

No. 818,030.

PATENTED APR. 17, 1906.

R. G. KIRKWOOD.
OIL BURNER.

APPLICATION FILED FEB. 23, 1905.

2 SHEETS—SHEET 2.

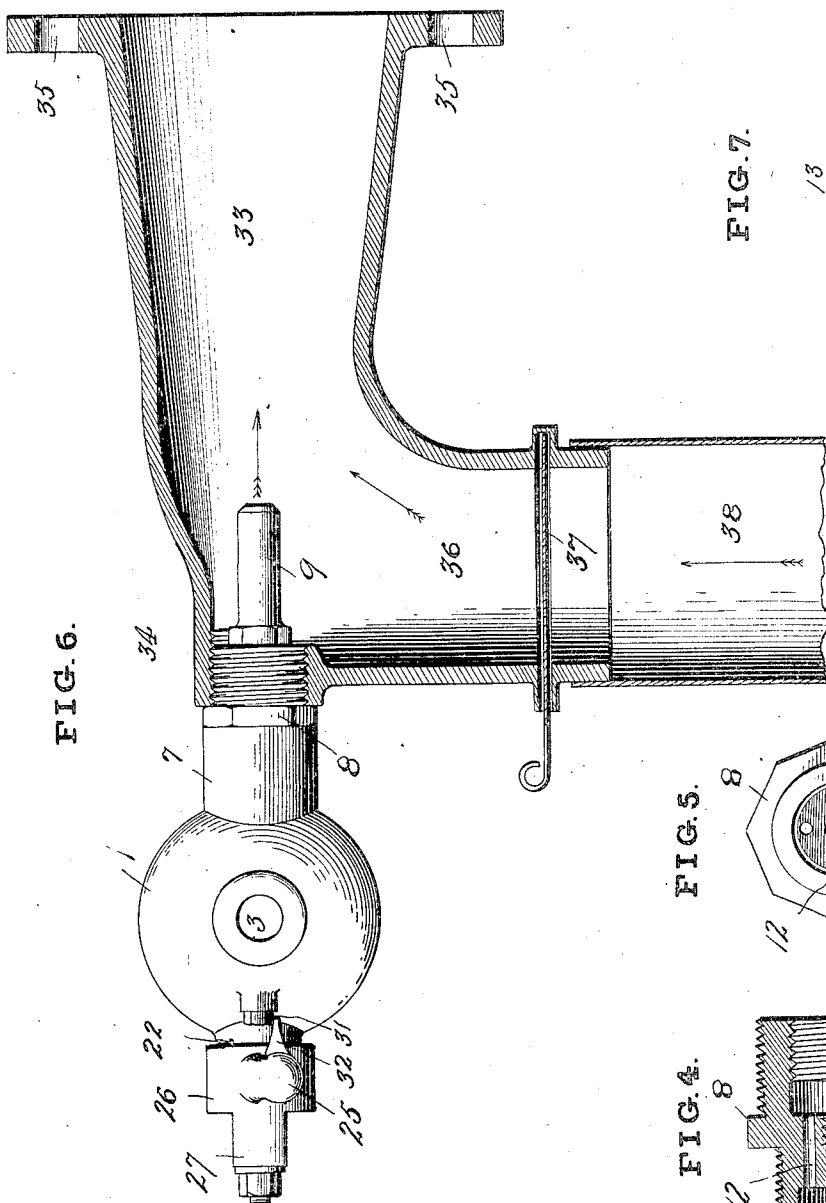


FIG. 7.

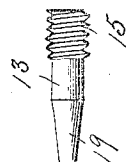


FIG. 5.

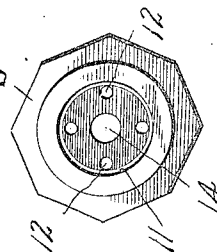
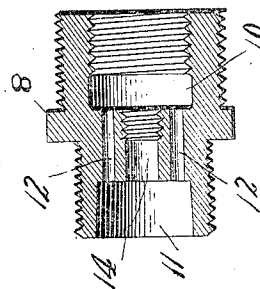


FIG. 4.



WITNESSES:

John A. Daly.
E. S. Davies.

INVENTOR

Robert S. Kirkwood

By Chas. H. Davis

Attorney

UNITED STATES PATENT OFFICE.

ROBERT G. KIRKWOOD, OF PITTSBURG, PENNSYLVANIA.

OIL-BURNER.

No. 818,030.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed February 23, 1905. Serial No. 246,980.

To all whom it may concern:

Be it known that I, ROBERT G. KIRKWOOD, a citizen of the United States, residing at 23 Alpha Terrace, Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Oil-Burners, of which the following is a specification.

My invention relates to improvements in oil-burners, and has for its object the provision of means for controlling and regulating the feed of oil and air or steam as fuel to the nozzle of the burner, the control and regulation being effected by one and the same movement of a lever and the feed of the different elements of the fuel being increased or decreased in proportion with the movement of the regulating-lever. In attaining these objects I provide a compact, durable, and easily-operated valve mechanism.

The invention consists in a combined high-pressure oil and air valve mechanism with suitable inlets and a common outlet controlled and regulated by a single lever, in the combination with such a mechanism of a second valve or gate for a low pressure of air to the burner, and in certain novel features of constructions and combinations and arrangements of parts, as herein described, more particularly pointed out in the claims, and as illustrated in the accompanying drawings.

I have described the invention as using oil and air; but it will be understood that other elements than those enumerated may be employed.

Figure 1 is a vertical central sectional view of a burner embodying my invention. Fig. 2 is a side view in elevation of the valve-stem. Fig. 3 is an end view of the adjustable valve-stem lever. Fig. 4 is a detail sectional view of the air-valve seat, and Fig. 5 is an inner end view of said seat as seen from the left in Fig. 4. Fig. 6 is a view showing a furnace-nozzle in section with my improved burner connected thereto in operative position. Fig. 7 is a side view of the oil-valve head.

Referring particularly to Fig. 1 of the drawings, the globe 1 is a hollow casting provided with openings 2 and 3, forming air and oil inlets, respectively, said openings having screw-threads for reception of supply-pipes.

The interior of the globe is formed with two integral bored-out arms 4 and 5, the arm 4 forming an oil-passage from the oil-inlet 5 and arm 5 serving as a guide for the valve-

stem 6. A screw-thread extension 7 projects from the casing 1, having interior threads in which is screwed the plug or sleeve 8, to which the nozzle 9 is secured by screw-threads, as shown, in chamber 10 in the sleeve. On its end adjacent the interior of the globe the sleeve 8 has a tapered bore 11, forming an air-valve seat which communicates with the chamber 10 by a plurality of passages 12. The plug 13, preferably formed from a head-less screw, is passed through the passage 14 of the sleeve 8 and secured therein by the screw-threads 15. This plug forms the oil-valve head, as will be described.

The valve-stem 6 has a longitudinal bore 16 and an angled portion 17 leading from the end of the bore 16, opening into the oil-inlet pipe 4. At its outer end the bore 16 increases in diameter, forming a tapering opening 18 complementary to and for the reception of the tapered end 19 of the plug 13, thus forming the oil-valve for the burner. A tapered head 20 is fashioned on the valve-stem 6, adapted to fit in the tapered seat or bore 11 of the sleeve 8, forming the air-valve for the burner. As shown, the valve-stem 6 is located in and guided by the arm 5. Sleeve 21 surrounds the stem and is located in an extension 22, formed at the end of the globe opposite the nozzle. A gland 23 and space 24 are provided for packing to prevent leakage.

On the exterior screw-threads 24' of the extension 22 I locate the adjusting and regulating lever 25, which is formed with a threaded sleeve portion 26 to engage the threaded extension 22. A bearing-arm 27, projected from the sleeve 26, receives the end 28 of the valve-stem 6, and said stem is loosely secured to said arm and thus to the lever 25 by nut 29 on the threaded end 30 of the stem; but it will be understood that the valve-stem is capable of turning in the bearing-arm 27.

A set-screw 31 may be located on a portion of the globe adjacent finger 32 of the lever 25 and in the path of movement of said finger to provide a stop for the lever 25 after making one turn, which movement is sufficient for feeding the proper amount of oil and air to the burner.

The above-described mechanism controls the supply of compressed air and oil under pressure to the burner. In addition to this, I employ a feed of air to the burner at a lower pressure to furnish oxygen in sufficient quantity to the mouth of the burner or nozzle

thereof to burn the atomized oil and air after they are forced through the nozzle 9 and nozzle 33 into the furnace.

As seen in Fig. 6, the burner proper is secured by screw-threads 34 to the nozzle 33, which latter may be secured to the furnace by bolts passed through holes 35. The mixed oil and air under high pressure emerges at the mouth of the nozzle 9, where the elements are atomized and carried with the air-blast into the furnace. In the extension 36 of the nozzle 33 I locate the gate-valve 37, which regulates the inflow of air through pipe 38, which pipe receives air from a fan-blast.

In the position shown in Fig. 1 both the air and oil valves are closed. To open the valves, turn the lever 25 to the right on the extension 22 as a center. This movement will withdraw the valve-stem 6, opening a passage for oil through inlets 3, 17, 16, and 12 past the tapered pin or plug 19 into the bore 11 through passages 12, chamber 10, and nozzle 9 to the furnace. The same movement of the valve-stem also opens the air-valve at 20 and 11, and compressed air enters the globe 2, passes through the tapered bore 11, and mingling with the oil therein the two elements pass through passages 12 and chamber 10 to the nozzle. At the mouth of the nozzle 9 the force of the compressed air atomizes the oil, and the low-pressure air-blast from extension 36, when gate 37 is open, entering nozzle 33 carries the atomized mixture from the mouth of the nozzle 9 into the furnace for combustion.

It will be observed that I combine the compressed air and oil in the openings 12 and chamber 10, mingling the air and oil, so that as they pass the end of the nozzle 9 the expanding air easily and thoroughly atomizes the oil. The atomized oil is then caught by blast of air at a low pressure in the L-shaped nozzle 33 and carried into the furnace, the low air-blast furnishing oxygen for combustion, thus providing an efficient burner with a very limited quantity of compressed air.

The construction whereby the lever 25 by one motion regulates the oil and air feed and always in proper proportion secures an easily manipulated and accurate feed of fuel to the furnace.

While I have illustrated only one form of the physical embodiment of my invention, I do not limit myself to the specific structure shown herein, as modifications, alterations, and changes may be made without departing from the scope of my claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a casing having a valve-head and a valve-seat surrounding said head, of a movable hollow stem having a valve-seat and valve-head to fit said complementary members, and means for operating said movable stem.

2. The combination of a casing having a stationary valve-head and valve-seat surrounding said head, a hollow movable stem having a valve-seat and valve-head complementary thereto, an operating-lever, a nozzle connected with said valves, and a second nozzle having means to regulate the flow of air to the burner, all combined in an oil-burner, substantially as described.

3. The combination in a valve device of a hollow casting having a plurality of inlets, a hollow movable stem therein formed with a valve-seat and communicating with one of the inlets, a sleeve secured in the casting, a projection from said sleeve adapted to fit said valve-seat, a valve-seat in said sleeve, a valve-head on said stem adapted to fit said valve-seat, and means for operating said movable valve-stem to simultaneously open or close said valves.

4. In a valve device the combination with a hollow casting having a plurality of inlets of a movable hollow stem formed with a valve-seat and communicating with one of said inlets, a sleeve with a valve-seat secured in the casting, a screw-plug in said sleeve adapted to fit said valve-seat in the stem, a head on the stem to fit the sleeve valve-seat, and means for operating the movable valve-stem.

5. A casting having a plurality of inlets, a hollow movable stem formed with a valve-seat, a sleeve in the casting having a projection adapted to fit said seat, and a valve-seat surrounding said projection, a valve-head on the stem adapted to fit the sleeve valve-seat, a chamber formed in the sleeve, passages connecting said chamber and adjacent valve-seat, and an operating-lever.

6. In a valve a hollow casting having a plurality of inlets, an integral guide-sleeve within said casting inclosing a hollow movable stem, a valve-head and valve-seat on said stem, an integral hollow arm in the casting connecting the hollow stem with one of the inlets, a fixed valve member in the casing adapted to fit said seat surrounding said valve member, and a valve-seat adapted to receive said valve-head.

7. A valve-casing having a plurality of inlets, a movable hollow stem communicating with one of said inlets having a valve-head and valve-seat, a valve-seat and valve-head in the casing adapted to fit said valve-head and seat on the stem said valve-seat surrounding the valve-head in the casing, and means for operating said stem.

8. A valve-casing having a plurality of inlets, a movable hollow stem communicating with one of said inlets having a valve-head and valve-seat, a sleeve secured in said casing having a valve-seat and valve-head adapted to fit said valve head and seat, and means for operating said stem.

9. A valve-casing having a plurality of in-

lets, a hollow movable stem having a valve-head and valve-seat, a branch pipe connecting one of said inlets with the hollow stem, a sleeve secured in the casing having a valve-head and valve-seat to receive said stem valve seat and head, a chamber at one end of said sleeve, and passages connecting said chamber with the valve-seat therein.

10. A valve-casing having a plurality of inlets, a hollow movable stem having a valve-head and valve-seat at one end and an operating-lever at the other, a valve-seat and valve-head in the casing to receive said valve head and seat, said lever being movable to operate the valve-stem.

11. A valve-casing having a plurality of inlets, a hollow, movable stem having a valve-head and valve-seat at one end, a valve-seat and valve-head in the casing to receive said valve head and seat, and a lever connected to said stem having bearing on the casing.

12. In an oil-burner, the combination of a valve-casing having a plurality of inlets, a hollow movable stem having a valve-head and valve-seat at one end, a sleeve in the casing having a valve-seat and valve-head to receive said valve head and seat, a nozzle in the sleeve, and means for operating said valve-stem and thereby simultaneously control said valves.

13. In an oil-burner the combination of a valve-casing having a plurality of inlets, a hollow movable stem having a valve head and seat at one end, a sleeve having a valve-seat and valve-head adapted to receive said stem valve head and seat, a chamber formed in the sleeve having communication with the valve-seat in the sleeve, and a nozzle connected to said chamber.

14. In an oil-burner the combination of a valve-casing having a plurality of inlets, a hollow movable stem having an air-valve head and an oil-valve seat at one end, a sleeve in the casing having a valve-seat and a valve-stem head to receive said head and seat, a chamber in the sleeve and a perforated partition between said chamber and valve-seat, and a nozzle connected in said chamber.

15. In an oil-burner the combination of a casing having a plurality of inlets, a movable hollow stem therein having an air-valve head and an oil-valve seat at one end, a sleeve in the casing having a valve-seat and a valve-head to receive said stem head and seat, a branch pipe within the casing connecting the oil-inlet and hollow valve-stem, a nozzle in the sleeve, and a lever connected to said stem.

16. In an oil-burner the combination with a casing having a valve and valve-seat therein, a nozzle connected to said casing, of a hollow stem having a valve-head and valve-seat thereon, and a lever connected to said stem for moving the same whereby said valves are regulated proportionately.

17. The combination in an oil-burner of a casing having a plurality of valves therein, a nozzle connected with said valves, a movable valve-stem, a lever having a threaded sleeve portion engaging said casing, and an extension on said sleeve forming a bearing for said stem, whereby the valves are operated by said lever.

18. The combination with a casing having a valve-seat and valve-head formed therein, a stem having a valve-head and valve-seat complementary thereto, and a lever connected to said stem for moving the same.

19. The combination with a casing having a valve-seat and valve-head therein, a stem having a valve-head and valve-seat, a lever having a threaded portion engaging the casing, and an extension on the lever forming a bearing for said stem, whereby the valves are operated simultaneously.

20. The combination in an oil-burner, of a casing having a valve-head and a valve-seat surrounding said head and both members fixed therein; a nozzle adjacent said head and seat; a hollow movable stem provided with a valve-seat and valve-head; and a second nozzle having means therein for regulating the draft therethrough.

21. The combination of a casing having an oil-valve head and an air-valve seat surrounding said head, and a nozzle, means for introducing oil and air therethrough under pressure; a movable hollow stem having an oil-valve seat and an air-valve head thereon and operating means therefor; and a second nozzle inclosing the first or casing nozzle having a lower pressure therethrough, and means for regulating said pressure.

22. The combination in an oil-burner of a casing having a valve-head and a valve-seat surrounding said head, a nozzle, and means for introducing oil and air therethrough under pressure; a movable hollow stem with a valve-seat and valve-head thereon, and a second nozzle having a gate-valve therein to regulate the flow of air under pressure.

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

ROBERT G. KIRKWOOD.

Witnesses:

JAS. W. DRAPE,
GEO. A. LINN.