July 29, 1924. 1,502,862

R. W. MENK

AIR CIRCULATOR

Filed Oct. 28, 1922

Fig. 1

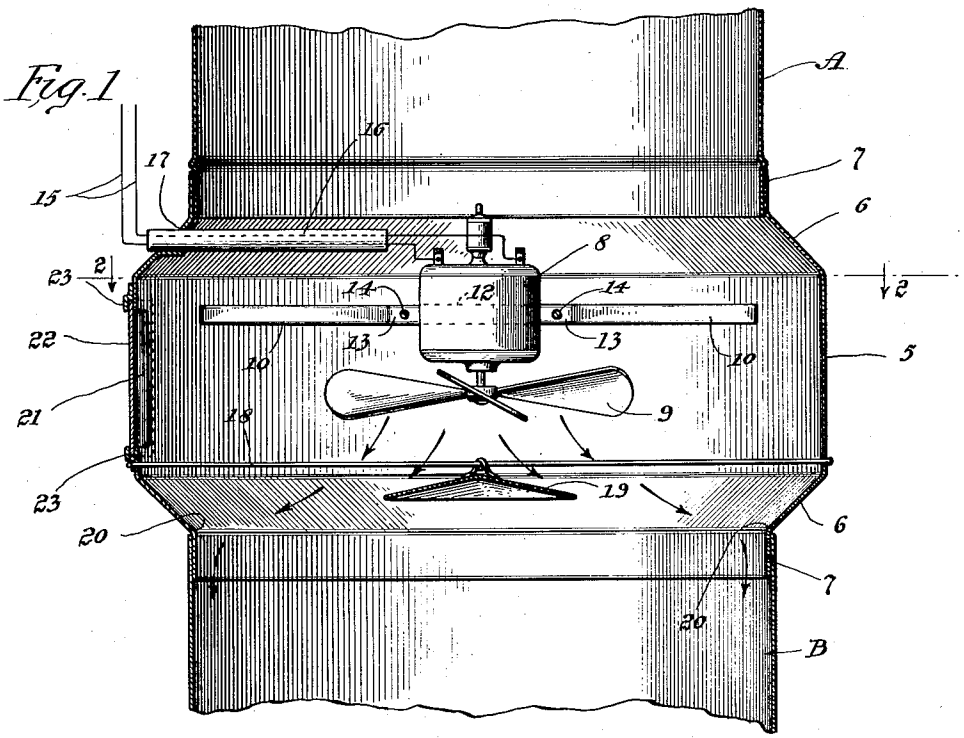
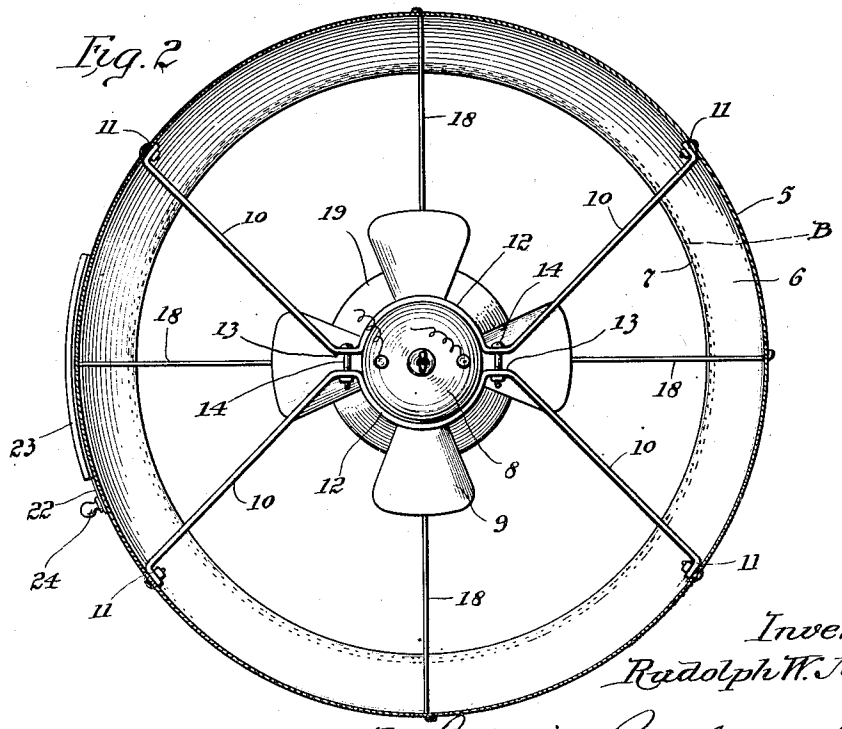


Fig. 2



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UNITED STATES PATENT OFFICE.

RUDOLPH W. MENK, OF JOLIET, ILLINOIS, ASSIGNOR TO EXCELSIOR STEEL FURNACE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AIR CIRCULATOR.

Application filed October 28, 1922. Serial No. 597,436.

To all whom it may concern:

Be it known that I, RUDOLPH W. MENK, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented a new and useful Improvement in an Air Circulator, of which the following is a specification.

My invention relates to means for circulating air in hot air heating systems, and has more particular reference to a structure that may be fabricated and sold as a unit and preferably interposed in the cold air or return pipe of a hot air heating system, and when installed is adapted to increase the velocity of the air moving in the system.

Among the divers objects of my invention are the provision of means for increasing movement of air in the system and I find that a convenient place for the installation of such means is in the cold air conduit or return pipe that leads to and supplies the interior of the furnace shell. In doing this, I have increased the velocity of flow of the air through the conduit or return pipe by means of a propeller or electric fan. With such an installation, however, before a flow has been established throughout the system, or when the discharge registers of the system are closed there is liable to be a resurgence of the heated air from the furnace casing back to and behind the fan. Such air is often very hot and not only increases the internal resistance of the motor but injuriously affects the insulation employed in motor windings. I have sought to prevent such a resurgence of hot air about the motor in two ways;—first, by mounting the motor in a compartment which constitutes a portion of the system but is of greater cross sectional area and capacity, and second, by the employment of a shield or baffle in front of the motor so shaped that it will not only protect the motor but will facilitate the passage of air therefrom in the desired direction. It will be realized that in a system in which the entire fluid-motive force has hitherto been developed wholly by gravity, no substantial pressure can be developed. It will be further realized that the creation of a chamber of enlarged cross-sectional area and capacity in a conduit of such a system will tend to lessen the rate of flow in that conduit. It will hereafter be seen that by providing such a chamber of increased cross-sectional area and capacity and installing in the chamber means for creating an increased flow, together with a shield and baffle, I have overcome any tendency to a resurgence of the hot air backwardly through the system.

Also, I have provided a fitting in which the aforementioned structure is installed which is capable of ready assembly with adjacent ends of the cold air return pipe. Further objects of my invention are to provide an air circulator that is capable of ready installation by persons unskilled in the tinner's art, and which is readily controlled by means of a simple electric switch, located either adjacent the furnace or at a point convenient to the occupants of the apartment being heated. The structure is also simple in operation, economical to manufacture so that it may be sold to the user at a moderate price, and is effective in performing the functions for which it is designed. Reference will now be had to the accompanying drawings that form a part of this specification, in which

Fig. 1 is a vertical sectional view of my air circulator installed or interposed between adjacent ends of a cool air return conduit.

Fig. 2 is a horizontal section thereof.

In the drawings, A and B designate adjacent opposite ends of a cool air return conduit of an ordinary hot air furnace, through which the air is usually circulated by gravity to the furnace shell where it is reheated and passes into the usual distributor pipes through which it is conveyed to suitable registers for discharge into the apartment or rooms being heated. Between the ends of pipes A and B is interposed my air circulator which, it will be seen, preferably comprises a shell in which the motor and fan are mounted, and below the fan is positioned a shield and deflector for directing the air forwardly and preventing its rearward return. The shell preferably comprises a cylinder 5 of greater diameter than conduit pipe A—B, and at its upper and lower ends is provided with frustro-conical portions 6, 6, that terminate in short cylindrical extensions 7, 7, of sufficient diameter to assemble with the adjacent ends of return pipe sections A and B.

The motor 8 and fan 9 are positioned axially within cylinder 5 with the fan fac-

ing in the direction of the normal flow of air through the conduit, and suitable means are provided for supporting the motor and fan unit in this position. This supporting structure comprises a frame formed of straps 10 having lateral extensions 11 at their outer ends, whereby the same are secured by rivets or otherwise to the inner surface of cylinder 5. These straps extend radially inwardly and the inner portions of each pair of straps are connected by semi-circular portions or bands 12 of sufficient diameter to partially surround the casing of motor 8 and be clamped thereto. A short straight neck portion 13 is provided between each strap 10 and the semi-circular connecting portion 12 so that bolts 14 may be inserted through suitable apertures in these necks 13 and clamped by means of nuts on their threaded ends. This securely clamps the semi-circular portion 12 around the motor and supports the same, together with the fan in the desired position.

The current conductor wires 15 for the motor lead from the same through any suitable conduit 16 that is inserted through an aperture 17 in the shell and lead to a switch which controls the operation of the motor. Below the fan is a pair of crossed wires 18 that are supported at their outer ends upon the shell and at their central points have a shield and deflector 19 suspended therefrom. This shield and deflector may be of any desire shape, but I prefer to form the same of a cone shape, preferably flattened substantially as shown, and so arranged that the diverging walls of the cone are disposed so that they are in line with the casing, at points 20, which is the juncture between the lower conical tapered portion 6 and the short collar 7 of the shell.

By forming the shell of increased diameter by use of cylinder 5, which is greater in diameter than conduit A—B, I am able to accommodate the motor, fan and other structure in such manner that the increased diameter takes care of the displaced area occupied by these elements. Access is had to the interior of the shell through an opening or hand-hole 21 formed in cylinder 5 which is normally closed by a slide door 22, the upper and lower edges whereof are retained in guides 23 of angular shape. Secured to the outer face of the door is a handle 24 that permits easy manipulation of the door.

What I claim is:

1. A device of the kind described comprising a cylinder, frustum-conical walls at the ends thereof, cylindrical sleeves extending oppositely from said walls for assembly with adjacent ends of an air conduit, oppositely arranged straps secured at their outer ends to said structure and at their adjacent central portions constructed to receive and clamp the casing of a motor, a motor and fan unit mounted in the central portions of said straps, and a shield and deflector positioned in front of said unit.

2. A device of the kind described comprising a cylinder, frustum-conical walls at the ends thereof, cylindrical sleeves extending oppositely from said walls for assembly with adjacent ends of an air conduit, oppositely arranged straps secured at their outer ends to said structure and at their adjacent central portions constructed to receive and clamp the casing of a motor, a motor and fan unit mounted in the central portion of said straps, and a conical shield and deflector carried by the walls of said structure in front of said unit with its apex towards the fan.

3. The combination with an air-circulating pipe, of a tubular casing interposed therein that is of a greater diameter than said pipe and having suitable connection therewith, two sets of radial members supported upon said casing, a motor and fan unit mounted in one of said sets of members, and a conical shield and deflector mounted in the other set of members with its apex in alinement with the axis of said fan, all of said elements being disposed within boundaries of said casing whereby the capacity of said casing is equalized to the capacity of said pipe.

4. The combination with an air-circulating pipe, of a tubular casing interposed therein that is of a greater diameter than said pipe and having suitable connection therewith, an upper pair of radially disposed members secured at their outer ends to the wall of said casing, a motor and fan unit mounted at the central portion of said members, a lower pair of radially disposed intersecting members secured at their outer ends to the wall of said casing, and a conical shield and deflector mounted pendent at the intersection of said lower members with the axis of the fan, said upper and lower members and the elements supported thereby being disposed within the boundaries of said casing whereby the capacity of said casing is equalized to the capacity of said pipe.

Signed at Chicago, county of Cook and State of Illinois, this 25th day of July, 1922.

RUDOLPH W. MENK.