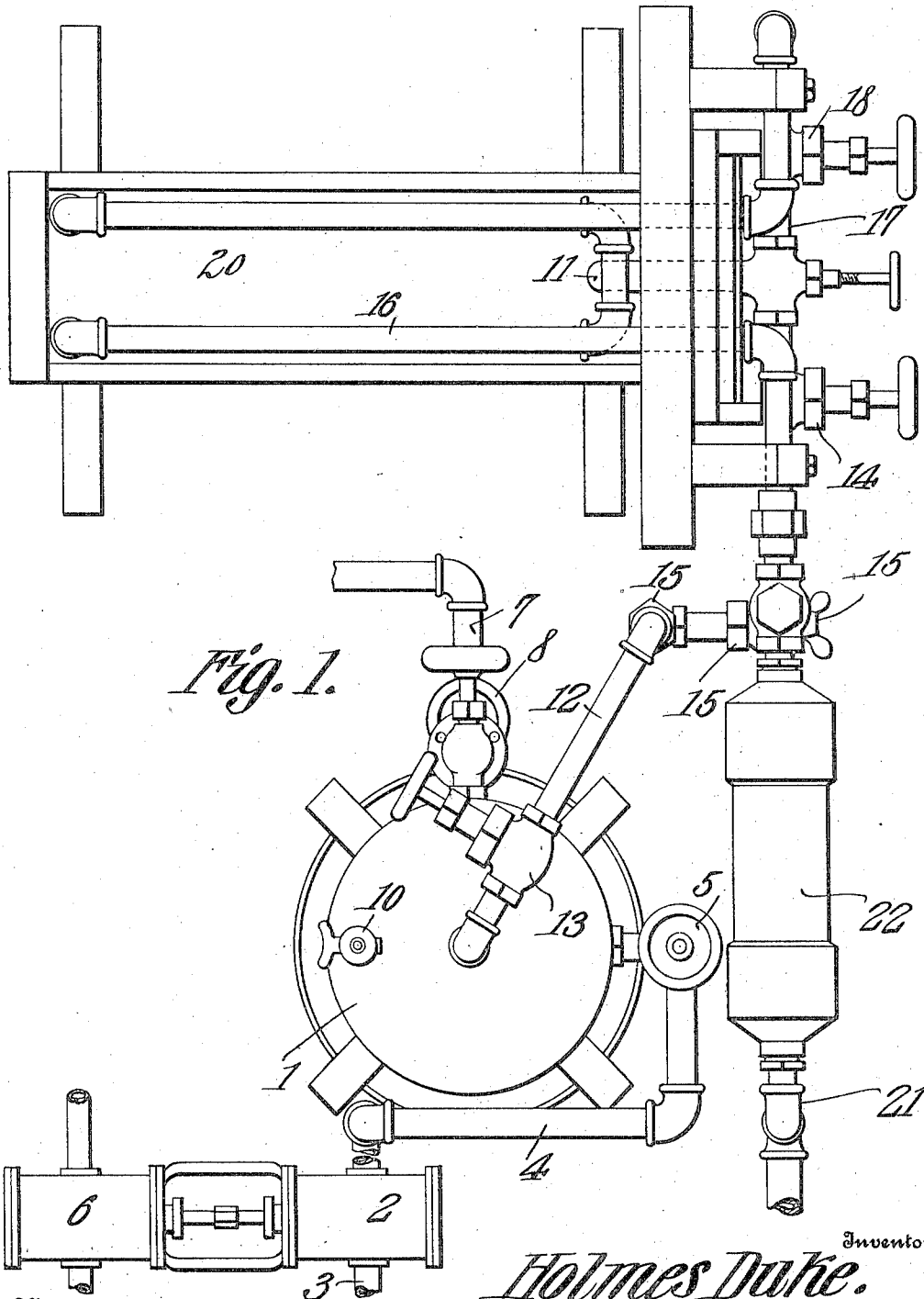


H. DUKE.
OIL BURNING SYSTEM.
APPLICATION FILED APR. 10, 1909.

947,890.

Patented Feb. 1, 1910.

3 SHEETS—SHEET 1.



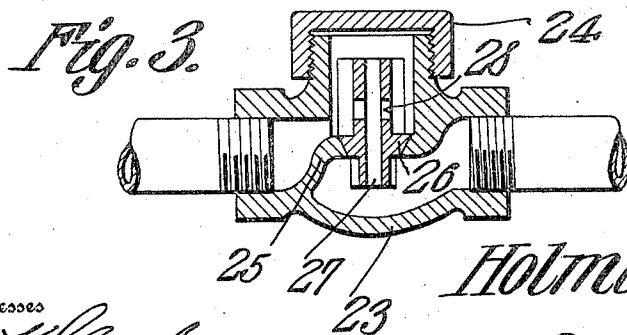
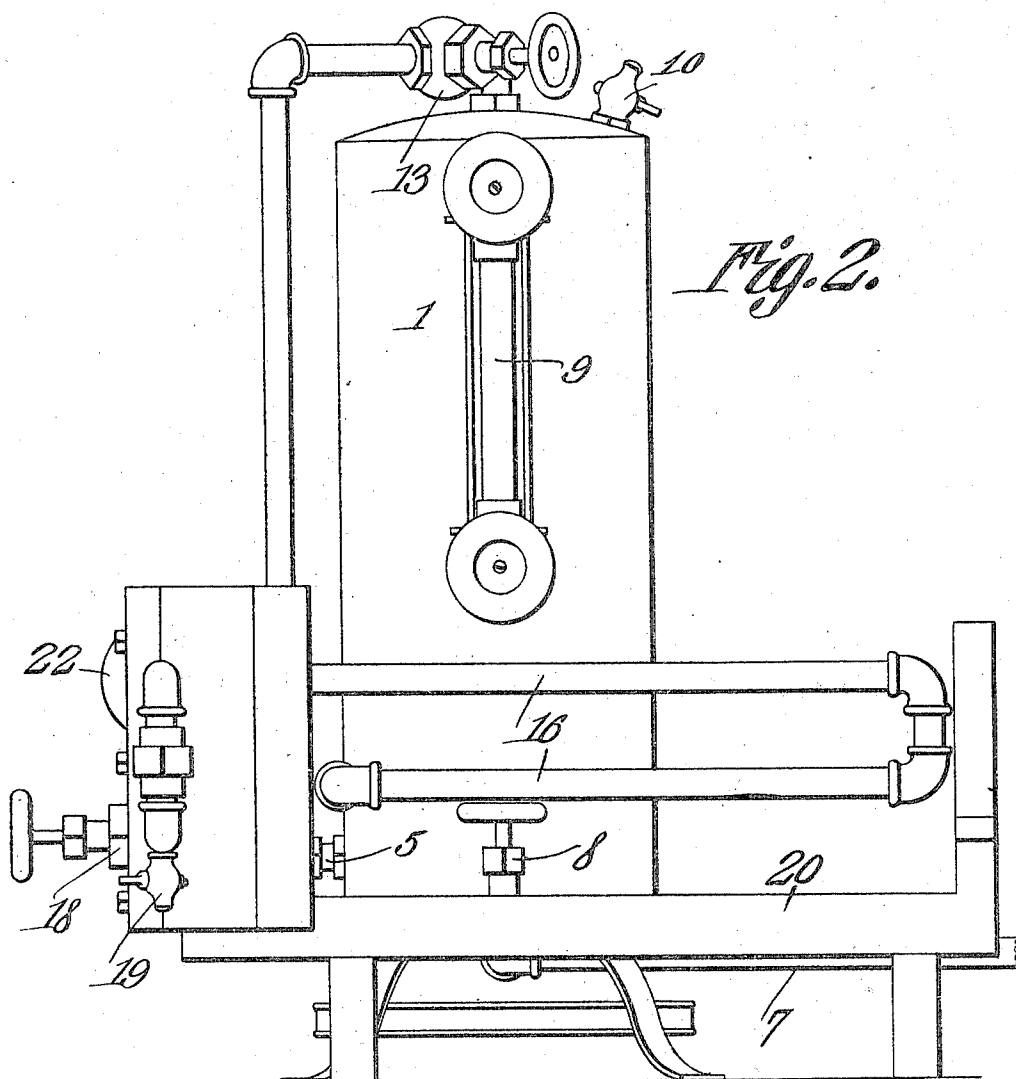
Witnesses
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3 SHEETS—SHEET 2.



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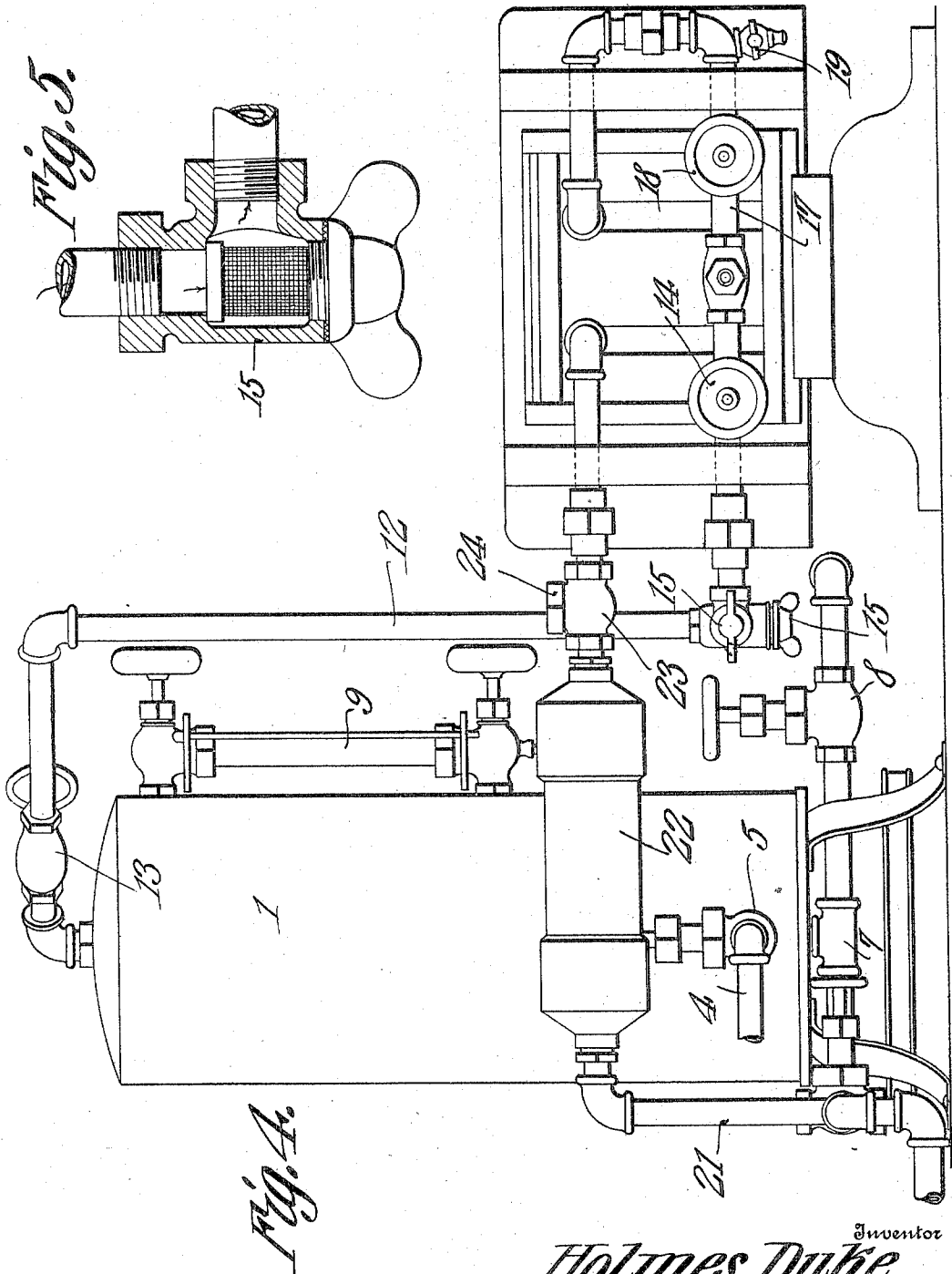
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Witnesses

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UNITED STATES PATENT OFFICE.

HOLMES DUKE, OF BEAUMONT, TEXAS.

OIL-BURNING SYSTEM.

947,890.

Specification of Letters Patent.

Patented Feb. 1, 1910.

Application filed April 10, 1909. Serial No. 489,079.

To all whom it may concern:

Be it known that I, HOLMES DUKE, a citizen of the United States, residing at Beaumont, in the county of Jefferson and State of Texas, have invented a new and useful Oil-Burning System, of which the following is a specification.

This invention relates to a liquid fuel burning system designed more particularly for burning crude oil, the burner proper being of the injector type which sprays or injects oil and steam into the combustion chamber of the furnace.

The object of the present invention is to provide an improved fuel feed characterized by a tank in which the oil contained therein is placed under pressure, together with an arrangement of parts whereby the pressure is automatically shut off when the oil is shut off at the burner.

The invention also has for its object to provide an improved method of generating steam for operating the injector.

Another object is to provide a burner which will operate successfully under medium pressure.

Another object is to support the oil in the tank on a film of water in order that a better separation of asphalt and other solid matter present in the oil may be had.

A further object is to provide for the escape of any excess pressure which may accumulate in the generator.

With the foregoing objects in view the invention consists in the novel construction and arrangement of parts to be hereinafter described and claimed, reference being had to the drawing hereto annexed forming a part of this specification, in which drawings—

Figure 1 is a plan view of the invention. Fig. 2 is a side elevation. Fig. 3 is a vertical section of the relief valve hereinafter referred to. Fig. 4 is a front elevation. Fig. 5 is a vertical sectional view of the strainer in the fuel supply pipe.

Referring more particularly to the drawings, 1 denotes a tank in which the liquid fuel is maintained under pressure, and from which it is forced to the burner. This tank is supplied from an underground tank (not shown) by a pump 2. The oil inlet pipe to the pump is indicated at 3, and the outlet pipe at 4, the latter leading to the tank, and being provided with a valve 5 for control-

ling the flow of oil to the tank. The pump 2 is operated by a water motor indicated diagrammatically at 6, said motor being connected to the city water main. By providing such a water motor for operating the pump, it will be seen that the oil in the tank is maintained at substantially the same pressure as that of the water, and upon turning off the burner, the pump will be automatically stopped as it will choke when the pressure in the tank attains the same pressure as that of the water. Another advantage of this arrangement is that the burner is operated under a medium pressure. The tank 1 also contains water, the supply pipe thereof being indicated at 7. The purpose of maintaining a supply of water in the tank is to obtain a better separation of asphalt, and other solid matter or sediment present in the oil. The oil pipe 4 enters the tank at such a level, that the oil will be forced through the water, whereby all impurities in the oil are effectually washed out, and as the specific gravity of the oil is less than that of the water, the oil rises and is held above the bottom of the tank by the water therein. The water supply pipe 7 is provided with a valve 8 for shutting off the water after the desired amount has been let into the tank. The tank is provided with a suitable glass 9, and a vent 10.

At 11 is indicated a burner of the injector type. Oil is supplied to the burner from the tank 1 by a pipe 12 leading from the top thereof, and provided adjacent to the latter with a valve 13. Adjacent to the burner, the pipe 12 is provided with another valve 14, in order that the oil may be shut off at the burner. The oil pipe 12 is also provided with strainers 15 as shown in detail in Fig. 5.

The injector burner 11 injects oil and steam into a combustion chamber of the furnace. The structure of the latter is immaterial to the present invention, and it has therefore not been shown in detail in the drawings. Located within the combustion chamber of the furnace are the steam generating coils 16 arranged so that the heat of the combustion chamber is also utilized to generate the steam for operating the injector. The coils are connected at one end to the burner by a pipe 17 provided with a valve 18 for controlling the flow to the burner. The pipe 17 is also provided with

a pit-cock 19. The combustion chamber of the furnace also contains a pan 20 into which oil is run to start the burner.

The water supply connection to the coils 5 16 is shown at 21. In this connection is located a tank 22, and in the connection 21 between the tank and the coils is located a valve for relieving the coils of any excess pressure which may accumulate therein. 10 This valve is shown in detail in Fig. 3, and comprises a casing 23 provided with a removable cap 24, and containing a diaphragm 25 provided with a seat for the valve 26. The latter is in the shape of an 15 ordinary check valve, and is provided with a longitudinal passage 27, and side openings 28 communicating with said passage, said side openings being on the inlet side of the valve.

20 The relief valve herein described operates as follows: The water flows through the pipe 21, into the tank 22, and out of the same through the passage 27 and openings 28, and thence passes to the coils. The valve 25 opens in the direction of the tank so that 25 when sufficient pressure accumulates in the coils to lift the valve, it opens, and the excess pressure escapes into the tank 22 where it is condensed. Steam is therefore supplied to the burner at substantially the same 30 pressure as that in the water main, and the burner therefore operates under medium pressure. The coils are so located in the combustion chamber of the furnace that 35 there is an instant generation of steam when the burner is in operation. To start the burner, oil is run into the pan 20, and the cock 19 is opened. As soon as steam appears, the cock is closed and the oil is then 40 turned into the burner. The level of oil in the tank 1 is preferably such that the oil will flow by gravity to the burner in case the pump should accidentally stop. Sufficient head may be obtained by slightly elevating the tank above the burner. In case 45 of derangement of the pump, all of the oil in the tank 1 can also be forced out of the same by turning on the water.

By the system herein described, crude oil 50 can be economically and safely employed for steam boiler and other furnaces. The tank 1 may be kept within the limits pre-

scribed by the National Board of Fire Underwriters, and as the tank which supplies said tank is underground, there is no increased fire risk, and the use of the system 55 does not result in any increase in the insurance rate. By operating the burner under low pressure, the system may be used in connection with domestic stoves and furnaces. 60

What is claimed is:

1. In a liquid fuel burning system, an injector burner, a steam generator connected to the burner, a water supply pipe connected to the generator, a tank interposed in said 65 pipe, and a pressure relief valve between said tank and the generator, said valve having leak ports, and opening to the tank when the pressure in the generator rises above the pressure in the supply pipe. 70

2. In a liquid fuel burning system, an injector burner, a steam generator connected to the burner, a water supply connection to the generator, a tank in said connection, and 75 a valve between the tank and the generator, said valve having leak ports, and opening to excess pressure in the generator.

3. In a liquid fuel burning system, an injector burner, means for supplying fuel thereto, a steam generator connected to the 80 burner, a water supply connection to the generator, a tank in said connection, and a valve between the tank and the generator, said valve having leak ports, and opening in the direction of the tank to excess pressure in the generator. 85

4. In a liquid fuel burning system, the combination with a water main, of an injector burner, means for supplying fuel thereto, a steam generator connected to the 90 burner, a supply connection to the generator from the water main, a tank in said connection, and a relief valve between the tank and the generator opening when the pressure in the generator exceeds the pressure in the water main. 95

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HOLMES DUKE.

Witnesses:

E. HUME TALBERT,
C. E. PREINKERT.