

No. 864,589.

PATENTED AUG. 27, 1907.

I. F. ZIMMERMAN.  
HYDROCARBON BURNER.  
APPLICATION FILED DEC. 29, 1905.

Fig. 1.

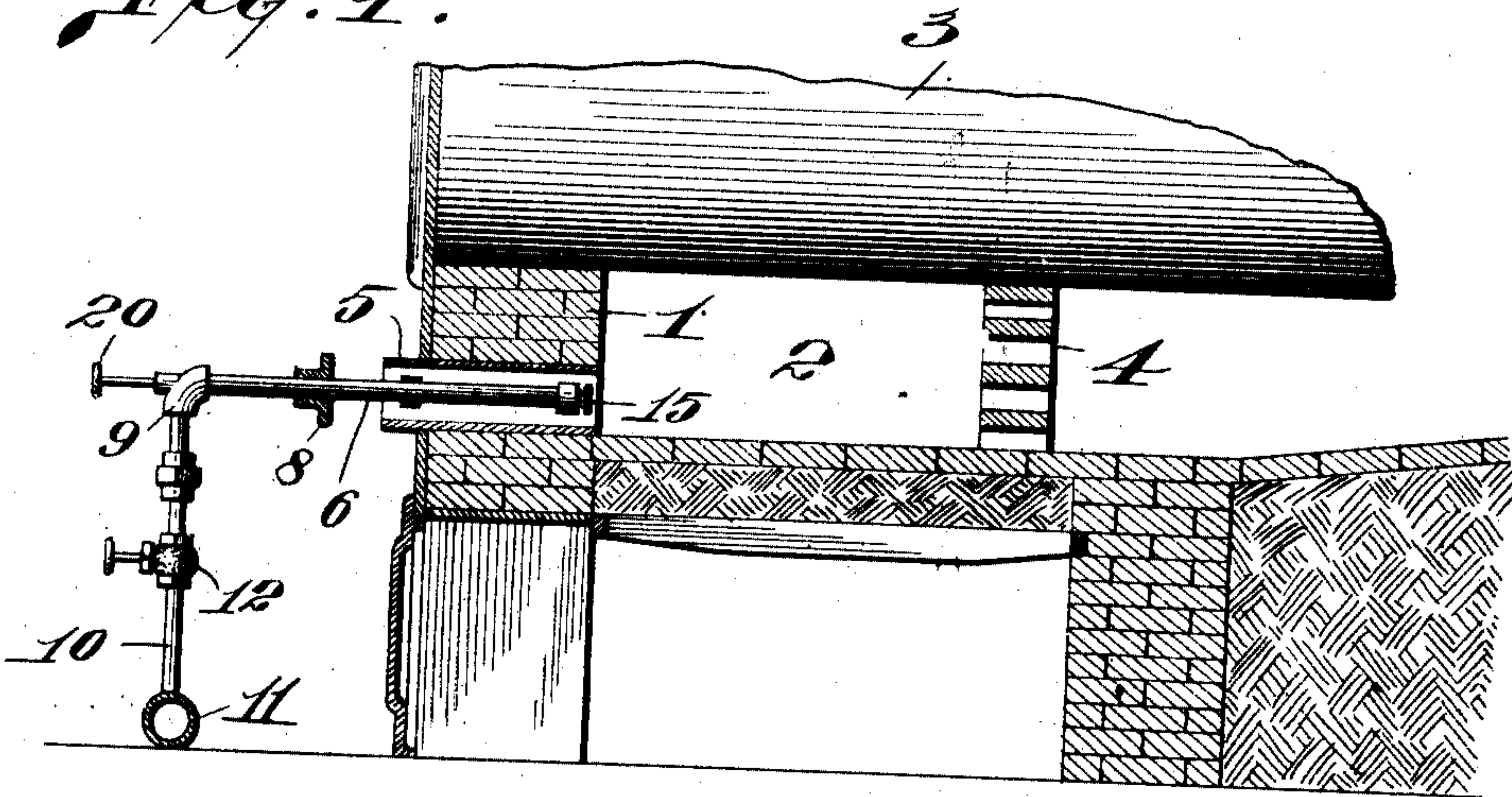


Fig. 2.

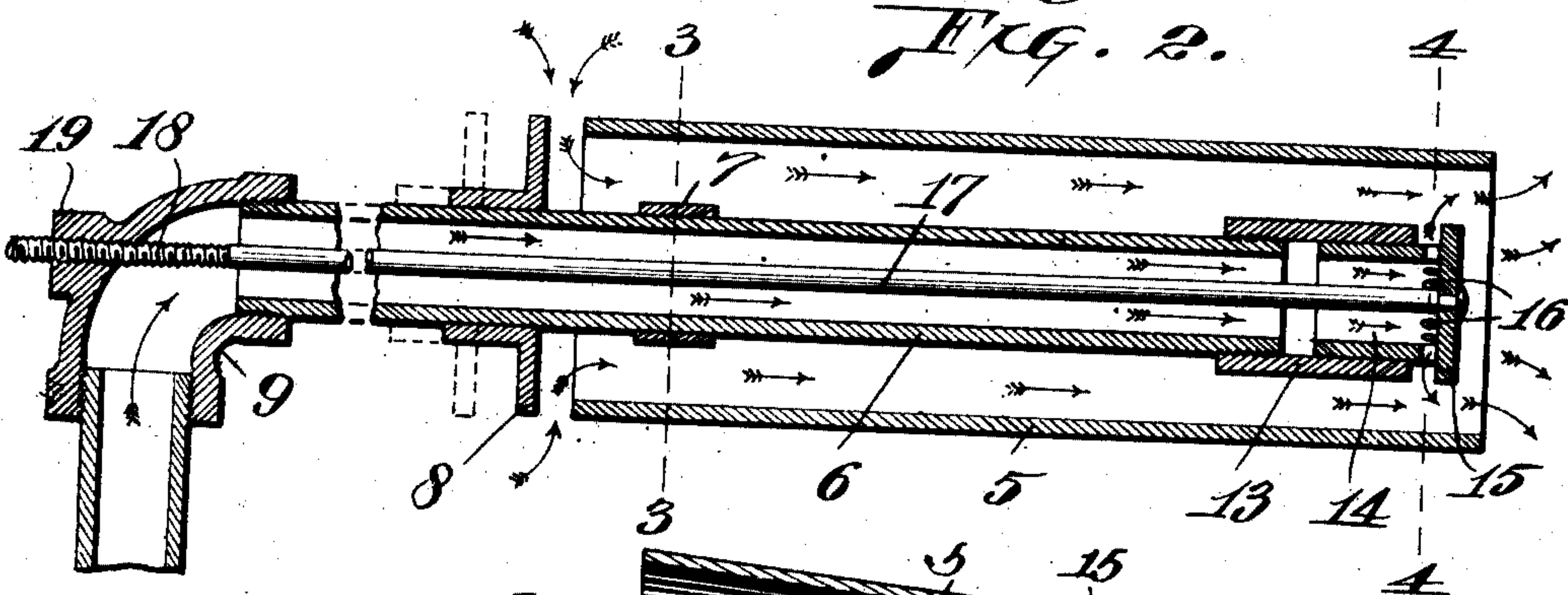


Fig. 3.

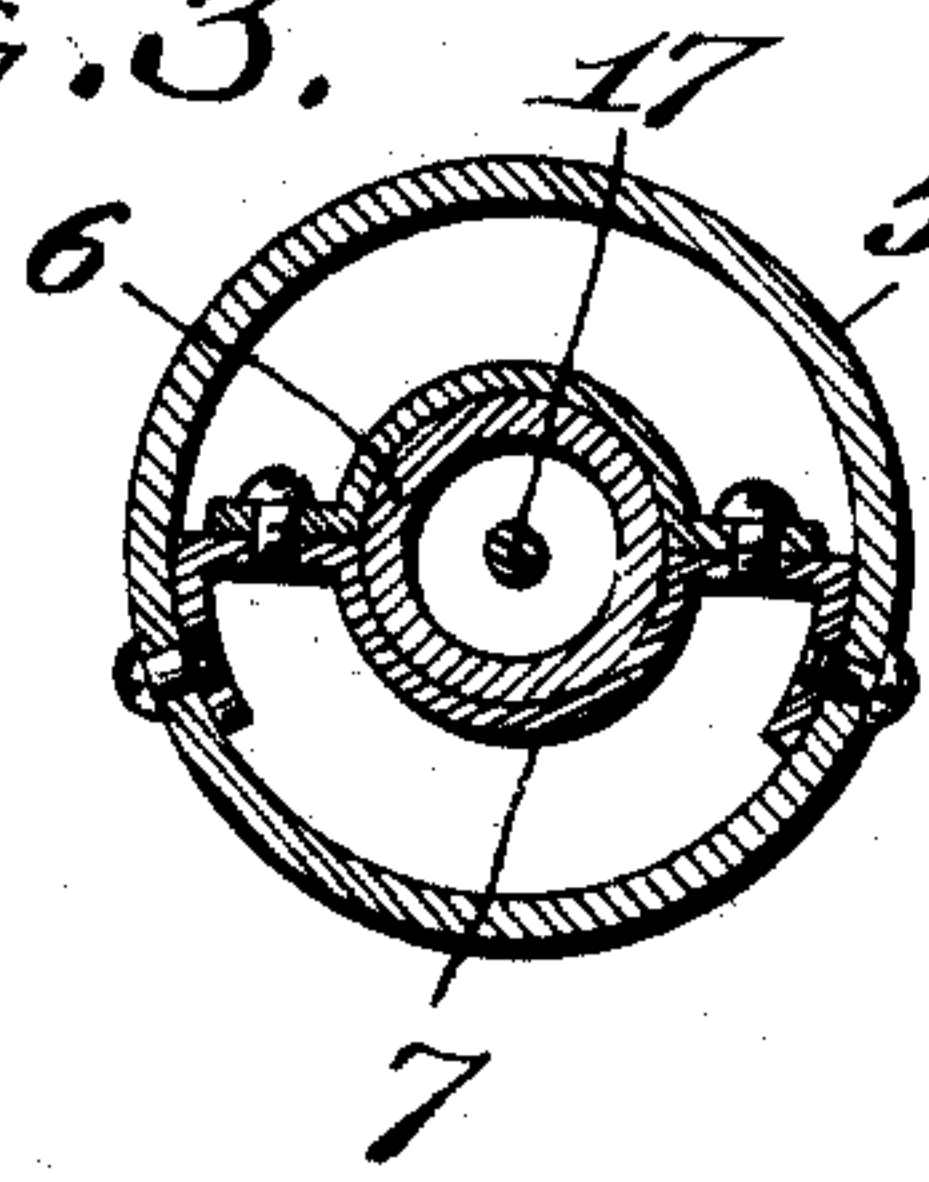


Fig. 4.

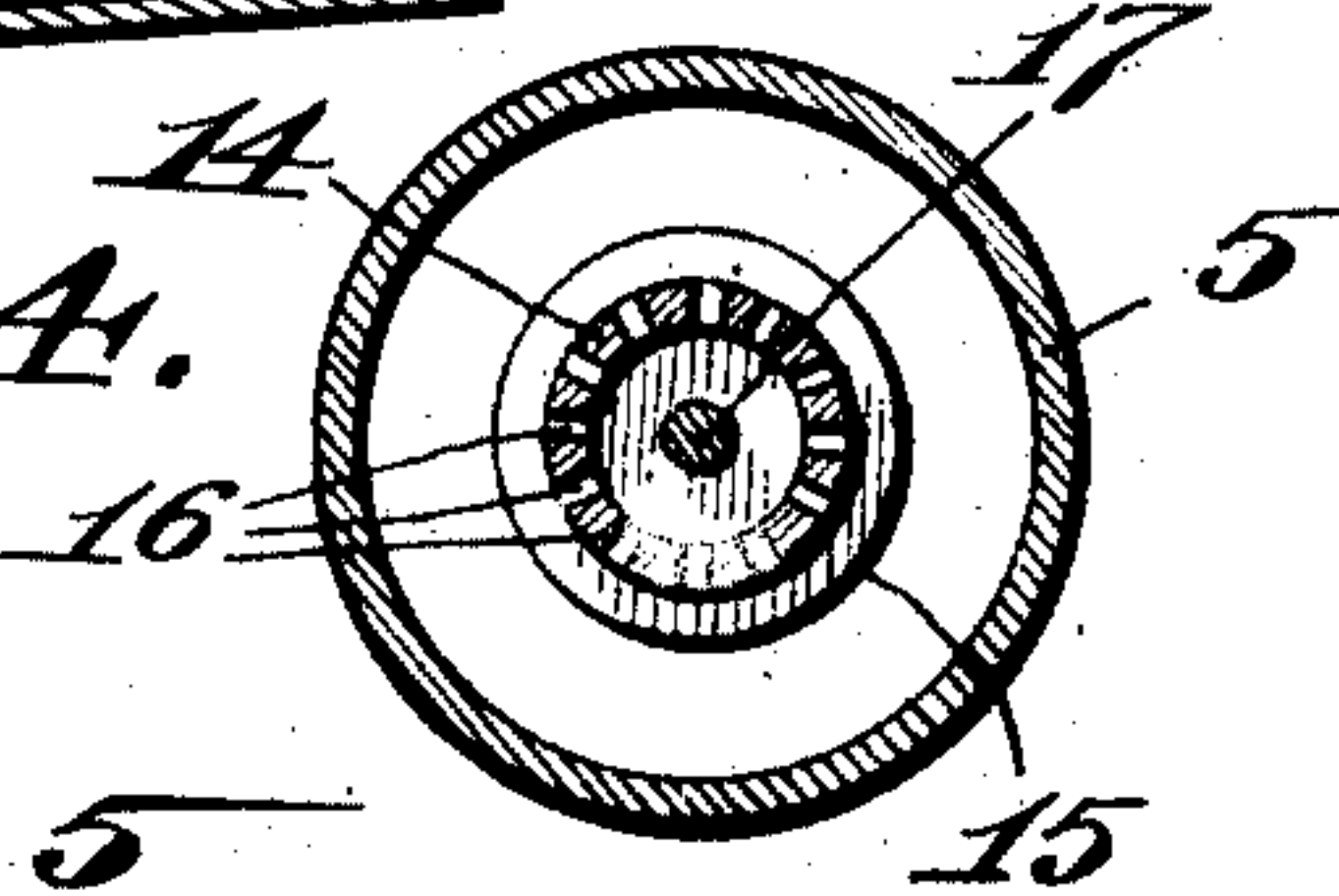


Fig. 5.

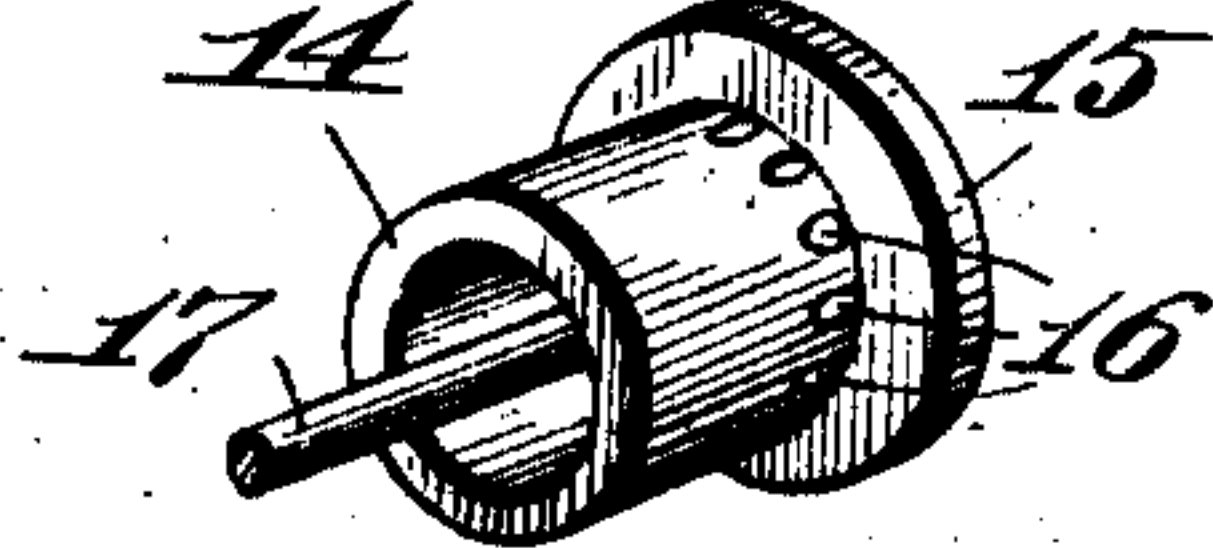
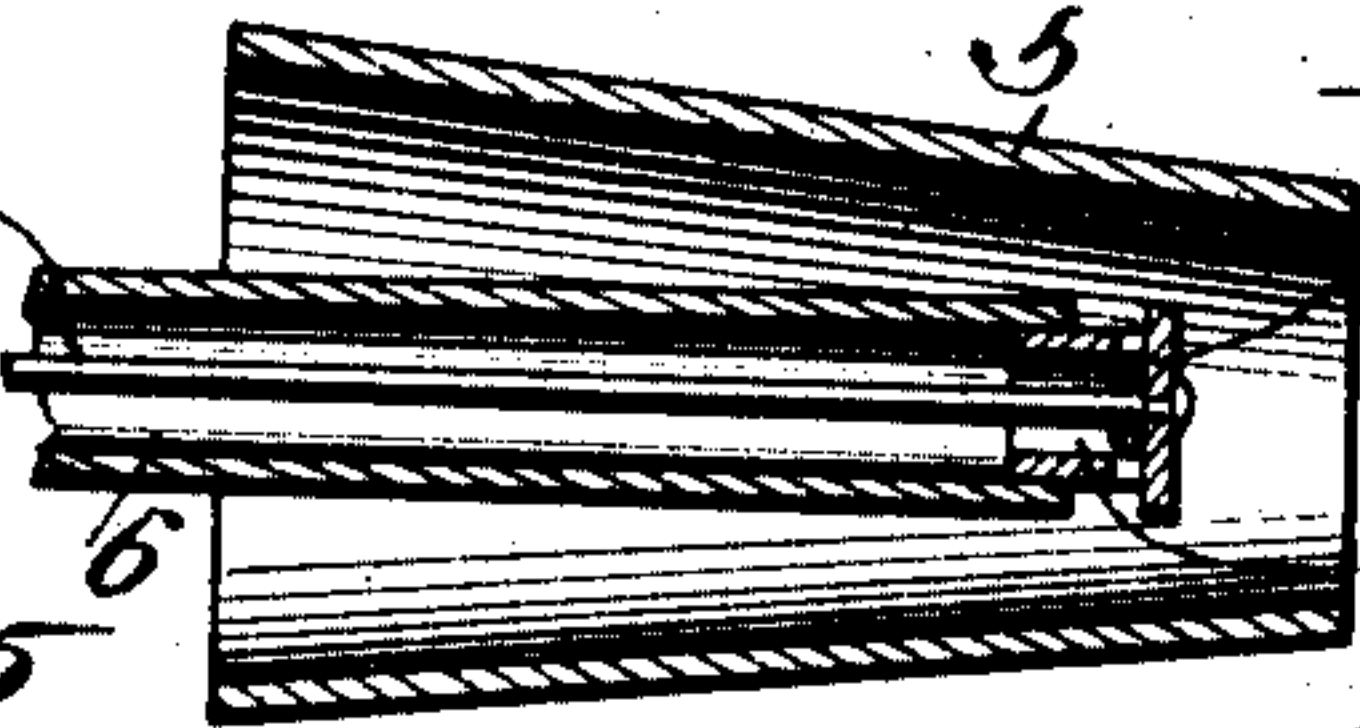


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## HYDROCARBON-BURNER.

No. 864,589.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed December 29, 1905. Serial No. 293,824.

*To all whom it may concern:*

Be it known that I, IRA F. ZIMMERMAN, a citizen of the United States, and a resident of Coffeyville, Montgomery county, Kansas, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a hydrocarbon burner, of the type usually employed in boiler furnaces and the like.

The object of my invention is to provide a simple inexpensive construction that may be readily applied, to all furnaces, and which is so arranged as to very thoroughly mix and commingle the hydrocarbon with air.

A further object of my invention is to provide a burner with adjustable devices whereby the flow of air and the hydrocarbon can be very easily and accurately regulated so as to insure a proper mixture in order to obtain perfect combustion.

To the above purposes, my invention consists of certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical section taken through the fire box of a boiler furnace, and showing one of my improved burners applied thereto; Fig. 2 is a longitudinal section taken through the center of one of my improved hydrocarbon burners; Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2; Fig. 4 is a vertical section taken on the line 4—4 of Fig. 2; Fig. 5 is a perspective view of an adjustable burner head that I make use of in carrying out my invention; Fig. 6 is a vertical section taken through the center of a modified form of the burner and the air tube in which the same is located.

Referring by numerals to the accompanying drawings: 1 indicates the front wall of a boiler setting, 2 the fire box, 3 the boiler, and 4 the checker work that forms the rear wall of the fire box, and which is arranged above the bridge wall of the boiler setting. These parts are of ordinary well known construction, and form no part of my invention, it being understood that my improved burner can be applied to any furnace where it is desired to use gas as a fuel.

Located in the front wall 1 of the boiler furnace is an air pipe 5. This pipe is preferably straight, and of the same diameter throughout its length, although it may be tapered, (as seen in Fig. 6,) with the small end discharging into the fire box.

Located in the diametrical center of the tube 5, and extending longitudinally therein is a tube 6, which conveys the oil or gas through the air tube into the fire box.

This tube 6 is supported centrally within the air tube 5 by means of a suitable bracket 7 that is detachably fixed within the tube 5 adjacent its outer end.

Located upon the tube 6 and arranged to slide thereon is a disk 8 which is of such a size as that it will readily close the outer end of the air tube 5 when it is moved to a position against said outer end.

The outer end of the tube 6 is seated in an elbow 9 to which is connected a pipe 10 that leads from an oil or gas supply pipe 11, and a valve 12 controls the flow of oil or gas through said pipe 10.

Rigidly fixed on the inner end of the tube 6 is a short tubular head 13, the end of which terminates adjacent the inner end of the air tube 5, and arranged to slide in the outer end of said tubular head is a cylindrical thimble 14 provided on its outer end with an integral disk 15, which is of the same diameter as is the tubular head 13. Formed through the tubular thimble 14, adjacent this disk 15, is a circular row of apertures 16.

Extending longitudinally through the center of the tube 6 is a rod 17, the outer end of which is seated in the center of the disk 15. The opposite end of this rod 17 is screw threaded, as indicated by 18, and said screw threaded end passes through a bearing 19 formed integral with the elbow 9; and located upon the extreme outer end of said rod is an operating handle 20. Thus, when the rod 17 is rotated by manipulating the handle 20, the tubular thimble 14 is moved longitudinally relative the tubular head 13, this being for the purpose of exposing or closing the apertures 16.

In the modified construction seen in Fig. 6, the head 13 is dispensed with, and the thimble 14 operates in the forward end of the tube 6.

In the use of my improved hydrocarbon burner, the oil or gas from the supply pipe 11, under pressure, passes upwardly through the tube 10, through the tube 6, and discharges therefrom through the apertures 16 in the thimble 14, said apertures being so arranged as to discharge the jets of oil or gas at approximately right angles to the air flowing through the tube 5. This action very thoroughly mixes and commingles the hydrocarbon with the air before it discharges from the inner end of the air tube 5 into the combustion chamber 2. By manipulating the hand wheel 20, the thimble 14 can be moved longitudinally in the head 13 to open or close the openings 16, thus very accurately regulating the discharge of hydrocarbon. The inlet of air through the tube 5 is regulated by adjusting the disk 8 to and from the open outer end of said tube 5.

In Fig. 6 I have shown the air tube as tapering slightly toward its inner or discharge end, this construction being applicable for certain kinds of furnaces. In this



construction the thimble 14 is adjustable in the end of the hydrocarbon pipe 6.

In my improved hydrocarbon burner, both the air and gas supplies can be very accurately regulated independent of one another from the exterior of the furnace, and the hydrocarbon is discharged in a series of jets at right angles to the ingoing air so as to be perfectly mixed and commingled therewith previous to its reaching its point of combustion. The burner can be applied to all kinds of furnaces, and can be positioned at any convenient point therein, and in furnaces already constructed, the burner can be applied for use without altering the furnace walls. If desired, a forced draft of air can be applied to the air tube 5. The position of the inner end of the hydrocarbon tube 6 relative the inner end of the air tube 5 may be varied to suit different conditions in obtaining perfect combustion.

My improved burner is very simple in construction, can be easily placed in position for use, and comprises a minimum number of parts all of which may be quickly

and cheaply replaced should they become broken or inoperative while in use.

I claim:—

The combination with a furnace, of an open ended air tube arranged in the front wall of said furnace, a hydrocarbon tube extending into the air tube, means arranged on the interior of the air tube for supporting the hydrocarbon tube in the center thereof, a disk arranged to slide on the hydrocarbon tube in front of the air tube and to close the opening thereinto, tubular means arranged at the inner end of the hydrocarbon tube and provided with a row of perforations for discharging hydrocarbon in jets approximately at right angles to the direction of travel of air through the air tube, and an adjusting rod passing through the hydrocarbon tube and connected to the tubular means at the inner end of the hydrocarbon tube for adjusting the same to vary the degree of opening of the apertures through which the hydrocarbon discharges.

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

IRA F. ZIMMERMAN.

Witnesses:

HARRY ZIMMERMAN,  
J. S. ARNOLD.