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VENTILATING APPARATUS

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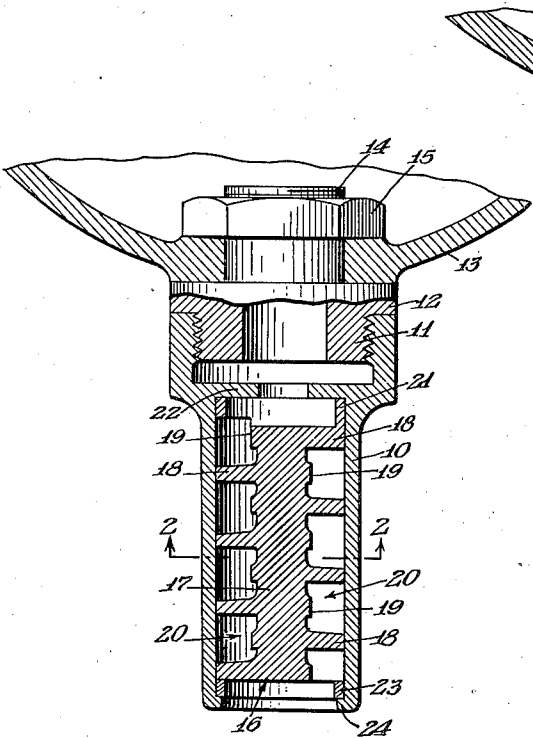


FIG. 1.

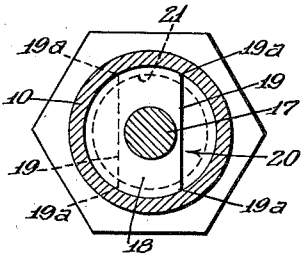


FIG. 2.

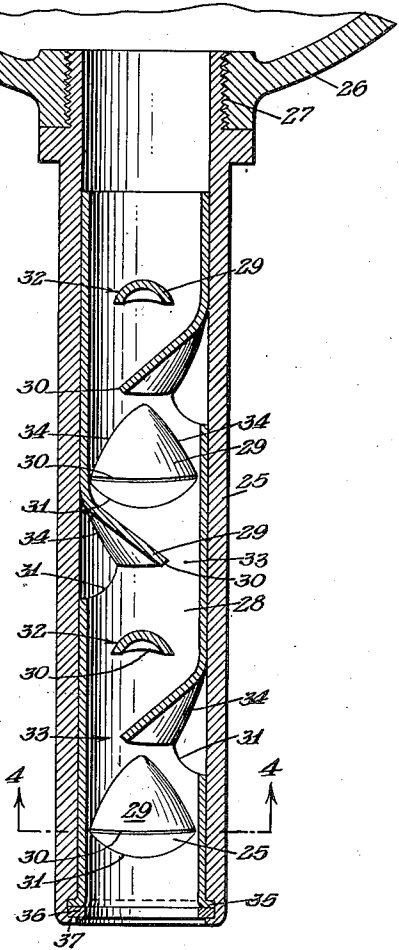


FIG. 3.

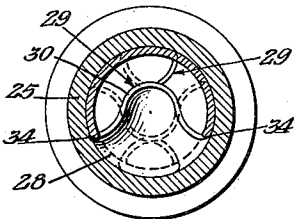


FIG. 4.

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VENTILATING APPARATUS

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8 Claims. (Cl. 98—1)

This invention relates to ventilating apparatus and more particularly to means adapted to separate moisture and other foreign matter from air while permitting the passage of the air there-through to a space to be ventilated.

One of the objects of the present invention is to provide a novel simplified ventilator of the baffle type adapted for use in connection with magneto casings, distributor housings or the like.

Another object of the invention is to provide a ventilator of the above type which is constructed in a novel manner from a small number of simple and rugged parts.

Still another object is to provide novel ventilating means for closed casings, said means being so constructed as to occupy only a relatively small space as compared with prior devices of like capacity.

A further object is to provide novel ventilating apparatus which may be readily and rapidly manufactured, assembled and installed at low cost.

Another object is to provide a novel constructed casing ventilating means which is highly efficient and yet is not apt to become clogged or rendered inoperative in any way, the same being so constructed as to facilitate the discharging of moisture or the like which is separated from the air stream.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is for the purpose of illustration only and is not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawing, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a sectional side elevation of a device embodying a preferred form of the invention;

Fig. 2 is a transverse sectional view of said device, the section being taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1, showing another preferred embodiment of the invention; and,

Fig. 4 is a transverse sectional view taken substantially along line 4—4 of Fig. 3.

The two ventilators illustrated in the drawing, by way of example, are enlarged scale representations of actual structures embodying the inven-

tion made by different modes of manufacture, which structures are being commercially employed for ventilating the casings of magnetos and distributors used in the ignition systems of internal combustion engines on military and industrial aircraft and the like. These preferred embodiments are so constructed that the same may be readily adapted to use on existing casings as well as on new casings. Each of the illustrated structures is primarily constituted by a simple tubular casing in which a simply constructed unitary baffle member is secured for effecting a desired number of changes in the course of the air flowing through said tubular casing into the space to be ventilated. While changing the path or course of the air stream, the velocity thereof is also varied by the baffle member so that moisture and other particles of foreign matter entrained with the air are separated therefrom.

In the form illustrated in Figs. 1 and 2, the novel ventilator comprises a tubular metallic casing 10 which is provided with internal threads in the upper, enlarged end thereof that cooperate with external threads on a tubular adapter 11. The latter has an external flange 12 that engages the outer wall of a housing 13, which is to be ventilated, and an externally threaded portion 14 which extends through an opening in said housing wall. A nut 15 cooperates with said last-mentioned threaded portion for securing the adapter in place so that air may flow through casing 10 and the adapter into housing 13, only a portion of the latter being shown. It will, of course, be understood that casing 10 may be secured to housing 13 in any other suitable manner, the adapter securing means shown being suitable primarily for adapting the ventilator to existing housings or those having thin walls.

Novel means are provided in casing 10 for the purpose of directing the flow of air therethrough and for varying the velocity of the air stream in such a manner as to bring about the separation from the air of water and other particles of foreign matter entrained with the air. As illustrated, said means comprises a system of baffles formed by a member 16 which is made from a single piece of metal or other suitable material. Baffle member 16 includes a central or core portion 17 and a plurality of axially-spaced, annularly-extending radial fins 18. Each of said fins extends transversely across a substantial portion of the annular space around core 17. The periphery of each baffle or fin has close sliding engagement with the inner surface of casing 10, except that each is cut away or terminates, as

at 19, to provide openings 20 and permit the flow of air through casing 10. The fins or baffles are so arranged that successive passages 20 are located at opposite sides of casing 10, thereby causing the air to be diverted from one side of the casing to the other between successive baffles.

It will be understood that the areas and shapes as well as the relative positions of successive passages 20 may be varied considerably in each device or in different devices, depending upon the use to be made of the ventilator. Some or all of the passages may, for example, be sector-shaped and successive ones may be located 90° or some other suitable angle from each other. The areas of the passages are chosen in each instance to avoid any re-entrainment of water or other particles which are separated from the air stream. Baffle member 16 may be die-cast from a light alloy, such as an aluminum alloy, or it may be constructed in any other suitable manner. If desired, said baffle member may be formed by machining a cylindrical piece of stock to form axially-spaced annular fins thereon and then cutting portions of said fins off, such as at 19.

As viewed in the drawing, the uppermost fin 18 is provided with a cylindrical, axially-extending flange 21 which engages an internal flange 22 in casing 10 to limit the movement of baffle member 16 into said casing. Member 16 may be held in position in casing 10 in any suitable manner, such as by means of a washer or ring 23 which is engaged by a rolled or spun-in portion 24 of casing 10. It will be seen that baffle member 16 is thus so constructed that it may be placed in casing 10 in any angular position.

In order to reduce to a minimum the possibility that the water separated from the air will be again picked up by the air stream, the upper surfaces of baffles 18 are so shaped as to cause the separated water to flow outwardly to the wall of casing 10 or inwardly to core 17. In the form shown, said surfaces slope upwardly and inwardly from the casing wall to the center core, thereby causing the water to flow to the casing wall and thence off the baffles at point 19a (Fig. 2) and down said wall. The water and other deposited particles are thus kept out of the air stream as much as possible.

A second embodiment of the invention, as illustrated in Figs. 3 and 4, comprises a tubular casing 25 threaded into the wall of a housing 26, as at 27. Slidably extending into casing 25 is a novel air directing or baffle member which is constituted by a metallic tube 28 having a relatively thin wall section. At suitable axial and angular intervals, portions of said wall are pressed inwardly to form a plurality of integral lips 29 which constitute baffles for diverting the course and varying the velocity of air flowing through tube 28 into housing 26.

As shown, the angular spacing of successive lips 29 is 90°, but this spacing, as well as the axial spacing of said lips, may be varied. Each lip or baffle 29 extends inwardly from the wall of tube 28 to a point beyond the longitudinal center line of the tube and outwardly relative to housing 26 at a suitable angle to said center line. In the form shown, this angle is substantially 45°. The lower or outer edge 30 of each lip 29 is formed by cutting the wall of tube 28 along an arcuate line 31 which extends for approximately 120° around the tube. For a purpose to appear hereinafter, each baffle or lip preferably has an arcuate contour, as best indicated by the section at 32, thereby making the upper surface

of the baffle convex and the lower surface thereof concave.

The space 33 remaining between the inner wall of tube 28 and the edge 30 of each baffle is shaped somewhat like a crescent, the area of said space being controlled by the size and position of the baffle. This area is preferably made as small as possible consistent with avoiding any entrainment by the air stream of moisture draining off the upper surfaces of the baffles. Although all of these passages are shown as having substantially the same area in the embodiment of Fig. 3, the same may, of course, be varied to suit the exigencies of particular instances. The prevention of any re-entrainment of the moisture and other particles is also enhanced by the fact that the water and other foreign matter which separates from the air and drops onto the convex upper surfaces of the baffles is caused by the contour of the latter to flow outwardly to the lines of intersection 34, 34 of the baffles 29 and the wall of tube 28 and thence downwardly along said wall. The deposited water and other particles thus draining out of the baffle tube do not fall into the space within the air stream, but rather tend to follow the wall of the tube where the same are least affected by the air stream.

In the embodiment of Fig. 3 it is desirable to employ as many baffles 29 as the available space will permit but it is necessary to provide only enough to prevent any direct flow through tube 28. With baffles of the size and in the positions illustrated, four are enough to produce effective results.

Baffle tube 28 is preferably positioned in casing 25 by an external flange 35 at the end thereof, said flange engaging an internal shoulder in said casing. If desired, a ring 36 may be interposed between flange 35 and a spun-in portion 37 of casing 25. In either of the illustrated embodiments of the invention, the baffle member 16 or 28 may be held in place in any suitable manner, such, for example, as by means of a nut having screw threaded engagement with casing 10 or 25, respectively.

The manufacture of tube 28 may be accomplished by inserting a plunger having a suitably shaped beveled end into said tube for supporting the latter internally along the line of cut 30, 31, while a beveled cutting tool moves in at right angles to the axis of the tube. The beveled cutting tool is provided with a convex end surface for shaping the baffles 29 in the manner described above during the cutting and pressing-in of the latter. After all of the baffles have been formed, tube 28 may be pushed through a sizing die to restore the roundness thereof, if necessary, and flange 35 may then be spun thereon.

There is thus provided a very simple and yet effective means for ventilating an enclosed space, while at the same time preventing the entrance of an excessive amount of moisture or other particles of foreign matter. The novel devices provided comprise a minimum number of parts, which lend themselves to rapid and quantity manufacture at low cost. Additionally, the novel ventilating means comprehended by the invention may be adapted to use in many environments without necessitating the making of complicated castings or complicated ventilating units of the nature heretofore employed.

Although only two embodiments of the invention are illustrated and described in detail, it is to be expressly understood that the same is not limited to these specific structures. Various

changes, such as those mentioned above, and also changes in the design and arrangement of parts illustrated may be made without departing from the spirit and scope of the invention, as will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference is had primarily to the appended claims.

What is claimed is:

1. In apparatus of the class described, a tubular casing, a tube slidably inserted in said casing, said tube having axially-spaced, angularly-spaced wall portions pressed inwardly to form baffles in said tube, the outer or lower edge of each of said baffles being formed by cutting the wall of the tube and each baffle extending across the longitudinal center line of said tube, the number of said baffles being sufficient to prevent any direct longitudinal flow of air through said tube and casing, and means for securing said tube in said casing.

2. In apparatus of the class described, a casing having a passage therethrough, a tube slidably inserted in said casing, a plurality of baffles in said tube constituted by inwardly pressed integral portions of the wall of said tube, each of said baffles being angularly spaced around said tube with respect to the baffles adjacent thereto and extending across the center of said tube, said baffles being effective to restrict air flow in said passage and to prevent any direct flow of air longitudinally through said tube and casing, and means for securing said tube in said casing.

3. A ventilating device comprising a casing having an air passage therethrough, a tube inserted into said casing in close engagement with the inner wall of the latter, integral triangular-like portions of the wall of said tube being pressed inwardly to form a series of baffles which are effective to compel air flowing through said tube and casing to follow a tortuous path, and means for securing said tube in said casing.

4. A ventilating device comprising a tubular casing, a tube inserted into said casing and having close engagement with the inner wall of the latter, the wall of said tube having a plurality of circumferentially-extending arcuate cuts therein and portions of said wall bordering said cuts bent inwardly across the center line of the tube, said bent-in portions being angularly spaced

with respect to each other around said tube, and means for securing said tube in said casing.

5. A ventilating device comprising a casing having a passage therethrough, a perforated tube in said passage engaging the walls thereof, the perforations in said tube being formed by pressing axially and angularly-spaced portions of the wall thereof inwardly to form baffles for restricting the flow of air through said tube, the inner or upper surfaces of each of said baffles being convex, said baffles being so arranged as to effect a plurality of changes in the direction of flow of the air passing through said tube, and means for securing said tube in said casing.

6. A baffle gang for a gas conduit comprising a cylindrical supporting member, a plurality of inclined baffles secured to said supporting member in spaced relation to one another, said baffles being arcuate in cross section and extending in a plurality of different directions into overlapping relationship at the center of the member so as to compel gas passing through the member to take a tortuous path and to discharge upon the baffles a portion of its entrained moisture and solids, the downstream sides of the baffles having an inclination that deflects discharge moisture and solids away from the path of the gas stream.

7. A baffle gang for a gas conduit comprising a cylindrical supporting member, a plurality of inclined baffles secured to said supporting member and staggered about the wall of the supporting member in spaced relation to one another, said baffles being arcuate in cross section and extending into overlapped relationship at the center of the member so as to compel gas passing through the member to take a tortuous path and to discharge upon the baffles a portion of its entrained moisture and solids, the downstream sides of the baffles having an inclination that deflects discharged moisture and solids away from the path of the gas stream.

8. A liner for a ventilating duct comprising a cylinder having a plurality of wall sections severed along arcuate lines and in bent to form baffles which extend in a plurality of different directions into overlapping relation at the center of the cylinder.

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