G. G. BAYNE.

HEATER FOR FREIGHT CARS.

APPLICATION FILED NOV. 21, 1914.

1,164,058.

Patented Dec. 14, 1915.

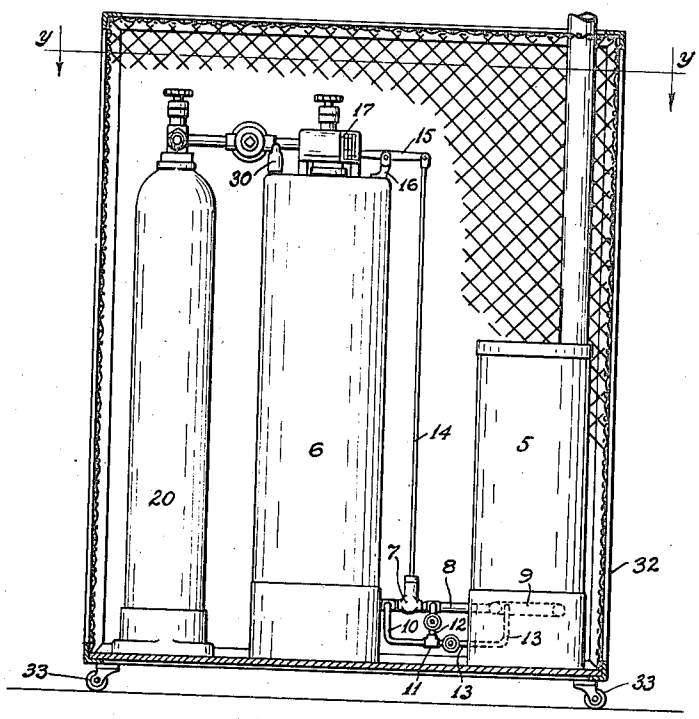


FIG. 1

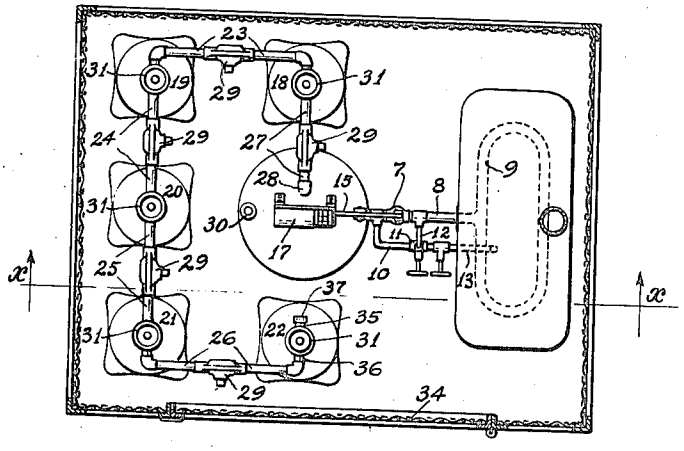


FIG. 2

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HEATER FOR FREIGHT-CARS.

1,164,058. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed November 21, 1914. Serial No. 873,268.

To all whom it may concern:

Be it known that I, GEORGE G. BAYNE, citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented a certain new and useful Improvement in Heaters for Freight-Cars, of which the following is a specification.

My invention relates to improvements in portable heaters, and the object of my invention is to provide a portable heating apparatus which shall embody a stove for burning fluid fuel, a tank for fluid fuel under low pressure, a desired number of containers adapted to hold a supply of fluid fuel under high pressure, reducing valves, and a thermostatically controlled valve, all of which devices shall be associated by suitable connecting pipes so that the rate of flow of fluid fuel from said gas tank to the point of combustion within said stove shall be changed automatically in response to slight changes in the temperature of the surrounding atmosphere and so that said containers shall be automatically controlled to permit the flow of their contents into said gas tank only when the pressure therewithin is lower than a desired predetermined degree and, further, so that a burning ignition jet of fluid fuel may be maintained in said gas stove if desired. I attain this object by devices illustrated in the accompanying drawings, wherein—

Figure 1 is a view in side elevation of some of the principal parts of my invention as disposed within a portable inclosure which is shown in vertical section on broken line x, x of Fig. 2, and Fig. 2 is a plan view of the chief parts of my invention as disposed in said portable inclosure which is shown in horizontal section on broken line y, y of Fig. 1.

Referring to the drawings, throughout which like reference numerals indicate like parts, the numeral 5 indicates a stove of any form of construction that may adapt it to burn fluid fuel, as volatile oils or gases and such stove 5 is connected with a tank 6 that is constructed to adapt it to serve as a chamber for containing fluid fuel under a comparatively low pressure and such tank 6 is connected through a thermostatically controlled valve 7 and a conducting pipe 8 with the burner tip 9 of said stove 5, which burner tip 9 is indicated by dotted lines in Figs. 1 and 2 and said tank 6 is also provided with another outlet passageway which serves as a by-pass around the valve 7, and which consists of a pipe 10 which leads to and connects with a T 11, from which T 11 extends a valve controlled pipe 12, that connects with the pipe 8, and a valve controlled pipe 13 which leads to the point of combustion adjacent to the burner tip 9 (as indicated by said dotted lines in Figs. 1 and 2), whereby fluid fuel may if desired, be permitted to flow from the tank 6 to the burner tip 9 without passing through the valve 7 and whereby fluid fuel may, if desired, flow directly from the tank 6 through the pipes 10 and 13 to the point of combustion to issue from the end of said pipe 13 in the form of a small jet that may be ignited to serve as a pilot lighter that may be caused to burn constantly thus immediately to ignite any fuel that may issue from the burner tip 9.

The valve-stem of the valve 7 is connected with a connecting rod 14 which extends upwardly and its upper end is articulated with one end of a lever 15 which is pivotally mounted to oscillate on a bracket 16 that is disposed on the top of the tank 6 and the other end of said lever 15 is associated with the mechanism of a thermostat 17, which mechanism may serve to oscillate said lever 15 to actuate the valve 7 to control the flow of fuel therethrough in response to variations in the temperature of the atmosphere to which the thermostat 17 is subjected.

I have not illustrated the plan construction of the thermostat 17 since one of the different well known forms of thermostats may be employed and since I make no claim of any particular form of thermostat.

A plurality of cylindrically formed containers 18, 19, 20, 21 and 22 are connected together, in series, by conducting pipes 23, 24, 25 and 26, respectively, as indicated in Fig. 2, and the container 18 forming one end of said series is connected by a conducting pipe 27 with an elbow 28 that communicates with the interior of the tank 6 through the top wall thereof and interposed in each of said conducting pipes 23, 24, 25, 26 and 27 is a reducing valve 29 of a well known form of construction.

Since the tank 6 is intended to contain fluid fuel under a low pressure only such tank 6 may be made of thin sheet metal that is strong enough to resist such low pressure

but in order to obviate injury to such tank 6 due to its accidental subjection to an abnormally high pressure I have provided a safety valve 30 which may be of any well known form and which is disposed to communicate with the interior of said tank 6 through its top wall as shown.

Each of the containers 18, 19, 20, 21 and 22 is designed to withstand a very high pressure and is constructed of thick sheet steel to be much smaller in diameter than the tank 6 whereby it is adapted to store fluid fuel under very high pressure, as, for instance, a pressure of twelve hundred pounds to the square inch, under which pressure each of such containers may have forced into it a quantity of fluid fuel which under a normal pressure would be in a gaseous form, but which under such pressure of twelve hundred pounds per square inch would be in liquid form and which quantity under such high pressure would contain a great number of thermal units. Each of said containers 18, 19, 20, 21 and 22 is provided with a hand operated valve, as valves 31, which valves 31 serve to control the passageway from its respective container into the respective ones of the conducting pipes 23, 24, 25, 26 and 27 and the pipe connections between adjacent ones of said containers 18, 19, 20, 21 and 22 and between the container 18 and the tank 6 are adapted to be connected and disconnected whereby any of them may be removed and replaced as may be desired, and such pipe connections include nipples extending one from each of opposite sides of each of the valves 31, like nipples 35 and 36, as shown more clearly on the container 22 in Fig. 2, and when a container is disposed at the end of the series of containers which is most distant from the tank 6, as, for instance, like the container 22 of Fig. 2, then one of said nipples, as, for instance, the nipple 35 has its open end closed by a cap 37.

All of the containers 18, 19, 20, 21 and 22 together with the tank 6 and the stove 5 are disposed within a portable inclosure 32 which is mounted on casters 33, which inclosure is provided with a door 34 and which is preferably made of woven wire, as shown, thus to permit a free escape of heated air to the surrounding atmosphere.

I have provided the stove 5 with a flue which may be extended to a point outside of the car or room to be heated, through which products of combustion may escape from said stove 5.

To prepare my heater for operation the containers 18, 19, 20, 21 and 22 are all disconnected and a cap, as cap 37, disposed on one of the nipples, as nipples 35, of each of said containers and the opposite nipple, as the nipple 36, is connected to a pipe leading to a pump or source of supply of fluid fuel and by such pump or other suitable means fluid fuel, as, for instance, an inflammable gas is forced within the container until the pressure therein is of a desired high degree or until such gas becomes liquefied whereupon the valve 31 is closed and when all the containers are so charged they may be replaced within the inclosure 32 and connected in association with the reducing valves and gas tank 6, as shown in Fig. 2, and then the inclosure 32 is rolled to a desired position within a freight car or room to be heated.

The operation of the heater may be described as follows: The reducing valves 29 are each adjusted to reduce the pressure from any degree of high pressure to a desired low pressure, as, for instance, four pounds to a square inch. Thus if each of the containers 18, 19, 20, 21 and 22 be charged at a pressure of twelve hundred pounds then the reducing valve 20 between the container 18 and the tank 6 will operate to permit the flow of fluid fuel from the container 18 into the tank 6 only when the pressure within said tank 6 is at a desired pressure, as for instance, four pounds or at a pressure less than four pounds, and, therefore, when the tank 6 is charged at a pressure of four pounds the reducing valve 29 will interrupt the flow of fluid fuel into said tank 6.

The tank 6 being charged at the pressure of four pounds the valve in the pipe 13 is opened and the jet of fluid fuel which will then issue from its end adjacent to the burner tip 9 may be ignited to serve as a pilot lighter and if the temperature to which the thermostat 17 is subjected be lower than required such thermostat 17 (being adjusted to operate at a desired predetermined degree of temperature) then such thermostat 17 will actuate the lever 15 to cause the connecting rod 14 to open the valve to admit fluid fuel into the pipe 8 from the tank 6 to supply the burner tip 9 whereupon such fluid fuel issuing from the burner tip 9 will be ignited by the pilot lighter, and the stove 5 will then heat the surrounding atmosphere to the required temperature, but if the surrounding atmosphere becomes warmer than the desired predetermined degree for which the thermostat 17 is, then, in such case, said thermostat 17 will actuate the lever 15 to decrease the flow of fluid fuel through the valve 7 to the burner tip 9, or wholly interrupt such flow as required; thus any variation in the temperature of the surrounding atmosphere will vary or interrupt the flow of fluid fuel through the valve 7.

As the fluid fuel flows from the tank 6 to be consumed by the stove 5 the pressure in said tank 6 will tend to decrease below four pounds but the reducing valve 29 upon the beginning of such decrease will be actuated to admit more fluid fuel from the container 18 thus to maintain the pressure of four pounds

per square inch in the tank 6 and when the quantity of fluid fuel within the container 18 is reduced to such point that the pressure therein is four pounds or less then the reducing valve 29 interposed in the pipe 23 will be actuated to admit fluid fuel from the container 19 into the container 18; and when the pressure in the container 19 is reduced to four pounds or less then the reducing valve 29 interposed in the pipe 24 will operate to permit fluid fuel to flow from the container 20 into the container 19 and in a like manner the fluid fuel contained in containers 21 and 22 will be permitted successively to flow toward the tank 6.

The pressure in the container 19 will not be changed from its initial pressure of twelve hundred pounds per square inch until the pressure in the container 18 is four pounds per square inch or less and the initial pressure in the container 20 will not be changed until the pressure in the container 19 is four pounds per square inch or less and the initial pressure in the container 21 will not be changed until the pressure in the container 20 is four pounds per square inch or less and the initial pressure in the container 22 will not be changed until the pressure in the container 21 is reduced to four pounds per square inch or less and when the initial pressure in the container 22 is reduced to four pounds per square inch or less then all the containers may be disconnected and recharged and then again connected in the manner shown in Fig. 2 to be ready for further operation.

The valve 12 controlling a bypath for fluid fuel around the valve 7 may be operated by hand, if it be desired to heat the surrounding atmosphere to a higher temperature than that degree for which the thermostat 17 is adjusted.

Of course any number of containers may be connected in series or only one container as the container 18 may be employed when the stove is to be operated for a correspondingly shorter period of time, and the form of the portable inclosure 32 may be modified to suit different conditions of use, and, if desired, pressure gages may be connected with the tank 6 or with the pipes extending between adjacent ones of the containers 18, 19, 20, 21 and 22 whereby to indicate the pressure within said tank and said container.

Manifestly, changes may be made in the forms and dimensions of the different parts of my invention without departing from the spirit thereof.

What I claim is:

1. In a heater of the class described, the combination with a stove adapted to burn fluid fuel, of a tank adapted to contain fluid fuel under a desired low operating pressure, a thermostatically controlled passageway for fluid fuel leading from said tank to the burner of said stove; a burner tip for a pilot light disposed adjacent to said burner of said stove; a valve controlled passageway leading from said tank to said burner tip of said pilot light; a valve controlled bypath forming an independent passageway between said tank and said burner of said stove; a safety valve associated with said tank and adapted to operate when the pressure within said tank is increased to a predetermined degree; a container adapted to contain fluid fuel under a high pressure; a pipe for conducting fluid fuel from said container to said tank; and a reducing valve interposed in said pipe whereby the pressure in said tank may not be increased above a desired predetermined degree by the flow of fluid fuel from said container into said tank.

2. A heater of the class described, embodying a fluid fuel burner, a stove inclosing said burner, a tank for fluid fuel, a thermostatically-controlled passageway extending between said tank and said burner, an independent valve controlled passageway connected to the aforesaid passageway for feeding fluid fuel from said tank to said burner, a pilot burner tip disposed adjacent to said burner, a second independent valve controlled passageway for fluid fuel extending between the second named passageway and said pilot burner tip.

In witness whereof, I, hereunto subscribe my name this second day of November A. D., 1914.

GEORGE G. BAYNE.

Witnesses:
FRANK WARREN,
A. HASKINS.