

July 5, 1960

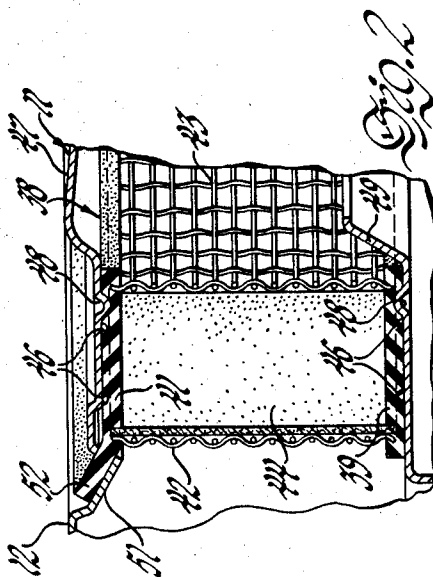
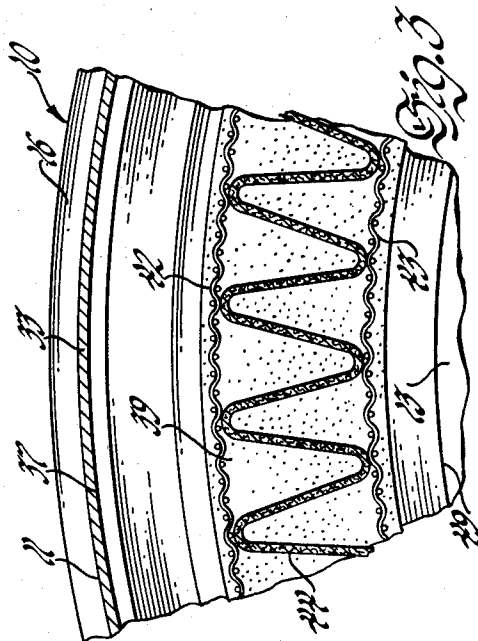
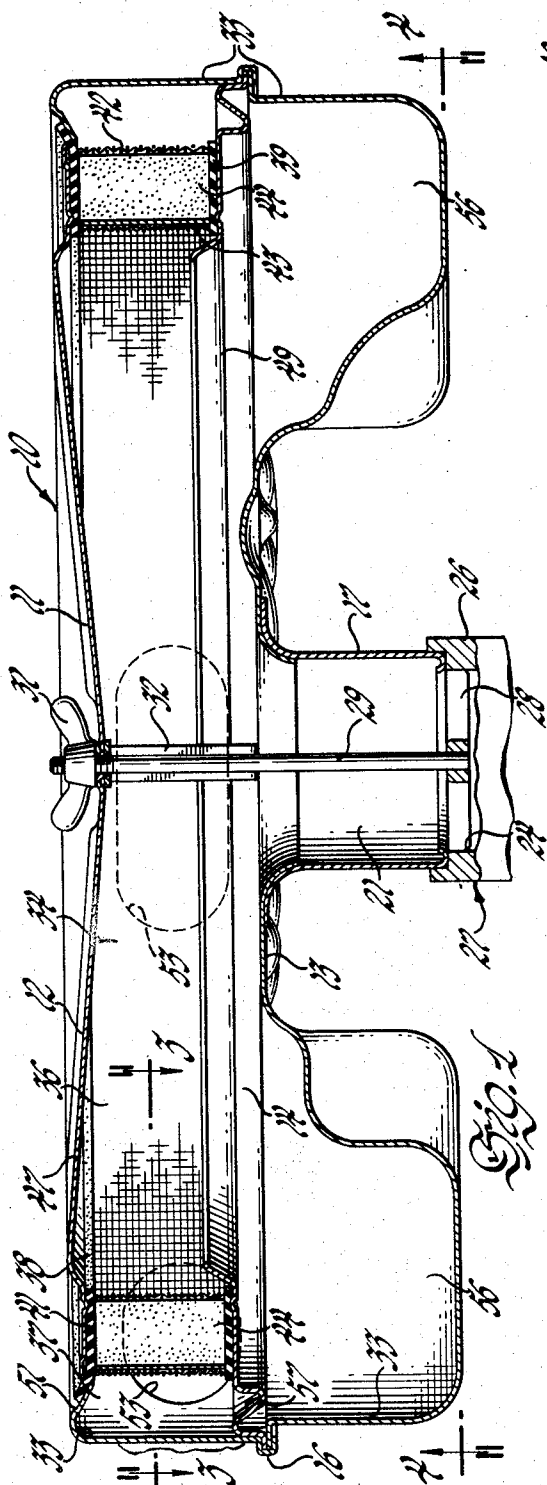
W. F. THORNBURGH

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AIR CLEANER AND SILENCER ASSEMBLY

Filed Feb. 13, 1957

2 Sheets-Sheet 1



INVENTOR.
William F. Thornburgh
BY
Ed Burch
ATTORNEY.

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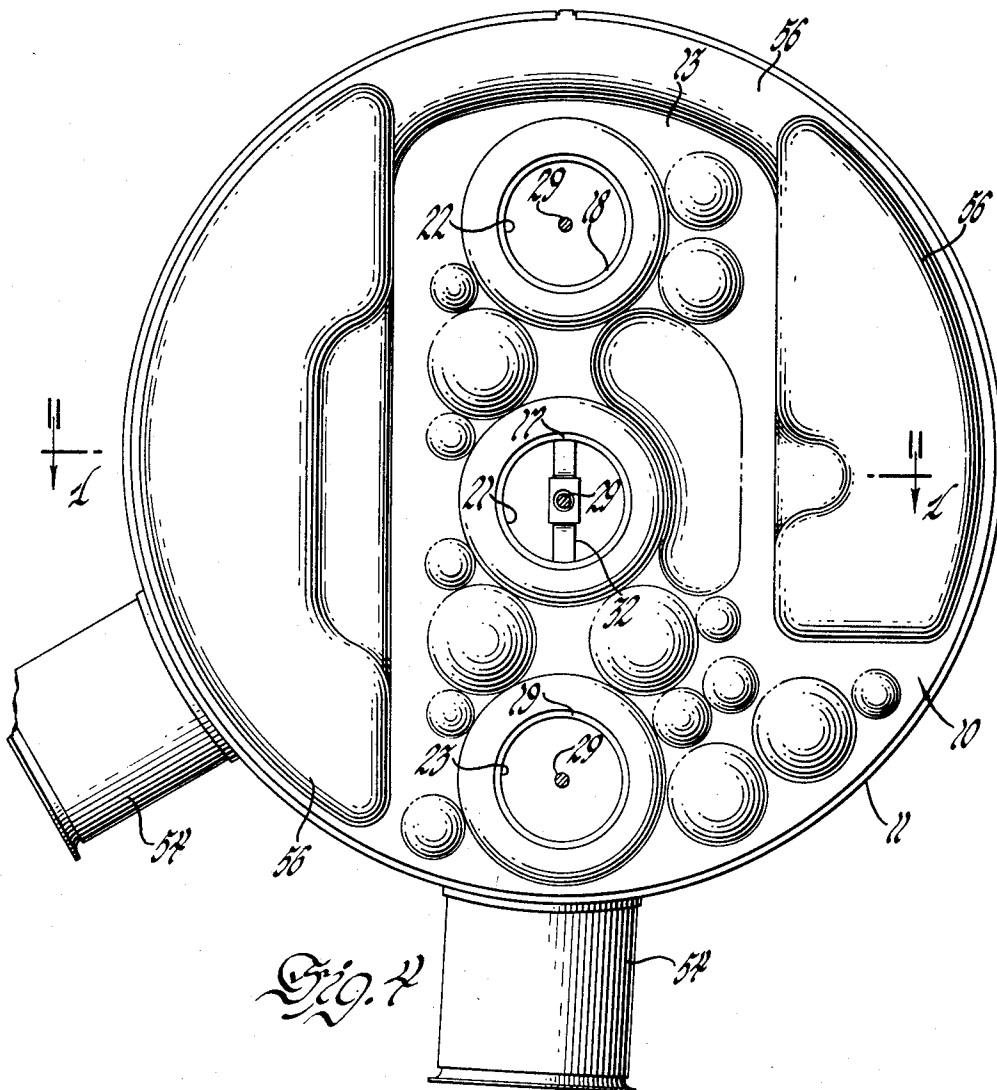


Fig. 7

INVENTOR.
William F. Thornburgh
BY
L. D. Burch
ATTORNEY.

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AIR CLEANER AND SILENCER ASSEMBLY

William F. Thornburgh, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Feb. 13, 1957, Ser. No. 639,960

1 Claim. (Cl. 183—71)

This invention relates to cleaner silencer assemblies for internal combustion engines and the like and has particular relation to cleaner silencer assemblies for V-type internal combustion engines for automotive and other purposes.

It is proposed to provide a cleaner silencer assembly structure in which low-pass filter type sound attenuating means and disposable air filter means may be embodied. The structure embodies an unusual number of inexpensive parts, is relatively wide and shallow to take advantage of the installation space available and may be assembled and serviced with a minimum of operations.

In the drawings:

Figure 1 is a transverse vertical sectional view of a cleaner silencer assembly installed on the induction system of a V-type internal combustion engine for automotive or other purposes. Figure 1 is taken substantially on the plane of line 1—1 of Figure 4.

Figure 2 is an enlarged fragmentary cross sectional view of the filter means embodied in the structure disclosed by Figure 1.

Figure 3 is another enlarged fragmentary cross sectional view of the filter means as the latter would appear substantially in the plane of line 3—3 of Figure 1.

Figure 4 is a plan view of the lower end of the structure disclosed by Figure 1, taken substantially in the plane of line 4—4 of Figure 1 looking in the direction of the arrows.

The cleaner silencer assembly 10 embodying the invention includes a casing 11 formed by upper wall means 12, lower wall means 13 and extension wall means 14, all being secured together by a rolled seam 16. The lower wall means 13 is formed to provide a plurality of tubular extensions 17, 18 and 19 forming air inlet and acoustical outlet passages or passage means 21, 22 and 23 adapted to be connected to a plurality of passages 24 embodied in the induction system 26 of a V-type internal combustion engine indicated generally at 27. The passages 24 are traversed by bridges 28 from which bolts 29 extend upwardly within the passages 21, 22 and 23 and through openings formed in the upper wall means 12. The bolts are adapted to be engaged by wing nuts 31 for securing the assembly 10 to the engine. A bridge or bracket 32 extends across the central passage 21 between the upper and lower wall means 12 and 13 respectively for the purpose of spacing the wall means to make the central part of the casing 11 more rigid and to prevent vibration of the upper and lower walls of the casing. The wall means 12 and 13 are formed at the adjacent edges thereof to provide side wall means 33 thereby spacing the upper and lower walls of the casing to provide an air distribution and acoustical expansion or capacitance chamber or chamber means indicated at 34. The chamber or chamber means 34 is shallow in proportion to the width thereof and extends across the top of the engine to provide a relatively large acoustical expansion space in which the air velocity is low enough to

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provide a substantially uniform distribution of air to all of the passages 21, 22 and 23. The chamber means 34 is divided into an air outlet chamber means 36 and an air inlet chamber means 37 by the extension wall means 14 and a disposable or cleanable filter element or means 38. The extension means 14 provides a shelf extending inwardly of the expansion chamber means 34 for supporting filter means 38 within the casing 11. The filter means 38 is formed by resilient annular supporting wall means 39 and 41 in which the ends of screens 42 and 43 and a paper or other suitable pleated filter 44 are embedded. The supporting wall means 39 and 41 may be formed of any suitable plastic material having some compressionability and resiliency and capable of being molded. It is possible to hold the screens 42 and 43 in any desired position during the molding operation since they are outside of the pleated filter 44. In order to hold the pleated filter in the desired position during the molding operation it is proposed to provide rib means on the surfaces of the mold which are adapted to engage the outer surfaces of the supporting wall means 39 and 41. The rib means will form grooves or depressions indicated at 46 in the outer surfaces of the supporting wall means 39 and 41. These may extend throughout the extent of the surfaces in the form of parallel grooves or in the form of lettering indicating the manufacturer's name and the part and model identification of the filter unit. The ribs forming the grooves or lettering 46 will project into the supporting wall means 39 and 41 during the molding operation, to hold the filter in a position midway between the outer surfaces of the supporting wall means 39 and 41. Otherwise the filter 44 might extend almost entirely through one of the supporting wall means and be hardly embedded at all in the other. The filter unit 38 is adapted to be secured in the chamber means 34 by compression between the supporting surface of the shelf 14 and the outer peripheral edge of a cover 47 forming a part of the upper wall means 12. The cover 47 and the shelf 14 are provided with annular ribs 48 which are adapted to be compressed into the resilient material forming the supporting wall means 39 and 41 when the cover is secured in position by tightening the wing nuts 31 on the bolts 29. The cover and the shelf engage the supporting wall means 39 and 41 throughout a greater area than at the ribs 48 to support and seal the filter unit 38 between the upper and lower wall means of the casing 11. The shelf 14 has an inwardly flanged inner edge 49 for properly centering and locating the filter unit 38 with respect to the chamber 34 and an inwardly flange part or edge 51 forming an opening in the upper wall means 12 through which the shelf 14 and the filter unit 38 may be exposed when the cover 47 is removed. In order to seal this opening when the cover 47 is assembled it is proposed to extend the supporting wall means 41 beyond the screen 42 to provide an edge 52 which is larger than the opening within the flange 51 and which is adapted to engage the outer surface of the flange when the filter 38 is projected within the opening and into engagement with the shelf 14. When the cover 47 is assembled by tightening the wing nuts 31 upon the bolts 29, it will be apparent that the edge 52 of the supporting wall means 41 will be bent as indicated by the drawing to seal the upper wall means 12 between the flange 51 and the edge of the cover 47.

Air inlet and acoustical outlet and impedance passage means 53 may be provided by air inlet and tuning tubes indicated at 54. In the present instance a plurality of tubes 54 is provided to take advantage of available space. However, any number of tubes may be provided to attain the same air inlet and acoustical impedance capacity.

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The passages 53 communicate with the inlet chamber means 37 surrounding the filter unit 38 and with the chamber means 34 beyond the filter unit 38 and the shelf 14.

The chamber means 34 and the passages 53 within the tubes 54 are tuned to attenuate sounds emanating from the engine through the passages 21, 22 and 23. The tuning may be varied by varying the length of the tubes 54 and by changing the volume of the chamber 34. The volume of the chamber 34 may be changed by varying the depressions 56 formed in the lower wall means 13.

The air flowing to the engine through the filter unit 38 is cleaned by the filter unit 38, which may be thrown away or removed and cleaned when a sufficient amount of dirt has been collected by the filter unit to impair the operation of the engine. To restore the filter unit 38 it is necessary only to remove the cover and remove and replace the filter unit with a new filter unit or a cleaned filter unit.

During the operation of the engine it sometimes occurs that dirt separated by the filter 44 or by the screen 42 will be displaced by vibrations of the engine and will fall upon the shelf 14. In order that this dirt may not be again lodged upon the screen or the filter it is proposed to provide a groove 57 in the shelf 14 around the filter unit 38 for the purpose of collecting such dirt and storing the dirt out of the air flow path through the filter unit until the filter unit is removed. The dirt in the groove then may be removed by a cleaning rag wetted in gasoline or by any other desirable means.

The claim:

A cleaner silencer assembly for internal combustion engines and the like and comprising, a casing having an upper wall and a lower wall and an intermediate wall, said walls being spaced to provide an air distribution and acoustical capacitance chamber therein, said walls at the outer edges embracing laterally extending side walls having flanges forming a seam securing said walls together, said intermediate wall being formed to provide a centrally disposed opening and forming an annular shelf around and within said chamber, said lower wall being formed on opposite sides of said casing and beneath said intermediate wall to extend downwardly to provide oppositely disposed cavities enlarging and forming extensions within said lower wall of said air distribution and acoustical capacitance chambers, an annular filter element having end seals and being supported on one of said end seals on said annular shelf,

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said annular filter element being adjacent said side walls but spaced from said side walls to divide said chamber into an outer air inlet chamber and an inner air outlet chamber, a centrally disposed opening formed in said upper wall and through which said annular filter element may be inserted into and removed from said air distribution and acoustical capacitance chamber, a cover engaging another end seal of said filter element and closing said opening, said another end seal also being disposed between said cover and said upper wall and forming a seal between said cover and said upper wall, air outlet and acoustical inlet passage means formed in said lower wall and extending downwardly from the central part of said lower wall and the space between said cavities in said lower wall and providing communication between said air distribution and acoustical capacitance chamber and the induction system of an internal combustion engine or the like, said space between said cavities and around said air outlet and acoustical inlet passage means providing an open recess in said lower wall of said casing, said open recess extending upwardly in radially inwardly spaced relation to said filter element and said intermediate wall and around said air outlet and acoustical inlet passage means, an air inlet and acoustical outlet and impedance passage means formed in another of said casing walls and providing communication between said air inlet chamber and the atmosphere, said air inlet and acoustical outlet and impedance passage means and said air distribution and acoustical capacitance chamber being tuned to attenuate sounds emanating from said engine or the like.

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