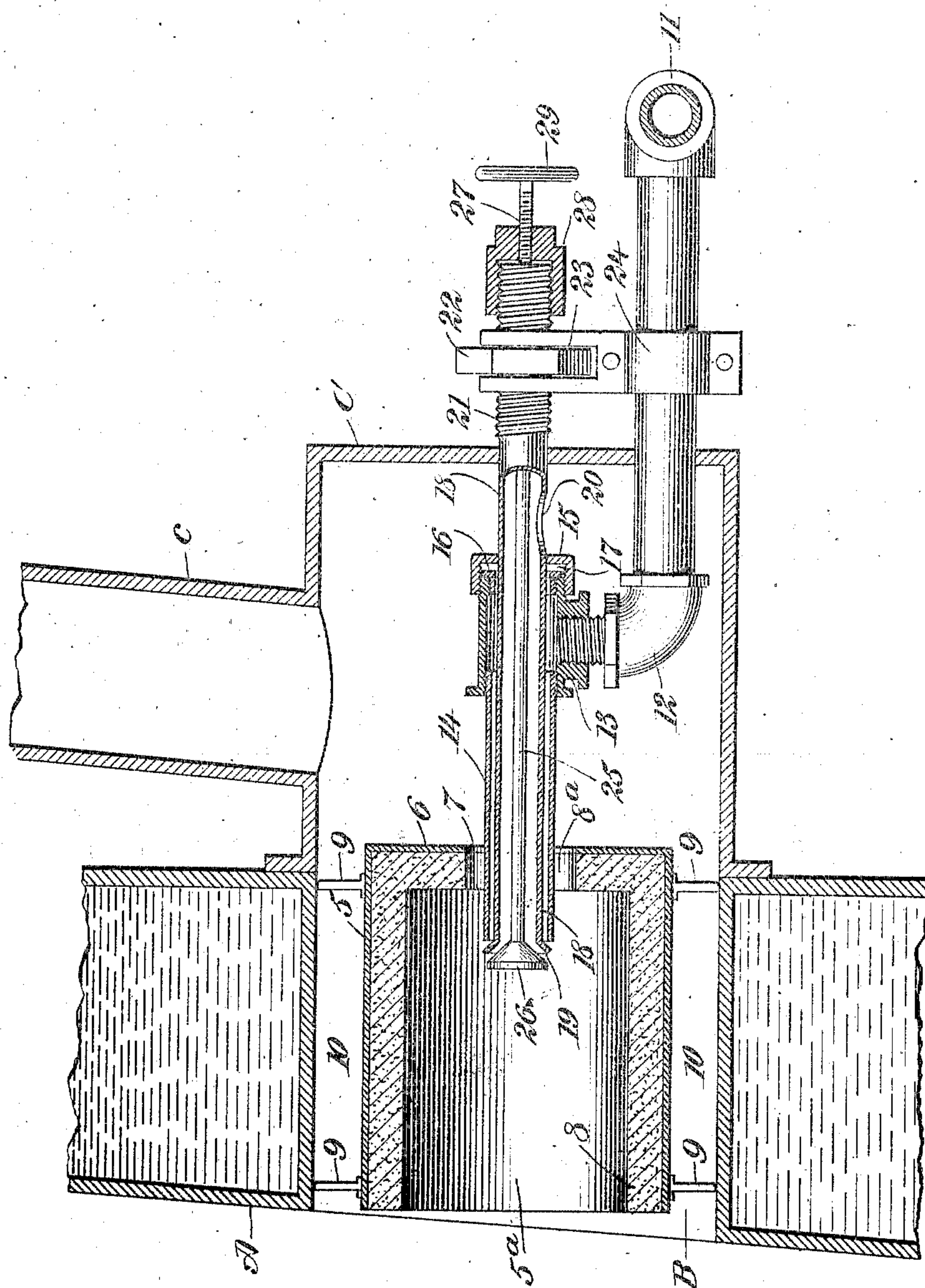


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PATENTED MAY 22, 1906.

W. KEMP.
HYDROCARBON BURNER.
APPLICATION FILED FEB. 27, 1903.



WITNESSES:

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HYDROCARBON-BURNER.

No. 821,419.

Specification of Letters Patent.

Patented May 22, 1906.

Original application filed August 7, 1902, Serial No. 118,746. Divided and this application filed February 27, 1903. Serial No. 145,317.

To all whom it may concern:

Be it known that I, WILLIAM KEMP, a citizen of the United States, and a resident of Tucson, in the county of Pima and Territory of Arizona, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a full, clear, and exact description.

My invention relates to improvements in hydrocarbon-burners; and it constitutes a division of a prior application filed by me on August 7, 1902, Serial No. 118,746, and entitled "Means for utilizing oil or gas in ore-reducing furnaces."

15. In this invention I seek to produce an improved burner wherein the inflow of air and of liquid or gaseous fuel is regulated independently of each other, to the end that an intense or modified heat may be secured and the regulating means are normally under the control of an attendant, such burner being simple in construction, durable in service, and involving small expense in installation and repairs.

25. Further objects and advantages of the invention will appear in the course of the subjoined description, and the novelty will be defined by the annexed claim.

I have illustrated a preferred embodiment 30 of my improved hydrocarbon-burner in the accompanying drawing, in which the figure represents a vertical sectional elevation of the improved burner in operative relation to a part of an ore-reducing furnace.

35. In the present application my improved hydrocarbon-burner is represented as being adapted for use in connection with an ore-reducing furnace, wherein A designates a part of the furnace-wall having a twyer-opening B. A wind-box C surrounds the furnace and is in communication with the twyer-opening B therein, said wind-box having a blast-pipe c. I would have it understood, 40 however, that the improved burner to be hereinafter described may be used in other arts and in different relations.

50. In the twyer-opening is arranged a shell 5, adapted to form a combustion-chamber for the fuel and air supplied thereto by devices of my invention. This shell 5 of the combustion-chamber may be of any desired shape in cross-section—such, for example, as square, rectangular, or otherwise—but, as shown by

the drawing, the shell is cylindrical and open at its inner end. The shell is preferably 55 made of metal and provided at its outer end with a head 6, the latter having a large central opening 7. To protect the shell from the deteriorating influence of heat in the furnace, it is provided with a refractory lining 60 8, which may consist of fire-brick, clay, or other suitable material, and this lining is arranged to extend across the head 6, on the interior thereof, the end portion of the lining having an opening 8^a coincident with the 65 opening 7 in the head of the shell. The width or diameter of the shell is less than that of the twyer-opening in which the shell is arranged, and this shell is thus supported in the twyer-opening by a plurality of lugs 9, 70 which extend radially from the shell and are adapted to be secured within the twyer-opening by any approved means. This arrangement of the shell in the twyer-opening provides a surrounding or annular passage 10, 75 which has direct communication with the wind-box C and with a working chamber of the furnace.

11 designates the fuel-supply pipe, which extends through the wind-box C and is provided with an elbow 12, the upper end of which is attached in any suitable way to a coupling 13. In one end of this coupling is secured the fuel pipe or tube 14 of the burner; but the other end of the coupling is closed by 85 means of a gland 15, which is arranged to inclose a head 16 in such a way as to form a chamber 17, adapted to receive a packing. Through the head 16, the packing-chamber 17, and the gland 15 is passed an air-supply 90 tube 18, the latter being of sufficient length to extend entirely through the fuel-tube 14 and the outer side of the wind-box C. The inner extremity of this air-tube 18 is enlarged or flared in order to form a valve member 19, the same being disposed beyond the 95 inner extremity of the fuel-tube 14, the latter being formed in such a way as to produce a seat for the valve member 19. This air-tube 18 is also provided at a point beyond the 100 gland 15 with a port or opening 20, which lies within the wind-box C and allows the air or blast to pass directly from the wind-box into the air-tube. The air-tube is furthermore provided with a male screw-thread 21 on 105 that part thereof which is exposed beyond or

outside of the wind-box, and on this threaded part of the air-tube is screwed an adjusting-nut 22, the latter being held or confined in the forked or slotted end 23 of a bracket 24, which is supported in a stationary position outside of the wind-box—as, for example, by attaching the bracket to the fuel-supply pipe 11. The nut 22 is always exposed for convenient access by an operator, and this nut may be turned within the forked or slotted bracket in a manner to adjust the air-tube 18 in the direction of its length, thereby regulating the position of the valve member 19 with relation to the inner end of the fuel tube or pipe 14 of the burner.

25 designates a valve-stem which extends longitudinally through the air-tube 18, and the inner end of this stem is provided with a valve 26, the latter having a flared or conical face adapted to be seated against the outer face of the valve member 19 on the air-tube 18. The outer end of the valve-stem 25 is prolonged or extended beyond the threaded part of the air-tube 18, and said valve-stem is also provided with an exterior thread 27, which is screwed into a threaded opening provided in the closed end of a cap 28, the latter being in turn screwed on the threaded end 21 of the air-tube. The projecting or exposed end 27 of the valve-stem 25, is provided with a hand-wheel 29 or other suitable device for turning the valve-stem, thus making provision for adjustment of the valve-stem 25 and the valve 26, so as to regulate the area of the opening through which the air is discharged at the inner end of the air-tube 18.

By reference to the drawing it will be seen that the inner end of the fuel-tube 14 and the flared end 19 of the air-tube are extended or carried through the openings 7 8^a of the shell 5 and the lining thereof. The inner ends of the fuel and air tubes, comprising parts of the burner, are thus projected well into the combustion-chamber 5^a, and the air is supplied to the flame at the inner end of the burner through the openings 7 8^a and through the inner end of the air-tube 18, thus equalizing the volume and pressure of air which is supplied to the flame. It will be observed also that the valve 26 may be adjusted independently of the air-tube, because the hand-wheel 29 on the stem 26 may be turned in the cap 28, so as to vary the distance of the valve 26 from the flared mouth or valve member 19 of the air-tube. The tube 18 may also be adjusted by turning the

nut 22 in a direction to impart endwise movement to the tube and change the position of its valve member 19 with relation to the end of the fuel-tube 14, whereby the control of the fuel and of the air may be changed to admit greater or less volumes of fuel or air, or both, in order to maintain an intense or modified heat in the combustion-chamber 5^a.

In the operation of the burner the fuel is carried through the pipe 11 and its elbow 12 to the coupling 13 and through the annular spaces provided between the tubes 14 18. The fuel finds its exit at the inner end of the tube 14 and around the flared mouth or valve member 19 of the tube 18. The air from the wind-box C is free to pass through the opening 20 into the air-tube 18, and the air under pressure is forced through the flared end or valve member 19 within the annular flame caused by the combustion of the fuel which is supplied by the tube 14. At the same time the air from the wind-box is free to pass through the openings 7 8^a of the shell 5, and air is thus supplied to the flame within and without the same, whereby the combustion of fuel is maintained to the best advantage within the combustion-chamber 5^a. The heat and products of combustion are free to pass from the chamber 5^a directly into the working chamber of the furnace.

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

A hydrocarbon-burner, comprising a fuel-tube and a supply-pipe therefor, an air-tube slidable within the fuel-tube and projecting beyond the latter at one end, and having an external thread from this end and a controlling-valve for the fuel-tube at its other end, a closing-cap for the air-tube turning on said thread and provided with a central threaded opening, a valve for controlling the air-tube, provided with a stem having a threaded portion working in said opening, a bracket supported on the supply-pipe, and a nut held thereby and working on the same thread for effecting the adjustment of the air-tube.

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

WILLIAM KEMP.

Witnesses:

J. W. BOGAN,
L. W. WAKEFIELD.