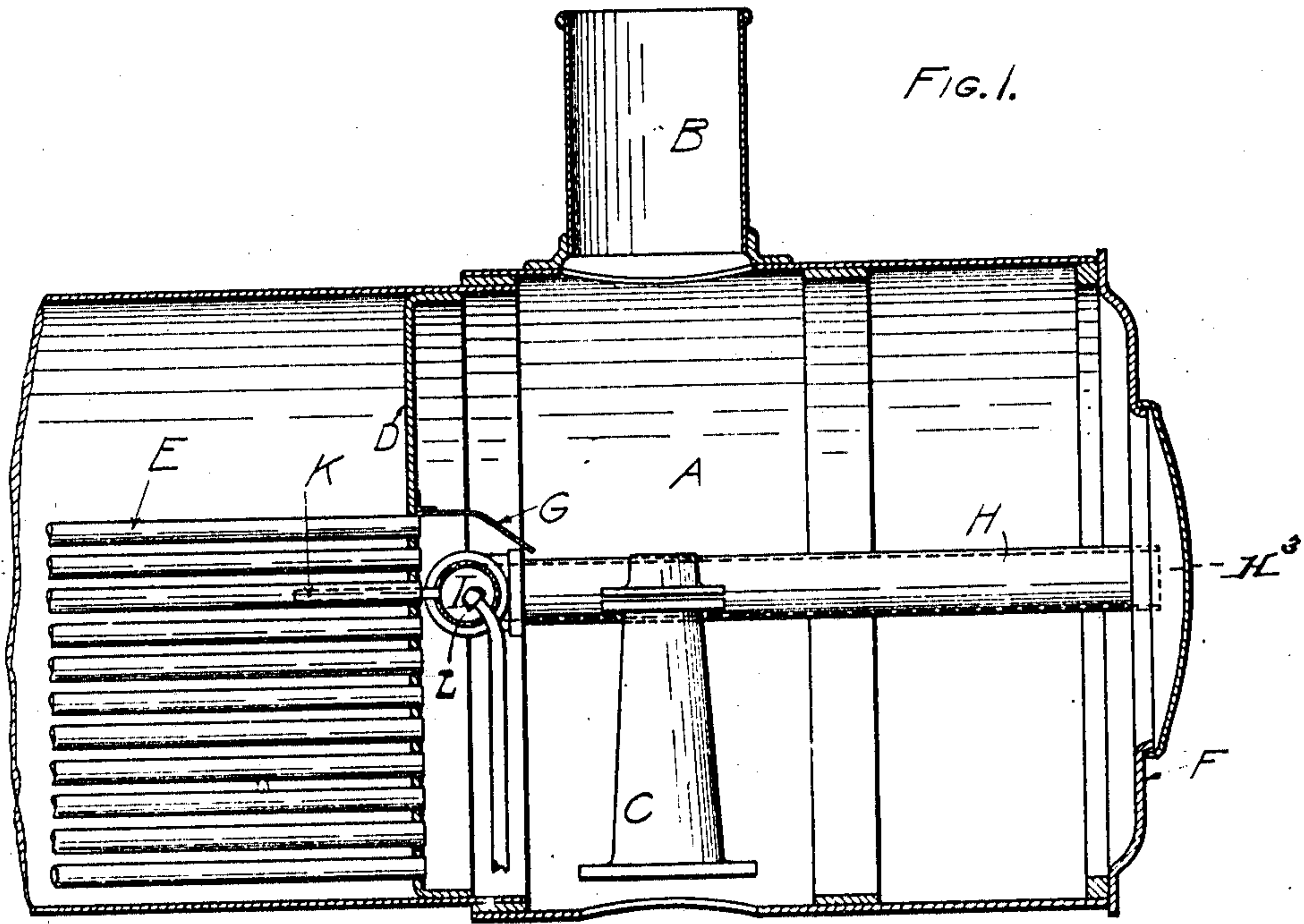


FIG. 3.

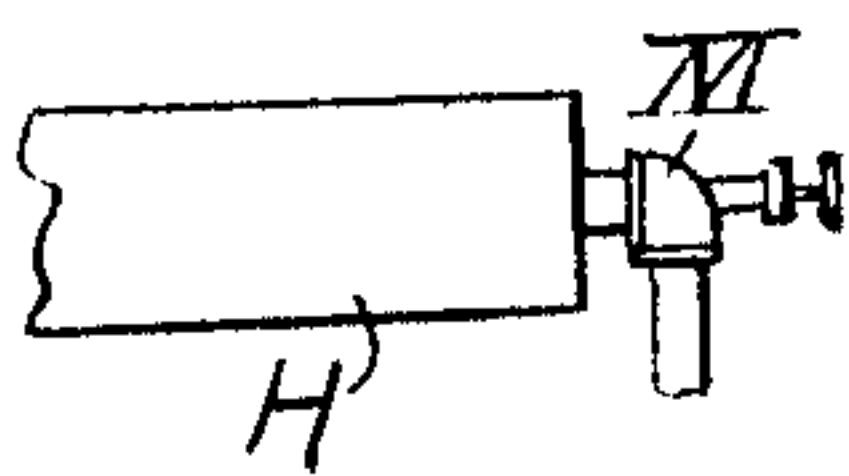
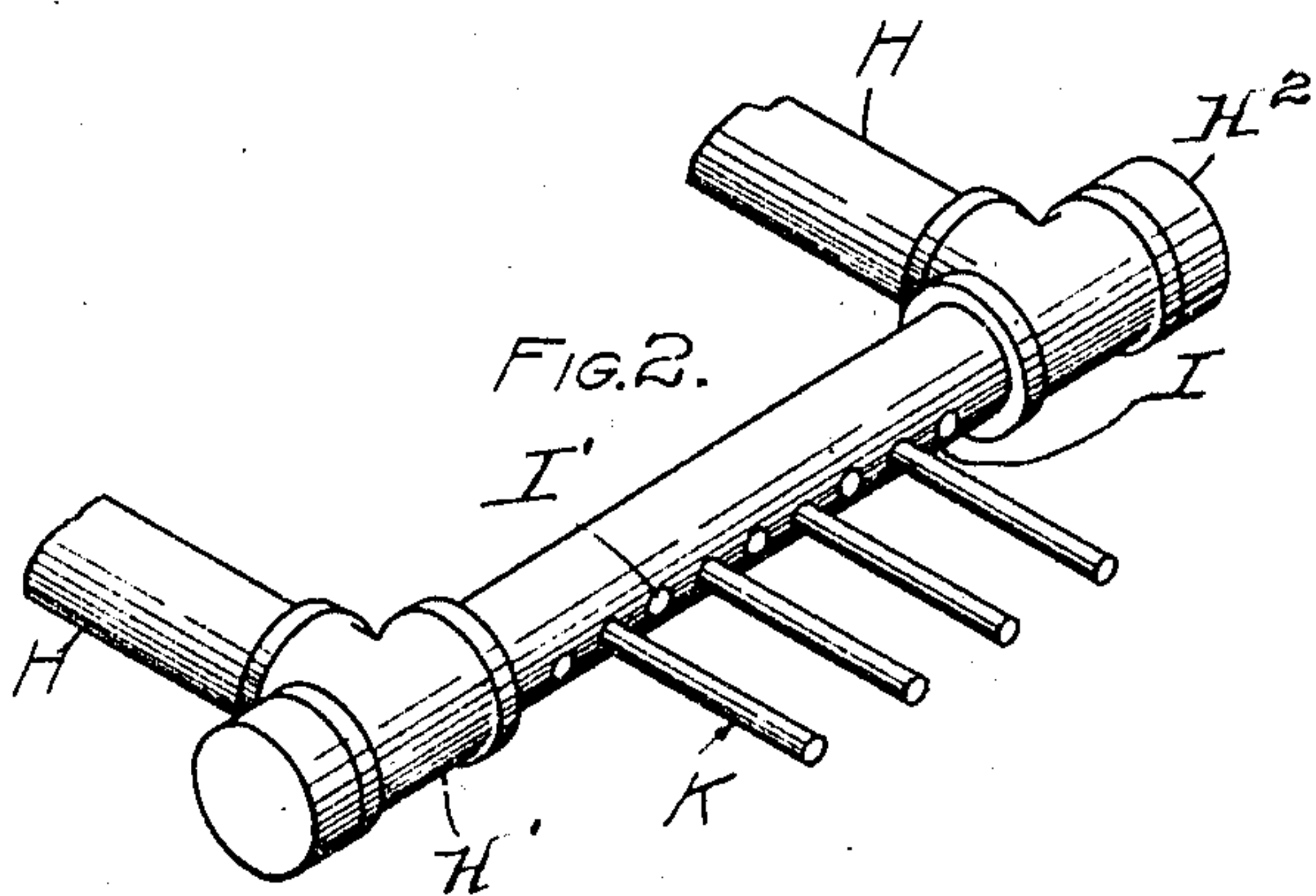
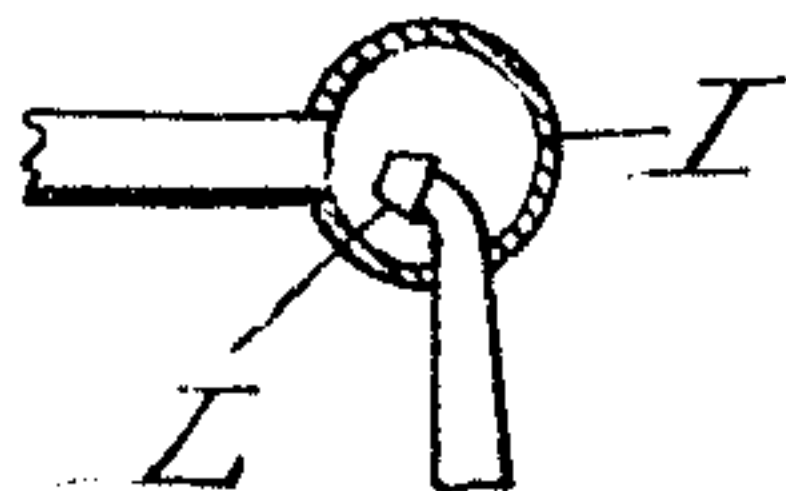


FIG. 4.



WITNESSES  
H. Strauss  
A. S. Kitchen

INVENTOR  
Gardner Clark  
BY Mason, Pritchard, Lawrence  
his ATTORNEYS.



# UNITED STATES PATENT OFFICE.

GARDNER CLARK, OF SOUTH ACTON, MASSACHUSETTS.

FUEL-ECONOMIZER AND SMOKE AND SPARK CONSUMER.

988,861.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed July 1, 1909. Serial No. 505,485.

*To all whom it may concern:*

Be it known that I, GARDNER CLARK, a citizen of the United States, residing at South Acton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Fuel-Economizers and Smoke and Spark Consumers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to fuel economizers and smoke and spark consumers.

The object of the invention is to provide for the more complete combustion of the fuel than has been possible heretofore, with means for consuming the smoke, sparks and cinders.

A further object is to provide an improved device of the character indicated which may be applied to any type of steam boiler for effecting the result stated.

With these and other objects in view, the invention consists in the novel construction hereinafter described and claimed.

In the accompanying drawings—Figure 1 is a view in vertical longitudinal section of a portion of a locomotive boiler with the screens, smoke pipes, etc., removed, in order to more clearly illustrate the application of the invention. Fig. 2 is a perspective view of a portion of the construction shown in Fig. 1, and represents a device for admitting air under pressure. Figs. 3 and 4 are detail views showing means for increasing the air pressure.

In Fig. 1 of the drawings there is shown a portion of a locomotive boiler, the fire tubes of which are designated by the letter E, such tubes being connected with the tube sheet D which forms one side of the smoke chamber A. The stack B connects with the smoke chamber in the usual manner, and below the stack is the usual steam nozzle C, arranged to discharge coaxially with the stack. The front of the chamber is shown at F, and extending lengthwise of the chamber A are pipes H located substantially midway of the upper and lower portions of the chamber and having connection with a transverse pipe or header I extending across the forward ends of the fire tubes. Header I is located adjacent to the tube sheet D, but not in direct contact therewith. A diaphragm or baffle plate is shown at G, this plate be-

ing connected with the tube sheet D and projecting over the transverse header I. The latter is connected with the longitudinal tubes H by means of T connections H' closed at their outer ends by caps H<sup>2</sup>, or in any other suitable manner. Tubes H constitute air inlet pipes and are open at their front ends H<sup>3</sup>, for the purpose of admitting air under the pressure created by the motion of the engine. When necessary or desirable, the draft may be created or increased by the use of an injecting device. The header I is provided with a series of perforations extending along one side thereof, and certain of these perforations have connected therewith short tubes K which extend into the ends of adjacent fire tubes, for the purpose of conducting air from header I through such tubes to the fire box, not shown in the present drawings. A portion of the air admitted through intake H escapes from the transverse header through perforations I', and thence into smoke chamber A, where it mingles with the products of combustion and assists materially in the further combustion of unconsumed portions, the latter being almost wholly disposed of. Fluid may be admitted into the header I through an injecting device L when increased pressure is desired.

In Fig. 3 I have shown an arrangement in which an injector M is connected with the forward end of intake pipe H.

One of the important advantages of this device over previous constructions is that fluid is admitted at the same time and from the same ducts both to the fire box and to the smoke chamber, in the required proportions and under the required pressure, in each, to effect the result desired.

What I claim is:

1. In a device of the class described, a tubular boiler, a smoke chamber adjacent to the boiler and connected with the tubes thereof, means including a longitudinally disposed inlet pipe and a transverse header for conveying air through the smoke chamber, from the exterior, and tubes arranged to connect said header with a fire box, through the medium of the boiler tubes, such header being provided with apertures for admitting air directly to the smoke chamber.

2. In a device of the class described, a tubular boiler, a smoke chamber adjacent to the front of the boiler, an inlet pipe passing through the wall of the smoke chamber, a

transverse pipe connecting with the inlet  
pipe and extending directly across the ends  
of the boiler tubes, said transverse pipe be-  
ing provided with outlets for discharging  
5 air in proximity to the ends of the tubes,  
and a baffle plate arranged above the trans-  
verse pipe.

In testimony whereof I affix my signature  
in presence of two witnesses.

GARDNER CLARK.

Witnesses:

FRANK C. ELLISON,  
GEO. R. RICHARDS.