April 27, 1937. W. L. MACK 2,078,766

UNIT HEATER

Filed Oct. 26, 1935

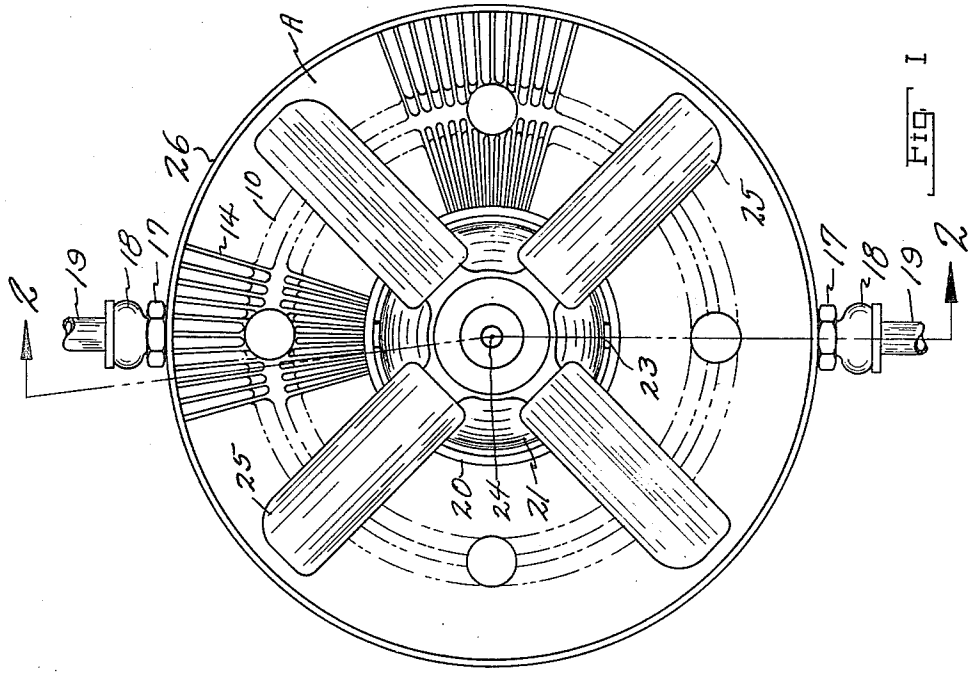


Fig. 1

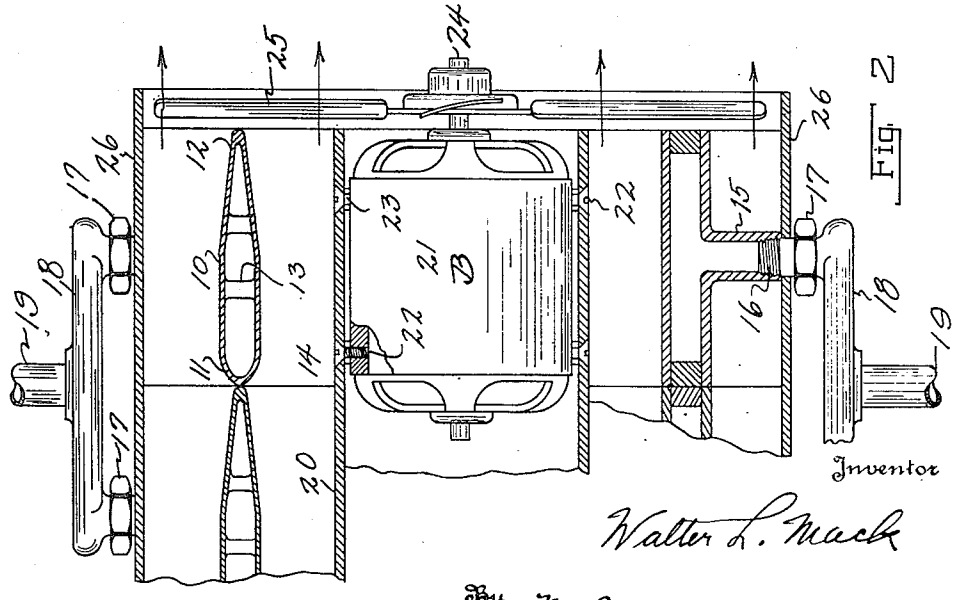


Fig. 2

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UNIT HEATER

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3 Claims. (Cl. 257—137)

My invention relates to unit heaters of the type wherein a blower or fan forces air through a radiator element and thence directs a stream of warmed air into a space to be conditioned, and more particularly to that type of unit heater wherein the fan is positioned closely adjacent the radiator element and in a plane substantially parallel to the face of said element.

An object of this invention is to increase the efficiency of this type of heater by providing an arrangement wherein a maximum percentage of the area of the radiator element will be utilized in providing heat for the stream of air furnished by the fan. This object is attained by constructing the radiator element in the form of a ring and employing a fan of such dimensions and so arranged that the path of travel of the fan blades will substantially register with the face of the radiator element.

Another object is to provide in this type of heater an arrangement wherein the motor will be properly cooled by the air provided by the fan and yet wherein the motor is mounted in a very secure, simple and inexpensive manner.

Another object of the invention is to provide a unit heater of simple, durable and inexpensive construction, wherein the radiator element serves not only for the purpose of heat transfer but also as the frame structure of the heater, carrying the weight of the motor and fan and being supported simply by its connection to a pair of steam headers, such casing members as may be used for confining the air stream being supported by the radiator element.

The preceding object is largely facilitated by the employment of an integrally cast radiator construction.

With these and other objects in view my invention consists in the combination construction and arrangement of the various parts thereof, whereby the objects contemplated are attained, as more fully set forth in the accompanying specifications, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Fig. 1 is a front elevation of a heater embodying my invention, and

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

I have used the reference letter "A" to indicate generally the ring shaped radiator element of my invention, and the reference character "B" to indicate the motor and fan assembly.

The radiator element "A" comprises a ring shaped steam conduit 10 which in cross section is elongated in a direction parallel to the axis of the radiator as shown in Fig. 2, and tapered so that one edge is relatively thick as at 11 and the other edge is relatively thin as at 12.

Struts 13 integrally cast with the side walls of the conduit 10, serve to tie said walls together and to brace them against the pressure of steam used in operating the heater.

Vanes 14 are cast integrally with the conduit 10 and are positioned in planes radial to and intersecting the axis of the radiator. These vanes are substantially equal in length to the longitudinal dimension of the cross section of the conduit, and in a radial direction, project beyond the conduit on either side thereof.

Diametrically positioned are a pair of cored bosses 15 which communicate with the interior of the conduit 10 and extend radially outwardly to the perimeter of the radiator and are internally threaded to receive the nipples 16 to which are connected as by means of unions 17 the header members 18.

In the assembled heater, a pair of the ring shaped radiators are employed, mounted co-axially and face to face as shown in Fig. 2, and they are supported and held in such face to face relation by means of the headers 18 each of which is provided with a double connection for simultaneous attachment to both radiators.

The headers 18 may be connected to a steam line 19 for providing a heating fluid for the radiator.

Support for the heater may be provided by suitably connecting the headers 18 to supporting means, or by suspending the heater from the upper pipe 19.

Within the hollow center of the associated radiators is mounted a sleeve 20 which serves both to aid in confining the air stream and also to secure the motor 21 to the motor-fan assembly "B". The motor 21 may be secured within the sleeve 20 in any suitable manner as by means of screws 22, and is preferably spaced from the sleeve as by means of the washers 23 in order that a film of air may pass around the motor case as well as through the same for cooling purposes.

It may now be noted that in assembling the heater, the motor 21 may first be mounted within the sleeve 20 and the latter then slipped into the cylindrical cavity in the associated radiator units. The motor is thereby mounted co-axial with the radiator units.

On the motor shaft 24 is mounted a fan 25, the blades of which travel a path substantially regis-

tering with the face of the adjacent radiator "A".

The sleeve 20 serves to prevent any passage of air from the space occupied by the radiator into the space occupied by the motor or vice versa.

An external casing or housing may be employed for confining the air stream, and such a housing can be simply a cylindrical shell 26 encircling and supported by the assembled radiators, and held in place by the nipples 16 passing through its wall.

The advantage of this construction resides primarily in an increased efficiency resulting from the substantial registering of the path of travel of the fan with the face of the radiator element. The radiator element being ring shaped, its median line substantially registers with the median line of the path of travel of the fan blades and all portions of the radiator thus are acted upon equally by the suction produced by the fan.

As a consequence, a smaller area of radiating surface may be employed, and every portion of that surface delivers heat to maximum capacity owing to the fact that every portion of the radiator surface is acted upon uniformly.

I claim as my invention:

1. A ring shaped radiator element comprising a cast ring shaped conduit elongated in a direction parallel to its axis and tapered so that it is considerably thicker at one edge than the other, and integrally cast spaced vanes thereon positioned radially.

2. In a unit heater, a ring shaped radiator element comprising a ring shaped steam conduit, said conduit in cross section being elongated in a direction parallel to its axis, and tapered so that its thicker edge is disposed on the side of incoming air, spaced vanes on the conduit, positioned radially, and a fan for causing air to pass through said element, said fan being positioned coaxial with the element and its path of travel substantially registering with the element.

3. A unit heater or the like comprising two ring-shaped conduits of tapered streamlined cross-section having radial vanes and arranged coaxially in contact with each other with the thicker edge of the second conduit engaging the thinner edge of the first conduit, and intake and exhaust headers communicating with both conduits and securing them rigidly together.

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