March 17, 1931. A. T. SCHMIDT 1,796,767

VAPOR STOVE

Filed Aug. 24, 1926 3 Sheets-Sheet 1

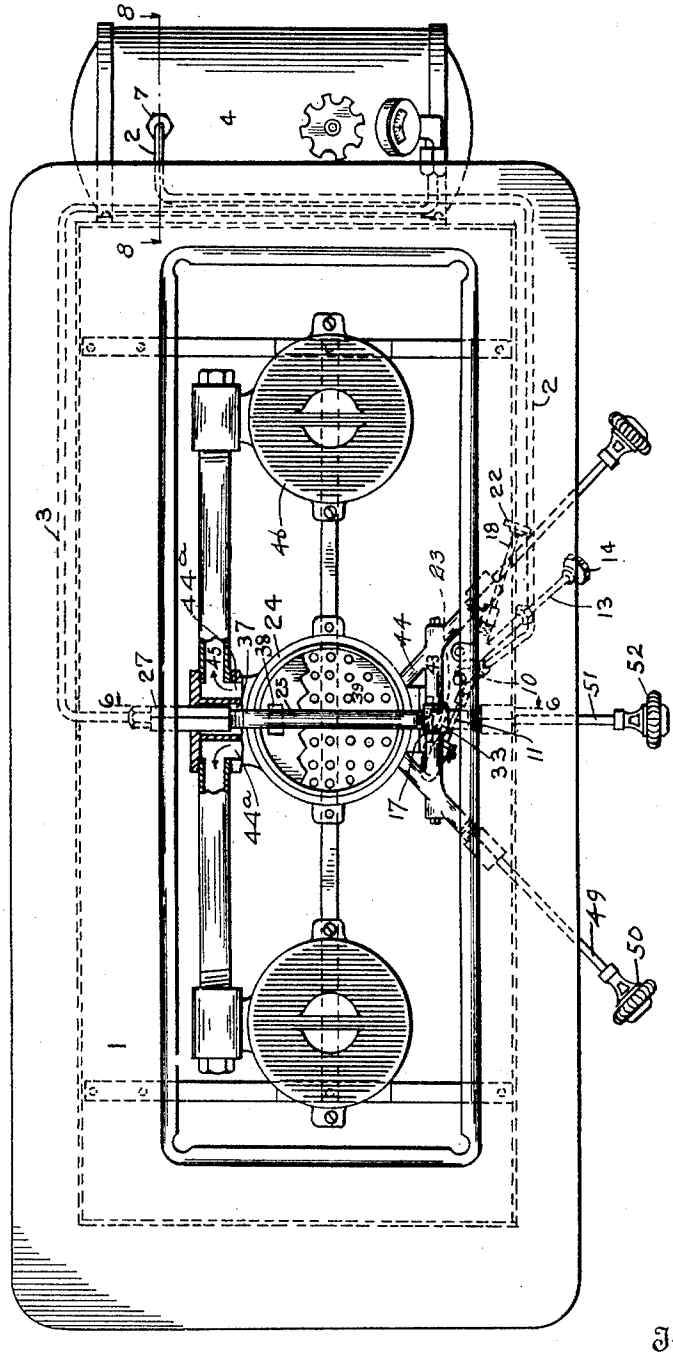

Fig. 1

Inventor
Adolph T. Schmidt
By his Attorney S. J. Cox.

March 17, 1931. A. T. SCHMIDT 1,796,767

VAPOR STOVE

Filed Aug. 24, 1926 3 Sheets-Sheet 2

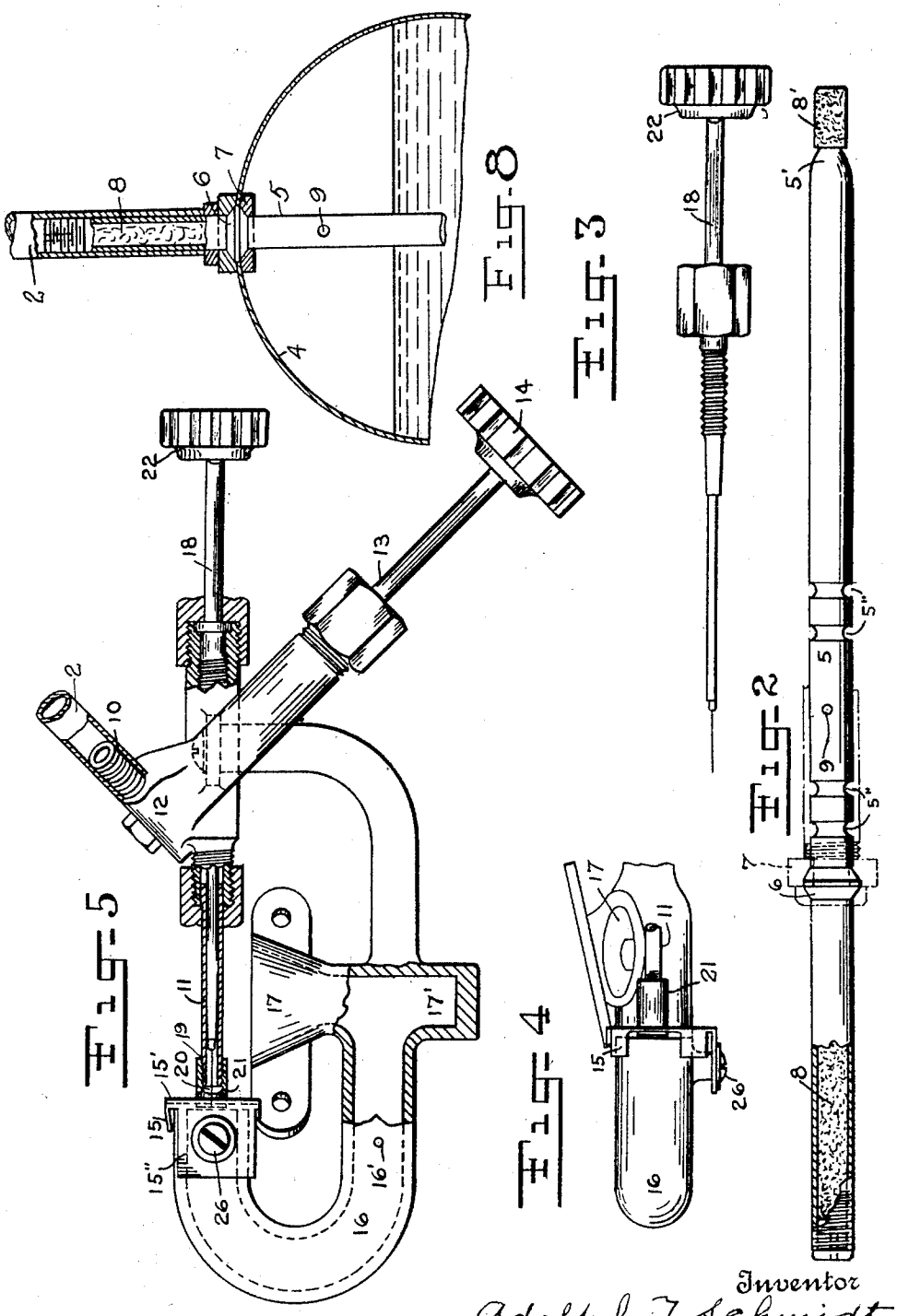

Fig. 8

Fig. 3

Fig. 2

Fig. 5

Fig. 4

Inventor
Adolph T. Schmidt
By his Attorney S. J. Cox.

March 17, 1931. A. T. SCHMIDT 1,796,767

VAPOR STOVE

Filed Aug. 24, 1926 3 Sheets-Sheet 3

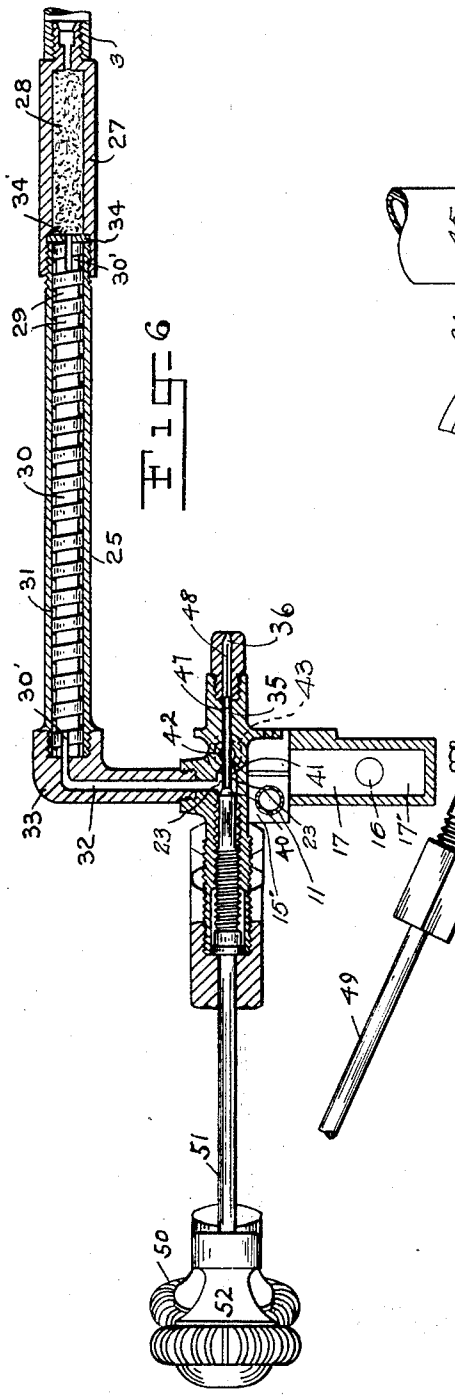

Fig. 6

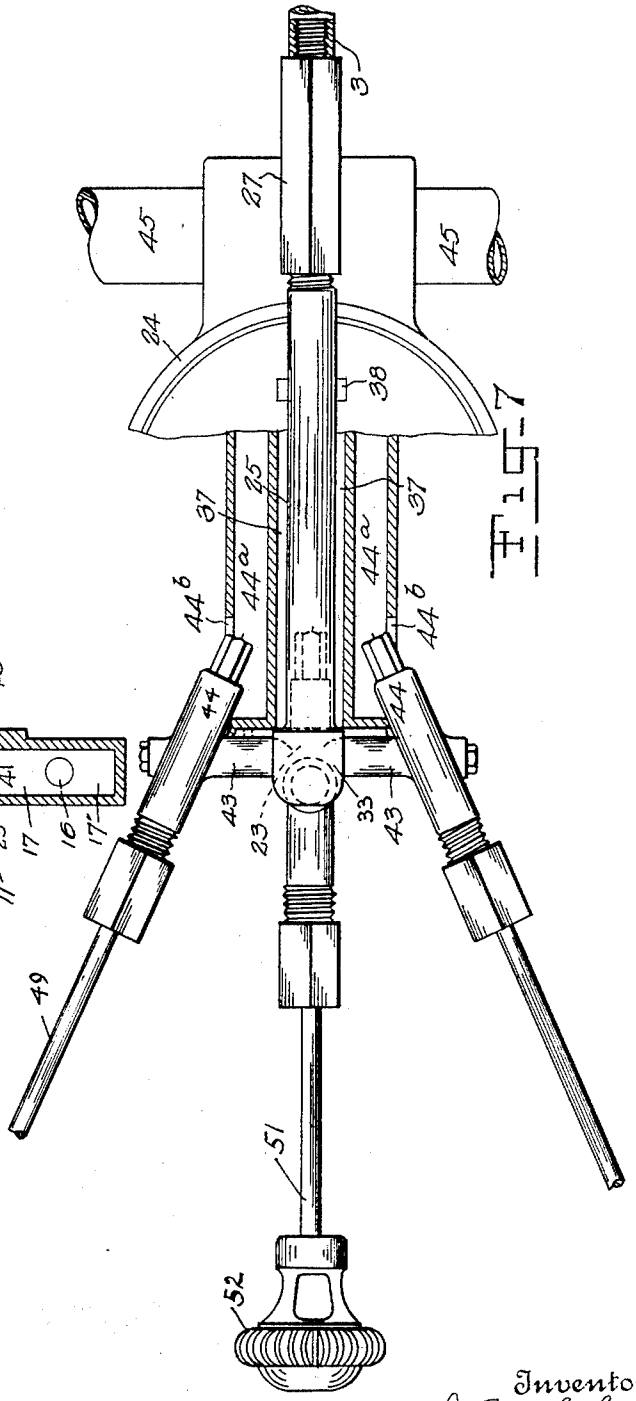

Fig. 7

Inventor
Adolph T. Schmidt
By his Attorney S. J. Cox.

Patented Mar. 17, 1931 1,796,767

UNITED STATES PATENT OFFICE

ADOLPH T. SCHMIDT, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO A. J. LINDEMANN & HOVERSON COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN

VAPOR STOVE

Application filed August 24, 1926. Serial No. 131,200.

The improvements relate primarily to stoves adapted to utilize light hydrocarbons as fuel in which the fuel is pre-heated and vaporized before delivery to the burner to support the combustion, and their objects are, among others, to provide simple, safe and effective means for lighting the burners and for vaporizing and distributing the fuel to the lighter and burners.

The improvements are illustrated in the accompanying drawings, in which Figure 1 is a top plan view of a stove with the grids and central portion of the top removed and certain portions of the other parts broken away; Figure 2 is an elevation, with one end portion in longitudinal section, of the vapor generator and transmitter for the lighter, removed from the tank or reservoir; Figure 3 is an elevation of the needle clean-out and regulator for the lighter supply conduit, removed; Figure 4 is a top view of the lighter mixing device detached with parts broken away; Figure 5 is a side view of the lighting device with its valve, mixer and other accessories, portions being broken away; Figure 6 is a longitudinal medial section substantially on the line 6—6 of Figure 1, showing the main valve for controlling the supply of fuel to the burners, the vaporizer strainer and regulator therefor and parts of the lighter burner in section; Figure 7 is a plan of some of the parts shown in Figure 6 and auxiliary valves associated with the main valve for controlling the supply of vaporized fuel to secondary burners, showing also the burner conduits partly in section with the main burner broken away. Fig. 8 is a section of reservoir 4 taken on line 8—8 of Fig. 1, parts being broken away.

The top of the stove 1 may be of any suitable construction, and has attached to the underside thereof and supported thereon fuel supply tubes 2 and 3 leading to the tank or reservoir 4 and supplying fuel for the lighter and the burner combustion respectively.

The vaporizing and vapor transmitting device for the lighter is mounted on the reservoir and extends down to the bottom thereof. It consists of a rigid metallic tube 5 provided with a gasket 6, by which it may be supported in a sleeve (not shown) projecting from the top of the tank and receiving a threaded nut 7 by which said gasket may be securely clamped against the top of the sleeve and made to form an air tight closure, as indicated in Figure 2, a filling of absorbent material 8 extending through said tube 5, and having a portion 8′ projecting beyond its lower contracted end 5′. The tube 5 has a small opening 9, which will be located in the upper part of the reservoir, above the level of liquid fuel therein, to receive air pressure from the interior of said reservoir, and the reservoir is provided with any suitable means for creating air pressure therein and for maintaining an air cushion at its upper part which will prevent the level of liquid from rising above the air intake 9. By this provision and arrangement the liquid fuel absorbed by the projecting portion 8′ of the wick member is carried up through the tube 5 in limited quantity and in a finely divided state, is prevented from accumulating to form a body of liquid therein, and is placed under fluid pressure entering freely at the opening 9, to force the said fuel, as a vapor, to and through the conduit 2. The conduit 2 leads to the union 10 through which the liquid and vapor passes to the tube 11 (Fig. 6) under the control of the valve 12 operated by the stem 13 and wheel 14. To regulate the flow of the vapor to the mixer 15, and thence through the large conduit 16 to the lighting burner 17, a stem 18 extending through the tube and having a needle 19 at its inner end, is provided. The needle enters an orifice 20 in the hollow block 21, and under the control of the operator through the wheel 22, regulates the escape of the vapor from the tube 11 and also frees the small passage 20 of carbon or other foreign matter tending to clog the same.

To ignite the lighter the valve 12 is opened, permitting a small quantity of vapor, to pass to the lighting burner 17, and a lighted match or the like applied to the mouth of this burner. The flame issuing from the lighting burner 17 heats the vapor or liquid, in the small chamber 23 (Fig. 6) of the primary burner valve 40 and causes it to issue thence to the burner or burners in communication

therewith and to furnish them with fuel under sufficient pressure to support combustion until the heat of the middle or primary burner 24 raises the temperature of the pre-heating chamber 25 and causes a sufficient supply of vapor under pressure to support full combustion in all burners to issue therefrom. The valve 12 may then be closed to extinguish the lighter.

The mixer 15 for the lighting burner may be of any serviceable construction, but as here shown, consists of a shutter 15′ covering the mouth of the conduit 16 and a plate 15″ controlled by a set screw 26, so that it may be moved toward or from the said mouth to regulate the volume of air admitted for admixture with the vapor. The manufacturer can adjust this shutter so as to provide a proper air supply and it need not thereafter be adjusted. The bowl 17′ at the bottom of the lighting burner will catch and hold condensed vapor, which will be consumed when the said burner is lighted and a small vent 16′ in the conduit 16, just above the level of the bowl, provides an overflow, which will prevent the accumulation of a large volume of fuel in the lighter, permitting it to escape therefrom very slowly. This provision, however, is not required except in very unusual circumstances.

From the foregoing description of the lighting device it will be seen that only a very small quantity of fuel is permitted to pass from the tank to the lighter; that this fuel is carefully regulated and controlled and safeguarded against all conditions tending to cause undesirable results; and that the parts controlling the lighter and its fuel supply are all fixed in position and so constructed and arranged that they cannot accidentally give rise to anything but the production of the flame required for the lighting of the burners. It will also be seen that the lighting operation requires only the turning of a valve and the application of a match, and can be performed safely by any person of ordinary intelligence, and without knowledge of the construction or operation of the parts or the explosive character of the fuel.

The tube 5 is preferably provided with annular grooves 5″, by peening, or otherwise, to compress the absorbent therein and control the fluid passing therefrom and mixing with the compressed air admitted thereto, so that a combustible and not over saturated mixture is supplied to the lighter.

The fuel supply pipe 3 leads to the tubular chamber 27 filled with an absorbent 28, and the fuel passes through said pipe and to and through the said chamber under the pressure of the reservoir, thence through the spiral channel 29 formed by the grooved rod 30 in the tube 31, through the curved bore 32 in the connecting member 33 down to the chamber 23, from whence it passes to the burners. The tube 31 is threaded into the forward end of the absorption chamber 27, and presses against a disc 34 in the enlarged threaded end of said chamber to compress and hold under compression the absorbent 28, the disc being clamped in position by the end of said tube. The disc 34 has a central opening 34′ for the passage of the fuel to the spiral channel 29, and the rod 30, in which the spiral groove is formed, has its ends split, as indicated at 30′ to admit the fuel to said groove at one end and permit it to pass out at the other. As indicated in Figure 1, the tube 31, defining pre-heating chamber 25, extends over the top of the central burner 24, and is therefore exposed to the heat of the burner which causes the fuel passing through it to be thoroughly vaporized and pre-heated and raises its pressure to a degree sufficient to force it into the burner.

The entrance chamber 23 communicates through the bore 35 with the nozzle 36 which discharges the vaporized fuel into the conduit 37, from whence it passes through the inlet 38 to the bottom of the burner 24, issuing thence through the perforated diaphragm 39 through the slitted cap or cover of that burner, the said burner being provided with a cap similar to the other burners but not shown in the drawings. The perforated diaphragm 39 is supported above the bottom of the burner bowl so that a space is provided beneath it for the even distribution of the vapor fuel.

The valve plug 40 seats at 41 and controls the supply of vapor to all the burners, to the middle or primary burner through the nozzle 36 and to the other burners through the lateral conduits 42 in the branch pipes 43 which communicate with the valve controlled conduits 44 leading to the ducts 44ª through air ports 44ᵇ therein. As clearly seen in Figs. 1 and 7, said ducts 44ª communicate with tubes 45 which conducts the fuel thence to the bottoms of the side burners, which are provided with the usual slitted caps 46. It will be seen therefore that the valve 40, 41 controls the supply of vapor to all the burners. This valve is provided with a stem 47 extending beyond the plug, and at the end of this stem is a needle 48 for cleaning out the nozzle 36. The valves controlling the flow of vapor through the conduits 44, 44ª, and 45 are of substantially the same construction as the main valve, and are provided with nozzles similar to 36 and stems and needles similar to 47 and 48. They are controlled by rods 49 and handles 50 and the main valve is operated by the rod 51 and handle 52. These valves and the parts connected therewith are of ordinary construction, and serve to control the flow of fuel, so as to regulate the flame of the burners, by regulating the size of the valve orifice and also by restricting the nozzle opening by means of their needles, in the

usual manner, and it will be seen that the flame of the primary burner may be greatly reduced without cutting off the supply of vapor to the other burners or reducing it to any material extent.

The stems 49 of the valves controlling the supply of fuel to the side burners are disposed at an angle of approximately 45 degrees to the stem of the main valve, and are of sufficient length to bring their handles 50 to a position opposite their respective burners at the front of the stove. In this manner it is possible to have the valves located centrally and their operating wheels located substantially in line with the burners controlled thereby, so that there can be no mistake on the part of the operator as to which burner is controlled by each valve wheel, which might occur if the controls were all grouped at the center of the stove.

In operating the stove the lighter valve is first opened and the lighting burner ignited to heat the main vapor supply conduits of the burners, and on account of the construction and arrangement of the present improvements this is easily accomplished, and the operation of the lighter at the front of the stove is easily observed. The main valve is then opened and the central burner lighted. The valves for the side burners may then be opened and these burners lighted, or one of the side burners only may be lighted. After this is done the combustion of all three burners may be shut off by the main valve or regulated separately through the respective valves, the positions of the valves indicating at all times which one is to be manipulated to control the combustion of any one of the burners.

I claim:

1. The combination of a liquid fuel reservoir, a plurality of burners including a main burner, a fuel supply pipe leading from said reservoir to said main burner, and a plurality of ducts for supplying fuel to said burners, said ducts communicating with said pipe and extending from front to back of said main burner and in close proximity thereto, a single valve controlling the flow of fuel from said pipe to the ducts, and a laterally extending valve means additionally controlling said flow to one duct.

2. In a vapor stove, a plurality of spaced burners, a fuel supply pipe, a valve thereon, ducts leading from said pipe to the burners and passing from front to back of one of said burners, valves at the front of said last-named burner controlling the fuel supply to each burner, said valves having operating rods extending outwardly to positions opposite their respective burners.

3. In a vapor stove, the combination of a plurality of burners spaced apart, a fuel supply conduit extending over one burner, a fuel reservoir, a valve for controlling the flow of fuel to said burners after said fuel passes over said burner and separate conduits leading from said valve to each of said burners, said separate conduits extending across and beneath one of said burners in proximity thereto, and a separate control device for one of said burners, said device including a valve rod extending to a point opposite such burner.

Witness my hand this 31st day of July, 1926, at the city of Milwaukee, in the county of Milwaukee, State of Wisconsin.

ADOLPH T. SCHMIDT.