Dec. 4, 1928. 1,694,351

W. L. LONG

AIR HEATER

Filed Feb. 28, 1928 2 Sheets-Sheet 1

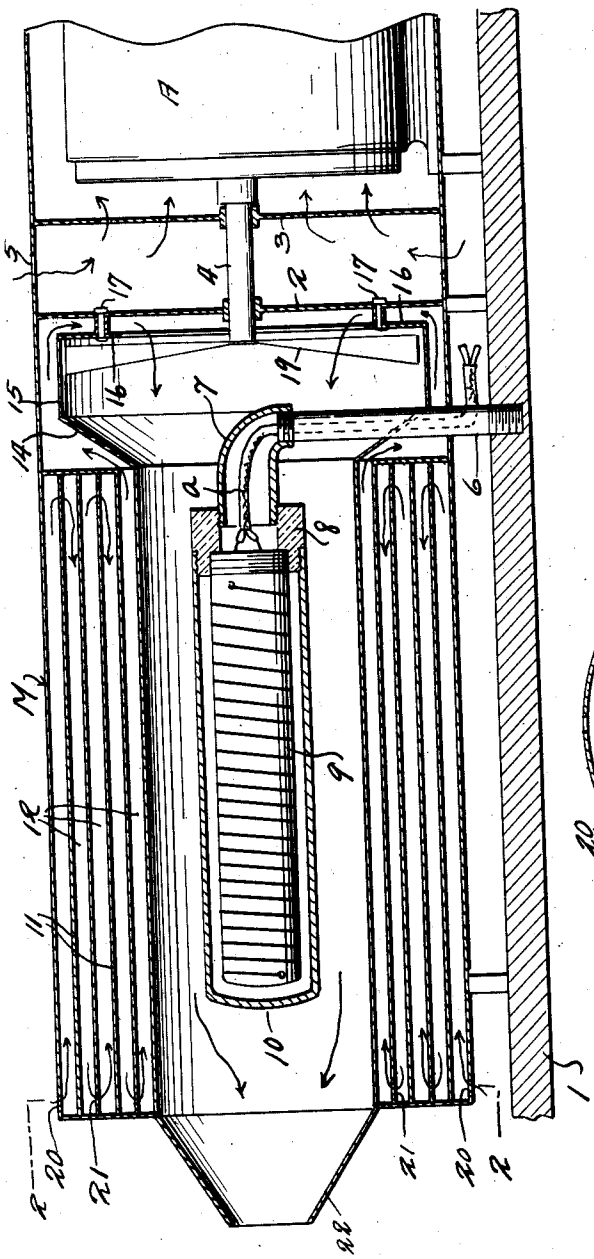


FIG. 1.

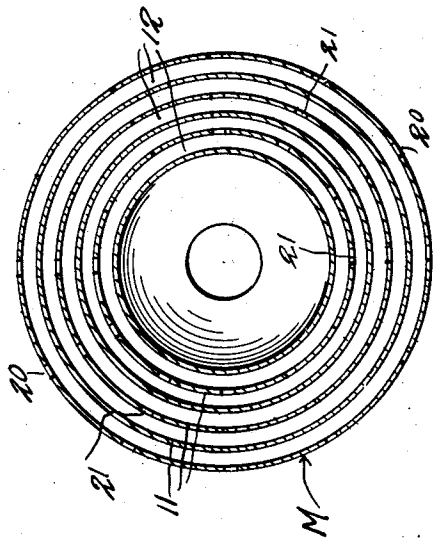


FIG. 2.

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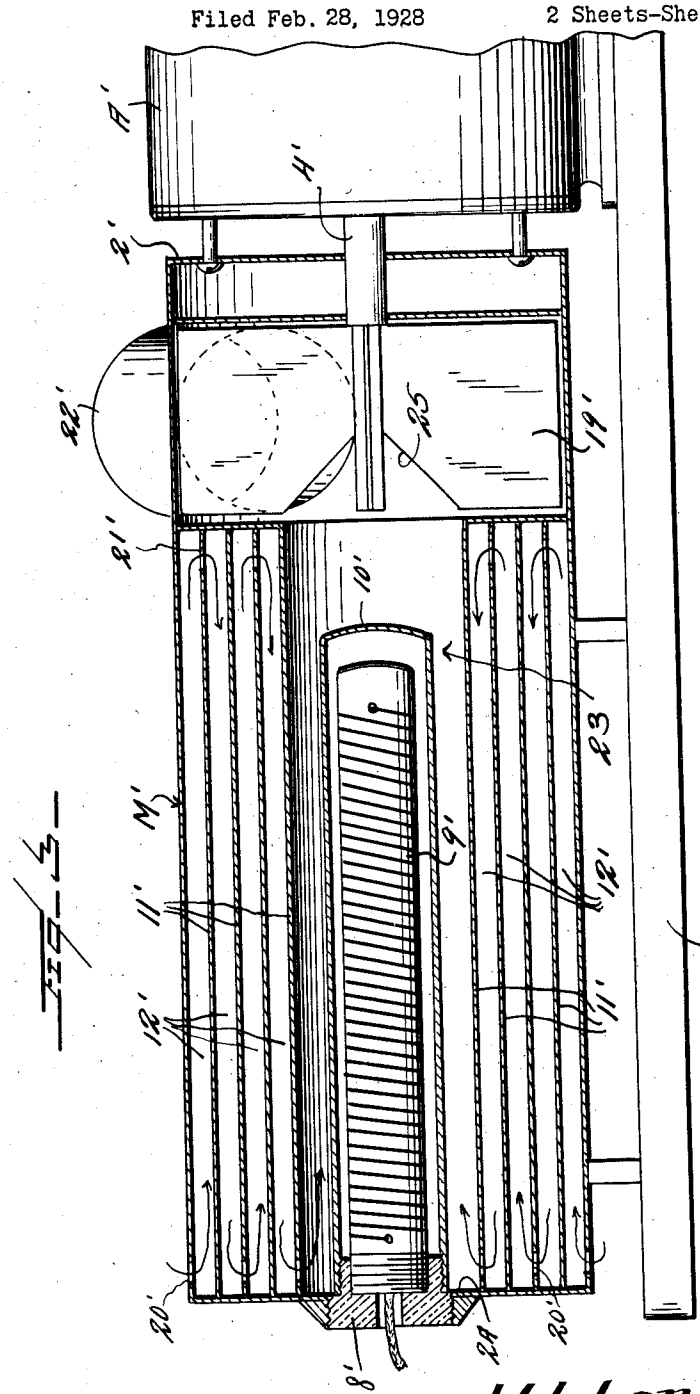
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AIR HEATER

Filed Feb. 28, 1928 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

WILBER L. LONG, OF KIRKSVILLE, MISSOURI, ASSIGNOR OF ONE-FOURTH TO WILLIAM P. BLAKE, ONE-FOURTH TO WILLIAM T. MINOR, ONE-EIGHTH TO WILLIAM E. DAVIS, AND ONE-EIGHTH TO JACOB M. WATTENBARGER, ALL OF KIRKSVILLE, MISSOURI.

AIR HEATER.

Application filed February 28, 1928. Serial No. 257,705.

This invention relates to an air heater and it is an object of the invention to provide a device of this kind whereby may be obtained a blast of superheated air.

It is also an object of the invention to provide a device of this kind comprising a heating unit together with means for drawing air around said unit in a tortuous path to initially heat the same and then to eject said initially heated air substantially in direct contact with the heating unit to produce a blast of superheated air.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved air heater whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawing, wherein:—

Figure 1 is a view in longitudinal section with portions in elevation of an air heater constructed in accordance with an embodiment of my invention;

Figure 2 is a transverse sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a view partly in section and partly in elevation illustrating a heater constructed in accordance with a further embodiment of my invention.

As disclosed in the accompanying drawing, 1 denotes a base upon which is mounted an elongated cylindrical member M provided adjacent to one end portion with the internal partitions 2 and 3 spaced apart one with respect to the other a desired distance and providing a mounting for a fan shaft 4. The wall of the member M between the partitions 2 and 3 is provided with air inlet openings 5 as is also the outer partition 3 so that effective air circulation may be had for the motor A mounted within the member M outwardly of the partition 3 and in desired driving connection with the shaft 4.

Extending upwardly from the base 1 and extending within the member M at a point in advance of but relatively close to the partition 2 is a tubular standard 6 provided at its upper or inserted end portion with an elbow 7 disposed toward the end of the member M remote from the partition 2 and substantially at the axial center of the member. The elbow 7 has threaded or otherwise suitably engaged therewith a plug or slot member 8 with which is adapted to be engaged the end portion of an elongated electric heating unit 9. This heating unit 9 when applied is connected with a suitable source of electrical energy through the medium of the conductor wires *a* directed through the elbow 7 and the tubular support 6.

Enclosing the applied heating unit 9 and threaded or otherwise engaged with the plug or slot member 8 is a coil jacket 10.

Arranged within the member M in desired spaced relation are a plurality of cylindrical members 11 in concentric relation with respect to themselves and to the applied heating unit. These applied members 11 in connection with the peripheral wall of the member M provide a plurality of circulating chambers 12, the outer ends of which being closed and the inner ends of said chambers 12 being closed with the exception of the innermost one. The inner end of the inner cylindrical member 11 is disposed on a desired incline toward the peripheral wall of the member M and then, as at 14, continued by a straight portion 15 substantially concentric to the peripheral wall of the member M and in relatively close proximity thereto. The inner end of this portion 15 is continued by an upstanding annular member 16 substantially parallel to the partition 2 and relatively close thereto. This portion 15 is suitably tied or connected, as at 17, with the partition 2 and the space or chamber 18 between the partition 2 and the portion 15 opens into the central portion of the member M rearwardly of the blast fan 19 fixed upon the shaft 4 hereinbefore referred to.

The peripheral wall of the member M is provided therearound with a plurality of openings 20 affording communication between the atmosphere and the outer circulating chamber 12 and the remaining chambers are in alternate communication adjacent to

opposite ends of the chambers by the openings 21.

It is to be noted that the innermost chamber 12 has its inner end opening directly into the rear portion of the member M in advance of the inclined portion 14 of the inner cylindrical member 11. By this means, upon rotation of the fan 19, the air will be drawn from the atmosphere through the openings 20 and caused to travel in a tortuous path through the various chambers 12 whereby the air is initially heated. This initially heated air is delivered rearwardly of the fan 19 and is ejected outwardly through the central portion of the member M and around the heating unit 9 and discharged in a superheated blast. The central portion of the member M, or that portion defined by the concentric cylindrical members 11, has projecting therefrom a nozzle or reducer nipple 22 whereby the effectiveness and efficiency of the discharged superheated blast is materially increased.

In the embodiment of my invention as illustrated in Figure 3, the member M′ has arranged therein a plurality of cylindrical members 11′ in concentric relation with respect to themselves and the member M′ and the opposite ends of the interposed circulating chambers 12′ are closed. The peripheral wall of the member M′ is provided therearound with a plurality of openings 20′ affording communication between the atmosphere and the adjacent chamber 12′ in close proximity to the outer end of the member and the remaining chambers 12′ are in alternate communication adjacent to opposite ends of the chambers by the openings 21′. The members 11′ define a central chamber 23, the outer end of which being partially closed by an end plate 24 defining a central opening in which is engaged a plug 8′ with which is operatively engaged an end portion of a heating unit 9′ extending inwardly of the chamber 23 at the axial center thereof. This heating unit 9′ is adapted to be connected with a suitable source of electrical energy. Also engaged with the plug 8′ is a coil jacket 10′. The applied heating unit 9′ and coil jacket 10′ extend inwardly of the chamber 23 and terminate in relatively close proximity to the members 11′ and the openings 21′ through the innermost member 11′ communicate with the central chamber 23 closely adjacent to the outer end thereof.

Extending within the member M′ through the inner end wall or head 2′ thereof is a shaft 4′ driven by the motor A′. The portion of the shaft 4′ within the member M′ carries and has radiating therefrom the flat fan blades 19′, the lower outer corners of which being cut away, as at 25. In communication with the portion of the member M′ inwardly of members 11′ is a discharge pipe 22′ so that as the blades are caused to rotate the air will be drawn in a tortuous path through the chambers 12′ into the outer end of the central chamber 23 and inwardly of said chamber and out through the pipe 22′. During this action the air before being discharged will be effectively heated.

From the foregoing description it is thought to be obvious that an air heater constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. An air heater of the class described comprising an elongated tubular member having one end closed and its opposite end open, a blast fan positioned within said member at the closed end portion thereof, means for driving said fan, a series of spaced nested members positioned within the open end portion of the first named member in advance of the fan and providing chambers therebetween, the ends of said chambers, with the exception of the inner chamber, being closed, the rear end of the innermost chamber discharging rearwardly of the fan, the peripheral wall of the first named member having openings at its outer portion affording communication between the atmosphere and the outer chamber, the remaining chambers being alternately in communication one with the other, and a heating unit arranged within the open end portion of the first named member at a point substantially axial of the nested members.

2. An air heater of the class described comprising an elongated tubular member having one end closed and its opposite end open, a blast fan positioned within said member at the closed end portion thereof, means for driving said fan, a series of spaced nested members positioned within the open end portion of the first named member in advance of the fan and providing chambers therebetween, the ends of said chambers, with the exception of the inner chamber, being closed, the rear end of the innermost chamber discharging rearwardly of the fan, the peripheral wall of the first named member having openings at its outer portion affording communication between the atmosphere and the outer chamber, the remaining chambers being alternately in communication one with the other, a heating unit arranged within the open end portion of the first named member at a point substantially axial of the nested members, and a reducing nozzle operatively

supported by the nested members and through which the blast created by the fan is discharged.

3. An air heater of the class described comprising an elongated tubular member having one end closed and its opposite end open, a blast fan positioned within said member at the closed end portion thereof, means for driving said fan, a series of spaced nested members positioned within the open end portion of the first named member in advance of the fan and providing chambers therebetween, the ends of said chambers, with the exception of the inner chamber, being closed, the rear end of the innermost chamber discharging rearwardly of the fan, the peripheral wall of the first named member having openings at its outer portion affording communication between the atmosphere and the outer chamber, the remaining chambers being alternately in communication one with the other, a supporting post extending within the first named member rearwardly of the nested members, and a heating unit supported by said post at a point substantially axial of the nested members.

4. An air heater of the class described comprising an elongated member, a blast fan positioned within said member and discharging an air blast exteriorly of the member, a series of spaced nested members positioned within the elongated member in advance of the fan and providing chambers therebetween, the ends of said chambers being closed, the outermost chamber being in communication with the atmosphere, said chambers being in alternate communication at opposite end portions thereof, the innermost chamber being in communication with the member, and a heating unit arranged within the first named member at a point substantially axial of the nested members.

5. An air heater of the class described comprising an elongated member, a blast fan positioned within said member and discharging an air blast exteriorly of the member, a series of spaced nested members positioned within the elongated member in advance of the fan and providing chambers therebetween, the ends of said chambers being closed, the outermost chamber being in communication with the atmosphere, said chambers being in alternate communication at opposite end portions thereof, the innermost chamber being in communication with the member, and a heating unit arranged within the first named member at a point substantially axial of the nested members, said heating unit extending through the innermost chamber from substantially end to end of the nested members.

In testimony whereof I hereunto affix my signature.

WILBER L. LONG.