

Nov. 13, 1923.

1,473,648

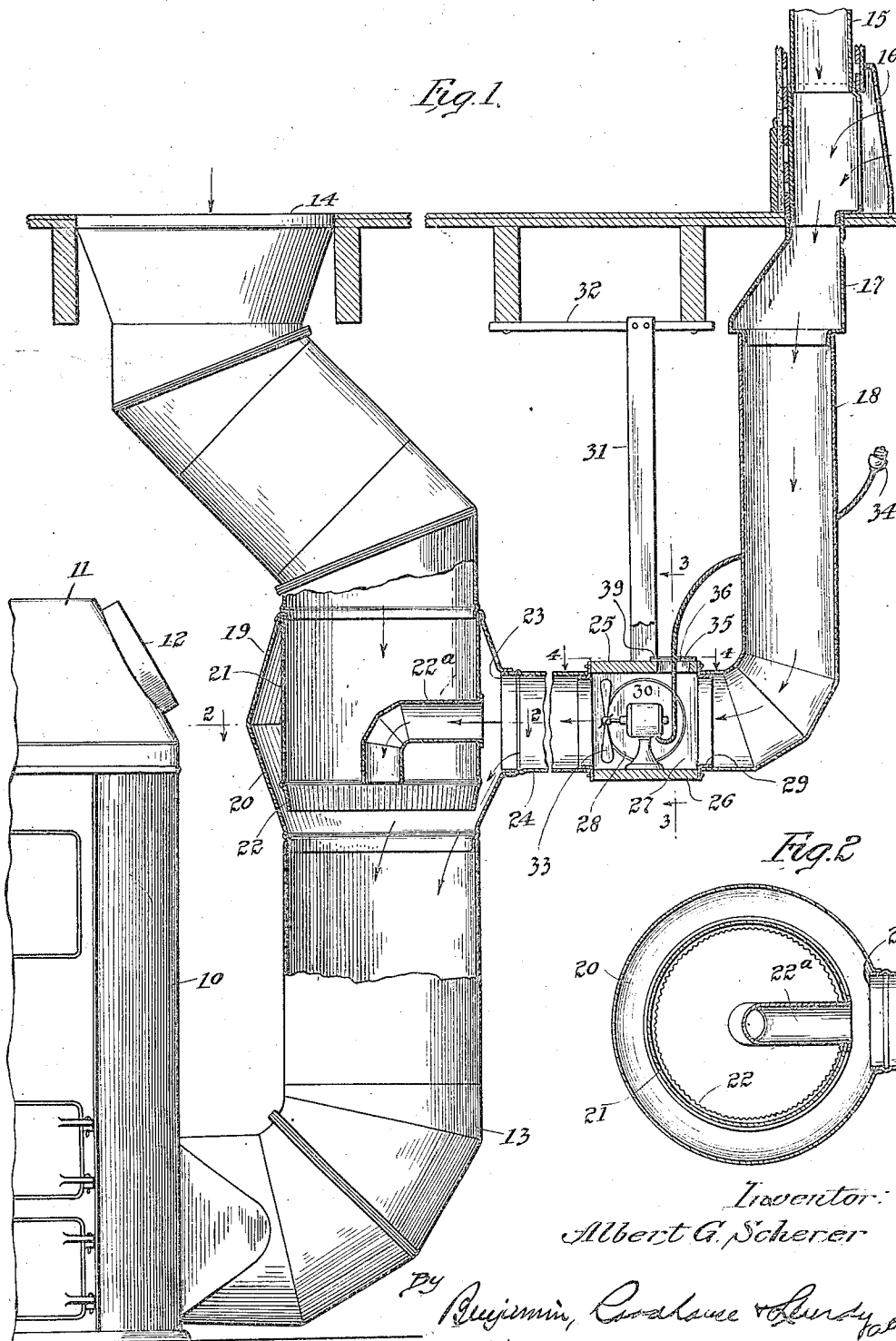
A. G. SCHERER

AIR CIRCULATOR

Filed Sept. 5, 1922

2 Sheets-Sheet 1

Fig. 1.



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Fig. 3

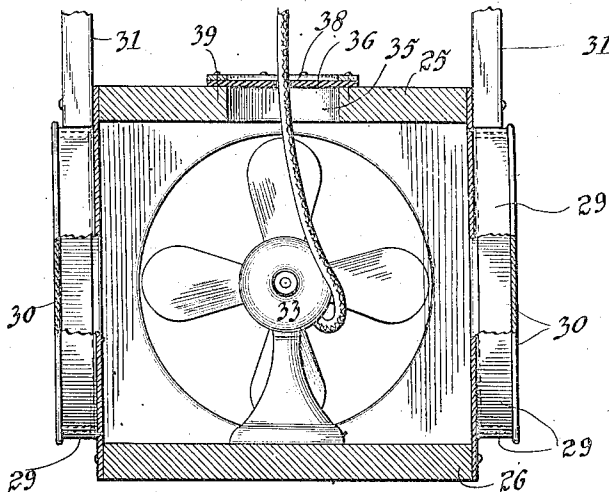


Fig. 4

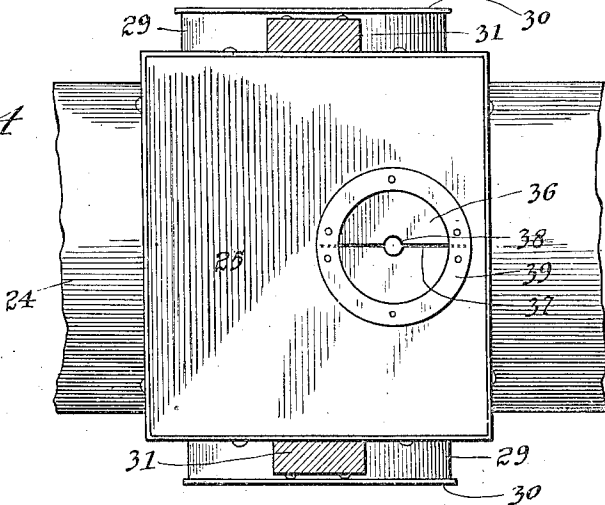
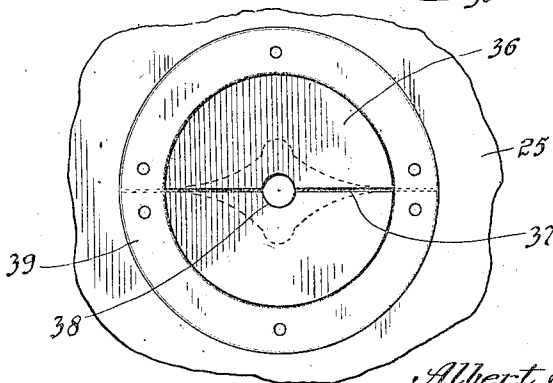


Fig. 5



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UNITED STATES PATENT OFFICE.

ALBERT G. SCHERER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE EXCELSIOR STEEL FURNACE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AIR CIRCULATOR.

Application filed September 5, 1922. Serial No. 586,165.

To all whom it may concern:

Be it known that I, ALBERT G. SCHERER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in an Air Circulator, of which the following is a specification.

My present invention relates to apparatus for circulating air in heating and ventilating systems, and has for its principal object the provision of a structure that may be installed in the return cool air pipe and connected with a duct or pipe leading to one of the rooms or apartments being heated. In this connection, I have provided a nozzle in the unit that is installed in the air pipe so that eddy and back currents are avoided, and I have also designed the apparatus so that it may be conveniently employed in connection with an ordinary electric fan. Other objects reside in the provision of an air circulator that is easy to install, is made up of few parts and which may be fabricated at a reasonable cost so that it may be retailed at a moderate price. I prefer to accomplish the foregoing and other objects by the means hereinafter described, reference being had to the accompanying drawings that show a typical or preferred embodiment of the principles of my invention.

In the drawings:

Fig. 1 is a view partly in section showing a fragmental portion of a hot air furnace, its return pipe and my air circulator incorporated therewith.

Fig. 2 is a horizontal section on line 2—2, Fig. 1, showing the fitting for the air pipe and the injector nozzle.

Fig. 3 is a vertical section on line 3—3, Fig. 1, looking in the direction of the arrows.

Fig. 4 is a top plan of the box in which the fan is installed.

Fig. 5 is an enlarged detail plan of the closure through which the conductor wire passes from the fan motor to the plug.

Similar reference characters have been employed to designate the same parts throughout the several views. In Fig. 1, I have shown, schematically, a furnace shell 10 having the usual bonnet 11 and hot air outlet or outlets 12 therein. The cool air conduit or return pipe 13 connects with the bottom or lower portion of shell 10 and

turns upwardly, in the illustration shown, to a floor registered 14 above the furnace. An auxiliary return pipe or flue 15 is positioned between the studding of the partition walls of the building and leads from the upper floors so that cool air may be taken in through registers 16 adjacent the floors and, below the flooring on the first story is provided a boot 17 that connects the rectangular conduit or pipe 15 to the cylindrical pipe or conduit 18 that is connected to the lower end of the boot. The object of return pipe 15 and conduit 18, which is a continuation thereof, is to take in cool air from portions of the building other than at the floor register 14, and, by means of my circulator device, to discharge the air so received into return pipe 13 at a higher velocity than is ordinarily the case where the circulation depends upon gravity, and in such a manner that the entire flow of air in pipe 13 is increased.

Interposed in return pipe 13 is a unit of greater diameter than the diameter of pipe 13, which is formed by means of oppositely tapered conical walls 19 and 20, which are arranged base to base and converge toward their juncture with return pipe 13. Secured to and depending from the upper end of wall 19 is an interior pipe 21 of cylindrical shape and of a diameter corresponding to the diameter of return pipe 13, which terminates above the lower edge of the lower conical wall 20 in an inwardly tapered portion 22 so that its lower end edge is out of contact with wall 20 to provide an air passage therebetween. Intermediate its height, cylindrical pipe 21 is provided with an opening into which is fitted a relatively small substantially L-shaped injector pipe or tube 22^a arranged with its discharge end facing downwardly in the axis of cylinder 21 and return pipe 13.

Leading from an opening 23 in conical walls 19 and 20 and adjacent and facing the inlet end of injector pipe 22^a is a small conduit 24 of substantially the same diameter as the auxiliary pipe 18, heretofore alluded to, and preferably alining axially with the inlet end of injector tube 22^a. The auxiliary pipe 18 and pipe 24, just referred to, terminate adjacent each other and have interposed therebetween a box-like structure in which the fan or blower for increasing the velocity of the air is installed. This box-

like structure comprises a top 25 and bottom 26, preferably formed of two rectangular pieces of wood that are spaced apart and have their edges secured to the surrounding side walls 27 which are preferably formed of a sheet of metal of a length to form the four side walls and which is provided in each of the four walls with an opening 28 of substantially the diameter of auxiliary pipe 18 and pipe 24, heretofore mentioned. By providing short lateral flanges or collars 29 to fit openings 28, it will be observed pipes 18 and 24 may be connected to whichever opening is most convenient in order to save using a number of elbows and joints in making the connection. Two of these openings in the structure illustrated are utilized for these connections and the remaining openings are closed by means of flanged caps 30.

In order to support the structure and add additional strength thereto the box is mounted by means of two stringers 31 nailed at their lower ends to the wood portions of the box, and at their upper ends secured to cross-pieces 32 conveniently connected to the joist or the structure of the building. The blower is of the ordinary electric fan type, as shown at 33 in the drawings, so that it is not necessary for the user to employ an expensive blower for this purpose. The fan is inserted through one of openings 28 by removing one of caps 30 and is positioned with its blades toward connecting pipe 24, as shown in the drawings. The electric plug 34 is then passed through an opening 35, preferably in the top of the box, and inserted in the usual socket connection. In order to close opening 35 and prevent dust and other foreign matter from the cellar entering the system through this opening, I have provided the same with a flexible diaphragm 36, preferably formed of a disc of rubber that is provided with a diametrical slit 37, and at its center has an aperture 38 of sufficient size to accommodate the transverse dimensions of the cord or similar conductor leading from the fan to the plug. This disk is placed over opening 35 in the box and is secured in position by means of an annulus 39 that is tacked, or otherwise secured to the box. When the plug is inserted through the diaphragm, slit 37 will permit the rubber to flex on each side thereof and allow the passage of the plug, after which the diaphragm will close and the cord will be positioned in aperture 38.

When the fan is set in motion the air drawn through register 16 is forced by the action of the fan at an increased velocity into pipe 24 from which it is discharged into the unit composed of walls 19, 20 and 21, a portion of the air passing into injector tube 22^a from which it is discharged axially downwardly into the cool air return conduit 13. The remaining air under increased

velocity from the fan discharges from the unit between wall 20 and the lower end of the inner cylindrical wall 21 in a downward direction into the return or cool air conduit 13. The employment of the injector in the position herein disclosed prevents the liability of eddy and back currents and the apparatus greatly increases the circulation of the air in the system.

It will be obvious, that should it be desired, other connections may be made with other openings in the box in which the fan is positioned by running one or more other leads of pipe from the box to other locations in the building or apartment being heated in order to draw off more air from the lower or cooler portions of the rooms.

What I claim is:—

1. The combination with an air conduit, of a fitting interposed therein consisting of oppositely tapered outer walls converging away from each other and adapted to fit adjacent portions of said conduit, an inner wall of substantially the diameter of the conduit arranged within said fitting in spaced relation to said tapered walls to provide a passageway therebetween, an L-shaped injector tube within said fitting and discharging into the same, and means connected with the outer walls adjacent the intake of the injector tube for discharging air into the fitting and injector tube.

2. An air circulator comprising a conductor pipe, a fitting interposed therein and formed with inner and outer spaced walls to provide a passageway discharging into said pipe, an angular tube opening at one end into the passageway and with its opposite end disposed longitudinally of said pipe, and means opening into the aforesaid structure for discharging air into said passageway and through said tube.

3. An air circulator comprising a conductor pipe, a fitting interposed therein and formed with inner and outer spaced walls to provide a passageway discharging into said pipe, a tube leading from said passageway through the inner wall and discharging into said pipe, and means communicating with the aforesaid structure whereby air is discharged into said passageway and through said tube.

4. An air circulator comprising a conductor pipe, a fitting interposed therein and formed with inner and outer spaced walls to provide a passageway discharging into said pipe, a tube leading from said passageway through the inner wall and discharging into said pipe; said outer wall provided with an inlet opening, an auxiliary pipe discharging into said passageway through said inlet opening, and a blower in said auxiliary pipe whereby air is forced through the latter pipe, said passageway and tube.

5. An air circulator comprising a conduc-

tor pipe, a fitting interposed therein and formed with inner and outer spaced walls to provide a passageway discharging into said pipe, a tube leading from said passageway through the inner wall and discharging into said pipe; said outer wall provided with an inlet opening in front of the inlet end of said tube, an auxiliary pipe discharging into said passageway through said inlet opening, and a blower in said auxiliary pipe whereby air is forced through the latter pipe, said passageway and tube.

6. An air circulator comprising a conductor pipe a portion thereof formed with inner and outer walls to provide an annular

passageway outside said pipe which passageway communicates therewith at the lower end of the inner wall, an auxiliary pipe communicating with said passageway above the point of discharge of the latter, a tube leading from said passageway into the interior of the aforesaid structure, and a blower discharging in said auxiliary pipe in the direction of the conductor pipe.

Signed at Chicago, county of Cook and State of Illinois, this 1st day of September, 1922.

ALBERT G. SCHERER.

Witness:

FLORENCE MITCHELL.