Feb. 11, 1958 V. C. HINES 2,822,800

COMBINED PORTABLE SPACE HEATER AND VENTILATOR

Filed Nov. 9, 1954 2 Sheets-Sheet 1

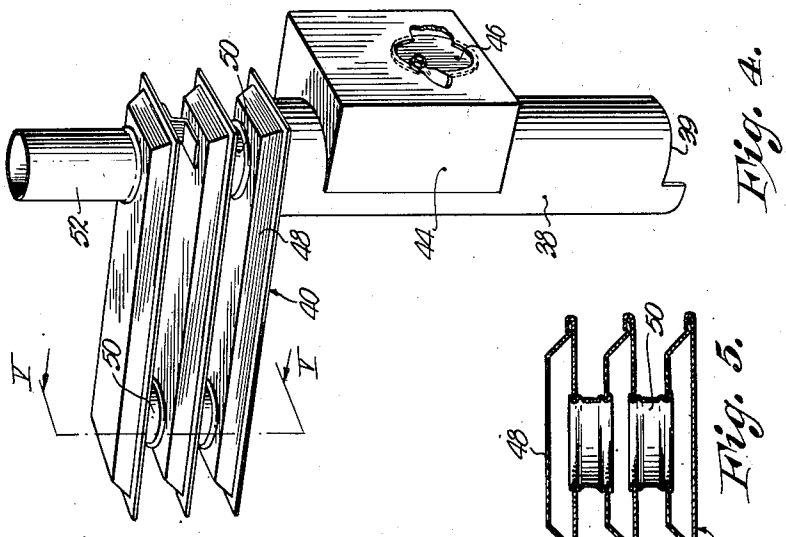


Fig. 4.

Fig. 5.

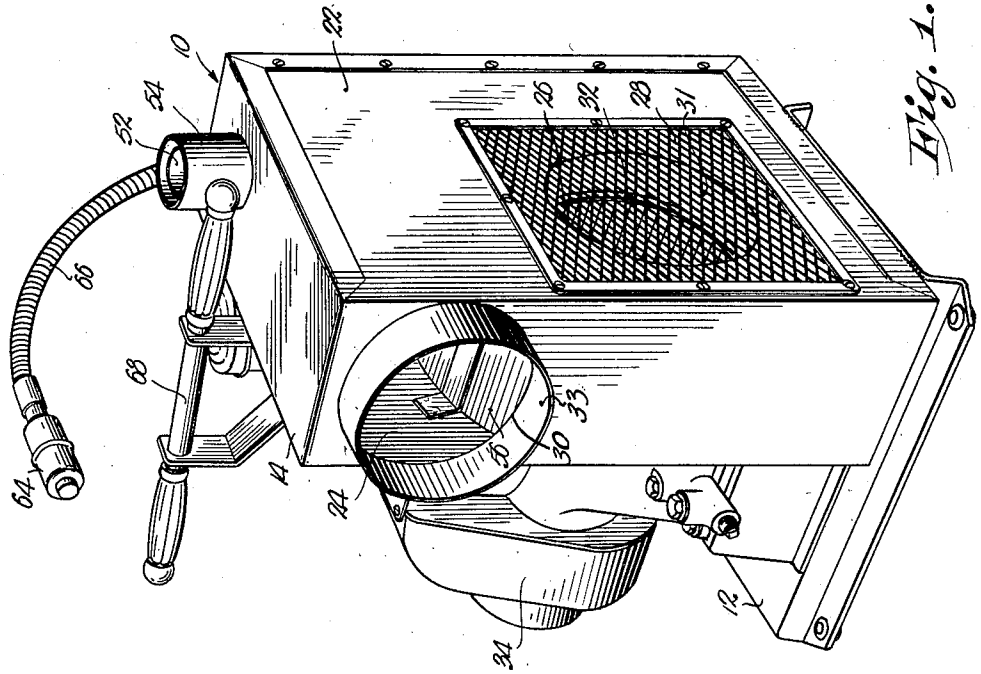


Fig. 1.

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2 Sheets-Sheet 2

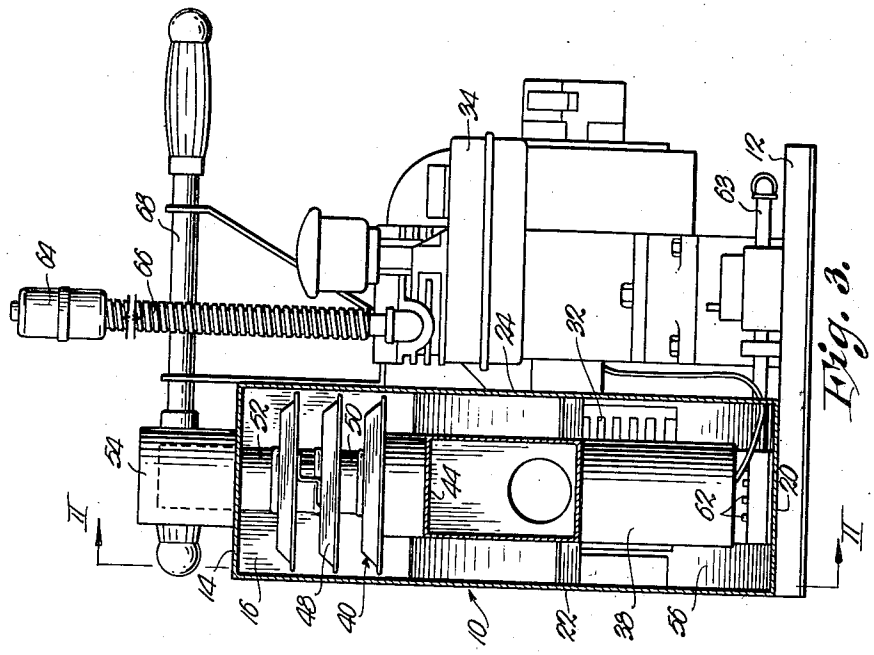


Fig. 3.

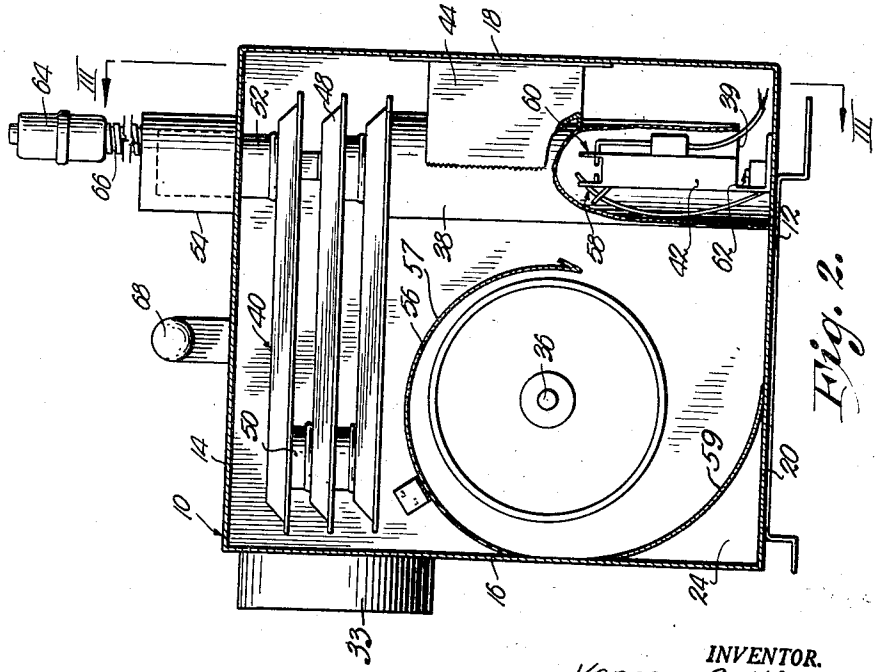


Fig. 2.

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2,822,800

COMBINED PORTABLE SPACE HEATER AND VENTILATOR

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Application November 9, 1954, Serial No. 467,773

2 Claims. (Cl. 126—110)

This invention relates to a portable combination space heater and ventilator and is particularly adapted for use wherever workmen must be subjected to discomfort because of heat, cold or poor circulation such as in manholes within canopies or tent-like protectors employed by linemen on telephone poles and the like.

It is the most important object of the present invention to provide a portable apparatus of the aforementioned character including a casing wherein is housed a heater and a heat exchanger, together with blower means for directing artificial currents of air across the heater and the exchanger and thence from the casing to a point of use by way of suitable conduits where the workmen may be made more comfortable during the time of the particular job with which they are confronted.

Another important object of the present invention is to provide a heater and ventilator having parts so arranged that maximum absorption of heat by the air is effected so that with but a relatively small burner spaces within which workmen must be confined can be heated to a comfortable working temperature.

Additional objects include many important details of construction to be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawings, wherein:

Figure 1 is a perspective view of a combined portable space heater and ventilator made pursuant to the present invention.

Fig. 2 is a vertical, cross-sectional view taken on line II—II of Fig. 3.

Fig. 3 is a vertical, cross-sectional view taken on line III—III of Fig. 2.

Fig. 4 is a perspective view of the combined heater, heat exchanger and flue entirely removed from within the casing; and

Fig. 5 is a cross-sectional view taken on line V—V of Fig. 4.

A hollow casing **10** mounted on a suitable base **12** has a top wall **14**, end walls **16** and **18**, a bottom wall **20** and a pair of side walls **22** and **24**. An inlet opening **26** in the side wall **22** may be covered with a suitable screen or the like **28** and communicates with a tubular sleeve **31**, an outlet opening **30** in the end wall **16** having a tubular flange **33** in circumscribing relationship thereto adapted to receive suitable conduits (not shown) for conveying currents of air developed by blower **32** to a point of use. Blower rotor **32** housed within the casing **10** is driven by a suitable prime mover such as an internal combustion engine **34** (mounted on base **12**), through a horizontal shaft **36**.

A tubular, upright heater **38**, open as at **39** and a heat exchanger **40** are mounted in the casing **10** in the manner shown by Figs. 2 and 3, with the heater **38** next adjacent the end wall **18** and with the heat exchanger **40** in overlying relationship to the blower rotor **32**, as well as in direct alignment with the outlet opening **30**. A fuel burner **42** is mounted within the heater **38** on the bottom wall **20** and is rendered accessible through a hollow side box **44** communicating with the heater **38**. Door **46**, in the box **44** accessible from the outside of casing **10**, may be opened for purposes of inspecting the burner **42** as desired.

The heat exchanger **40** consists of a plurality of spaced, horizontal, relatively shallow, closed shells **48** in superimposed relationship and interconnected by a number of stub pipes **50**. The lowermost shell **48** communicates with the uppermost end of the heater **38**, whereas the upper shell **48** communicates with a flue **52** that extends upwardly through the top wall **12** and is protected by a tube **54**.

Artificial currents of air are produced by the blower rotor **32**, and moving into the casing **10** through inlet **26**, are guided directly against the heater **38** near the lowermost end thereof and adjacent the burner **42** by a spiral scroll or shield **56** that spans the distance between the side walls **22** and **24** within the casing **10** and consists of an upper arcuate section **57** and a lower curved section **59**. The shield **56** is disposed between the blower rotor **32** and the heat exchanger **40** and, therefore, all incoming air must traverse the heater **38** as well as the heat exchanger **40**, before discharging from the casing **10** through the outlet **30**.

The forced draft burner **42** may be provided with a thermocouple **58** to control the fuel supply and with an electric igniter **60** if desired. Fuel orifices for the burner **42** are designated by the numeral **62** and a supply pipe **63** is provided to furnish the burner **42** by liquified petroleum gas or other suitable fuel.

It is to be preferred that muffler **64** for the engine **34** be connected through the medium of a flexible exhaust pipe **66** that may be positioned according to prevailing winds so as to avoid intake of exhaust fumes through the inlet **26**.

A handle **68** suitably mounted on the casing **10**, permits manual handling of the entire relatively light weight and compact unit.

It is manifest that in operation, after the burner **42** is ignited and the heater **38** becomes hot, energization of prime mover **34** will operate the blower rotor **32** to force currents of air against the heater **38** for ultimate discharge from the outlet **30**. The hot products of combustion rising from the heater **38** and passing through the heat exchanger **40** for exhaust through flue **52** will likewise give up heat to the air currents.

Through use of structure of this type, the aforementioned conduits leading from the outlet **30** may be directed into manholes or into overhead tents or canopies and other points of work for the purpose of permitting the workmen to operate in comfort notwithstanding the tedious nature of the job which they must perform. By the same token, the unit may be utilized for ventilation purposes through use of the blower **32**, all in the same manner but without use of the burner **42**.

While details of construction may vary within the spirit of the invention, it is desired to be limited only by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a portable, combination space heater and ventilator, a relatively narrow, hollow rectangular casing having a top wall, a bottom wall, a pair of side walls, one being provided with an air inlet in the lower part thereof, and a pair of end walls, one being provided with an air outlet in the upper part thereof; an upright tubular heater having an open uppermost end, said heater being positioned within the casing on the bottom wall adjacent the other of said end walls and extending upwardly alongside said other end wall in spaced relationship thereto; a blower rotor rotatably mounted within the lowermost portion of the casing between the heater and said one end

wall and located adjacent the inlet for creating currents of air and directing the same through the casing from the inlet to the outlet; an elongated, horizontal, sectional heat exchanger in the uppermost portion of the casing and having one end thereof secured to the open uppermost end of the heater and placing the exchanger in communication with the heater, said exchanger comprising a number of spaced, substantially parallel, relatively shallow, closed shells disposed in superimposed relationship, there being a plurality of tubular elements interconnecting the shells and placing the latter in intercommunication, said heat exchanger being located in superimposed relationship over the blower rotor and in substantial alignment with the air outlet, each of said shells substantially spanning the distance between the side walls and the ends of the shells terminating in spaced relationship to their respective end walls; a fuel burner disposed within the heater adjacent the lowermost end thereof; a flue mounted on the heat exchanger in communication therewith and extending through the casing for exhausting the heater and heat exchanger of products of combustion emanating from the burner; and a sectional spiral scroll between the blower and the heat exchanger and spanning the distance between the sides of the casing for guiding the air from the blower

rotor directly against the burner, upwardly around the heater, laterally across the shells and outwardly through the air inlet.

2. A heater and ventilator as set forth in claim 1, wherein there is provided an arcuate opening at the lowermost end of the heater in the face thereof proximate to said other end wall whereby air emanating from the rotor forces said products of combustion through the heater, the heat exchanger and the flue.

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