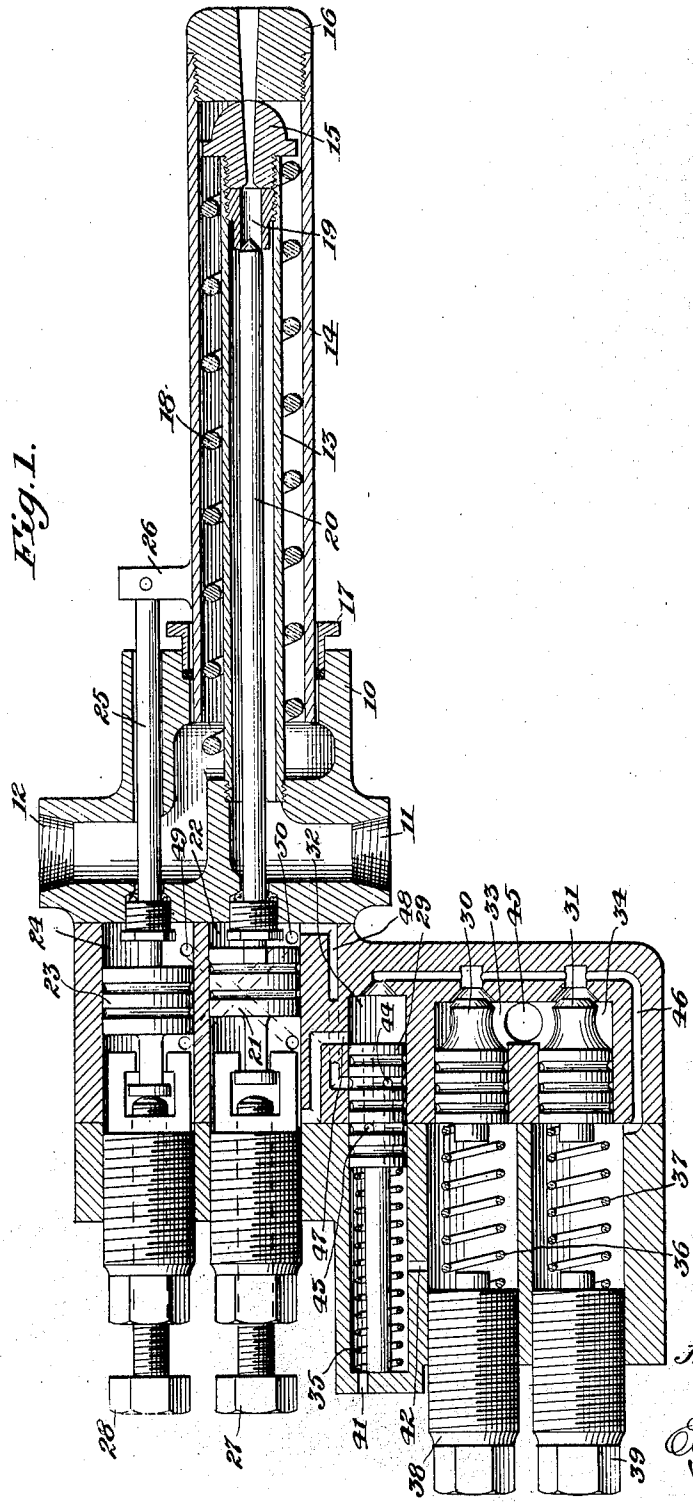
Sept. 15, 1925. 1,554,141

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OIL BURNER

Filed Oct. 27, 1924 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

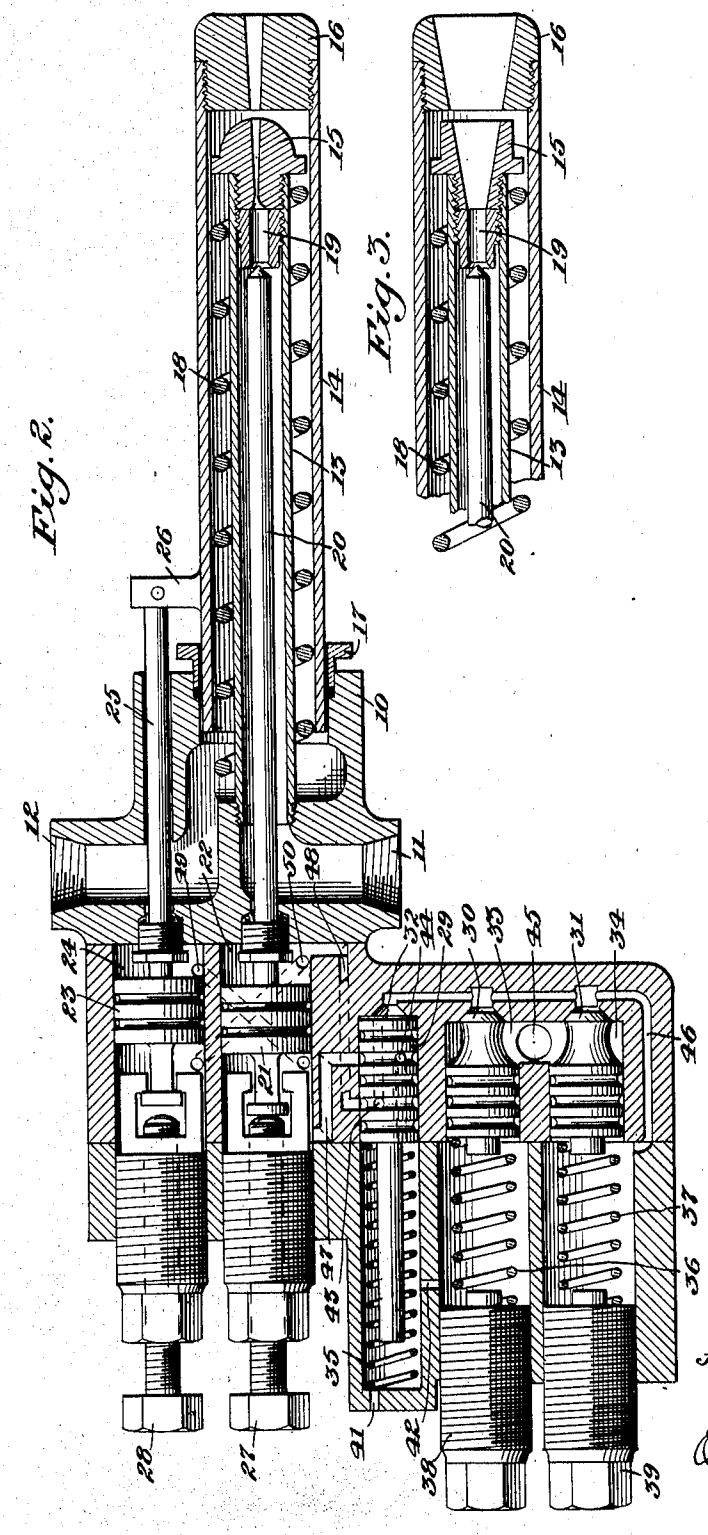


Fig. 3.

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Arthur W. Terry,

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Patented Sept. 15, 1925. 1,554,141

UNITED STATES PATENT OFFICE.

ARTHUR W. TERRY, OF PORTLAND, OREGON.

OIL BURNER.

Application filed October 27, 1924. Serial No. 746,143.

To all whom it may concern:

Be it known that I, ARTHUR W. TERRY, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

My said invention relates to an improvement in oil burners in which steam is commingled with the oil to break up and atomize the same as it is expelled from the nozzle of the burner and it is an object of the invention to utilize the steam to heat the oil prior to its being expelled from the nozzle of the burner as well as to control the opening and closing orifices or nozzles of the steam and oil outlets at the operative end of the burner.

Another object of my invention is to provide a device in which the steam pressure from the boiler will automatically control the fire maintaining low or full fire by regulating the outlet of atomizing steam and pre-heated oil.

A further object of my invention is to provide means for properly controlling the temperature of the oil before it reaches the atomizer and to provide an efficient combustion of such atomized oil.

A still further object of my invention is to provide a device sufficiently small in size to be conveniently installed as a complete unit in a boiler, furnace, common type of railroad locomotive or donkey boiler or in other similar capacities.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts:

Figure 1 is a vertical section of my device showing the parts in inoperative position;

Figure 2 is a similar view showing the parts in opposite position from that of Figure 1; and

Figure 3 is a similar view of the burner tip taken at right angles to Figure 1.

In the drawings reference character 10 indicates the burner body having a passage 11 for the entrance of steam and a passage 12 for the entrance of oil into the interior of said burner body. Concentric pipes 13 and 14 are carried by said burner body the pipe 13 having communication with the passage 11 and being fixed to the burner body while the pipe 14 has communication with the passage 12 and is adapted to reciprocate longitudinally over said smaller pipe. Tips 15 and 16 are mounted at the ends of the smaller and larger concentric pipes and are normally held in abutting end to end relation consituting a valve for the passage of oil into the exit passage of the nozzle, the smaller pipe is maintained rigidly connected to the burner body and the tip 15 at its outer end serves to support the larger pipe which is also supported by the burner body and is permitted to slide freely into the same. An oil tight expansion joint 17 is provided at the rear end of the larger pipe to prevent the escape of oil around the same and a coiled retarding and guiding element 18 is provided between the concentric pipes for delaying the passage of the oil into the nozzle. The pipe 13 is provided with a removable valve seat 19 in its end for coaction with the valve rod 20 to permit steam to pass out through tip 15 and atomize the oil passing into the outlet passage of the nozzle between the tips 15 and 16. The valve rod 20 is supported at its rear end by a piston 21 in a cylinder 22 and a similar piston 23 in a cylinder 24 carries a rod 25 attached to a bracket 26 on the pipe 14 for moving the valve rod 20 from its seat 19 and for moving the tip 16 of the larger pipe away from the tip 15 of the smaller pipe to permit oil and steam to be expelled from the burner. The amount of travel of the pistons 21 and 23 and the opening of the valves associated therewith is regulated by means of adjusting screws 27 and 28.

For manipulating the pistons 21 and 23 I provide a piston valve 29 in a cylinder 32 and variable pressure operated valves 30 and 31 in cylinders 33 and 34 by means of which steam is utilized to automatically control the operation of the burner. The cylinder 32 is provided adjacent its rear end with an opening 41 establishing communication with the atmosphere and another opening 42 is provided through the partition wall between cylinders 32 and 33 so that cylinder 33 may also have communication with the atmosphere through cylinder 32 and openings 41 and 42 whereby the valve 30 is kept on its seat only by the action of the spring 36. The piston valve 29 is normally held in a forwardly projected position by a spring 35 said piston valve being provided with passages 43 and 44 forming communication between the passage 46 and the port 48 and between the port 47 and the atmosphere in one position and between the port 48 and

the atmosphere in the other position. Thus when steam pressure is on one side of the pistons 21 and 23 the other side is open to the atmosphere. This construction permits positive and automatic operation. The valves 30 and 31 are normally pressed against their seats by springs 36 and 37 the tension of which may be varied by operation of the adjusting screws 38 and 39.

An entrance 45 is provided for steam from the boiler and a passage way 46 establishes communication with each of the valve cylinders or valve chambers 33 and 34 and with the cylinder or piston valve chamber 23. Additional passage ways or ports 47 and 48 are provided the passage 47 forming communication between the valve chamber 32 adjacent the front thereof and the rear of the cylinder 22. Also a by-pass 49 connects the rear portion of cylinder 22 with the forward end of cylinder 24. The passage 48 forms communication between the valve chamber 32 rearwardly of the entrance to passage 47 and the front end of the cylinder 22. Likewise a by-pass 50 connects the front end of the cylinder 22 and the rear end of the cylinder 24.

In operation when the parts are in position shown in Figure 1 it is necessary to adjust the screws 27 and 28 to permit a slight clearance between the tips 15 and 16 and the valve rod 20 and valve seat 19 to permit a very small amount of steam and oil to commingle and pass out through the nozzle. This adjustment is necessary in order to maintain the desired minimum fire. Steam pressure being admitted through the passage 45 will first lift valve 31 from its seat against the action of the spring 37 and allow pressure through the passageway 46 into the chamber back of the valve 31 and cause the valve to partially reseat and maintain a very slight or reduced pressure in passageway 46. This pressure is constant on the piston 29 and is insufficient to overcome the action of the spring and consequently the pressure will pass through the upper passage 43 in the valve and through the port 48 to the cylinder at the front of the valve 21 and through the by-pass 50 from said cylinder to the cylinder at the rear of the valve 23 and cause the pistons to shift the parts to the extreme position shown in Figure 2 which is the full fire position. Upon the increase of the steam pressure sufficient to overcome the resistance of spring 36 the valve 30 will be opened and the pressure will move the piston valve 29 to the position shown in Figure 1 whereupon the pressure will pass through the port 44 to the rear of the valve 21 and through the by-pass 47 to the cylinder at the front of the valve 23 and cause the pistons to shift the parts to the position shown in Figure 1 exhausting the air at the opposite sides of said pistons through the port and passage way in the piston valve 29 through the opening 41 in the rear of the cylinder 32 into the atmosphere. In this position the supply of steam and oil to the nozzles is reduced to a minimum and thus the smallest fire is maintained.

It will be obvious to those skilled in the art that various modifications may be made in the device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

Having thus fully described my said invention what I claim is:

1. An oil burner comprising a burner body having inlets for steam and oil, a pipe having communication with the inlet for steam rigidly mounted on said burner body having a tip at its outer end, a valve in said pipe inwardly of said tip, a larger pipe having communication with the inlet for oil slidable relative to the burner body telescoping said smaller pipe and having a tip at its outer end normally abutting the tip of the smaller pipe whereby oil entering the nozzle will pass around the steam pipe and be heated thereby, and a coiled rod-like retarding element interposed between the pipes, substantially as set forth.

2. An oil burner comprising a burner body, an inlet for steam into said body, an inlet for oil into said body, pipes having communication with said inlets and forming passages for the discharge of steam and oil from said body, tips in the ends of said pipes having longitudinal passages therethrough said tips being normally in abutting end to end relation one of said pipes being held in fixed relation to said body and the other of said pipes being longitudinally movable with reference to said body to space the tips apart for permitting the passage of fluid to the outlet passage of the tips, a valve seat in the inner of said pipes, a rod extending into said pipe and adapted to contact said valve seat, a piston supporting said rod, a bracket on said outer pipe, a rod extending from said bracket, a piston supporting said last mentioned rod, and means for adjusting the stroke of said pistons, substantially as set forth.

3. An oil burner comprising a burner body, an inlet for steam into said body, an inlet for oil into said body, pipes having communication with said inlets and forming passages for the discharge of steam and oil from said body, tips in the ends of said pipes having longitudinal passages therethrough said tips being normally in abutting end to end relation, one of said pipes being held in fixed relation to said body and the other of said pipes being longitudinally movable with reference to said body to space the tips

apart for permitting the passage of fluid to the outlet passage of the tips, a valve seat in the inner of said pipes, a rod extending into said pipe and adapted to contact said valve seat, a piston supporting said rod, a bracket on said outer pipe, a rod extending from said bracket, a piston supporting said last mentioned rod, means for adjusting the stroke of said pistons, and means for supplying steam at opposite sides of said pistons alternately for moving the pistons and rods carried thereby longitudinally, substantially as set forth.

4. An oil burner comprising a burner body, an inlet for steam into said body, an inlet for oil into said body, pipes having communication with said inlets and forming passages for the discharge of steam and oil from said body, tips in the ends of said pipes having longitudinal passages therethrough said tips being normally in abutting end to end relation one of said pipes being held in fixed relation to said body and the other of said pipes being longitudinally movable with reference to said body to space the tips apart for permitting the passage of fluid to the outlet passage of the tips, a valve seat in the inner of said pipes, a rod extending into said pipe and adapted to contact said valve seat, a piston supporting said rod, a bracket on said outer pipe, a rod extending from said bracket, a piston supporting said last mentioned rod, means for adjusting the stroke of said pistons, means for supplying steam at opposite sides of said pistons alternately for moving the pistons and rods carried thereby longitudinally, and controlling mechanism for supplying steam for actuating said pistons, substantially as set forth.

5. An oil burner comprising a burner body, an inlet for steam into said body, an inlet for oil into said body, concentric pipes having communication with said inlets and forming passages for the discharge of steam and oil from said body, tips in the ends of said pipes having longitudinal passages therethrough said tips being normally in abutting end to end relation one of said pipes being held in fixed relation to said body and the other of said pipes being longitudinally movable with reference to said body to space the tips apart for permitting the passage of fluid to the outlet passage of the tips, a valve seat in the inner of said pipes, a rod extending into said pipe and adapted to contact said valve seat, a piston supporting said rod, a bracket on said outer pipe, a rod extending from said bracket, a piston supporting said last mentioned rod, means for adjusting the stroke of said pistons, means for supplying steam at opposite sides of said pistons alternately for moving the pistons and rods carried thereby longitudinally, controlling mechanism for supplying steam for actuating said pistons said controlling mechanism comprising a plurality of spring pressed valves, an inlet for steam into said valves the adjustment on said valves being such that the initial pressure of steam will operate one of said valves to supply steam against the face of another of said valves and to the pistons, substantially as set forth.

6. In an oil burner, valves for discharging fluid and fuel from said burner, pistons for operating said discharge valves, controlling mechanism for supplying fluid to said pistons for actuating the same said controlling mechanism comprising a plurality of inlet valves having springs pressing them against their seats, an inlet for fluid into the burner against said valves the adjustment on the inlet valves being such that the initial pressure of fluid will open one inlet valve to supply fluid against the face of a control valve, while an increased pressure of said fluid will actuate a second inlet valve and the fluid pressure against the control valve will overcome the pressure of the spring which presses it against its seat the movements of said control valve operating to cause supply of fluid alternately to opposed faces of said pistons, substantially as set forth.

7. In an oil burner having a valve for the discharge of fuel, a piston for opening and closing said valve, a spring-pressed control valve for admitting the fluid to said piston to move the same longitudinally to open and close the valve, and a pair of valves for governing the flow of fluid to said control valve one of said valves being adapted to be opened by the initial pressure of the fluid and the other of said valves being adapted to be opened upon a greatly increased pressure said control valve being adapted to permit the fluid to pass to one side of the piston when one of said pair of valves is opened and being adapted to be shifted by the fluid pressure when the other of said pair of valves is opened to permit the fluid to pass to the opposite side of the piston for moving the discharge valve in opposite directions, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Portland, Oregon this 26th day of September, A. D. nineteen hundred and twenty-four.

ARTHUR W. TERRY.