

Aug. 11, 1936.

F. S. OREM

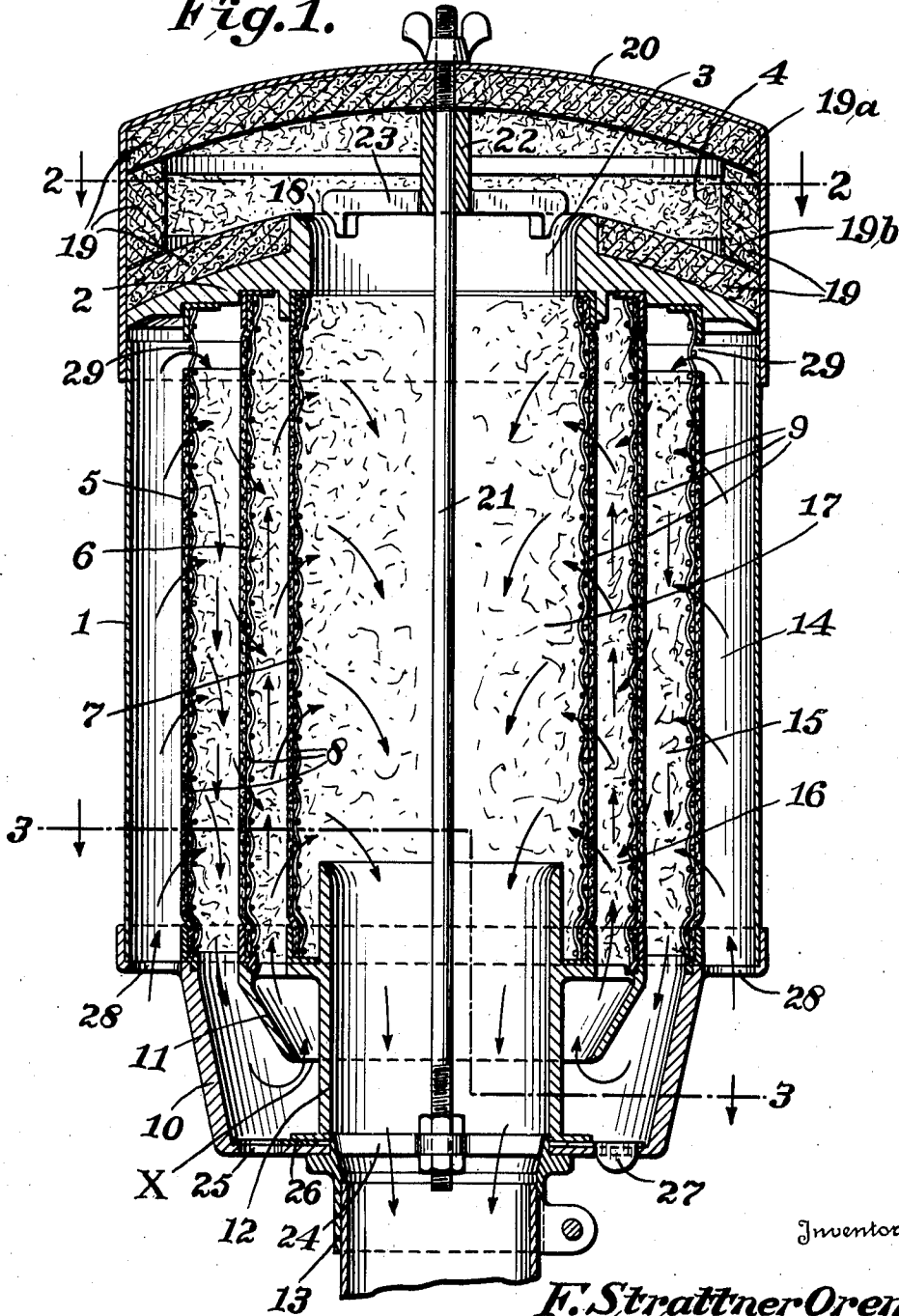
2,050,581

AIR CLEANING AND SOUND SILENCING APPARATUS

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2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

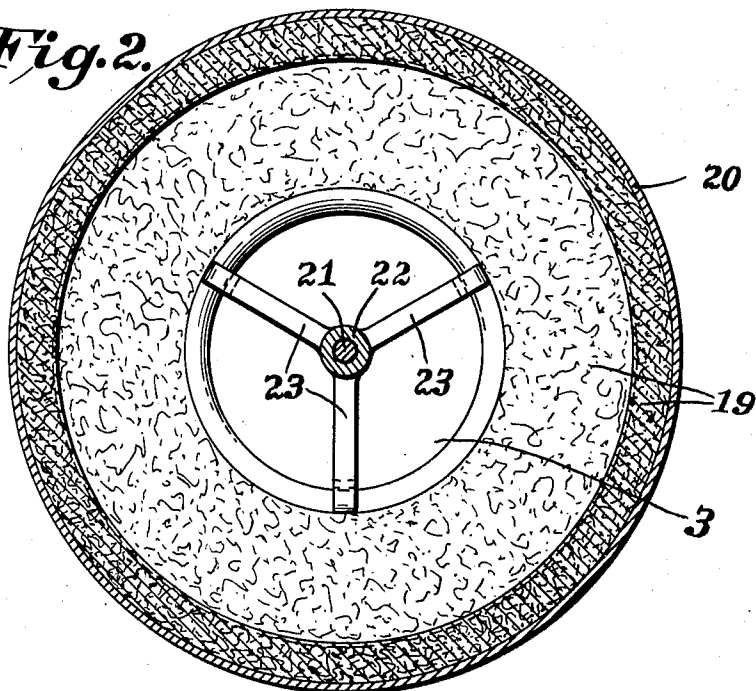
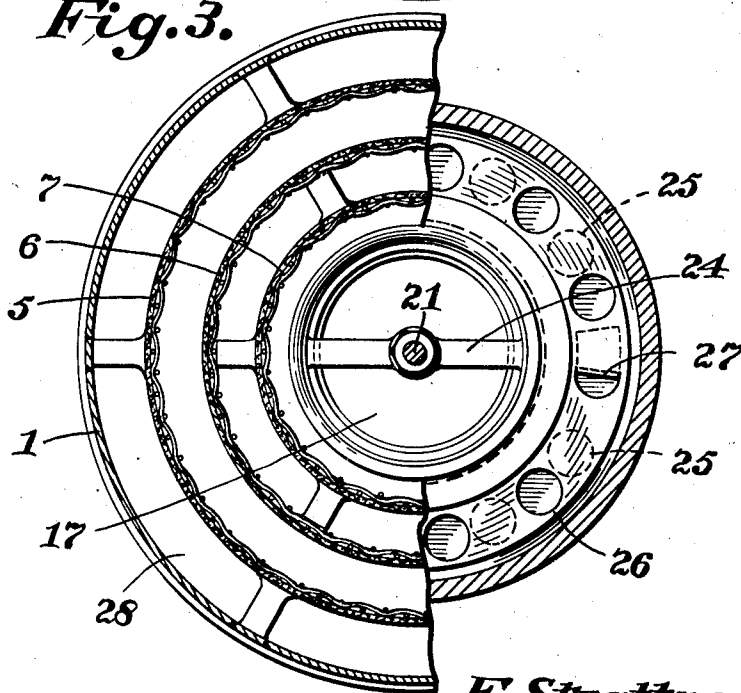


Fig. 3.



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AIR CLEANING AND SOUND-SILENCING
APPARATUS

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3 Claims. (Cl. 183—73)

This invention relates to apparatus for filtering air and for silencing sound, which apparatus is particularly suitable for attachment to the air intake of a carburetor of an internal combustion engine.

An object of the present invention is to provide a device adapted to be connected to the air intake of a carburetor of an internal combustion engine, which functions both as a filter to filter the air before it is drawn into the carburetor by the suction of the engine, and as a means for silencing carburetor noises and noises from the engine, which latter noises pass backward through the manifold of the engine to the air intake of the carburetor.

Another object of the present invention is to provide a device that will not become clogged and will not require cleaning.

A further object is to provide a device which, when employed for silencing carburetor and other noises passing through the carburetor, will in no way interfere with the free flow of air through the carburetor to the engine.

A still further object is to provide a combined air-filtering and sound-silencing device that is compact, simple in construction, and inexpensive to manufacture.

To these objects and such other as may hereinafter appear, the invention comprises features of construction and arrangement of parts hereinafter described and particularly pointed out in the appended claims.

In the drawings

Figure 1 is a vertical cross sectional view of the apparatus showing the relative positions of the air-filtering means and of the sound-silencing means;

Figure 2 is a cross sectional view on line 2—2 of Figure 1 in the direction of the arrows; and

Figure 3 is a cross sectional view on line 3—3 of Figure 1 in the direction of the arrows.

The apparatus of the present invention comprises an air-filtering chamber having an outer side wall 1, and an upper wall 2 provided with an opening 3 communicating with a sound-silencing chamber 4.

The outer wall is preferably cylindrical in shape. Within the air-filtering chamber, formed by said wall, are a plurality of vertically disposed cylindrical filtering means, which cylindrical means are nested within each other and spaced apart. In the drawings three such cylindrical filtering means, namely, 5, 6, and 7, are shown. Each of these means comprises a wire mesh screen 8 and filtering material, such as a felt layer 9, snugly fitting against the screen. The filtering material on the outer cylinder 5 covers the entire screen portion of the cylinder, with the exception of one or more rows of meshes at the upper end of the cylinder. This leaves an

annular opening at this point, the area of which is substantially the same as the area of the opening leading from the appliance into the carburetor.

The entire wire screen material of cylinders 6 and 7 is covered with filtering material.

The upper ends of the cylinders 5, 6, and 7 are held in place on the wall 2 in any suitable manner. The lower end of the cylinder 5 rests on the upper end of the wall of a cup shaped element 10. The lower end of the cylinder 6 comprises a solid baffle wall 11 which extends downwardly part way into the cup shaped element 10. Within the cup shaped element 10 is a tubular member 12 which extends partly into the air-filtering chamber, and is in alignment and communication with an air outlet 13 extending from an opening in the bottom of the cup shaped element 10. The lower end of the solid baffle wall 11 is spaced from the tubular member 12, and from the wall of the cup shaped element 10. The area of the annular opening at X between the bottom edge of the baffle 11 and the wall 12 is preferably substantially equal to the area of the opening left in the uncovered portion of the screen 5. The annular chambers 14, 15, and 16, formed by the filtering means constructed as described, provide, therefore, for the free passage of air through the said annular chambers as well as through the screen adjacent the upper end of cylinder 5 when passing from the annular chamber 14 into the annular chamber 15 and also into the lower end of the cylinder 6 when passing from the annular chamber 15 into the annular chamber 16.

The inner cylinder 7 forms an unobstructed central passage 17 which communicates at its lower end with the tubular member 12 and at its upper end with the opening 3, which leads into the sound-silencing chamber 4. The opening 3 comprises preferably a short, tubular structure, the upper end of the wall of which flares outwardly into the chamber 4, as at 18.

The sound-silencing chamber 4 may be any desired shape, and the walls thereof are lined with thick layers of sound-silencing material 19, such as felt. Separate felt layers may be placed on the upper, lower and side walls of chamber 4 as shown. The felt layer on the side wall may be provided with metal edges 19a and 19b which extend around the wall in the form of rings and serve to hold the felt firmly in place.

Sound waves travel axially from the intake of the carburetor and enter the coaxially disposed silencing chamber 4 which has its inlet 3 axially in line with the opening receiving the sound waves and which has a closed annular space surrounding the said axial opening.

A tie rod 21, which serves to hold various parts of the device in position when assembled, extends through the top 20, a sleeve 22, a spider 23 down-

wardly through the center of the passage 17 to a spider 24.

The bottom of the cup shaped element 10 is provided with openings 25, as more clearly shown in Figure 3, and a sliding shutter 26, resting on the bottom of the cup shaped element 10, is adapted to open and close the openings 25. A struck out portion 27 is provided for manipulating the shutter.

In the application of my device to internal combustion engines, the tubular member 13 is attached to the air intake of a carburetor (not shown). When the engine is operated, air is sucked in through the openings 28 provided at the lower end of the annular chamber 14.

The porosity and area of the walls of the filtering elements are such that sufficient air will pass through the said walls and the filtering action will take place. The outer cylinder 5 intercepts most of the dust. The pulsations in the air currents passing through the filtering material assist in dislodging dust that collects on the surface of the material. Dust dislodged from cylinder 5 falls through the openings 28.

Any dust in the air passing through space 29 will be separated from the air and fall into the cup shaped element 10 from which it may be removed by opening the shutter 26. The member 11 serves as a baffle to retard any dust that may be carried to this point by the air flow so that this dust will deposit at the bottom of the appliance for removal through the end discharge opening 25.

Spaces 29 and X supply any additional air that may be required by the carburetor. There is no interference with the free flow of air from inlet to outlet of the device.

In the annular chamber 15, the air takes a generally downwardly direction, some of it passing through the filtering material on cylinder 6, and the rest of it passing around the lower edge of the wall 11 upwardly into the annular chamber 16. The air then passes through the filtering material on cylinder 7.

The air taking the various paths indicated by the arrows, receives its final cleaning by passing through the felt layer of the cylinder 7 whereupon the air is drawn through the central passage 17 into the air intake of a carburetor of an engine. Any dust not removed by cylinders 5 and 6 respectively, which function both as filters and baffles, is removed by innermost cylinder 7, and falls into cup shaped element 10.

The so-called carburetor noises are due generally to the rush of air through the air intake and to sound waves generated in the manifold system of the engine. By means of my device, these noises are silenced. The silencing is effected to some extent both by the various filters and by reversing the direction of the air currents, as shown. However, the greater portion of the sound in the passage 17 leaving the intake of the carburetor travels in a direction parallel to the axis thereof and enters the silencing chamber 4. The annular wall of the filtering means acts to silence sounds that tend to radiate from the axis of the appliance.

The invention has been disclosed herein for illustrative purposes in its preferred embodiment, but it is to be understood that the scope of the invention is defined by the appended claims rather than by the foregoing description.

I claim:

1. Apparatus comprising a chamber having end

walls and side wall, an opening in an end wall adapted to be connected to the air intake of a carburetor, a plurality of air-filtering walls in the said chamber concentrically arranged around a passage formed by the innermost of the said air-filtering walls and leading from the said chamber to said air intake, an intermediate air-filtering wall of said concentrically arranged walls having a free end, a solid terminal baffle extension attached to the said end of the said intermediate wall around the free edge of which baffle extension air can freely pass, the outermost of said filtering walls having a second solid terminal extension beyond the end thereof forming a cup-like member into which said first named extension projects, and the air filtering wall forming the said passage being completely closed with filter material through which all required air normally passes without interfering with the free passage of air to the said air intake, and a second chamber closed to the atmosphere and connected to the said passage and provided with a lining of sound-silencing material.

2. Apparatus comprising walls forming a chamber provided with a lining of sound-silencing material covering the entire wall space, the said chamber otherwise closed to the atmosphere, having an opening, a closed tubular filter communicating at one end with said opening and at the other end with the air intake pipe of a carburetor, the said closed filter being completely covered with filter material of such dimensions and porosity that all required air for the carburetor freely passes therethrough unimpeded, and a plurality of additional tubular filters outside of and coaxial with said inner closed filter and providing an open annular circuitous air passageway leading to the outside of said inner closed filter to enable free flow of required air through or around said additional filters, the said inner and outer filters together with the open circuitous passageway being capacitated to remove dust from the unimpeded required air supply to the carburetor, and to deaden any sound from the carburetor not completely deadened by said lined chamber.

3. The combination in a combined air filter and sound silencer, of dust extracting means comprising an inner closed tubular filter communicating with an opening to the carburetor, and a plurality of tubular filters outside of and coaxial with said inner closed filter and providing an open annular circuitous air passageway leading to the outside of said inner filter, said annular circuitous air passageway passing around the alternate opposite ends of said outer filters and being substantially as large in total area at its smallest point as the area of the inlet opening to the carburetor, said inner closed filter being constructed of such area and porosity that required air for the carburetor which has free flow through or around said outer filters has free flow through said inner filter to reach the carburetor unimpeded, and walls forming a chamber completely lined with sound deadening material and closed except for a communicating opening between it and the interior of said closed inner filter to deaden sound emerging from the carburetor as a result of said unimpeded air flow to the carburetor, the said dust extracting means serving to intercept and deaden any sound not completely deadened by said lined chamber.

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