March 10, 1942. C. O. BERGSTROM 2,276,144

FAN HEATER UNIT

Filed Aug. 17, 1940

Fig. 1.

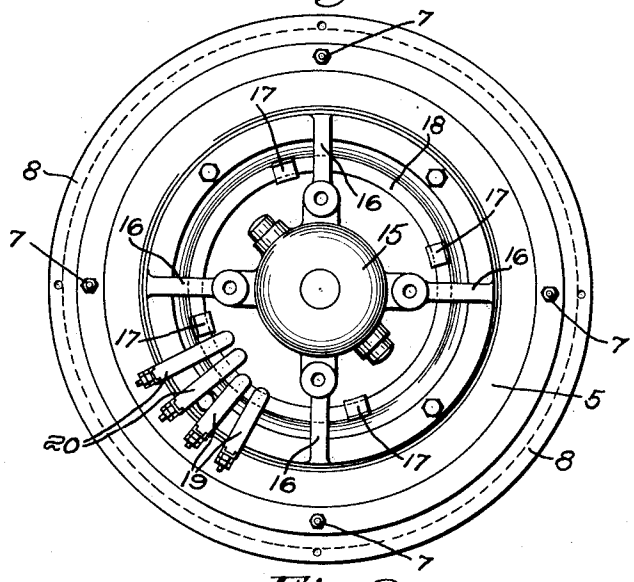


Fig. 2.

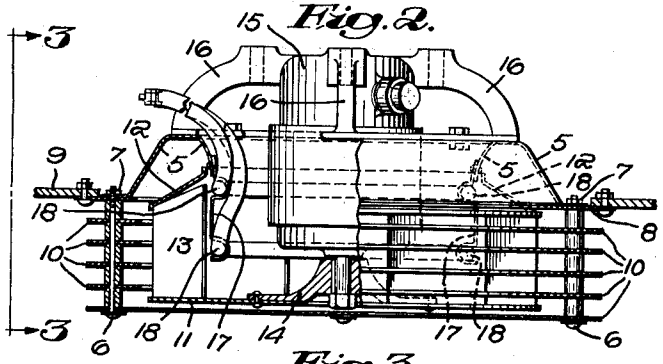
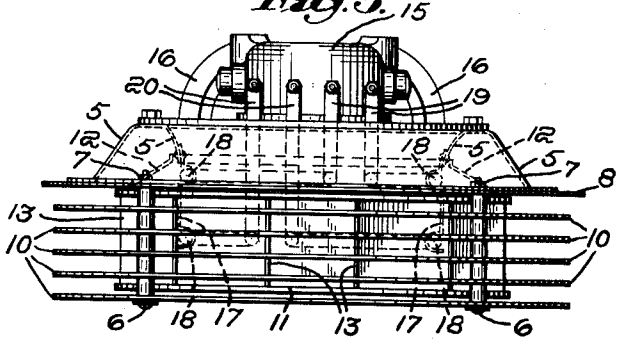


Fig. 3.



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Patented Mar. 10, 1942

2,276,144

UNITED STATES PATENT OFFICE

2,276,144

FAN HEATER UNIT

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Application August 17, 1940, Serial No. 352,987

1 Claim. (Cl. 219—39)

This invention relates to fan-heater units and relates more particularly to a combined centrifugal fan and electric air heater.

Electric heaters combined with fans have been proposed heretofore but so far as is known, such prior devices have been mere auxiliary heaters and were not capable of high duty performance. The present invention was developed for electric subway passengers cars which formerly used floor type heaters and overhead air circulating fans, and provides in overhead fan-heater units, equipment which provides more even and efficient heating and more adequate air circulation than the prior equipment was capable of.

The prior combined electric heater and fan units utilized heater wires arranged around the fan outlet or between same and the space served. Such arrangements while suitable for auxiliary heater units were not feasible for heating passenger cars due to the difficulty of circulating the heated air and of protecting the equipment from the heat.

The present invention utilizes electric heater elements mounted within the wheel of a centrifugal fan rather than at the fan outlet as has been the practice in the past. The heater elements are nearest the fan blades which are in motion and are not damaged by the tremendous heat developed and which force the heated air through the other elements of the fan at reduced temperature. The air is evenly heated due to the circular arrangement of the heater elements around the circular opening within the fan wheel.

An object of the invention is to provide an improved fan-heater unit capable of providing and circulating very hot air.

The invention will now be described with reference to the drawing, of which:

Fig. 1 is a plan view looking downwardly upon a fan-heater unit embodying this invention;

Fig. 2 is an elevational view of the unit of Fig. 1, with a portion in section, and

Fig. 3 is a view similar to Fig. 2 but taken along the lines 3—3 of Fig. 2.

The fan consists of the air guiding inlet casing 5, attached at four points by the bolts 6 and nuts 7 to the plate 8 which is attached around a circular opening to the roof 9 of the car. The bolts 9 also support the horizontal, air diffuser plates 10. The fan wheel consists of the back plate 11, the side plate 12, the blades 13, and the shaft support 14 attached to the back plate and rotated by the electric motor 15. The motor 15 is supported from the casing 12 by the arms 16.

The resistor clamps 17 are attached to the inlet portions of the casing 12 and extend within the fan wheel between the blades 13 and support the resistors 18, of which there are two, each extending substantially completely around the inside of the fan wheel in a circular path.

The upper resistor 18 has the two extensions 19 which form the leads or connections for electric supply. The lower resistor 18 has the two similar extensions 20 serving as supply leads. With the leads brought out as illustrated, the two resistors 18 may be connected separately to the electric supply, or in series or in parallel to provide different degrees of heat. The resistors 18 in one embodiment of the invention were formed from "calrod" wire and when connected in parallel to a 600 volt electric supply consumed 3 kilowatts of energy, and through operation of the fan, the resulting heat was distributed evenly and without injury to the fan due to the location of the resistors within the fan wheel.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement of apparatus illustrated as modifications thereof may be suggested by those skilled in the art without departure from the essence of the invention.

What is claimed is:

A fan heater unit for mounting to a surface comprising a plate having a central opening therein for the passage of air, means attached to one side of said plate around said opening and forming supports for attaching said unit to said surface, a centrifugal fan, means for attaching said fan to the other side of said plate, said fan including a fan wheel having a back plate and having a central inlet opening in axial alignment with said opening in said plate, an inlet casing having an outer end extending from said plate around the opening therein and having an inner end extending into said inlet opening, a plurality of spaced air diffusing plates extending around said wheel perpendicular to the axis thereof, and an electric resistor element supported within said inlet opening between said inner end of said casing and said back plate extending in a circular arc substantially around the circumference thereof.

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