

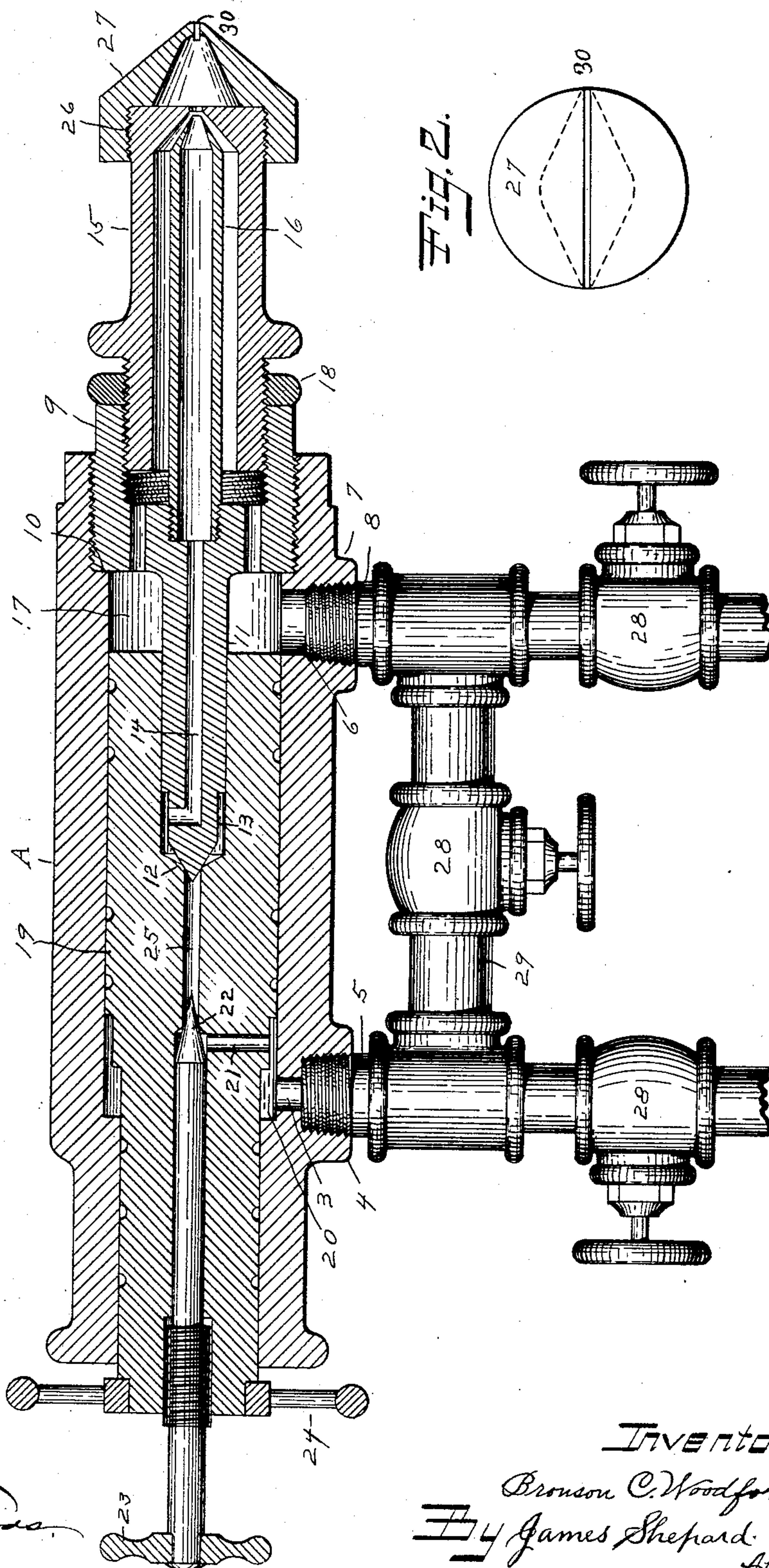
No. 772,016.

PATENTED OCT. 11, 1904.

B. C. WOODFORD.
HYDROCARBON BURNER.

APPLICATION FILED NOV. 27, 1903.

NO MODEL.



Witnesses.

S. H. Clarke.
H. S. Woods.

Inventor

Bronson C. Woodford.

James Shepard.

Att.

UNITED STATES PATENT OFFICE.

BRONSON C. WOODFORD, OF HOLYOKE, MASSACHUSETTS.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 772,016, dated October 11, 1904.

Application filed November 27, 1903. Serial No. 182,833. (No model.)

To all whom it may concern:

Be it known that I, BRONSON C. WOODFORD, a citizen of the United States, residing at Holyoke, in the county of Hampden, in the State of Massachusetts, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to improvements in hydrocarbon-burners; and the main object of my improvement is to make the burner automatic.

In the accompanying drawings, Figure 1 is a central longitudinal section of my burner with some of the parts in elevation. Fig. 2 is a detached end view or front elevation of a fish-tail nozzle for use with my burner.

A designates the casing or shell, having an inlet 3 and boss 4, to which boss an oil-supply pipe 5 may be connected. The said casing also has a secondary inlet 6 and boss 7 for connecting the supply-pipe 8 for steam or other fluid for commingling with the oil. The interior of the casing A is cylindrical, but has different portions in the length thereof on different diameters. A delivery-head on plug 9 is screwed up against a shoulder 10 in the outer end of the casing, the said plug having at its inner end a central stem 11, with a pointed end 12 to act as a valve. A short portion 13 of this stem adjacent to the pointed end is of a reduced diameter, and extending from the periphery of the stem at the said reduced portion to the body of the delivery-head there is an oil-passage 14. The outer end of the head 9 is bored and threaded on two different diameters to receive, respectively, the outer nozzle 15 and inner nozzle 16, the latter communicating with the oil-passage 14 in the stem 11, while the outer nozzle 15 communicates, by the passage 16, with the annular chamber 17, that surrounds the stem 11 at a point adjacent to the secondary or steam-supply inlet 6. The inner nozzle for the oil screws up against a shoulder, while the outer nozzle may be screwed in more or less, as may be desired, to adjust the relative position of these nozzles to each other at their effluent ends. An ordinary check-nut 18 is provided for holding

the outer nozzle in its adjusted position. The other end and body of the casing is mainly filled by a floating slide 19, that is fitted at each end to the different inner diameters of the said casing, although a portion of the said slide adjacent to the oil-inlet 3 is smaller than the surrounding inner wall of the casing, so as to form the connecting annular chamber 20, that communicates with the diametrical passage 21, adjacent to the valve 22 and its seat. The valve 22 is a screw-pin entering a central bore in the floating slide, and the outer end of the said pin is provided with a handle 23, while the outer end of the slide is provided with a handle 24, so that the slide may be held against rotation while the valve is turned by its handle to adjust the valve relatively to its seat for leaving it open more or less, as may be desired. The other end of the slide is bored centrally to fit the stem 11 and has a connecting-passage 25 between the two valves 22 and 12 of a smaller bore than that for the said valves, so that a valve-seat is formed at each end of the connecting-passage. Fitting the cylindrical stem 11 to the bore of the slide 19 forms a closure of the steam-chamber 17 on that side to which the said slide is presented. In all cases where the word "steam" is herein used air or other fluid under pressure is considered the equivalent thereof.

The outer nozzle 15 is provided with a centrally-arranged orifice, preferably round, for throwing a central stream or spray, and the exterior of said nozzle may be of any ordinary form. I prefer, however, in some cases to provide its outer end with a threaded portion 26 for the application when desired of an additional nozzle for changing the form of the discharge. I have shown an additional nozzle 27 as thus applied, the said nozzle being of a flattened form with a slit-like orifice 30, as shown in Fig. 2, for delivering a flattened stream or spray, making what is sometimes designated as a "fish-tail" burner. The burner can be used either with or without an additional nozzle, as may be desired.

The main and secondary supply-pipes 5 and 8 may be provided with any suitable cut-off valves 28, and I prefer to connect the said

pipes by means of a by-pass 29, which is also provided with a cut-off valve 28.

The oil and the steam are both delivered or designed to be delivered to their respective
 5 inlets at predetermined pressures. With the valve 28 in the by-pass 29 closed and both pipes delivering properly the opposing faces of the slide 19 as presented to the respective annular chambers 20 and 17 are so related to
 10 the steam and oil pressure that the pressure of the steam in the annular chamber 17 will overbalance the opposing pressure of the oil in the annular chamber 20, and thereby force the floating slide which carries the seat for
 15 the valve 12 away from the said valve, moving the parts from their closed position, as represented in the drawings, to their open position, so that oil may flow in through the passage 25, (the valve 22 having been adjusted to admit the desired quantity of oil to the
 20 said passage 25,) past the valve 12, through passage 14 to and through the inner nozzle 16. At the same time steam (or air) will flow in from the annular chamber 17 to and through
 25 the outer nozzle 15, and the oil and steam will mix at the junction of the said two nozzles in the outer end of the outer nozzle and the commingled oil and steam be discharged in the usual manner from the said outer nozzle 15
 30 directly into the fire or, if desired, into the additional nozzle 27 and then into the fire. The flow will continue as long as the supplies are kept up at the proper pressures; but if the pressure of the steam fails or falls mate-
 35 rially below its intended pressure there is no longer any counterbalancing of or resistance to the oil-pressure on the slide in the annular chamber 20, and hence the slide will automatically move to the position shown in the
 40 drawings and close the valve 12, so as also to cut off the supply of oil and stop the burner. The valve 12 will be automatically opened whenever there is the proper steam-pressure in the annular chamber 17.

45 In order that oil may be fed to and through the burner independently of the secondary supply for any desired purpose—as, for example, to generate steam from the heat of the burner when the steam is supplied from a coil
 50 of pipe over the fire of the burner—the valve 28 in the secondary supply-pipe 8 may be closed and the valve 28 in the by-pass opened, so that oil may flow to the burner through the secondary inlet 6, and the burner may be
 55 used for oil alone until such time as the proper steam-pressure is produced. The valve 28 in the by-pass may then be closed and the valve 28 in the secondary supply-pipe opened, when the burner will adjust itself automati-
 60 cally to deliver the commingled oil and steam, as before described.

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be un-

derstood as limiting myself to the precise form 65 of construction shown and described, but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I claim as my invention—

70 1. In a hydrocarbon-burner, the combination of a casing having two inlets with a slide having an oil-supply passage and having also opposing faces, and a head at the delivery end of the said casing, having an oil-passage form- 75 ing a continuation of the oil-supply passage of the said slide, the said parts forming within the casing two annular chambers inside of the said casing into which chambers the said two inlets deliver, the said opposing faces of 80 the said slide being presented to the said chambers and the said slide and head having within the said oil-passage the one a valve-seat and the other a valve, the same being 85 arranged to open and close the oil-passage within the said slide by the movement of the said slide.

2. The combination of the casing with a delivery-head having a delivery-stem with an oil-passage therethrough, and a slide arranged 90 within the said casing, the said parts forming within the said casing a chamber for oil and another chamber for steam, the said slide having at one end a bore fitted to the said delivery-stem for forming a closure of the said 95 steam-chamber on that side to which the said slide is presented, the said head and stem having the one a valve and the other a valve-seat, the said slide also having a passage leading to the said valve and opposing pressure-faces pre- 100 sented respectively to the said two chambers.

3. In a hydrocarbon-burner, having an outer nozzle for delivering mixed oil and steam, the combination of a casing having a chambered interior with a slide within the 105 said casing forming two separate chambers for oil and steam, the said slide having an oil-passage therethrough and opposing faces presented to the said chambers, a valve operated by the movement of the said slide and an in- 110 closed oil-passage leading from the said valve to the said delivery-nozzle.

4. In a hydrocarbon-burner, the combination of a casing having a chambered interior, with a slide within the said casing forming 115 separate chambers for steam and oil and having a passage for oil therethrough, a fixed valve in the said casing for opening and closing the outlet to the oil-passage through the slide, a head at the delivery end of the cas- 120 ing, concentric tubes mounted in the said head with their ends forming an inner nozzle for oil and an outer nozzle for mixed steam and oil, an inclosed oil-passage leading from the said fixed valve to the inner one of the said 125 concentric tubes, and a separate passage leading from the steam-chamber to the outer one of the said concentric tubes, whereby, when

the oil-passage through the slide is opened by the said slide and valve, the oil may flow freely from the said valve to the said inner one of the concentric tubes but cannot enter the
5 steam-chamber.

5. In a hydrocarbon-burner, the combination of a casing having a chambered interior with a slide within the said casing forming two separate chambers for steam and oil under different pressures, the said slide having an oil-passage therethrough and opposing pressure-faces of differing areas inversely proportionate to the respective pressures upon the said faces, and a valve for the oil-chamber operated by the movements of the said
10 slide to reduce the flow of oil through the oil-passage in the said slide when the steam falls below normal pressure, and to cut off the flow of oil whenever the steam-pressure ceases.
15

20 6. In a hydrocarbon-burner, the combination of a casing having a chambered interior with a slide within the said casing forming two separate chambers for steam and oil, the said slide having a passage for oil there-

through with a valve-seat at its delivery end, 25 a fixed valve in the casing acting with the said slide to open and close the said oil-passage, and means operated from the exterior of the casing for varying the size of the inlet to the said oil-passage through the said slide, 30 substantially as described.

7. In a hydrocarbon-burner, the combination of a casing having a chambered interior with a slide arranged therein forming two separate chambers for oil and steam, the said 35 slide having an oil-passage therethrough and opposing pressure-faces, the said faces being presented respectively to the said chambers, a valve at the delivery end of the said oil-passage through the slide for controlling the 40 flow of oil by the movements of the said slide, and another valve arranged to be operated from the exterior for regulating the size of the said oil-passage at its influent end.

BRONSON C. WOODFORD.

Witnesses:

THEO. L. LA FRANCE,
WM. C. WOODFORD.