May 27, 1941. B. G. BROWN 2,243,082

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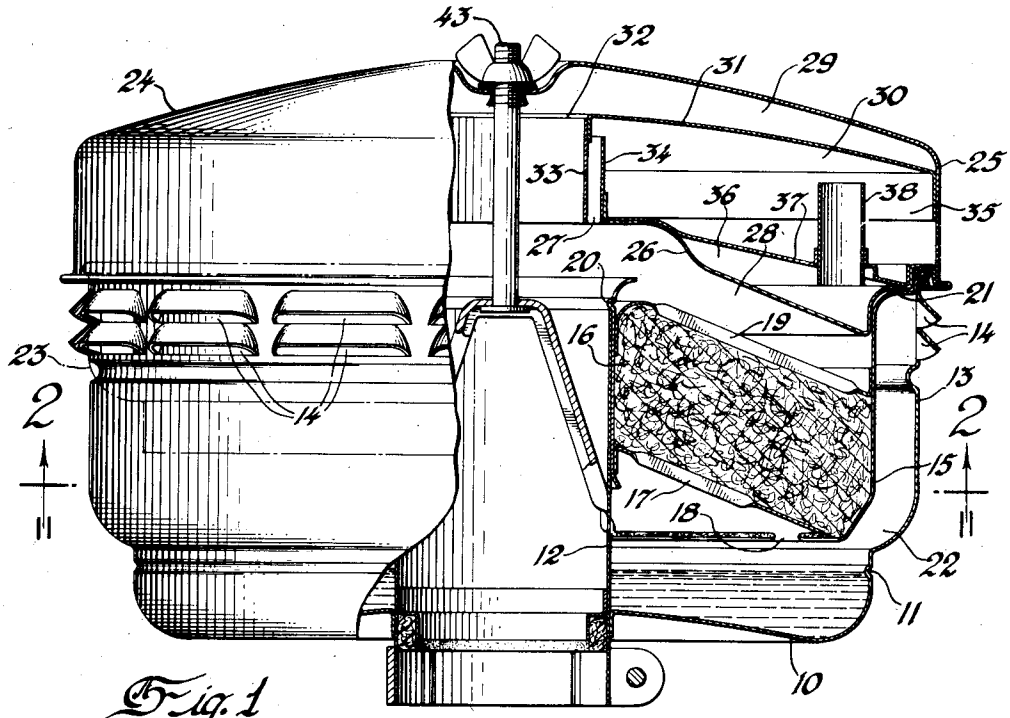


Fig. 1

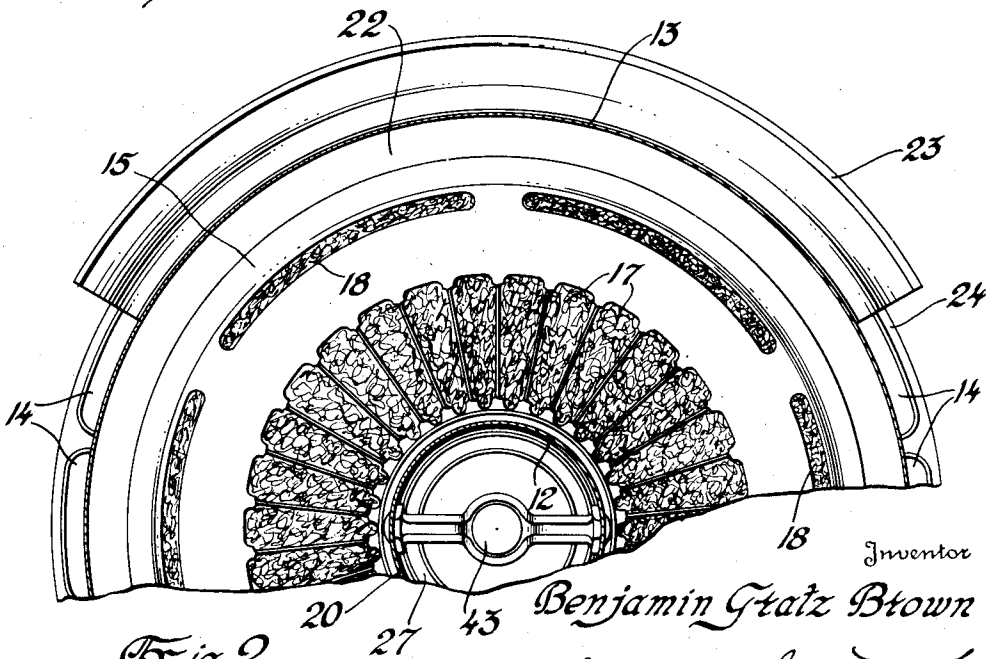


Fig. 2

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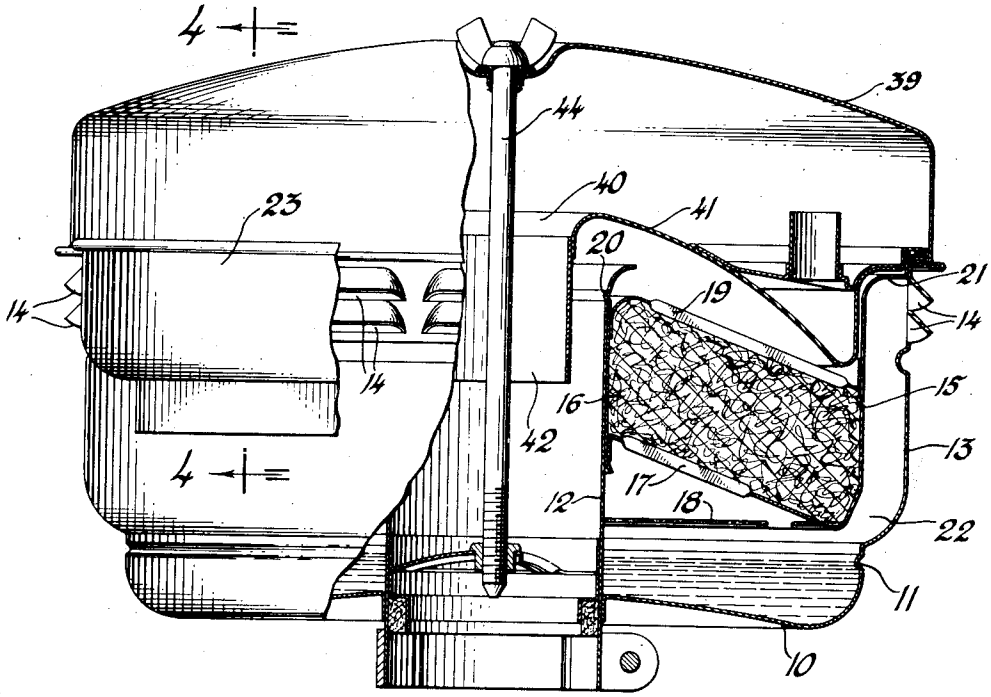


Fig. 3

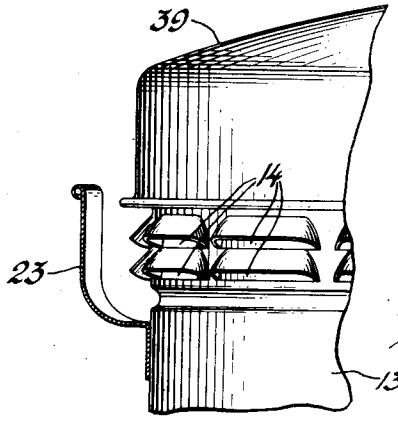


Fig. 4

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Patented May 27, 1941 2,243,082

UNITED STATES PATENT OFFICE

2,243,082

SILENCER

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Application August 24, 1936, Serial No. 97,494

3 Claims. (Cl. 181—48)

This invention has to do with silencers and has for its principal object to provide a unit which consists of an air cleaner of the liquid bath type and a silencer of the resonator type so constructed and assembled that it may be installed on an internal combustion engine carburetor which is so located that little head room is available.

For a better understanding of the nature and objects of this invention, reference is made to the following specification wherein there are described the preferred embodiment of the invention which are illustrated in the accompanying drawings.

In the accompanying drawings:

Figures 1 and 3 are views which show, partly in side elevation and partly in longitudinal section, air cleaner and silencer units in accordance with my invention;

Figure 2 is a view taken as indicated by the line 2—2 of Figure 1;

Figure 4 is a fragmentary side elevation of a unit of the type shown in the preceding figures with the baffle in section on the line 4—4 of Figure 3.

Except in the covers, the air cleaner and silencer units shown in the drawings do not differ materially from the air cleaner shown in Figure 1 of the Kamrath application Serial No. 740,420 which was filed on August 18, 1934. In each unit, there is included an annular receptacular body 10 which is filled with a suitable liquid, such as oil, to about the level of the bead 11 when the unit is in use. Within the body 10, between its tubular inner wall 12, which constitutes the air outlet duct of the unit, and its cylindrical outer wall 13, there is disposed a hollow annular member 15 which is filled with a suitable filter medium 16, such as that disclosed in the Webb application Serial No. 98,556 which was filed on August 29, 1936. In the cylindrical outer wall 13 of the body 10, just below its upper edge, there are formed two rings of air inlet orifices 14 of which those throughout about one-third of the circumference of the body are shielded by a baffle 23 whose lower edge is secured to the wall 13.

In the lower wall of the member 15, there are provided a ring of air inlet orifices 17 and a ring of liquid discharge orifices 18. In the upper wall of the member 15, there is provided a ring of air outlet orifices 19. The member 15 is supported on the upper ends of the inner and outer walls of the body 10 through the intermediaries of an inwardly projecting bead 20 on its inner wall and an outwardly projecting flange 21 on an upwardly projecting extension of its outer wall. The outer and bottom walls of the member 15 are spaced, respectively, from the outer wall 13 and above the level of the liquid in the bottom of the body 10 to define a passage 22 through which air may travel from the air inlet orifices 14 over the surface of the liquid to the orifices 17 in the bottom of the member 15.

The cover 24 of the unit which is shown in Figure 1 is a hollow member whose outer edge is seated on the flange 21 on the upwardly projecting extension of the outer wall of the member 15 and closes the upper end of the latter. The cover 24 consists of a member 25 which is shaped like an inverted cup and a member 26, in which there is formed an orifice 27 which is coaxial with the tubular member 12, joined at its outer edge to the lower edge of the side wall of the member 25 and spaced from the upper wall of the member 15 to define with it a passage 28 through which air may travel from the orifices 19 into the upper end of the tubular member 12.

The interior of the cover 24 is divided into upper and lower compartments 29 and 30 by a partition 31 whose outer edge is joined to the side wall of the member 25. In the partition 31 there is formed an orifice 32 which is coaxial with and of smaller diameter than the orifice 27 in the member 26. The orifice 32 is encircled by a tube 33 which extends through the compartment 30 and terminates flush with the portion of the member 26 which encircles the orifice 27, and establishes communication between the compartment 29 which constitutes a resonance chamber and the passage 28 independently of the compartment 30. The orifice 27 in the member 26 is encircled by a tube 34 which extends into the compartment 30 but terminates short of the partition 31 and is radially spaced from the tube 33 and with it defines an aperture through which the compartment 30 communicates with the passage 28 independently of the compartment 29. The compartment 30 is subdivided into primary and secondary resonance chambers 35 and 36 by a wall 37 which is joined to the member 26 at its inner and outer edges and spaced therefrom therebetween. A tube 38 which extends through the wall 37 establishes communication between the secondary and primary resonance chambers 36 and 35.

The cover 39 of the unit shown in Figure 3 does not differ materially from the cover 24 of the unit shown in Figure 1 except in that the partition 31 and the tube 34 have been omitted and the orifice 40 in the member 41 which, of course, corresponds to the member 26 is of smaller di-

ameter than the orifice 27 and encircled by a tube 42 which projects into and is radially spaced from the tubular member 12.

The bodies 10, the annular members 15 and the covers 24 and 39 of the units shown in Figures 1 and 3 are secured together with the annular members clamped between the bodies and the covers but are, of course, separable one from the others when the elements of the securing means, which is designated by the reference character 43 in Figures 1 and 2 and the reference character 44 in Figure 3, are disengaged.

The units shown in the drawings were designed for installation on internal combustion engine downdraft carburetors with the lower extremities of the tubular members 12 telescoped around the air inlet tubes of the carburetors. When one of the units is so installed and the engine is operating, air is drawn into the orifices 14, and successively, through the passage 22, the annular member 15 and the passage 28 (or the corresponding passage in the unit shown in Figure 3) into the upper end of the tubular member 12 whence it passes through the carburetor into the cylinders of the engine.

In the course of its passage between the orifices 14 and the air outlet orifices 19 in the member 15 the air is freed of foreign matter in a manner that requires no description. The resonators 29—33 and 36—38—35—27 incorporated in the unit shown in Figure 1 and the single compound resonator incorporated in the unit shown in Figure 3 are so tuned in the manner set forth in the Wilson application Serial No. 470,700 which was filed on July 25, 1930, and the corresponding foreign patents, viz., Canadian Patent No. 348,037, British Patent No. 391,180, French Patent No. 720,611, and Italian Patent No. 300,037, that they respond to and attenuate by resonance sound waves which issue from the air inlet tube of the carburetor and are of such frequency and intensity that they are objectionable. Thus the units serve both to clean the air which enters the carburetor and the cylinders of the engine on which they are installed and to silence the intake of the engine.

I claim:

1. A silencing element which includes a tube through which gases and sound waves travel, a hollow cap with an orifice in its inner wall disposed over one end of the tube, a partition which subdivides the hollow cap lengthwise into two chambers, an orifice in the partition, a tubular element which encircles the second-mentioned orifice and projects toward but is spaced from the boundary of the first-mentioned orifice, and an aperture between the hollow cap and the tube through which the latter communicates with the atmosphere.

2. A silencing element which includes a tube through which gases and sound waves travel, a hollow cap with an orifice in its inner wall disposed over but spaced from one end of the tube to define therewith an aperture through which the tube communicates with the atmosphere, a partition which subdivides the hollow cap lengthwise into two chambers, an orifice in the partition, a tubular element which encircles the second-mentioned orifice and extends toward but is spaced from the boundry of the first-mentioned orifice, and a partition in which there is an orifice which subdivides the chamber into which the tubular element extends into intercommunicating compartments.

3. A silencing element in which there is included a tubular member through which gases and sound waves travel, a hollow cap in whose inner wall there is an orifice disposed over an end of the tubular member, a tubular member which encircles the orifice and is telescoped within and radially spaced from the first-specified tubular member, and an aperture between the hollow cap and the first mentioned tubular member through which the latter communicates with the atmosphere.

BENJAMIN GRATZ BROWN.

CERTIFICATE OF CORRECTION.

atent No. 2,243,082. May 27, 1941.

BENJAMIN GRATZ BROWN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 1, after the word "with" insert --air cleaners and--; line 11, for "embodiment" read --embodiments--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of August, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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