

June 15, 1943.

E. W. GENT

2,321,907

BLOWER DEVICE

Filed May 31, 1941

2 Sheets-Sheet 1

FIG. 1

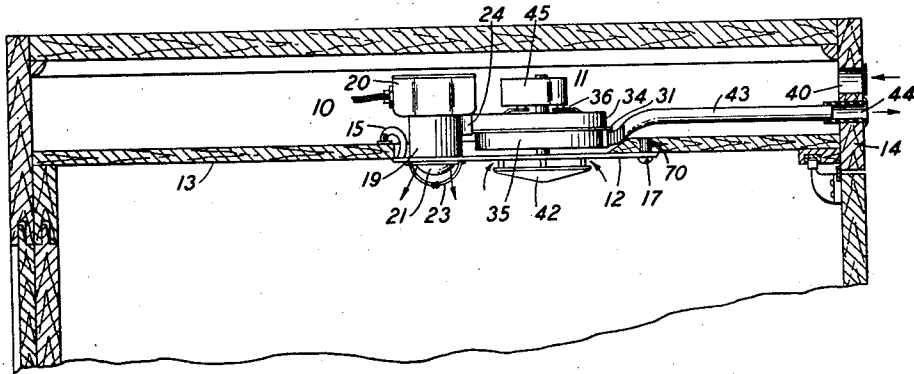


FIG. 2

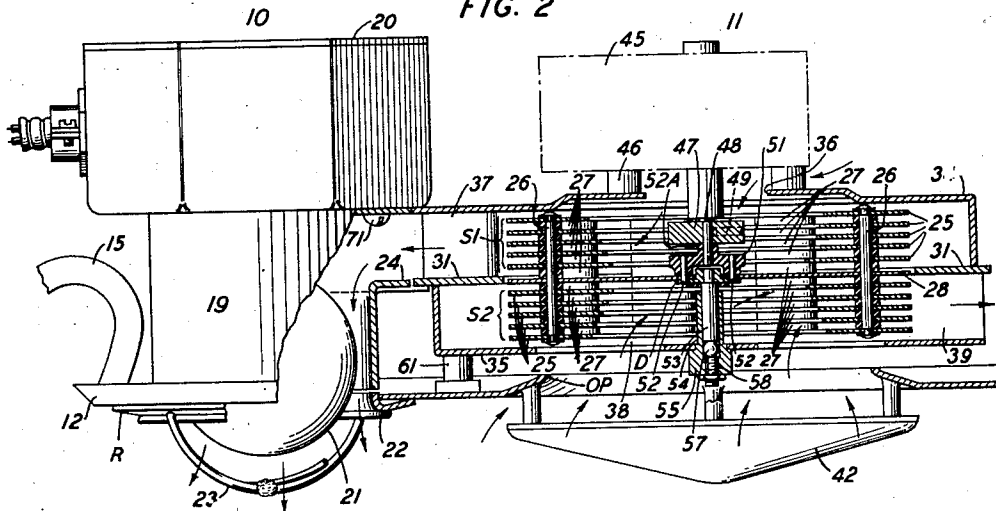


FIG. 5

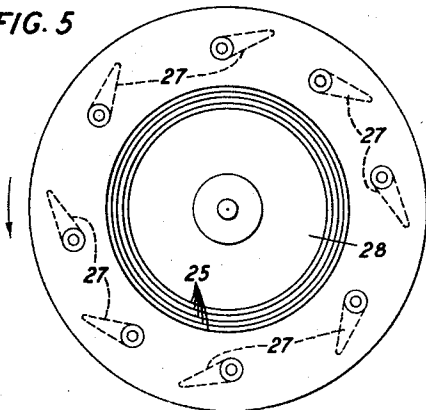
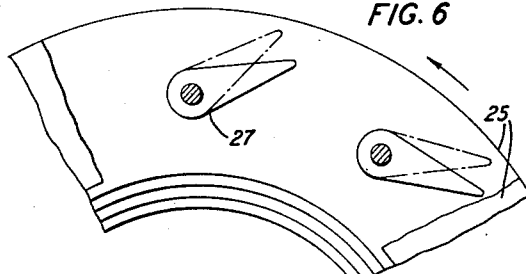


FIG. 6



INVENTOR
E. W. GENT
BY
J. Mac Donald
ATTORNEY

June 15, 1943.

E. W. GENT

2,321,907

BLOWER DEVICE

Filed May 31, 1941

2 Sheets-Sheet 2

FIG. 3

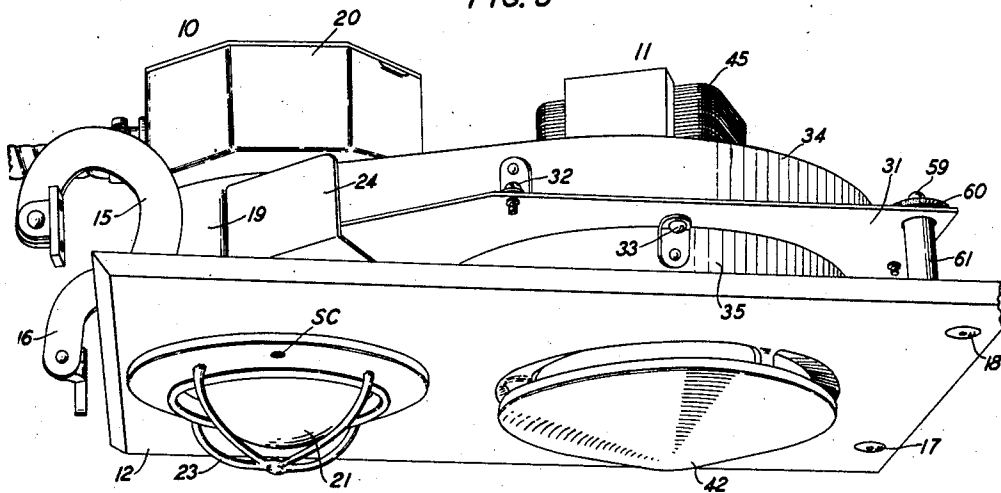
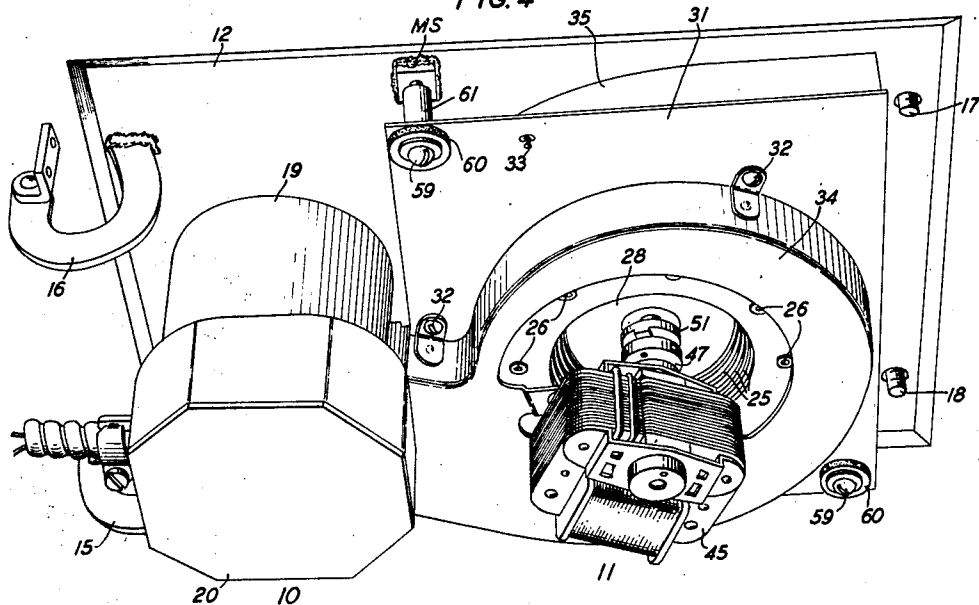


FIG. 4



INVENTOR
E. W. GENT
BY *J. Mac Donald*
ATTORNEY

UNITED STATES PATENT OFFICE

2,321,907

BLOWER DEVICE

Edgar W. Gent, Morristown, N. J., assignor to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application May 31, 1941, Serial No. 396,027

2 Claims. (Cl. 230—129)

This invention relates to ventilating devices and more particularly to a blower which is particularly well adapted for use in connection with the ventilation of telephone booths and the like.

The object of this invention is to provide a ventilating device for telephone booths which will be simple in construction and efficient and quiet in operation.

A feature of the invention is the provision of a blower device in which the air is set in motion by the rotation of flat rings disposed in superimposed and spaced relation to each other to form the rotor element of the blower.

Another feature of the invention is the provision of means in the rotor element cooperating with means carried by the rotor casing whereby the air is set in motion in directions opposite to each other, in one direction drawing the air into the booth and in the other direction drawing the air from the booth.

Another feature is the provision of means carried by the rings which may be set to give various amounts of air displacement.

Another feature is the provision of a ventilating unit which combines in a single unitary structure a blower and a lamp for the lighting of the booth.

More specifically, the blower of this invention which makes use of the combined effects of adhesion and cohesion of the air and of the frictional drag of rotating rings on the air consists of two casing sections, a partition between the casing sections and a rotor element. This rotor element comprises a plurality of flat rings held in spaced and superposed relation to each other by a series of streamlined vanes which may be set at different angles relative to a pitch line or path for controlling the flow of air generated by the movement of the flat rings. A disc which forms part of the rotor element cooperates with a portion of a mounting plate to divide the flat rings into two sets of equal number of rings. The rotor thus constructed is positioned in the housing in such a manner that each set of rings operates in its respective casing section and one of the sections is provided with an air inlet passage and the other section with an air outlet passage, one set of rings serving to draw fresh air from the outside and introduce it into the booth while the other set of rings serves to withdraw the vitiated air from the booth and expel it to the outside of the booth to the atmosphere, thus continuously renewing the air during the period that the booth is occupied and the door is closed.

The features of this invention will be understood from the following detailed description made with reference to the accompanying drawings in which:

Fig. 1 is a fragmentary view, partly in cross section, of the ceiling and attic portion of a telephone booth with the ventilating unit of this invention installed therein;

Fig. 2 is a side elevation, partly in cross section and with parts broken away, of the combined lighting fixture and blower unit;

Fig. 3 is a view in perspective of the underside of the ventilating unit showing the booth inlet and outlet apertures;

Fig. 4 is a view in perspective of the top side of the ventilating unit shown in Fig. 3;

Fig. 5 is a top plan view of the rotor unit; and

Fig. 6 is an enlarged fragmentary view, with parts broken away, of the rotor unit showing the streamlined air displacing vanes.

The air blower of this invention is arranged to be mounted in a compartment formed by the ceiling and the roof of a telephone booth with the air inlet and outlet apertures extending through the front wall of the booth as shown in Fig. 1.

The air blower is mounted on a supporting plate 12 which in turn is pivoted to the ceiling 13 of the booth 14 as on hinges 15 and 16, best seen in Fig. 3, and locked in position by screws 17 and 18 engaging bushings 10 secured to the ceiling 13. A cylindrical housing 19 secured to the plate 12 forms the terminal end of the air inlet path and to this housing is secured as by a number of screws 71, an outlet box 20. The box 20 has located therein the usual screw-type lamp socket (not shown) into which the lamp 21 is secured in position concentric to housing 19 with the lamp extending a short distance below the underside of plate 12 in juxtaposition to a wire grid or guard 23 having a ring R pivoted to the plate 12 and held in the closed position by a screw SC engaging the plate 12. The lamp 21 is of such diameter relative to inner diameter of casing 19 that a concentric air space is provided between the inner wall of the housing 19 and the lamp.

The rotor element of the blower 11, as shown in Fig. 2, comprises a spindle 53, a disc 28 forming an element of a partition and a plurality of flat rings 25 secured in coaxial relation to each other and to the spindle 53 to which the disc 28 is secured. Studs as 26 are provided for collectively securing the rings 25 to the partition element disc 28 and serve for mounting streamlined vanes 27 intermediate the rings 25 for holding

the latter in spaced relation to each other and to perform a function which will be hereinafter described in detail.

The supporting disc 28 divides the rings 25 into two sets S1 and S2 with an equal number of rings in each set. In the operation of this rotor element, while sufficient air flow has been secured by the sole operation of the rings 25, a greater air displacement can be secured by setting the streamlined vanes 27 at an angle relative to their path of rotation while the streamlining of these vanes effectively prevents the generation of vibrations and therefore so-called humming noise by the rotor elements.

As shown in Fig. 2, the housing for the rotor element consists of two casing sections 34 and 35 and a stationary apertured plate 31 forming the complementary portion of partition disc 28 and in cooperation with these casing sections forms two separate compartments, the casing sections 34 and 35 being secured to the complementary partition plate 31 by a number of screws 32 and 33 best seen in Figs. 3 and 4.

The casing section 34 in which the set of rings 25 of set S1 rotate is provided with an opening 36 forming with the opening in the rings 25, and the spaces between these rings, an air inlet leading at 37 to the annular air path formed by circular casing 19 and the lamp 21 and hence to the interior of the booth through the wire guard 23. The air from the exterior atmosphere enters the compartment formed by the ceiling and the roof of the booth by the opening 40 in the wall of the booth.

The outlet 38 for the vitiated air from the interior of the booth is formed by the space between a shield 42 secured to the plate 12 and the opening OP in this plate which leads to the openings in the plates 25 of set S2 and hence through the spaces between these plates and through a conduit 43 leading to the exterior of the booth through a bushing 44 to which the end of conduit 43 is secured, the inner disposed end of conduit 43 terminating a small distance from the portion 39 of casing 35 so as to permit the pivotal movement of plate 12 and the apparatus mounted thereon for inspection from the interior of the booth.

The electric motor 45, as shown in Figs. 2 and 4, is mounted on the casing section 34 and is provided with suitable cushioning means 46 located between the motor base and the casing section 34. The armature shaft of motor 45 is connected to one end of spindle 53 of the rotor element by a universal coupling in the form of a rubber disc 51 having openings disposed 90 degrees apart for engaging pins 52A carried by a collar 47 keyed to the armature shaft of the motor and pins 52 carried by a disc D keyed to the spindle 53 of the rotor element.

The spindle 53 of the rotor element rotates in a sleeve or bearing 54 secured to the casing section 35 while an end thrust bearing in the form of a ball 57 interposed between the end of spindle 53 and a screw 58 serves for adjusting the rotatable partition disc 28 relative to the plane of its cooperating apertured mounting plate partition 31.

In the operation of the blower device of the invention as used in connection with the ventilation of a telephone booth, for example, the closure of the telephone booth door is effective to operate a switching device provided for controlling the operation of the lamp 21 and simultaneously causes the energization of the motor

45 for actuating the rotor element of the blower. The operation of this element is effective to generate a current of air from opening 40 in the front wall 14 of the telephone booth shown in Fig. 1 leading into the compartment formed by the ceiling and the roof of the booth and thence into the air inlet 36 and forces such air into the interior of the booth through the set of rings S1 operating between wall section 34, the rotating disc partition element 28 and its cooperating apertured plate partition element 31 forming the other wall of this compartment, the conduit 37 which connects with the annular air opening formed by the lamp 21 and the circular housing 19. Another flow of air is generated by the operation of the set of rings S2 from the interior of the booth through the space formed between the shield 42 and the mounting plate 12, the opening OP in this plate, the openings of the rings 25 of set S2 through the spaces between the rings rotating in the compartment formed by wall section 35, the apertured mounting plate partition element 31 and the rotary disc partition 28 and thence through the air outlet 39 leading to the duct 43 which in turn is connected to the opening 44 located in the front wall of the booth.

In order to service the combined blower and lighting fixture thus constructed, the removal of bolts 17 and 18 permits the pivotal movement of plate 12 on its hinges 15 and 16, thus giving access to the blower including its actuating motor 45 and the lamp 21 used for the lighting of the booth.

As shown in Figs. 2, 3 and 4, the apertured partition mounting plate 31 of the blower is secured to the mounting plate 12 by screw 59 engaging units MS carried by the plate 12 with resilient washers 60 and resilient bushings or spacers 61 provided for resiliently supporting the partition mounting plate 31, this mounting effectively preventing any vibration of the motor from being transmitted to the booth structure, thus preventing the generation of noise from this source.

While there is shown and described herein the preferred embodiment of my invention, it is understood that it is not limited to telephone booths or confined to the details of construction herein described as various modifications may be made without departing from the spirit of the invention and I am only limited by the scope of the appended claims.

What is claimed is:

1. An air blower comprising a casing made of two wall sections, a stationary partition disposed between said wall sections, means for securing said wall sections to said partition, said partition cooperating with each of said wall sections to form two air paths each having an air inlet and an air outlet, said partition having a circular opening, a rotor element comprising a plurality of parallel disposed flat rings, a circular partition dividing said flat rings in sets and rotatable as a unit with said rings, said circular partition being disposed for rotation in the opening of said stationary partition and in the same plane therewith to form a complementary portion thereof, one of said paths extending from the exterior to interiorly of a room and the other of said air paths extending from the interior to the exterior of the room, a motor secured to one of said casing sections, and resilient coupling means operatively connecting said motor to said rotor element.

2. In an air blower device, a casing comprising

two wall sections, a stationary plate for securely mounting said wall sections on each side thereof, said stationary plate having an opening, a rotatable element cooperating with said stationary element to form with said wall sections compartments, one of said wall sections having a bushing, a shaft having one of its ends secured to said rotary partition element and resting in an end thrust bearing in said bushing, a set of flat rings carried by said rotary partition on each side 10

thereof for operation in said compartments, means in said bushing for adjustably holding said rotary element for rotation in a plane common to said stationary mounting plate, a motor 5 mounted on the other of said wall sections with its driving shaft in position coaxial with the first-mentioned shaft, and resilient coupling means operatively connecting the first and second-mentioned shafts.

EDGAR W. GENT.