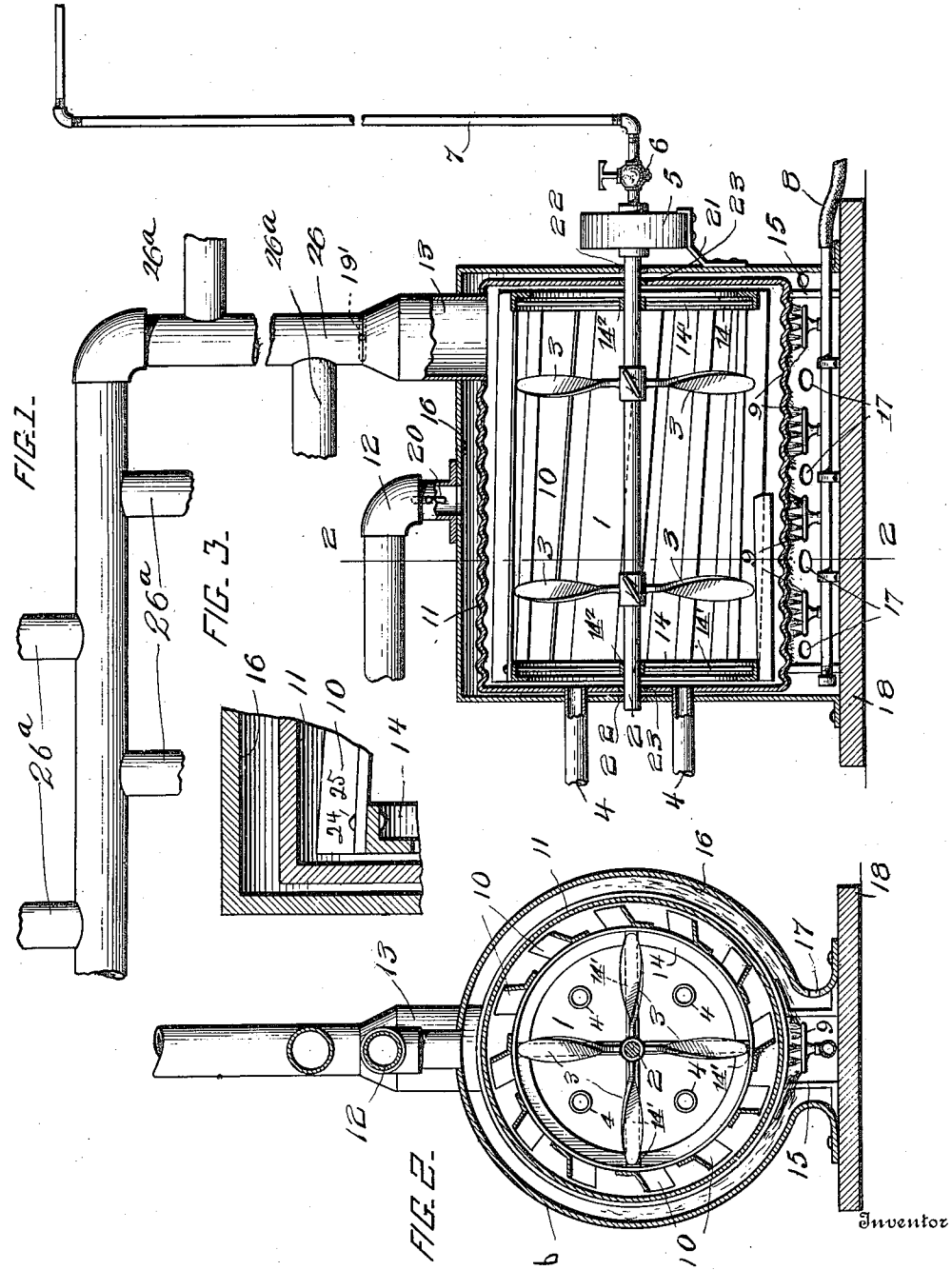
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AIR HEATER AND DISTRIBUTER.

APPLICATION FILED DEC. 15, 1913. RENEWED FEB. 26, 1919.

1,323,889. Patented Dec. 2, 1919.



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AIR HEATER AND DISTRIBUTER.

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To all whom it may concern:

Be it known that I, CHARLES R. MABEE, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Air Heaters and Distributers, of which the following is a specification.

This invention relates to air heaters and distributers and especially to that class of heaters which are employed for heating residences and other buildings. It provides means for the application of centrifugal force and circumferential motion to a thin cylinder or film of air forced around and against the concave cylindrical walls of a heater and means for forcing air so heated to the various parts of a structure.

To enable others skilled in the art to which it pertains to make and use the same, I will proceed to describe the invention with reference to the accompanying drawings, in which similar reference characters refer to similar parts in all the figures.

Figure 1 is a vertical longitudinal section of my improved device, with the attached pipes and driving means in elevation, Fig. 2 is a transverse section of the same along the line 2—2 of Fig. 1, Fig. 3 is a detail view of an alternative form of heater without corrugations, showing the attachment of the longitudinal blades.

Referring more particularly to the drawings, 1 designates the heater, which is essentially a horizontally disposed cylinder provided with an external jacket 16, mounted on a support 18 and provided with a plurality of suitable heaters 9, here shown as vapor burners. The heater is supported in horizontal position by pedestals 15 and the cylindrical wall 11 thereof is provided with circumferential corrugations and a flue 12 connected to the jacket and provided with a damper 20 furnishes escape for the gases of combustion, suitable air inlets to the burners being shown at 17. Extending centrally and longitudinally of the cylinder is a shaft 2 supported for rotation in bearings 22 and 23 at the ends of the cylinder. Located within the cylinder on the shaft at opposite ends thereof are supporting rings 14, said rings being arranged concentrically with the walls of the cylinder and connected with the shaft by radially extending arms 14′ that connect with central hubs 14^2 fixed to the shaft. Extending longitudinally of the cylinder are a plurality of blades 10, said blades being connected at their opposite ends with the respective supporting rings 14 and being arranged in a circle adjacent the periphery or walls of the cylinder, said blades being closely associated and equally distanced from each other. The blades 10 preferably take the form illustrated in the drawing, in which they are shown as bars that are substantially L-shaped in cross section, the bars having one of their flanges secured to the rings, the other portion or flange extending outwardly toward the wall of the cylinder. As illustrated in the drawing the blades 10 extend at an angle to the longitudinal axial line of the cylinder. Arranged within the space at the interior of the supporting rings 14 and the longitudinally disposed blades 10, are radially extending blades 3, said blades being arranged in sets intermediate the ends of the longitudinally disposed blades, in the present instance two sets of radial blades being shown one near each end of the cylinder. The shaft 2 is here shown as driven by a water motor 5 mounted on a bracket 21 attached to the jacket, said motor being supplied through a pipe 7 controlled by a valve 6. A plurality of inlets 4 open through the jacket to the air and an outlet pipe 13 radially of one end of the heater opposite to the inlets 4, connects with a distributing pipe 26 provided with a damper 19′. The distributing pipe 26 has a plurality of branches 26^a, shown cut away, and adapted to lead to various rooms or the like for heating purposes. A flexible tube 8 is here shown as conveying fuel to the burners 9.

The operation of my device is as follows:

The burners 9 having been lighted, the valve 6 in the pipe 7 is opened and the motor 5 is started communicating rotary motion to the shaft 2, the fan blades 3, the rings 14 and the blades 10. Under the influence of the fan blades, air flows into the container 1 through the inlets 4 and has communicated to it, rotary motion in the direction of the revolution of the shaft and fan blades. Under the impulse from the blades 10 of L cross-section, air is forced

against the corrugated surface of the wall 11 of the container and a thin cylinder of air is heated to a high temperature. The air thus heated is forced into the outlet 13 and is distributed through pipes 26 to parts of the building where heat is desired. The wall 11 may be constructed without corrugations.

While the construction set out is excellently adapted for the employment of my invention in practice, I do not limit myself to the details as they may be modified without departing from the spirit of my invention.

I do not herein claim any of the subject-matter described in the claims of my copending applications, as follows: Serial No. 718114, filed August 31, 1912; Serial No. 738178, filed December 23, 1912; Serial No. 108956, filed July 12, 1916, renewal of No. 797087, filed October 24, 1913; Serial No. 805598, filed December 9, 1913; Serial No. 40757, filed July 19, 1915; Serial No. 57472, filed October 23, 1915; Serial No. 77996, filed February 12, 1916; and Serial No. 277904, filed February 18, 1919; the said applications relating more particularly to methods and apparatus for subjecting to treatment substances containing liquid while in movable film formation in contact with a heated surface for evaporating and similar purposes, whereas the claims in the present case, except as founded on matter not disclosed in above applications, are restricted to means within the container for drawing fluid into the container, and more particularly to means consisting of blades upon a central shaft supplemental to the film forming and moving blades.

Having thus fully described my invention, what I claim is—

1. In a fluid heating apparatus, the combination of a cylindrical container having an inlet for fluid adjacent one end and an outlet for the heated fluid adjacent the opposite end, means for applying heat to the outer wall of the container, means within the container adjacent the inlet for drawing fluid therein, and longitudinally extending rotatable conveyer means adjacent the inner surface of the cylindrical wall for forming said fluid into a cylindrical film and subjecting the same to rotatable movement and moving the same longitudinally toward said outlet.

2. In a fluid heating apparatus, the combination of a cylindrical container having an inlet for fluid adjacent one end and an outlet for the heated fluid adjacent the opposite end, a heating jacket surrounding the container for heating the wall thereof, means within the container adjacent the inlet for drawing fluid therein, longitudinally extending rotatable conveyer means adjacent the inner surface of the wall of the container for forming said fluid into a cylindrical film and subjecting the same to rotatable movement under pressure and moving the same longitudinally toward said outlet, and means adjacent the outlet for ejecting the heated fluid.

3. In a fluid heating apparatus, the combination of a cylindrical container having an inlet for fluid adjacent one end and an outlet for the heated fluid adjacent the opposite end, means within the container adjacent the inlet for drawing the fluid into the container, means adjacent the outlet of the container for forcing the heated fluid through the outlet, means for heating the wall of the container, longitudinally extending members arranged adjacent the inner surface of the container, and means for rotating said members at a speed sufficient to form the fluid in a cylindrical ring or film and impart rotatable movement to said film over the inner surface of the container.

4. In an air treating apparatus, the combination of a substantially horizontally disposed elongated cylindrical container having an air inlet adjacent one end and an outlet adjacent the opposite end, means for applying to the wall of the container a temperature different from that of the air, rotatable means within the container adjacent the inlet for drawing the air thereinto, rotatable means within the container adjacent the outlet for forcing the treated air through said outlet, longitudinally extending members circumferentially spaced from one another and arranged adjacent the inner surface of the container, common means for imparting rotatable movement to said rotatable means and longitudinally extending members, and an air distributing pipe leading from said outlet opening.

5. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, a rotary shaft extending centrally and longitudinally of the cylinder, radially extending blades on the shaft for drawing fluid into the cylinder through the said inlet, and independent blades supported from the shaft and disposed longitudinally of the cylinder and adjacent the surface thereof for centrifugally forcing the fluid out and over the heated wall of the cylinder, and means for imparting motion to said shaft.

6. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, radially extending blades on the shaft within the cylinder for drawing fluid into the cylinder, and independent blades mount-

ed for movement with the shaft and disposed longitudinally of the cylinder near the periphery or wall thereof for centrifugally forcing the fluid out and over the heating surface of the cylinder in the form of a cylindrical film, and means for driving said shaft.

7. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, radially extending blades on the shaft for drawing fluid into the cylinder, and blades supported for movement with the shaft and disposed longitudinally of the cylinder near the wall thereof and arranged at an angle to the longitudinal axial line of the cylinder, said blades acting to centrifugally force the fluid out and over the heating surfaces of the cylinder, and means for driving said shaft.

8. In an air heating apparatus, the combination of a horizontally disposed cylindrical container, means for applying heat to the wall of said container, a centrally disposed longitudinally extending rotatable shaft, said container having an air inlet adjacent one end and an air outlet adjacent the opposite end, an outlet pipe leading from said outlet and having a series of laterally extending distributing branches, and means mounted on the shaft for rotatable movement therewith for forming the incoming air into a circular ring and for rotating said ring of air over the inner surface of the container, said means including a plurality of circumferentially spaced blades extending longitudinally of the container at an angle.

9. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, blades mounted for movement with the shaft disposed longitudinally of the cylinder and extending substantially the full length thereof adjacent the walls of the same, radially extending blades on the shaft arranged interiorly of the said longitudinally extending blades, and means for driving said shaft at a high speed whereby said longitudinally extending blades will maintain a cylindrical film of the fluid under continuous movement in a circular path over the surface of the cylinder.

10. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, a supporting ring at each end of the shaft, said rings being arranged concentrically respecting the shaft and cylinder and connected with the shaft, blades extending longitudinally of the cylinder and secured at opposite ends to the respective rings, and blades on the shaft extending radially therefrom within the space at the interior of the longitudinally extending blades, and means for imparting motion to the shaft.

11. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, a plurality of blades mounted for movement with the shaft, said blades being disposed longitudinally of the cylinder and arranged in a circle adjacent the walls thereof in closely associated relation and equally distanced from each other by unobstructed spaces, radially extending blades on the shaft, and means for driving the shaft.

12. In a fluid heating apparatus, the combination with a cylinder, means for heating the walls thereof, the cylinder having a fluid inlet at one end and a fluid outlet at the opposite end, of a rotary shaft extending centrally and longitudinally of the cylinder, radially extending blades on the shaft for drawing fluid into the cylinder, and other blades mounted for movement with the shaft and disposed longitudinally of the cylinder in a circle adjacent the walls of the cylinder, said longitudinally extending blades being substantially L-shaped in cross section, and means for driving the shaft.

13. In a device of the character described, the combination of a hot air distributing cylinder or drum, a rotatable frame mounted therein and provided on its periphery with longitudinal fan blades, and fans on the shaft of the rotatable frame and within said frame, said cylinder having an air inlet and an air outlet.

14. In a device of the character described, the combination of a hot air distributing cylinder or drum having a corrugated surface, a rotatable frame mounted therein and provided on its periphery with longitudinal fan blades arranged adjacent said surface, and fans on the shaft of the rotatable frame within said frame, said cylinder having an inlet and an outlet.

15. In a device of the character described, the combination of a distributing cylinder or drum having an air inlet adjacent one end and an air outlet adjacent the opposite end, a rotatable frame mounted within said drum and provided on its periphery with longitudinal angularly disposed fan blades, and fans on the shaft of the rotatable frame and within said frame.

16. In a device of the character described,

the combination of a horizontally disposed stationary hot air distributing cylinder or drum, a rotatable frame mounted within said cylinder and provided on its periphery with longitudinally extending fan blades arranged adjacent the surface of the cylinder, and fans on the shaft of the rotatable member within said frame, the said cylinder having an air inlet adjacent one end and an air outlet adjacent its opposite end, and means for subjecting the exterior surface of said cylinder to a heating medium.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES R. MABEE.

Witnesses:

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