Jan. 21, 1941. W. J. CLEMENTS 2,229,277

STOVE

Filed Oct. 14, 1938

Fig. 1

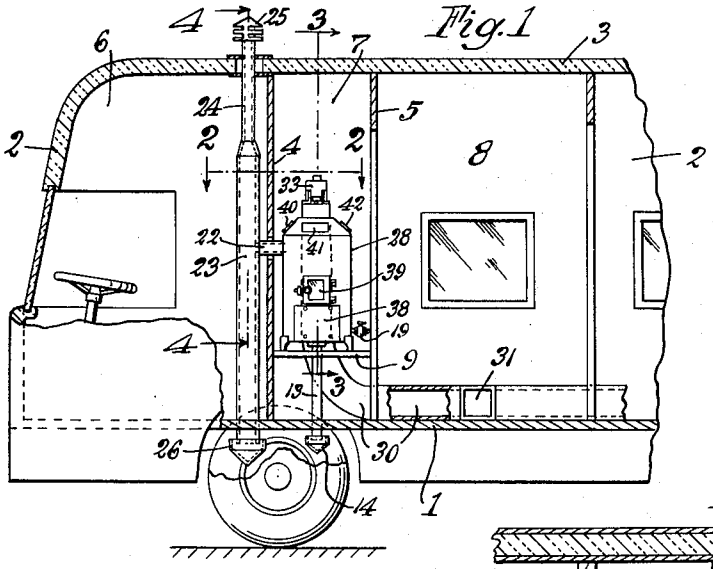


Fig. 4

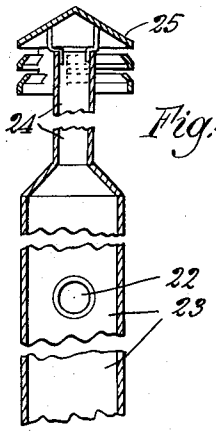


Fig. 2

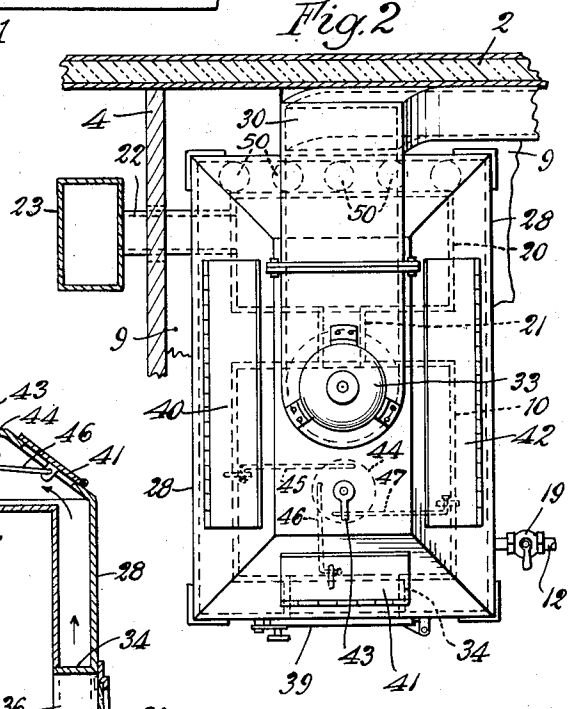
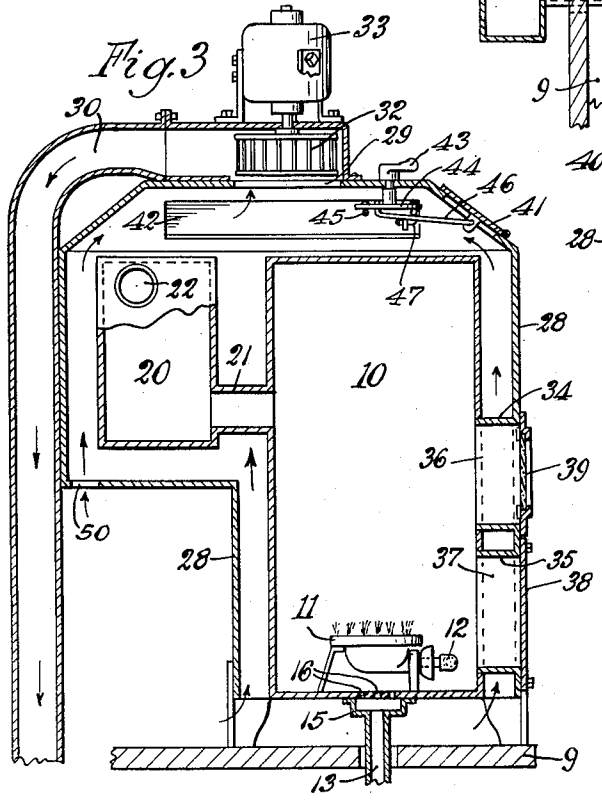


Fig. 3



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UNITED STATES PATENT OFFICE

2,229,277

STOVE

William J. Clements, Chicago, Ill., assignor to Clements Mfg. Co., Chicago, Ill., a corporation of Illinois

Application October 14, 1938, Serial No. 234,977

5 Claims. (Cl. 237—30)

My invention relates to improvements in stoves or heaters for vehicles and the like, and has for one object to provide a new and improved form of stove which will have maximum efficiency, be light and easily installed, and in which the danger of fire and explosion is reduced to a minimum.

Other objects will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawing wherein:

Figure 1 shows a longitudinal part section of an automotive vehicle with my stove installed;

Figure 2 is a section along the line 2—2 of Figure 1 on an enlarged scale;

Figure 3 is a section on the line 3—3 of Figure 1 on an enlarged scale; and

Figure 4 is an enlarged fragmentary section on the line 4—4 of Figure 1.

Like parts are indicated by like characters throughout the specification and drawing.

Referring to the drawing, an automotive vehicle has a supporting frame 1, an outer wall 2, a roof 3, and partitions 4 and 5. The partition 4 defines a driver's compartment 6. Between the partitions 4 and 5 is the stove or heating compartment 7. This compartment 7 is open through apertures or doors as indicated to the rear compartment 8. 9 is a shelf supported between the partitions 4 and 5 upon which rests my stove or heater.

The stove or heater includes a rectangular sheet metal combustion chamber 10. In the bottom of this chamber is a burner 11 supplied with gas or other fuel from any suitable source of supply through the pipe 12. 13 is a duct adapted to admit cold air to support combustion. This duct terminates in a hood 14 outside the body of the vehicle and extends up through the vehicle floor through the shelf 9 to terminate in a chamber 15 beneath the floor of the combustion chamber. Apertures 16, 16 lead up from the chamber 15 through the floor of the combustion chamber immediately beneath the burner 11, or a single larger aperture may be used. The burner 11 may be of any suitable type and may be employed with any suitable fuel, gas, liquified hydrocarbon or the like. The flow of fuel and thus the height of the flame may be controlled by any suitable valve means 19.

20 is a rectangular heat transfer box. It is adjacent the upper portion of the combustion chamber 10 and is connected thereto by means of a flue 21 which leaves the combustion chamber at a point intermediate its top and bottom and communicates with the box 20 at a point adjacent its bottom. 22 is a flue discharging from the box 20 to the vertical chimney drum 23. This chimney drum is located in the driver's compartment 6. It discharges at its upper end into a smoke pipe 24 extending upwardly through the roof of the vehicle and provided with a draft hood 25. A cold air duct extends upwardly from a draft hood 26 through the floor of the vehicle and connects with the chimney drum.

Whereas in the drawing the passages or pipes 23 and 24 are shown of different dimensions, it will be understood that they are preferably of the same capacity, the top section 24 being understood to be flattened but to have the same cross sectional area as the rounded part 23. It will be understood, of course, that the details, shapes and dimensions of the composite flue, chimney or passage member thus provided may be varied. The flue 22 communicates with the chimney drum at a point intermediate its two ends.

The combustion chamber 10 and the heat box 20 are both enclosed in a jacket or casing 28. This jacket or casing is open at the bottom around the combustion chamber and is expanded laterally to include the heat chamber 20, so that cold air which enters the jacket at the bottom must pass upwardly around the combustion chamber, then laterally and upwardly around the heat chamber, and may be discharged through the opening 29 at the top of the jacket. This opening communicates with the hot air duct 30 which extends down along the outside of the jacket and rearwardly along the floor of the vehicle, being provided with hot air discharge ports 31. Any suitable means such as the apertures 50 may be employed to permit additional cold air to flow into the space about the heat box 20.

32 is a fan in line with the aperture 29 and adapted to draw hot air out of the space within the furnace jacket and discharge it through the heat duct 30. 33 is the motor adapted to operate the fan.

Sleeves 34 and 35 extend outwardly from apertures 36 and 37 in the wall of the combustion chamber through the air duct. Sleeve 35 and aperture 37 are closed by a removable sheet 38 bolted in position, and sleeve 34 and aperture 36 by a hinged inspection door 39. Through these two doors access may be had to the combustion chamber for purposes of inspection, lighting, maintenance and repair, the door 39 being translucent or transparent, which makes it possible

to inspect the burner and its operation under ordinary operating conditions.

The outer casing 28 contains at front and on both sides, above the combustion chamber, shutters 40, 41 and 42, closing apertures through which warm air may escape. 43 is a handle pivoted in the upper wall of the casing 28, carrying a disc 44 to which are connected by means of links 45, 46 and 47 the shutters 40, 41 and 42, so that rotation of the handle 43 may open these shutters when it is desired to get a direct flow of air into that part of the vehicle immediately adjacent the stove. By varying the degree of opening, the proportionate amount of hot air discharged through the duct and through the apertures may be controlled, so as to adjust and control the operation of the heating plant insofar as the transmission of hot air is concerned.

The chimney drum 23 serves to heat the driver's compartment 6.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawing to be taken as in a broad sense illustrative and diagrammatic, rather than as limiting me to my precise showing.

The use and operation of my invention are as follows:

I find the stove or heating unit herein described particularly adaptable to vehicles, for example trailers, although it may be applied to other uses. In use, cold air to support combustion flows through the duct 13. As a practical embodiment of my invention I run the duct through the bottom 1 of the trailer, providing a dust preventing hood 14. No valve or shutter is needed in the duct 13 since the draft is controlled by and is responsive to the volume of fuel being burned in the burner 11. As the amount of fuel is increased and the flame becomes larger, a larger volume of air flows upwardly through the duct 13 or, in other words, the inward flow of air through the duct 13 is increased.

The chimney duct 23, 24 is open both at top and bottom. The heated by-products of combustion flow upwardly and outwardly through the passage 24. Since the passages 23 and 24 both communicate with the exterior, the former below the vehicle and the latter above, the draft is unaffected by wind or by the speed of the vehicle, and in practice the draft is completely controlled by controlling combustion in response to the control of the volume of fuel admitted past the valve 19 to the burner. No air controlling damper is needed and the fuel consumption regulates the draft.

The shutters 40, 41 and 42 are effective to permit the controlled escape of hot air into the general space surrounding the stove. When the fan 32 is not in operation, heated air will not circulate through the hot air outlet 30. When the hot air circulating system proper is not in operation and the fan is off, a certain amount of heated air may be permitted in controlled volume to the interior of the trailer or conveyance in which the stove is mounted by opening the shutters 40, 41 and 42 and permitting the heated air to flow directly into the room.

The aperture 50 is disposed in the horizontal closing at the bottom of the heat transfer chamber 20 so as to insure adequate circulation of air thereby.

I claim:

1. In combination with a movable vehicle, a chimney extending from top to bottom of said vehicle and having openings in communication with the atmosphere at top and bottom, a stove including a combustion chamber and means for burning fuel therein, an air inlet passage extending from the exterior of the vehicle to said combustion chamber, a passage extending from the combustion chamber to said chimney intermediate the ends of the chimney, an air jacket surrounding said combustion chamber and including air inlet means whereby air from within said vehicle may pass into the space within said jacket and about said combustion chamber, a hot air delivery duct and means for delivering air from said space to said duct, said duct being provided with one or more air outlet openings remote from said combustion chamber.

2. In combination with a movable vehicle, a chimney extending from top to bottom of said vehicle and having openings in communication with the atmosphere at top and bottom, a stove including a combustion chamber and means for burning fuel therein, an air inlet passage extending from the exterior of the vehicle to said combustion chamber, and a passage extending from the combustion chamber to said chimney intermediate the ends of the chimney.

3. In combination with a movable vehicle, a chimney extending from top to bottom of said vehicle and having openings in communication with the atmosphere at top and bottom, a stove including a combustion chamber and means for burning fuel therein, an air inlet passage extending from the exterior of the vehicle to said combustion chamber, a passage extending from the combustion chamber to said chimney intermediate the ends of the chimney, an air jacket surrounding said combustion chamber and including air inlet means whereby air from within said vehicle may pass into the space within said jacket and about said combustion chamber, a hot air delivery duct and means for delivering air from said space to said duct, said duct being provided with one or more air outlet openings remote from said combustion chamber, and a fan adapted to draw hot air through said hot air delivery duct, and means for actuating it.

4. In combination with a movable vehicle having a plurality of compartments and partitions separating them, a heating unit located in one such compartment and including a combustion chamber and a surrounding housing spaced therefrom, a chimney located in another such compartment and extending from bottom to top of the vehicle and having connections with the atmosphere at the top and bottom thereof, an exhaust passage extending from said combustion chamber to said chimney intermediate top and bottom of the chimney, and means for delivering hot air from the interior of said housing to the interior of the vehicle.

5. In combination with a movable vehicle, a heating unit including a combustion chamber and a heat transfer chamber located at one side thereof, said combustion chamber having substantially greater vertical extension than the heat transfer chamber, the heat transfer chamber being located at the level of an upper portion of the combustion chamber, a housing surrounding said two chambers and spaced therefrom, said

housing including an open bottom portion surrounding the bottom portion of said combustion chamber, and a generally horizontal closure portion underlying the bottom of said heat transfer chamber, the said horizontal closure portion being apertured in line with the space between said heat transfer chamber and an adjacent wall of said housing, said housing including a cover portion overlying both said chambers, said cover portion being provided with hot air outlet passages, and means for controlling the passage of air therethrough.

WILLIAM J. CLEMENTS.