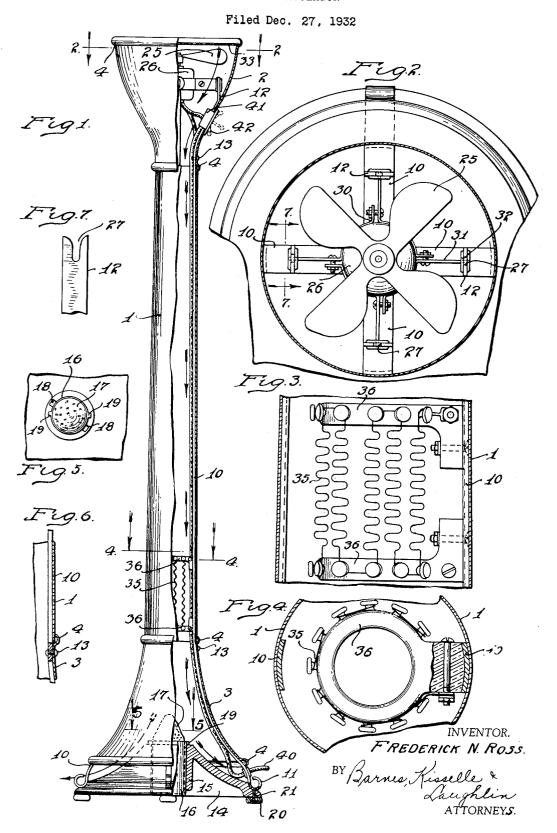
AIR CIRCULATOR



## UNITED STATES PATENT OFFICE

## 1,958,768

## AIR CIRCULATOR

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11 Claims. (Cl. 261—14)

This invention has to do with the circulation and conditioning of air, and it relates primarily to an apparatus or device which may be termed an air circulator and which is especially adapted for use in rooms of residences, offices, and the like.

More particularly the invention is directed to the provision of a device which may be placed in a room and which may have one or more elements, such as a fan, a heater, or the like, electrically operated, and which may be so operated by merely establishing an electrical connection.

Among the objects of the invention is the provision of a device capable of effecting an air circulation in such a manner that the air is circulated to and from the upper and lower portions of the room. Since warm air moves upwardly the device is preferably arranged to remove air from the upper portions of the room and deliver same to the lower portions thereof. The device may be used with or without a heater for heating the air, and it may also include an arrangement for humidifying the air.

Also among the objects of the invention is the provision of a device of the nature mentioned which is sufficiently portable to permit of its being placed wherever desired in the room, and a device which not only requires a small amount of room but one which will not be objectionable 30 from an esthetic standpoint.

In the accompanying drawing:

Fig. 1 is a view illustrating a portion of a device constructed in accordance with the invention in side elevation, and having some parts cut away 35 and some parts shown in section.

Fig. 2 is a sectional view looking substantially on line 2—2 of Fig. 1, showing the fan and mounting.

Fig. 3 is a sectional view through a housing 40 member illustrating the heating element.

Fig. 4 is a section taken substantially on line 4—4 of Fig. 1.

Fig. 5 is an enlarged sectional view showing a structural detail.

Fig. 6 is a detail sectional view of a portion of the base structure.

Fig. 7 is a detail of an upper end of a structural member.

The device comprises primarily a tubular body
1 which may be made of a sheet of metal and
which advantageously may be of a slightly tapered shape, connecting at its upper end to an
inverted bell or funnel 2, also advantageously of
sheet metal. Another bell or funnel 3 connects
to the lower end of the body member 1. The

bell members 2 and 3 may have rolled or beaded edges 4 and some of the beads 4, as illustrated in Fig. 6, lap over the upper and lower ends of the body member 1 at the joint.

These sheet metal members may be of relative- 60 ly light construction and they may be supported by a suitable supporting frame-like structure. This structure may comprise four lengths of metal which may be in the nature of strap iron, as shown at 10. The lower ends of the members 65 10 may be fashioned into rolls or loops 11, and these members extend upwardly inside the bell 3, inside the body member 1, and inside the inverted bell 2, their upper ends being shown at 12. The sheet metal shell members may be attached to 70 the supporting members 10 in any desirable fashion and wherever desired; as for example, rivets 13 may pass through the structural members 10 and bells 2 and 3.

A base member is shown at 14 and may have a 75 central hub-like part 15 for receiving a receptacle 16, which may be filled with water and which may contain a sponge or other absorbent material 17. The receptacle 16 may be removable, for which purpose the hub may have grooves 18 and the 80 cup may have lugs 19. When the lugs are lined up with the grooves the cup may be removed from the bottom of the base and when turned into disalignment the lugs support the cup, as shown in Fig. 1. This is just one way in which the cup 85 may be mounted. The base member may have supporting feet 20, which may be pads of rubber or other composition and screws 21 may be passed therethrough which may also enter the loops 11 to hold the members 10.

A fan 25 may be positioned in the bell 2 and it may be operated by an electric motor 26. The upper ends of the structural members 10 preferably support the motor, and for this purpose the upper ends may each be provided with a slot or 95 notch 27. Four similar supporting members 30 may be clamped around the motor, as shown in Fig. 2, and each may have an arm 31, upon the end of which is mounted a grommet of rubber, or the like, as illustrated at 32, and these grommets 100 may be fitted in the slots 27. Thus the motor is securely supported, yet resiliently mounted and carried in part by each structural member 10. It is thought to be preferable that the fan be covered by a screen 33 positioned adjacent the upper end 105 of the inverted bell 2.

An electric heating element having resistance wires at 35 may be supported by insulating supporting members 36 carried by one or more of the structural members 10, as illustrated in Fig. 3. 110

Electrical conductors advantageously in the form of duplex wire or cable 40 may pass into the bell 3 and connect to the heating elements and motor through a suitable switch 41. This switch has an 5 operating lever 42 and the switch advantageously may be one capable of establishing an electrical connection for the motor only, and for the motor and heater together. The arm 42 may have three positions, two of which are shown in dotted lines 10 in Fig. 1. In one of the three positions the motor and heating element are cut off from the electrical conductors; in another position the motor only is connected; and in the third position both the motor and heating element are connected.

This device may be disposed most anywhere in a room and when the motor is set into operation the fan sets up a current of air downwardly through the device, as illustrated by the arrows of Fig. 1. Thus air is drawn from the upper 20 regions of the room into the inverted bell 2 and forced outwardly at the bottom underneath the lower edge of the bell 3. It will be noted that the lower edge of the bell 3 terminates above the base member 14, thus leaving substantially a circumferential outlet so that the air may pass out in all directions. If it is desired to humidify the air, the receptacle 16 may be filled with water, and in this connection any deodorizing agent may be employed in the receptacle 16. Thus the air in the upper regions of the room, which is relatively warm, is discharged in all directions in close proximity to the floor of the room, whence it again may rise to the upper regions. In this fashion substantially the entire air volume in a room may be kept in constant movement, so that the temperature differential between the upper and lower portions of the room is maintained at a minimum. This factor is advantageous in the winter time when the room is being heated, as the lower portions near the floor may be kept at a temperature more nearly that of the upper regions. The heater may not be used during winter time operation when heat is otherwise provided. During summer time operation the air in the room may be constantly circulated, thus maintaining a substantially uniform temperature, and under cool weather conditions the heater may be employed to heat the air as it passes through the device, whereby warm air is caused to pass out of the device into regions adjacent the floor. Thus the heated air is immediately brought to the desired location, namely, the lower portion of the room, whence it may rise to the upper portions and be again drawn through the device to the end that the air does not become stratified-the cool air at the bottom and the warm air at the top.

In some of the claims appended hereto use is made of the word "bell" in describing the members 60 2 and 3. This word is not to be construed narrowly since the members 2 and 3 are capable of quite a large variation in shape and still fall within the invention. This word is to be construed to describe a structure which is in the nature of an 65 enlargement or flare. Also in some of the claims it is specified that the upper end is at the upper regions of the room. The device may be constructed with an over all height in the neighborhood of six feet, although even this height may be 70 varied, and such a height is intended to be such as to cause the upper end to be in the upper regions of the room when the device is resting upon the

The member 33 may be an air filtering element, 75 in which event it serves to filter the air, as well as

protecting the fan. This air filtering element may advantageously be of that type which comprises exploded glass or which comprises other material forming a mass with a multiplicity of interstices therein through which the air may be drawn.

I claim:

1. An air circulator, comprising a hollow body member having a bell shaped lower end and an inverted upwardly opening bell shaped upper end, supporting means for the body member holding the lowermost edge of the lower bell spaced from adjacent parts whereby to provide a substantially circumferential air passageway, said device being adapted to rest upon the floor of a room or the like with the inverted bell near the upper regions of the room adapted to receive air by substantially vertical movement of air into the same, and a fan positioned in one of the bells for moving a current of air downwardly through the hollow body member with the air entering the inverted bell and discharging through the said circumferential air passageway.

2. An air circulator, comprising a hollow body member having a bell shaped lower end and an inverted upwardly opening bell shaped upper 100 end, supporting means, said device being adapted to rest upon the floor of a room or the like with the lowermost edge of the lower bell spaced from the floor whereby to provide a substantially circumferential air passageway and with inverted 105 bell near the upper regions of the room, and a horizontally positioned fan in said upper bell for moving a current of air downwardly through the hollow body member with the air entering the inverted bell with substantially vertical movement 110 and discharging through the said circumferential air passageway.

3. An air circulator, comprising a tubular central member, a separate bell member for the lower end thereof, another separate inverted bell 115 member for the upper end thereof, an air propelling fan for moving air through said members, a supporting base, and structural strips secured to the base extending through the lower bell, the central member, and into the upper inverted bell 120 and means for holding said members assembled on said strips.

4. An air circulator, comprising a tubular central member, a separate bell member for the lower end thereof, another separate inverted bell mem- 125 ber for the upper end thereof, a supporting base, and structural strips secured to the base extending through the lower bell, the central member and into the upper inverted bell, said strips projecting below the lower bell and supporting the 130 lower edge of the lower bell spaced from the base member to provide an air outlet passageway, an electric motor positioned in the upper bell, supporting means secured to the motor and connected to the upper ends of the structural strips 135 and carried thereby, and an air fan operated by the motor for directing a downward current of air through the bells and central member.

5. An air circulator, comprising a hollow body member adapted to stand upon the floor of a room 140 or the like with its upper end disposed near the upper regions of the room, an air fan positioned within the member for setting up a current of air downwardly through the hollow body member with the air entering the top and discharging near 145 the bottom, the said fan being positioned near the upper inlet end of the hollow body member, and an air filtering element positioned in the inlet end through which the air is drawn and which serves as a protector covering for the fan.

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6. A portable air circulator comprising, a rel- adapted to rest upon the floor of a room and supatively long sheet metal tubular body member, supporting means adapted to rest upon the floor of a room for supporting the body member in a substantially vertical position, the lower end of the tubular body member being open and spaced from the said floor for the discharge of air, an inverted bell shaped member on the upper end of the body member associated with the upper end of 10 the tubular body member in sealed relation and with the large end of the bell member opening upwardly, said tubular body member being of such height as to locate the upwardly opening bell member in the upper regions of a room, and an 15 air fan within the circulator for moving a current of air downwardly from the upper regions of the room into the upwardly opening bell and downwardly through the tubular body member with said air discharging from the lower end of 20 the tubular body member.

7. An air circulator comprising, a relatively long tubular body member, supporting means adapted to rest upon the floor for supporting the body member in a substantially vertical position, the lower end of the tubular body member being open for the discharge of air, an inverted bell shaped member on the upper end of the body member associated with the upper end of the body member in sealed relation and with the large end of the bell member opening upwardly, said tubular body member being of such height as to locate the upwardly opening bell member in the upper regions of a room, an electric motor positioned on a vertical axis and located in the in-35 verted bell, an air fan on the motor shaft and positioned within the bell adjacent the upper edge thereof, and a filter element covering the upper large end of the bell and immediately overlying the fan for protecting the same.

8. An air circulator comprising, a relatively long tubular body member, a bell shaped end piece at one end of the body member, supporting means for supporting the body member in a substantially vertical position with the lower large end of the bell piece spaced therefrom to form an outlet for air, an inverted bell member at the upper end of the body member located with its large end opening upwardly, the body member being of such height as to locate the inverted bell member in the upper regions of a room, and a fan positioned on a substantially vertical axis and located within the large end portion of the inverted bell for drawing air into the bell with a general downward movement of the air and for directing a current of air downwardly through the tubular body with said air discharging around the lower end of the first mentioned bell piece.

9. A portable air circulator comprising, a tubular sheet metal body member, oppositely disposed bell shaped members at opposite ends of the tubular body member, one for the inlet of air and one for the outlet of air, a supporting means

porting the body member in a substantially vertical position with the lower edge of the lower bell spaced from the floor so that air may pass out of the same in proximity to the floor, the tubular body member and the bells on its opposite ends being of such a combined height as to locate the bell on the upper end of the body member in the upper regions of a room when the said supporting means is resting upon the floor of said room, the bell on the upper end of the body member having its large end opening upwardly, and an air propelling fan in one of the bells for moving a current of air downwardly with the air in the upper regions of the room entering the upper bell, passing through the body member and discharging from the lower bell in proximity to the floor.

10. A portable air circulator comprising, a tubular sheet metal body member, oppositely disposed bell shaped members at opposite ends of the tubular body member, one for the inlet of air and one for the outlet of air, a supporting means adapted to rest upon the floor of a room and supporting the body member in a substan- 100 tially vertical position the tubular body member together with the bell members on its opposite ends having such a combined height as to locate the bell on the upper end of the body in the upper regions of the room when the supporting 105 means is resting upon the floor of said room, the bell member on the upper end of the body member having its large end opening upwardly and an air impelling fan positioned in one of the bells for moving a current of air downwardly through 110 the body member with the air in the upper regions of the room entering the upper bell member and with said air discharging from the lower bell member in close proximity to the floor.

11. A portable air circulator comprising, a tu- 115 bular sheet metal body member, oppositely disposed bell shaped members at opposite ends of the tubular body member, one for the inlet of air and one for the outlet of air, a supporting means adapted to rest upon the floor of a room and sup- 120 porting the body member in a substantially vertical position with the lower edge of the lower bell spaced from the floor so that air may pass between the lower edge of the bell and the floor, the tubular body member and the bells on its opposite ends being of such a combined height as to locate the bell on the upper end of the body member in the upper regions of a room when the said supporting means is resting upon the floor of said room, the bell on the upper end of the body member having its large end opening upwardly, and an air propelling fan in one of the bells for moving a current of air through the body member and bells whereby to effect a substantially vertical circulation of the air between the upper regions and the lower regions of the room.

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