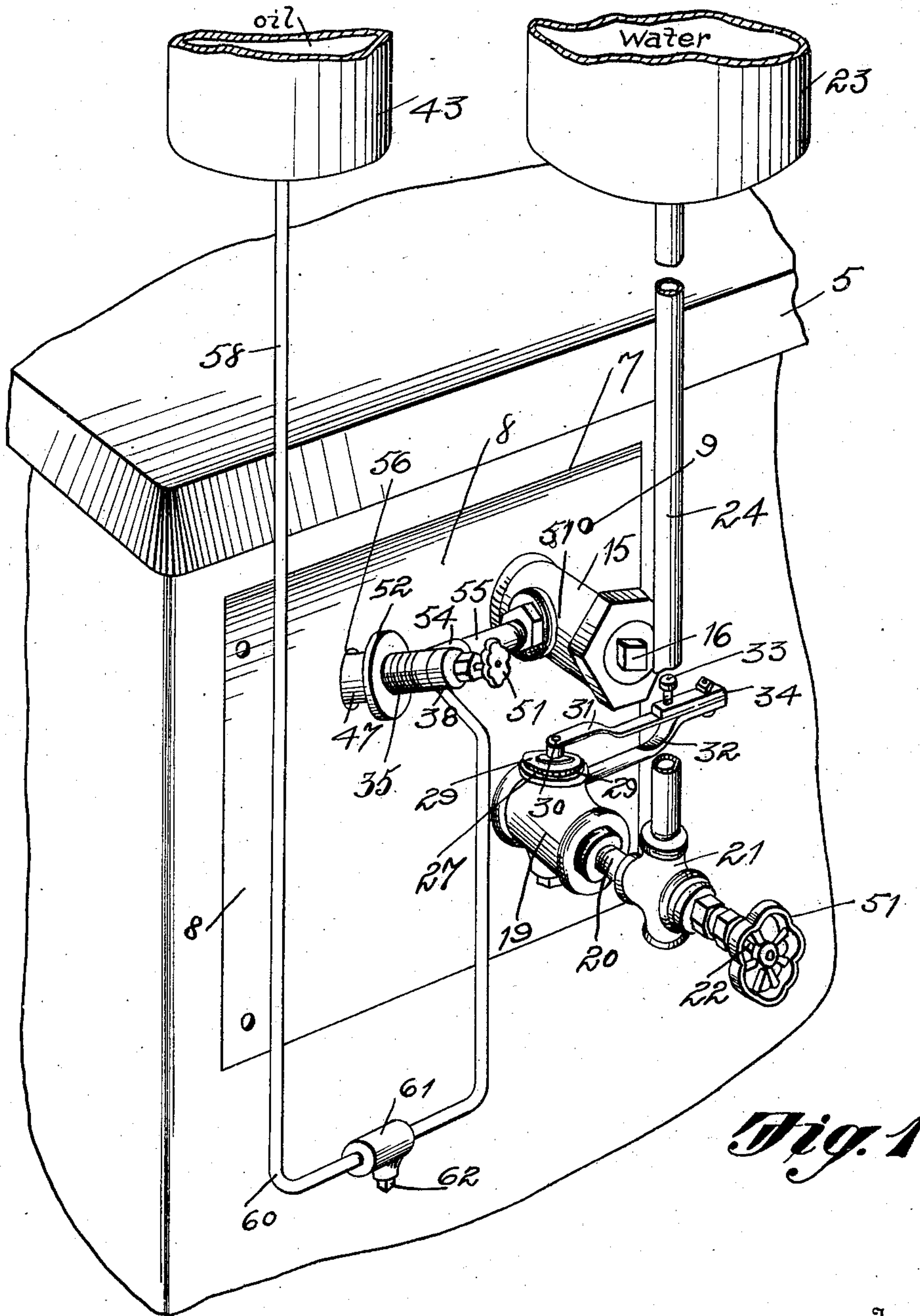


V. H. & J. H. T. MILLS.  
HYDROCARBON BURNER.  
APPLICATION FILED DEC. 4, 1909.

986,739.

Patented Mar. 14, 1911.

3 SHEETS-SHEET 1.



*Fig. 1.*

Witnesses  
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Inventors  
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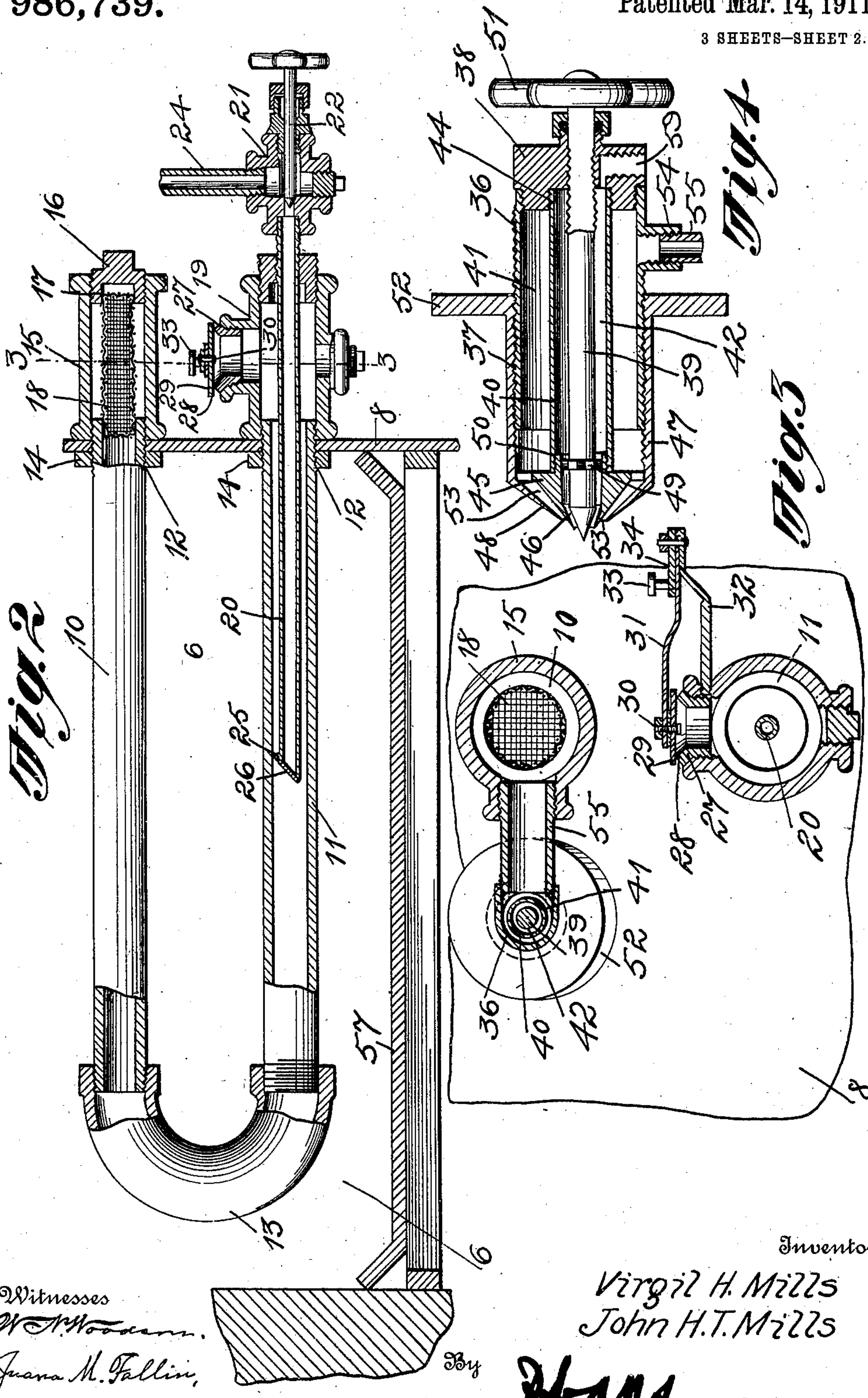
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3 SHEETS—SHEET 2.

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3 SHEETS—SHEET 3.

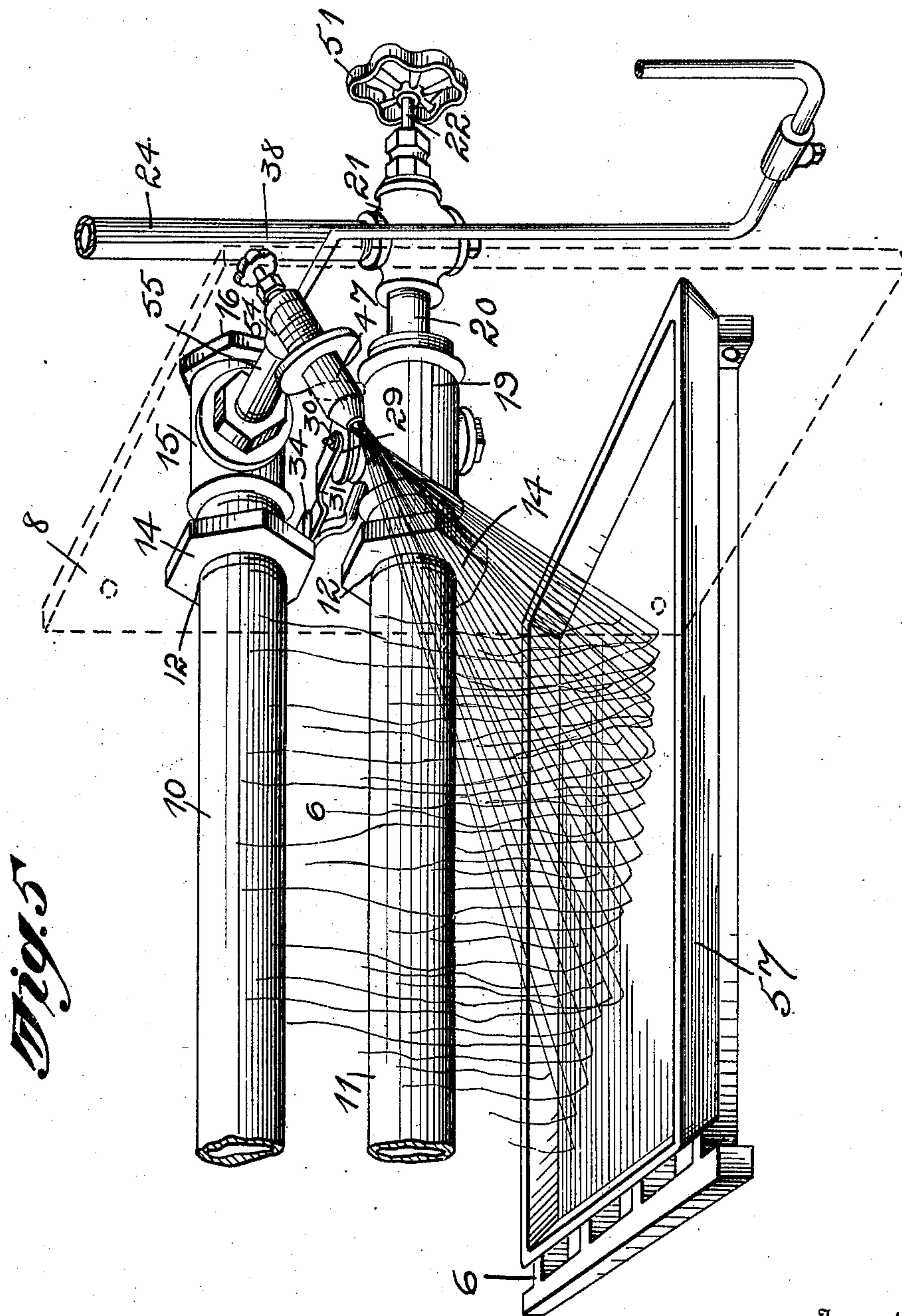


Fig. 5

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# UNITED STATES PATENT OFFICE.

VIRGIL H. MILLS AND JOHN H. T. MILLS, OF HUBBARD, TEXAS.

## HYDROCARBON-BURNER.

986,739.

Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed December 4, 1909. Serial No. 531,455.

*To all whom it may concern:*

Be it known that we, VIRGIL H. MILLS and JOHN H. T. MILLS, citizens of the United States, both residing at Hubbard, in the county of Hill and State of Texas, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

This invention relates to steam generators and more particularly to that class of generators especially designed for use in connection with hydro-carbon burners.

The object of the invention is to provide a steam generator of simple and durable construction, by means of which a jet of steam may be directed on the oil at the burner tip for the purpose of atomizing the fuel and effecting perfect combustion of the latter.

A further object is to provide means for preventing the steam in the generator from entering the water supply pipe and checking the flow of fluid, and means for permitting the escape of steam from said generator in case the pressure becomes excessive.

A still further object of the invention is generally to improve this class of devices to increase their utility, durability and efficiency.

For a full understanding of the invention reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a perspective view of a portion of a stove provided with a steam generator constructed in accordance with our invention. Fig. 2 is a vertical sectional view partly in elevation. Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2. Fig. 4 is a longitudinal sectional view of the burner proper. Fig. 5 is a perspective view of the burner and oil pan detached.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the accompanying drawings by the same reference characters.

The improved steam generator forming the subject-matter of the present invention is principally designed for use in connection with heating and cooking stoves, and by the way of illustration is shown applied to a cooking stove of ordinary construction in which 5 designates the body of a stove, 6 the firebox, and 7 the opening through which access may be had to said firebox.

The device comprises a plate 8 preferably formed of metal and adapted to extend across and form a closure for the opening 7, said plate being detachably secured to the body of the stove by screws, or similar fastening devices 9.

The generator is preferably formed of upper and lower pipes 10 and 11 having their outer ends threaded at 12, and extended through suitable openings in the plate 8 and their inner ends connected by a coupling 13, there being clamping nuts 14 engaging the threaded portions 12 of the pipe sections, and bearing against the inner face of the supporting plate 8, as shown, for the purpose of rigidly clamping said pipe sections on the supporting plate.

Threaded on the outer end of the upper pipe section 10 of the steam generator is a T-coupling 15 having one end thereof closed by a removable plug 16, the inner face of which is formed with a seating recess 17 for the reception of the adjacent end of a strainer 18, the opposite end of said strainer being seated within the adjacent end of the pipe section 10. The purpose of the strainer 18 is to remove scales, or other foreign impurities in the steam, when said steam is fed to the burner, thus to prevent clogging of the steam and oil passages at the burner tip. Threaded on the outer end of the lower pipe section 11 is a similar T-coupling 19 through which extends a water supply pipe or tube 20. The inner end of the



supply pipe 20 is threaded in a valve casing 21 having a needle valve 22 operating within the same, so that the supply of water to the generator may be regulated at will.

5 Supported in any suitable manner above the stove 5, is a tank 23 adapted to contain a quantity of water, the water in the tank 23 being fed to the supply pipe 20 through the medium of a conductor 24.

10 Pivotaly mounted at 25, on the inner end of the water supply pipe 20, is a flap-valve 26, which latter normally closes the discharge end of the supply pipe 20, and prevents the steam generated in the pipe 11 from entering the supply pipe 20 and checking the flow of water to said generator.

15 The valve 26 is so constructed as to allow a small quantity of water to drip from the discharge end of the pipe 20 into the pipe 20 11, where it will be instantaneously converted into steam by contact with the hot walls thereof. Should the steam pressure in the generator 11 become excessive, however, the pressure of steam will overcome the gravity of water in the pipe 20 and automatically close the valve 26 so as to prevent the steam from forcing the water rearwardly in the pipe and thus checking the flow thereof, as before stated.

30 The upper end of the T-coupling 19 is provided with an opening, the walls of which are threaded for the reception of a correspondingly threaded bushing 27, the latter being provided with a seat 28 adapted to receive a spring-pressed disk 29, constituting a safety valve. The disk 29 is mounted for rotation on a pin 30 carried by a spring-arm 31, the latter being bolted, or otherwise secured to a suitable support 32 40 extending laterally from the coupling 19. An adjusting screw 33 is threaded in an overhanging arm 34, carried by the support 32 and adapted to bear against a spring 31 for the purpose of regulating the tension thereof, and consequently causing the disk, or valve 29 to engage the valve-seat with more or less pressure according to the conditions under which it is used. Thus it will be seen that should the steam pressure in the 50 generator rise above a predetermined degree, the steam will lift the safety valve 29 and permit steam to escape through the bushing 27. The spring 31 is preferably adjusted so that the pressure exerted on the bushing 27 by the valve 29 will be equal to the force of water flowing through the pipe 20, so that in case too much steam is generated in the pipes 10 and 11, the valve 26 will be automatically moved to closed position 60 thus to cut off the flow of water to the generator, while at the same time the valve 29 will be elevated against the tension of the spring 31 to permit the escape of steam from said generator.

65 The burner 35 is disposed opposite the

coupling 15 and comprises a hollow body portion 36 having its exterior walls threaded at 37 and its rear end closed by a plug 38 in which is threaded a valve stem 39. Arranged concentrically with the body portion 70 36 is a tubular member 40, the latter being spaced from the interior walls of the body portion 36 to form independent circumferential chambers 41 and 42, one of which is adapted to receive steam from the generator 11, and the other, crude petroleum, or other fuel from a supply tank 43. The inner end of the tubular member 40 engages a threaded opening 44 in the plug 38, while the other end thereof is provided with a head 80 45, the latter being spaced from the pointed terminal of the valve stem 39 so as to form a circumferential passage 46 for the discharge of oil in the chamber 42. Threaded on the exterior walls of the body portion 36 is a 85 nozzle 47 having its outer portion provided with a conical shaped tip 48 spaced from the inclined walls of the cap 45 to form a passage for the discharge of steam from the chamber 41. The valve-stem 39 is preferably formed with a plurality of radiating 90 lugs 49 which latter bear against the reduced portion 50 of the head 45 and serve to guide the stem 39 in the chamber 42 and center the pointed terminal thereof with 95 respect to the inner wall of said head. A hand-wheel 51 is secured to the valve-stem 39 so that by rotating the wheel 51 the discharge of fuel through the passage 46 may be controlled at will. A collar or flange 52 100 is also preferably formed on the inner end of the nozzle 47 to facilitate adjusting the nozzle so as to regulate the width of the steam passage 53. Thus it will be seen that the oil from the chamber 42 will be deposited on the pointed terminal of the valve-stem 39, while the steam discharging through the passage 53 will be directed against the oil on the pointed terminal of the valve-stem 39 so as to thoroughly atomize the same and 110 thus effect perfect combustion of the fuel.

By projecting the pointed terminal of the head 45 slightly beyond the conical tip of the nozzle 47, not only is the oil thoroughly atomized, but by reason of the disposition 115 of the parts, the back pressure of the steam discharging through the passage 53 is effectually prevented from entering the passage 46 and checking the flow of fuel to the burner tip. 120

The body portion 36 is provided with a nipple 54 for engagement with a short pipe 55, the latter forming a connection between the burner and coupling 15 and serving to support the burner in position on said coupling. 125

The active end of the burner 35 extends through an opening 56 in the supporting plate 8 and is preferably deflected downwardly so as to direct the flame in contact 130



with the oil-pan 57 and thus cause the flame to be deflected upwardly in contact with the steam generator and maintain the latter at the proper temperature.

5 The oil supply tank 43 is connected to the burner 35 by means of a pipe section 58, one end of which is threaded in an opening 59 formed in the plug 38. The pipe 58 is preferably formed in two sections bent to form  
10 a U-shaped trap 60, said sections being connected by a coupling 61 having a removable plug 62 so that sediment, and other foreign matter in the oil, collected in the trap 61 may be removed therefrom by detaching the  
15 plug 62.

In operation a quantity of oil is placed in the pan 57 and lighted with a match so as to initially heat the pipe sections 10 and 11 constituting the steam generator. The valve  
20 44 is then opened, which allows the water from the tank 23 to flow through the pipe 20 into the generator, where it will be instantaneously converted into steam, the latter passing through the strainer 18 and connect-  
25 ing pipe 55 into the chamber 41 of the burner. The valve 39 is then adjusted so as to permit the passage of a small quantity of crude petroleum, or other fuel to the burner tip, where it will be met by the jet  
30 of steam from the nozzle and thoroughly atomized, as before stated. The flame from the burner tip is directed downwardly upon the pan 57 and is deflected upwardly by said pan around the pipes 10 and 11 so as to  
35 maintain the latter at the proper temperature to insure the generation of steam at all times.

The device is extremely simple in construction and may be successfully operated by an  
40 unskilled person without danger.

Having thus described the invention what is claimed as new is:—

1. In a device of the class described, a steam generator, a burner communicating  
45 with the generator, means for feeding water to the generator, and means disposed within and housed by the generator for preventing the steam from checking the flow of water to said generator.

50 2. In a device of the class described, a steam generator, a burner connected with said generator, a water supply pipe extending within the generator, and a flap valve pivotally mounted on the discharge end of the  
55 water supply pipe for preventing the steam from checking the flow of fluid.

3. In a device of the class described, a steam generator, a burner connected with the generator, a water supply pipe extending  
60 within the generator, a valve pivotally mounted on and normally closing the discharge end of the water supply pipe, and a safety valve for controlling the escape of steam from said generator.

65 4. In a device of the class described, a

supporting plate for attachment to a stove, a steam generator carried by the supporting plate, a burner connected with the generator, a water supply pipe extending within the generator, and a valve pivotally mount- 70 ed on the discharge end of the supply pipe for preventing the steam from checking the flow of water to the generator.

5. In a device of the class described, a supporting plate having means for attach- 75 ment to a stove, spaced pipes having their outer ends secured to the supporting plate and their inner ends connected by a coupling, said pipes constituting a steam generator, a burner connected with the gen- 80 erator, a water supply pipe disposed within the steam generator, and a valve pivotally mounted on the inner end of the water supply pipe.

6. In a device of the class described, a 85 supporting plate, spaced pipes having their outer ends connected and their inner ends secured to the supporting plate, a burner connected with the upper pipe, a coupling carried by the lower pipe and provided with 90 a valve seat, a spring-pressed valve normally engaging said seat, means for feeding oil to the other chamber of the burner, a water supply pipe extending within said lower pipe, and a valve pivotally mounted upon 95 the discharge end of the water supply pipe for preventing the steam from checking the flow of water through the water supply pipe.

7. In a device of the class described, a supporting plate, a steam generator carried 100 by the plate and including spaced pipes, a coupling secured to the upper pipe, a strainer within the coupling, a burner connected with the coupling, a second coupling se- 105 cured to the lower pipe of the steam generator and provided with a valve-seat, a safety valve yieldably engaged with said seat, a water supply pipe extending within the lower pipe of the steam generator, and 110 a valve pivotally mounted on the discharge end of the supply pipe and movable to open position under the pressure of water and to closed position under the pressure of steam.

8. In a device of the class described, a steam generator, a burner communicating 115 with the generator, a water supply pipe extending within the generator, a valve pivotally mounted on the discharge end of the water supply pipe and movable to open posi- 120 tion by the pressure of the water and to closed position by the pressure of steam in the generator, and a safety valve for permitting the escape of steam from the generator thereby to allow opening movement of the 125 pivoted valve.

9. In a device of the class described, a steam generator, a burner communicating 130 with the generator, a water supply pipe extending within the generator, a flap-valve pivotally mounted on the discharge end of



the water supply pipe and adapted to automatically cut off the supply of water to the generator when the pressure of steam in the latter becomes excessive, and a safety valve  
5 for permitting the escape of steam from the generator, thereby to permit opening movement of said flap-valve.

In testimony whereof we affix our signatures in presence of two witnesses.

VIRGIL H. MILLS. [L. S.]

JOHN H. T. MILLS. [L. S.]

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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