

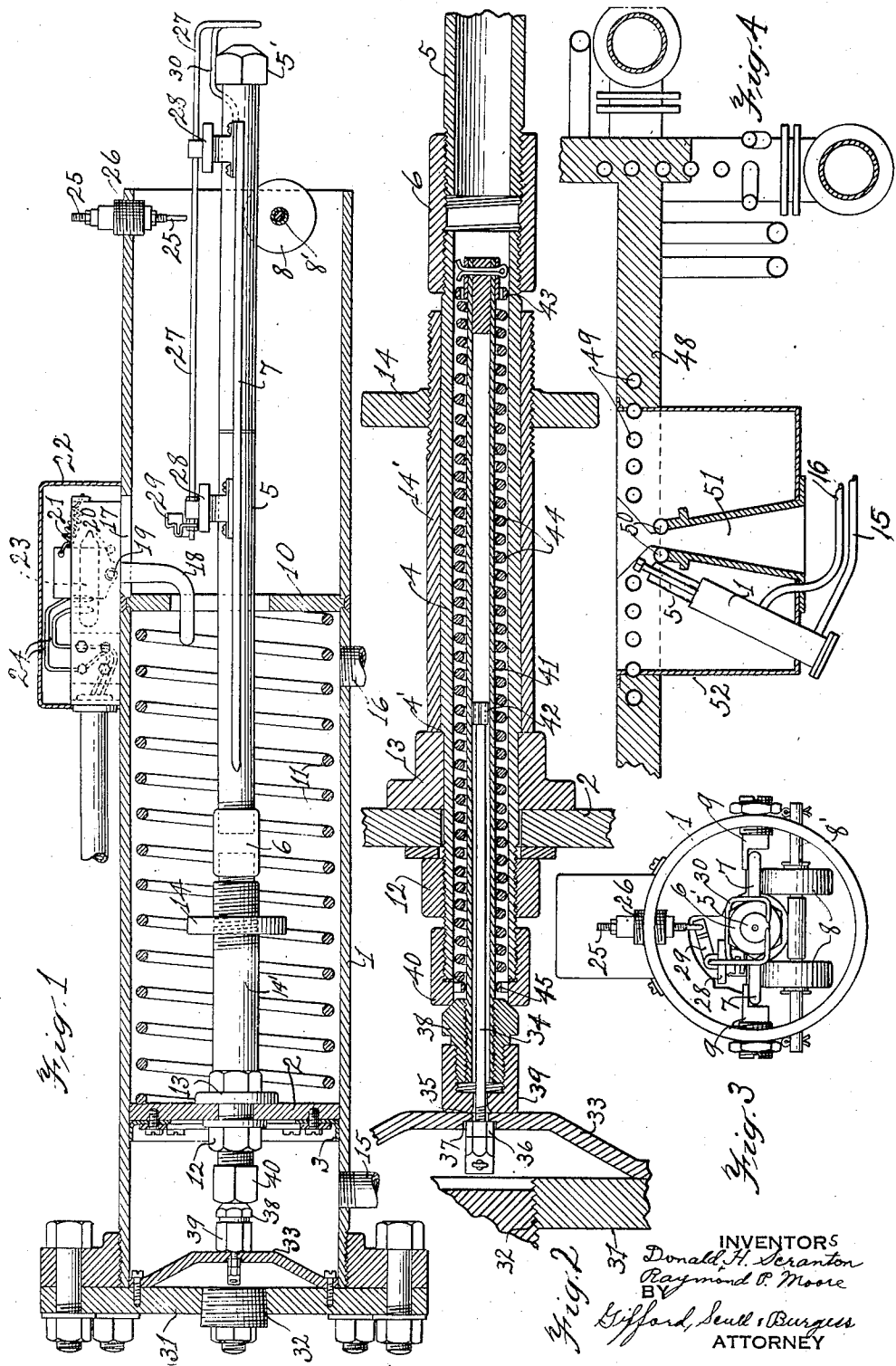
July 14, 1936.

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FUEL LIGHTER FOR FURNACES

Original Filed Feb. 9, 1929 2 Sheets-Sheet 1



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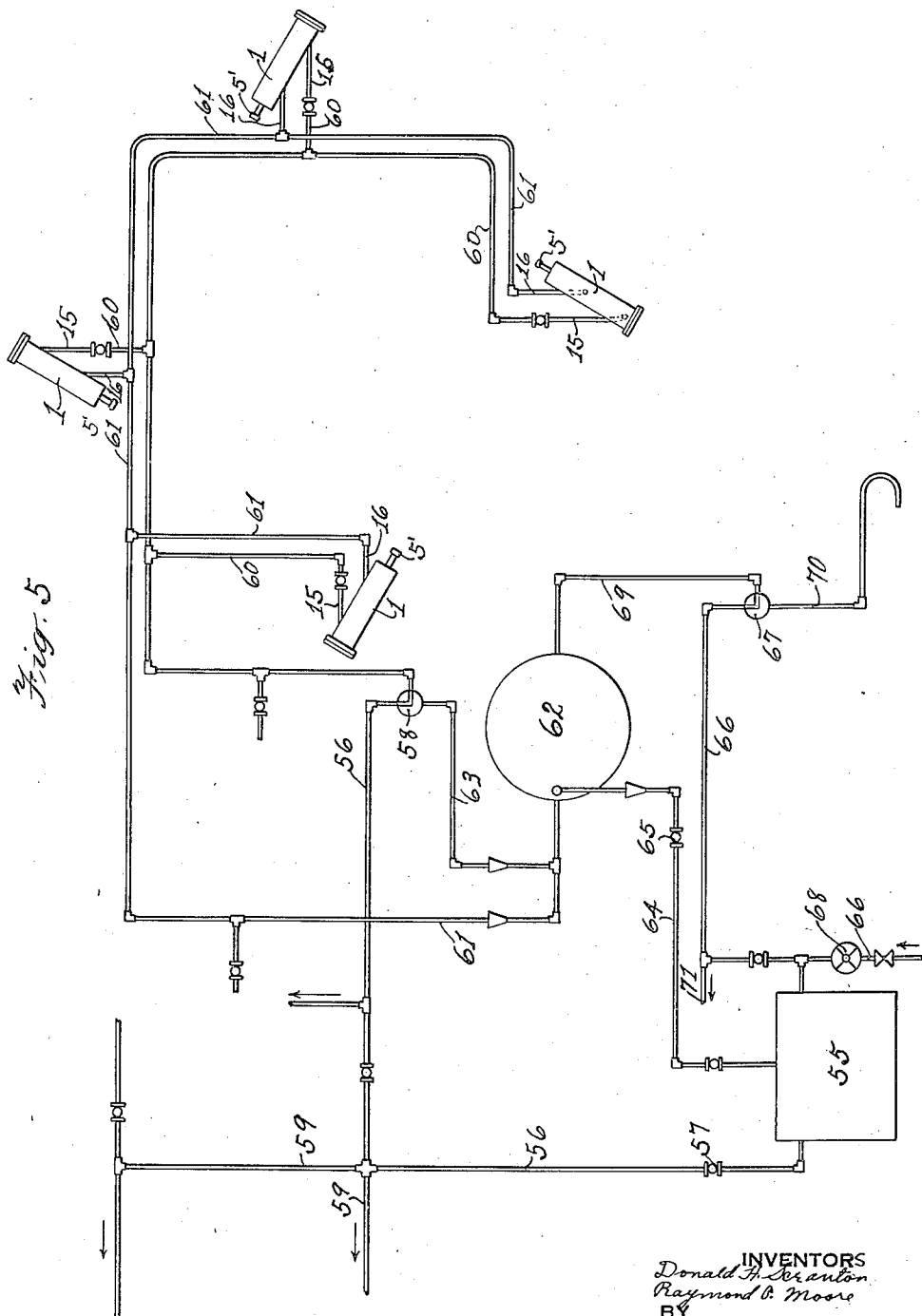
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UNITED STATES PATENT OFFICE

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FUEL LIGHTER FOR FURNACES

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Moore, Kenmore, N. Y.Application February 9, 1929, Serial No. 338,650
Renewed May 9, 1933

11 Claims. (Cl. 158—28)

This invention relates to a device by means of which fuel may be ignited in a furnace or other place by projecting a member forwardly and causing a spark, after which the member may be withdrawn some distance. At the same time secondary fuel may be introduced through the lighter and ignited and maintained for the desired length of time. The device may be controlled from a remote point and several of them may be controlled at the same time.

The invention will be understood from the description in connection with the accompanying drawings in which Fig. 1 is a longitudinal section through an illustrative embodiment of the fuel lighter; Fig. 2 is a longitudinal section through some of the parts on an enlarged scale; Fig. 3 is an end view of the device; Fig. 4 is a horizontal section through a portion of a furnace wall showing one of the devices in place near a burner; and Fig. 5 is a somewhat diagrammatical view, showing how a plurality of the devices can be controlled from a remote point.

In the drawings reference character 1 indicates a hollow member, preferably cylindrically shaped, that is open at one end. A disc 2 is provided in the cylinder 1 and carries a piston 3 that is attached to the disc 2 in any convenient manner, so as to resist leakage of fluid past the disc when fluid is admitted to the cylinder on the left hand side of the disc, as shown in Fig. 1. A hollow pipe is attached to the disc 2 and consists of two sections 4 and 5 connected by a union 6. A burner or nozzle 5' is attached to the end of the section 5. Two flanges or fins 7 are connected to opposite sides of the section 5 and rest upon guide rollers 8 pivoted on a shaft 8' near the open end of the cylinder 1. Stationary guides 9 are attached to the cylinder 1 on opposite sides of the same and extend into positions along the upper sides of the flanges or fins 7.

An annular ring or stop 10 for one end of a compression spring 11 is provided in the cylinder 1 intermediate its ends. The other end of the spring 11 rests against the disc 2. The section 4 is provided with an annular shoulder 4' and is connected to the disc 2 by a nut 12 that is screwed onto the section 4 and draws the shoulder 4' thereof against a nut 13 that rests against the face of the disc 2. A threaded washer 14 is screwed upon the threaded end of a sleeve 14' fitting tightly on the section 4 so that the washer 14 can be adjusted longitudinally. Pipes 15 and 16 are connected to the cylinder 1 on opposite sides of the disc 2.

An opening 17 is provided through the side of the cylinder 1. An arm 18 of a mercoild switch extends through the opening 17 into a position to be struck by the washer 14. The switch is pivoted at 19 and is normally held against the stop 20 by means of the spring 21. The switch may be housed in a housing 22 on the cylinder 1 and the mercoild circuit closing switch member 23 of a well known type is tilted back and forth to close the circuit 24 in the primary side of a high tension transformer (not shown), one side of the secondary of the transformer being grounded and the other side being connected to the contact element 25 mounted in an insulating bushing 26. An electrode 27 is carried by insulating supports 28 that are attached to the section 5 of the pipe. A spring 29 is connected to one end of the electrode 27 and extends laterally into a position to be brought into contact with the inwardly extending end of the contact 25 when the electrode is moved forward. Another electrode 30 is carried by the section 5, the ends of the electrodes 27 and 30 being spaced slightly apart near the outlet of the nozzle 5'.

The end of the cylinder 1 opposite the open end is closed by the disc 31 that is provided with a threaded opening 32 into which a plug is screwed. A bracket 33 is attached to the disc 31. A trip rod 34 (Fig. 2) for a valve at the end of the section 4 of the pipe passes through a hole 35 in the bracket 33 and is screwed into a nut 36 which is seated in a countersunk opening 37 in the bracket 33 to prevent the nut from turning. A valve 38, provided with a cap 39 that is screwed to the valve, is spring-pressed against the valve seat 40 that is screwed to the end of the section 4. A guide pipe 41 for the head 42 of the valve trip rod 34 is screwed into the valve 38 and extends a considerable distance into the section 4. A spring stop 43 is provided at the inner end of the pipe 41 and a compression spring 44 is interposed between the stop 43 and a stop 45 that is attached to the valve seat 40.

In Fig. 4 is shown a small portion of a furnace wall 46 having water wall tubes 48. Two of the water wall tubes as shown at 50 are bent outwardly between which a burner 51 projects fuel to be burned in the furnace. The fuel lighter is indicated as being mounted in the housing 52 surrounding the burner 51 in such a position that when the section 5 is projected forwardly and a spark is caused the fuel will be lighted as will now be explained.

A combustible fluid under pressure is introduced

through the pipe 15 into the cylinder 1 whereupon the disc 2 and pipe 5 are forced to the right, as seen in Fig. 1, compressing the spring 11. When the washer 14 strikes the switch arm 18 the primary side of the transformer is closed, thereby energizing the contact 25 with high potential current so that when contact is made between the spring 29 and the contact 25 a spark is produced at the ends of the electrodes 27 and 30 in front of the nozzle 5'. When the disc 2 has been forced forwardly a sufficient distance to cause the cap 39 of the valve 38 to strike the head 42 of the valve trip rod 34, the valve 38 is stopped and any further movement of the disc 2 and valve seat 40 will open the valve to permit the fuel to pass through the sections 4 and 5 of the pipe. When the fuel passes through the nozzle 5' it will be ignited by the spark at the ends of the electrodes 27 and 30, thus igniting the fuel entering through the burner 51. The parts may be so adjusted that the spark may take place between the electrodes 27 and 30 without any secondary fuel being introduced through the sections 4 and 5, thus directly igniting the fuel that enters through the burner 51.

When it is desired to retract the electrodes the fluid pressure is relieved behind the disc 2, whereupon the spring 11 moves the parts to the retracted position. As soon as the valve seat 40 moves far enough to contact with the valve 38, the valve closes. During this time the expansion of the spring 11 forces the fluid back out through the pipe 15. Any fluid that may have escaped by the piston 3 is drawn off through the pipe 16. The combustible fluid for projecting the electrodes forwardly may be gas or oil, for example.

Fig. 5 shows a somewhat diagrammatical arrangement of apparatus for operating a plurality of the fuel lighters from a distant point. Reference character 55 indicates a tank or supply of oil, for example, that is maintained under pressure. A pipe 56 provided with a check valve 57 leads to a three way valve 58 and may have branches 59 leading to corresponding three way valves for other lighters. A pipe leads from the three way valve 58 and has branches 60 leading into pipes 15 in the lighters already described. Pipes 61 lead from the pipes 16 of the lighters to a tank 62. A pipe 63 also leads from the three way valve 58 to the tank 62. A pipe 64 provided with a check valve 65 leads from the tank 62 to the tank 55.

A pipe 66 leads from a source of compressed air (not shown) to the tank 55 and also to the three way valve 67. A valve 68 is provided in the pipe 66. A pipe 69 leads from the three way valve 67 to the tank 62 and a pipe 70 leads from the three way valve 67 to the atmosphere. The pipe 66 may be provided with one or more branches 71 leading to other fuel supply tanks.

The three way valves 58 and 67 may be so connected that they can be opened and closed simultaneously. When the valves 58 and 67 are turned to the positions indicated in Fig. 5 and the oil in the tank 55 is placed under pressure by opening the valve 68, oil is forced through the pipe 56 and branches 60, thus projecting the fuel lighters forwardly to ignite the fuel in the furnace. At the same time whatever oil is in the tank 62 will drain by gravity into the tank 55, as the two tanks are at that time under the same pressure. When it is desired to retract the lighters, the valves 58 and 67 are turned to the other positions, whereupon the springs 11 will retract

the lighters as above described, and, since the tank 62 is thereby placed under atmospheric pressure, the oil will be forced back through the branches 60 and pipe 63 into the tank 62 and whatever oil may have passed by the pistons 3 will pass out through the pipes 16 and 61 into the tank 62 ready to pass into the tank 55 at the next operation.

By this invention the ignition flame can be introduced into a furnace automatically by an operator at a remote point, thereby making it safe for the operator to light the furnace; the ability to retract the nozzle avoids burning the same and also prevents carbonization of the oil to clog it up; the ignition flame can be kept going whatever length of time is necessary to insure ignition of the fuel in the furnace; a single operator can light a large number of boilers; and oil, gas or powdered fuel can be ignited either by the spark or by means of the secondary fuel that is introduced with this device and ignited by the spark.

We claim:

1. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, means to pass fuel through said pipe, a valve for said pipe which is opened at a predetermined position thereof, and means operated by movement of said piston to ignite said fuel.

2. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, means to pass fuel through said pipe, a valve for said pipe which is opened at a predetermined position thereof, and means operated by movement of said piston to ignite said fuel, said last named means comprising an electric spark producing device.

3. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, means to pass fuel through said pipe, a valve for said pipe which is opened at a predetermined position thereof, a spring for closing said valve, and means operated by movement of said piston to ignite said fuel.

4. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, a valve at one end of said pipe, and means to produce an electric spark at the other end of said pipe.

5. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, a valve at one end of said pipe, a rod carried by said cylinder to open said valve, and means to produce an electric spark at the other end of said pipe.

6. A fuel lighter comprising a cylinder having a stop, a piston for said cylinder, a spring between said stop and piston, a pipe attached to said piston, a valve at one end of said pipe, a rod carried by said cylinder and extending into said pipe to open said valve, and means to produce an electric spark at the other end of said pipe.

7. In a device of the character described, a furnace, means for introducing fuel into said furnace, means for providing an ignition flame adjacent the point of introduction of said fuel, said last named means comprising a movable member through which fuel is supplied for the ignition, and means correlated with said movable member

to be rendered operative at a predetermined position thereof for igniting said ignition fuel.

8. In a device of the character described, a furnace, means for introducing fuel into said furnace, means for providing an ignition flame adjacent the point of introduction of said fuel, said last named means comprising a movable member through which fuel is supplied for the ignition, means whereby said ignition fuel moves said movable member, and means correlated with said movable member to be rendered operative at a predetermined position thereof for igniting said ignition fuel.

9. In a device of the character described, a furnace, means for projecting fuel in fluid form into said furnace, means for providing an ignition flame adjacent the point of introduction of said fuel, said last named means comprising a movable member through which fuel is supplied for the ignition, and means correlated with said movable member to be rendered operative at a predetermined position thereof for igniting said ignition fuel.

10. In a furnace, a fluid fuel burner mounted to permit movement to and fro from said furnace comprising a fuel supply pipe biased from the furnace, means for feeding fuel under pressure to said burner, means actuated by the pressure of the fuel operable to move said fuel supply pipe toward said furnace, and means correlated with said pipe and rendered operative at a predetermined position thereof to ignite the fuel delivered from said burner.

11. In a furnace, a main fuel injecting means, an ignition means therefor movable into and out of igniting relationship to said fuel injecting means comprising means feeding ignition fuel under pressure, a movable member through which ignition fuel is supplied, biased to its inoperative position and operable in response to the pressure of the ignition fuel to move into igniting relationship, and means correlated with said movable member and operable at a predetermined position thereof to ignite said ignition fuel.

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