

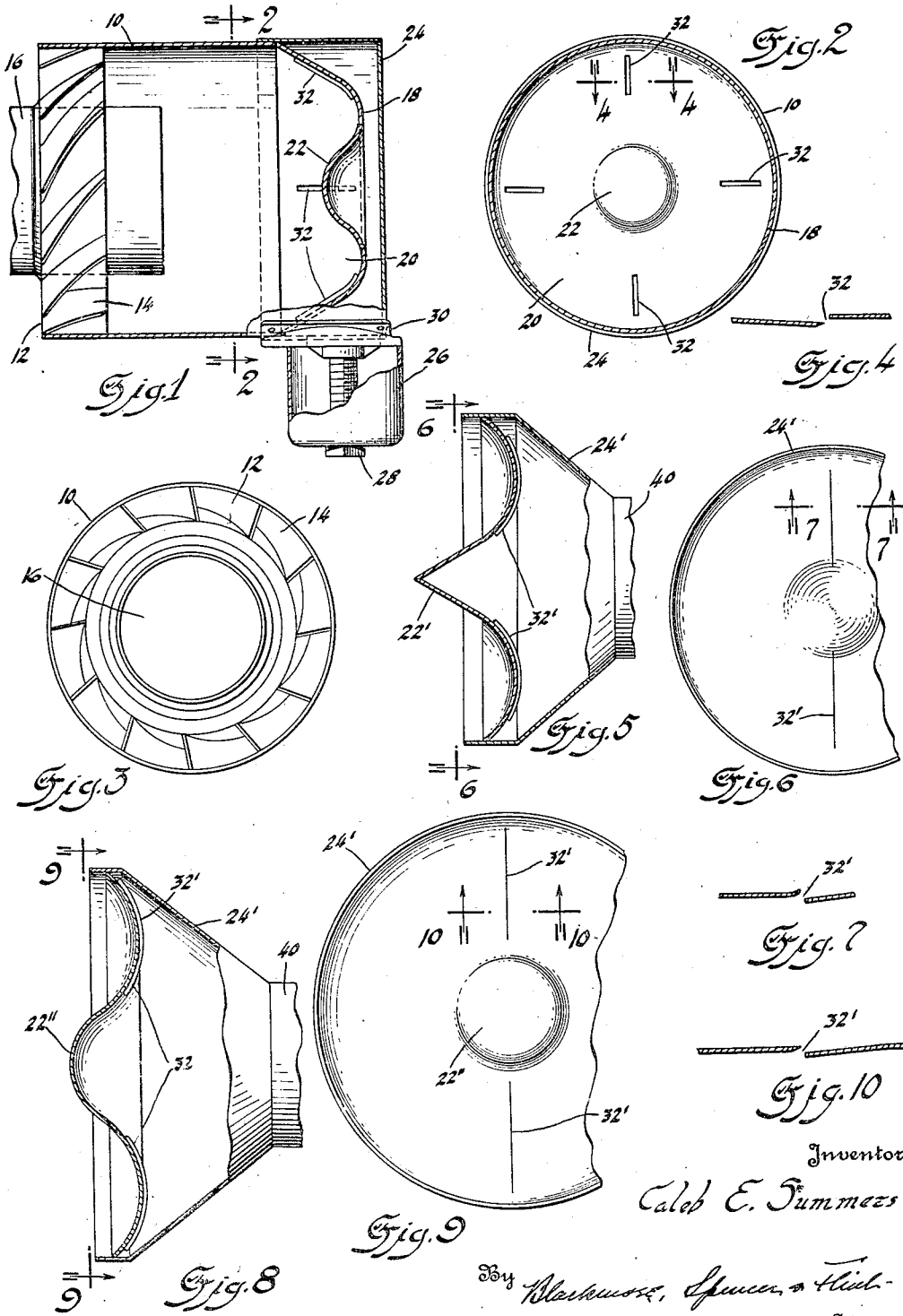
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AIR CLEANER

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AIR CLEANER

Application filed May 2, 1927. Serial No. 188,383.

This invention relates to air cleaners of the centrifugal type such as disclosed in my prior application Serial No. 754,007 filed December 5th, 1924, which became a Patent 5 Jan. 7, 1930, No. 1,742,564. In this design of cleaner, the air is given a spiral whirling motion and upon reaching one end of the cleaner casing its direction of travel is reversed and the column of air, now free of 10 its dust content, is discharged through an outlet centrally arranged in the casing. In carrying out the present invention I employ a dust trap at the closed end of the casing in the form of an annular pocket arranged 15 adjacent the outer periphery of the casing. The outer dust laden portions of the air stream are caught in the pocket and in the base of the latter, outlets are provided for the discharge of the dust. These outlets are 20 tangentially arranged and while discharge may be direct to the atmosphere I prefer to employ a dust receptacle. This receptacle may be in the form of an annulus but to insure against recirculation of dust I preferably provide a separate dust box for receiving the dust collected in the annular 25 receptacle, this box being so located as to be out of the path of stray air currents so that dust is not at any time drawn back into the cleaner. My cleaner may take various forms. It may be arranged for horizontal or vertical installation. The dome 30 created in the end of the casing in forming the annular trap may be of gently swelling contour or may be in the form of a pointed spur, the latter form possessing the disadvantage that dust particles creeping along the surface to the point of the spur may be drawn into the stream of clean air flowing 40 to the carburetor by the eddy currents which, under certain conditions, may be present there.

In the drawing, Figure 1 is a sectional view thru my improved cleaner.

Figure 2 is a view taken on line 2—2 of Figure 1.

Figure 3 is a view looking at the open end of the cleaner of Figure 1.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 is a section thru a slightly modified form of cap for the closed end of my cleaner.

Figure 6 is a view on line 6—6 of Figure 5.

Figure 7 is a view on line 7—7 of Figure 6.

Figure 8 is a view corresponding to Figure 5 showing a further modification.

Figure 9 is a view on line 9—9 of Figure 8.

Figure 10 is a view on line 10—10 of Figure 9.

In Figure 1, 10 represents a cylindrical casing provided at one end with an annular 65 air admission opening 12 equipped with blades 14 shaped to impart a whirling motion to the entering air stream. 16 indicates a clean air discharge port adapted for connection with the air intake of the carburetor 70 of an internal combustion engine and communicating with the interior of the casing adjacent its axis. The other end of the casing is closed by means of a member 18 shaped to form an annular dust trap 75 surrounding a raised or re-entrant portion 22. The member 18 may, if desired, be integral with the casing 10 but I have preferred to form it in a separate piece and to mount it within a cap 24 fitted on the 80 main portion of the casing 10. To the bottom of the cap 24 is secured a dust box 26 held on to the cap by means of bolt 28 threaded into fitting 30 secured to the cap 24. The outer inclined wall of the member 85 18 is slotted to provide circumferentially spaced dust discharge ports 32 constructed as shown in Figure 4. The ports 32 provide passages which permit the dusty air to follow its spiral path in leaving the casing 10. 90 The operation of the cleaner is as follows: Air entering thru the inlet 12, as a result of engine suction, is set whirling by contact with the blades 14 with the result that the dust particles are thrown outwardly and 95 segregated in the outer layers of the whirling air column. Upon reaching the end of the casing, the main stream of air reverses its direction and passes thru port 16 to the carburetor. The dust particles, because of 100

their greater inertia, are entrapped in the annular channel 18 and are finally discharged thru the slots 32 into the interior of the cap 24. From the cap 24 the dust particles find their way into the dust box 26 by the action of gravity. The purpose of the channel 18 is to confine the lighter particles which, upon first entering the trap, have insufficient inertia to accomplish their discharge thru the dust outlets. These lighter particles may continue to whirl around in the trap for some little time and, in some cases, may not be able to effect their escape until the suction has been wholly or partially shut off, as by rapid closing of the throttle whereupon the ram action of the air entering the cleaner will carry the lighter dust into the interior of the cap 24.

The constructions shown in Figures 5 to 10 are designed for vertical installation, the cap 24' being conical in shape and provided with an extension 40 adapted to receive the dust box not shown. In the form shown in Figures 5 and 6, the re-entrant portion 22' is in the form of a cone. This form possesses the disadvantage that dust particles creeping along the surface of the cone may reach the point and there be drawn into the stream going out thru the clean air outlet 16. In this embodiment, I have likewise shown but two dust discharge ports, 32'.

The form shown in Figures 8 to 10 is the same as that shown in Figures 5 to 7 except that the re-entrant portion 22'' is rounded. This design is likewise easier to manufacture as the metal is subjected to less bending.

I claim:

1. In an air cleaner, the combination of a casing, a clean air discharge port communicating with the interior of the casing adjacent its axis, means at one end of the casing for imparting a whirling motion to the entering air stream, an annular channel at the other end of the casing for retaining the dust-laden portions of the air stream, a dust discharge outlet leading from said channel, a cap surrounding the last-named end of the casing and forming with the wall of said channel a dust collector into which said dust outlet discharges.

2. In an air cleaner, the combination of a casing, means at one end of the casing for imparting a whirling motion to the entering air stream, an annular depression formed in the other end of the casing providing a dust trap, a clean air outlet communicating with the interior of the casing adjacent its axis, a dust outlet in said trap, a cap for the second named end of the casing forming with the latter a dust collector, and a dust box communicating with said collector.

3. In an air cleaner, the combination of a cylindrical casing, means for closing one end of the casing, the other end provided with

an annular inlet equipped with helical blades for imparting a whirling motion to the entering air, said last named end being also provided with an axial clean air outlet, the said first named means including a portion of reduced diameter and provided with an annular channel, and a wall of said channel being apertured to provide a dust discharge slot.

4. The combination as defined in claim 3, and a cap for the closed end of the casing forming, with the said reduced portion a dust collector for receiving dust discharge through said slot.

5. In an air cleaner, the combination of a cylindrical casing provided at one end with means for imparting a whirling motion to the entering air stream and with an axial clean air outlet, means for closing the other end of the casing, including a portion of reduced diameter provided with a centrally arranged inwardly pressed protuberance forming an annular channel at the base thereof, a wall of said channel being apertured to provide a dust discharge port.

6. In an air cleaner, the combination of a cylindrical casing provided at one end with means for imparting a whirling motion to the entering air stream and with an axial clean air outlet, means for closing the other end of the casing including a portion of reduced diameter provided with a centrally arranged inwardly pressed protuberance forming an annular channel at the base thereof, a wall of said channel being apertured to provide a dust discharge port, and a cap adapted to engage the portion of the casing of normal diameter and to enclose said reduced portion to form a dust collector.

In testimony whereof I affix my signature.

CALEB E. SUMMERS.