

June 19, 1951

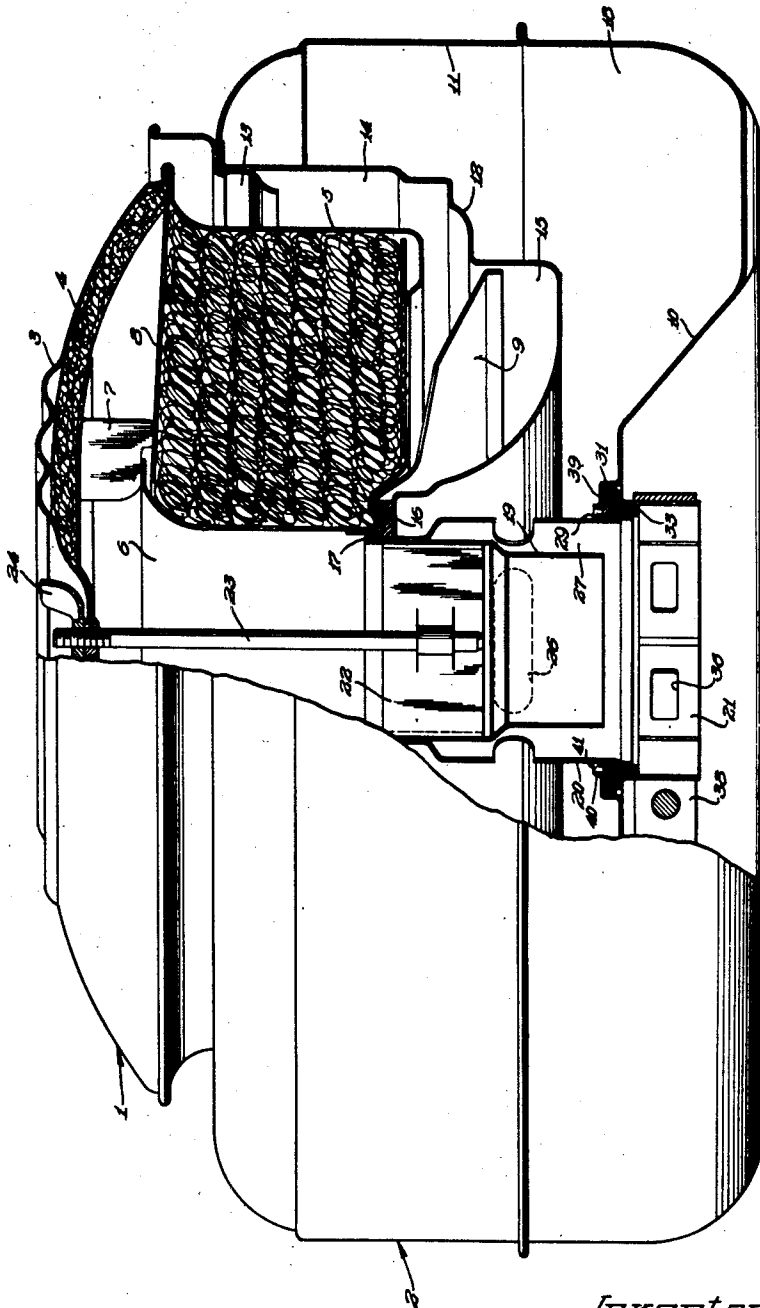
J. B. SEBOK
AIR CLEANER AND INTAKE SILENCER
AND OUTLET ASSEMBLY THEREFOR

2,557,237

Filed Dec. 23, 1948

2 Sheets-Sheet 1

Fig. 1



Inventor
Joseph B. Sebok

By *The Firm of Charles Hill*
Hills

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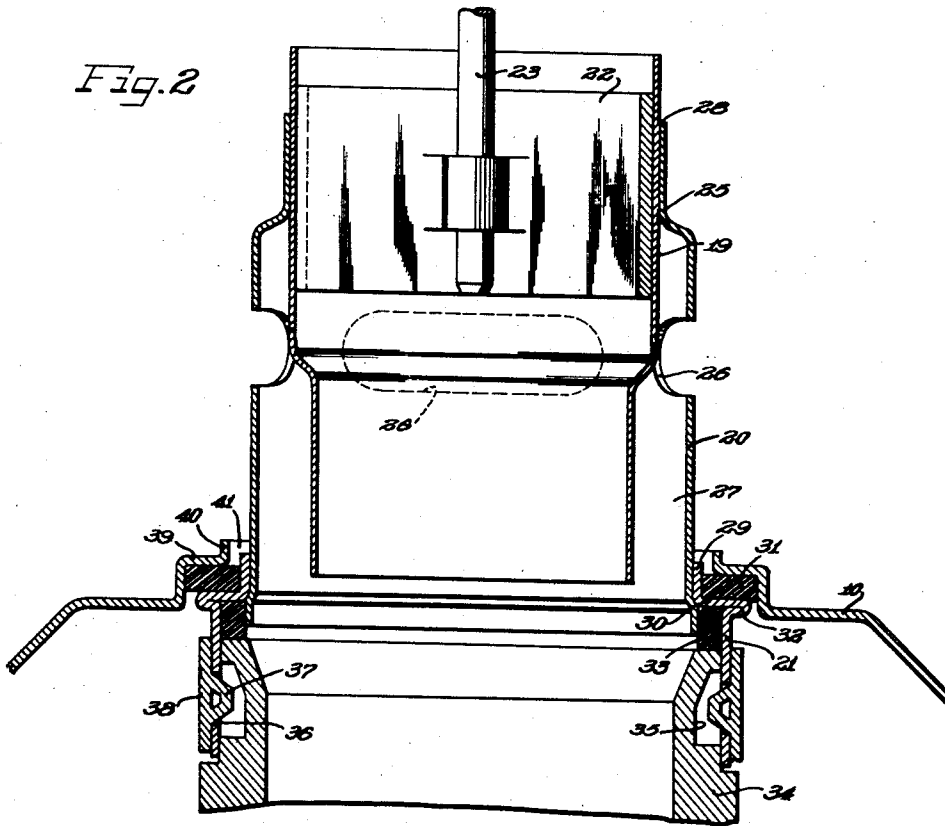
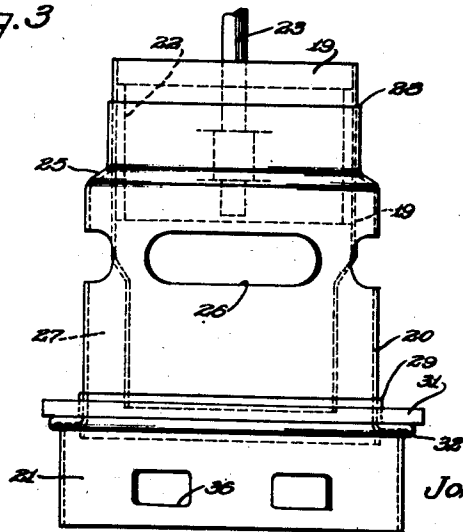


Fig. 3



Inventor
Joseph B. Sebok

By *Richard of Charles Hill* Atty.

UNITED STATES PATENT OFFICE

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AIR CLEANER AND INTAKE SILENCER AND OUTLET ASSEMBLY THEREFOR

Joseph B. Sebok, Detroit, Mich., assignor to Hou-
daille-Hershey Corporation, Detroit, Mich., a
corporation of Michigan

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6 Claims. (Cl. 183—15)

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This invention relates to improvements in an air cleaner and intake silencer and outlet assembly therefor, the invention being highly desirable for use in connection with combination air cleaning and intake silencing structures for association with the air inlet to the carburetor of an internal combustion engine, although the invention will have other uses and purposes as will be apparent to one skilled in the art.

In the past, combination air cleaners and intake silencers have frequently been used in association with the carburetor air horn or intake in automotive vehicles. Obviously it is desirable to pass clean air through the carburetor into the vehicle engine. It is also desirable to silence as much as possible at least the predominant noises developed in the engine. Heretofore the main noise, commonly referred to as power roar, was the result of a resonant frequency set up in the valve chamber, the intake manifold, the carburetor, or any one or all of them in combination. That usually was the predominant noise of the engine and could be effectively silenced by providing a sound attenuating chamber of the proper size and properly tuned to attenuate a sound of the particular frequency of the predominant engine noise, the attenuating being accomplished upon the resonator principle.

In many cases a so-called hat type of cleaner and silencer structure was employed for use upon a down-draft carburetor. This device included a casing embodying air cleansing means, and a lower attenuating chamber. The outlet was through the bottom of the casing and the entire structure rested upon the carburetor horn, to which it was clamped. Usually the bottom of the casing formed the bottom of the attenuating chamber and there was a direct connection by way of spot welding or equivalent means between that bottom and the flange which attached the entire structure to the carburetor.

It has been discovered, however, that such arrangement amplified certain engine noises created deep inside the engine by virtue of piston slap or valve knock, or by virtue of some other part of the engine providing a relatively loose fit with an adjacent part. Such noise would obviously be of a considerably different frequency than the power roar for which the silencer was designed, and it has been determined that such noise was in effect considerably amplified by virtue of that engine noise being transmitted directly to the relatively large bottom of the silencer through metal-to-metal contact. To provide an additional attenuating chamber capable of handling such a

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noise as piston slap might create would result in the provision of a structure entirely too large to be associated with a vehicle engine under the hood of an automotive vehicle. Some other method of eliminating that noise, and especially the amplification of that noise had to be found.

The instant invention has for its prime object the provision of an air cleaner and silencer structure embodying means to eliminate the possibility of the silencer casing amplifying a sound created inside an internal combustion engine which is different from that the silencer was designed to attenuate.

Another object of this invention is the provision of an air cleaner and intake silencer structure equipped with an outlet assembly so arranged as to eliminate metal-to-metal contact between the bottom of the structure and other parts of the assembly as well as the carburetor air horn.

Heretofore, it was customary to spot weld or equivalently secure the bottom of a casing of an air cleaner and intake silencer structure to the tuning tube which in turn, through a cylindrical carburetor flange, was connected to the carburetor of an internal combustion engine. Such a tuning tube required three parts, namely an outlet tube for clean air, a tuning tube disposed concentrically therearound, and the cylindrical carburetor flange attached to the tuning tube, but in connecting these parts together and in building up such an outlet assembly, great difficulty was experienced because of the relatively tremendously large bottom of the silencer chamber being welded to the carburetor flange or the tuning tube, and this large bottom had to be handled along with the other relatively small pieces while they were being secured together.

The instant invention also seeks the alleviation of such difficulty, and an important object of the invention is the provision of a simplified form of outlet assembly in which only the relatively small parts need be manipulated while they are secured together, and the bottom of the silencer chamber is never positively secured to the outlet assembly.

Still another object of the invention is the provision of an outlet tube assembly of the character set forth herein which is provided with an external gasket upon which the bottom of the silencer chamber may seat, and which gasket prevents the bottom of that silencer chamber from contacting any part of the outlet tube assembly.

Still another object of this invention is the provision of an outlet tube assembly embodying an external gasket for the seating of the bottom of

the silencer chamber, which assembly is so economical to manufacture as to more than compensate for the additional cost of the gasket.

While certain of the salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which—

Figure 1 is a part elevational, part central vertical sectional view of a combined air cleaner and intake silencer structure including an outlet tube assembly, all embodying principles of the instant invention;

Figure 2 is an enlarged fragmentary central vertical sectional view, with parts in elevation, this figure being an enlargement of the lower central portion of Fig. 1, to illustrate the outlet assembly and its association with the air cleaner and silencer structure, as well as the attachment to the carburetor horn, the lower portion of the structure being shown at a different angle than in Fig. 1 to better illustrate the carburetor horn connection; and

Figure 3 is a fragmentary elevational view of my novel outlet tube assembly per se.

As shown on the drawings:

In the illustrated embodiment of the instant invention there is shown a combination air cleaner and intake silencer including a casing comprising separable sections, an upper section indicated in general by reference numeral 1, and a lower section indicated in general by numeral 2. The upper section 1 includes a cover 3 equipped with a hiss silencer 4, a filter holding shell 5, and a center outlet conduit 6. One or more suitable spacers 7 are provided between the cover and the top of a filter element 8 disposed within the shell 5. Beneath the filter element 8 a downwardly sloping baffle 9 is provided.

The lower casing section includes a bottom 10, a side wall 11, and a top 12. In the upper portion where the side wall 11 and top are joined together a suitable air distributing flange 13 is provided. The vertical portion of the top wall 12 is spaced away from the filter holding shell 5 to provide an annular inlet 14 leading downwardly to a liquid sump 15 provided by the shaping of the top wall 12 of the lower section. At the inner portion of the top 12 there is a laterally extending annular seat provided for a gasket 16 against which the baffle and outlet conduit 6 of the upper casing section may seat. Just inside the gasket 16, the top wall 12 terminates in a cylindrical flange 17 as seen clearly in Fig. 1.

This lower casing section encloses a sound attenuating chamber 18 which operates on the resonating principle and is sized and tuned to attenuate the predominant noise developed in an internal combustion engine with which the cleaner and silencing structure may be associated. That predominant noise or tone is developed as a result of a resonant frequency set up in the valve chamber, the intake manifold or the carburetor of the engine, and is commonly referred to as power roar.

The inner portion of the attenuating chamber 18 is closed except for an entrance port or ports, two casing sections are held together in operative position, and the entire structure is attached to a carburetor, by means of a novel outlet tube assembly seen in elevation in Fig. 3. This outlet assembly comprises in general three tubes secured together by way of spot welding or in an equivalent manner, namely, an outlet conduit 19 for clean air, a tuning tube 20 which closes the inner

part of the attenuating chamber 18, and a tubular carburetor flange 21 for association with the air horn of a carburetor or other air intake element.

Secured inside the air outlet conduit 19 is a transversely disposed Z bar 22 into which the lower end of a bolt 23 is secured. The upper end of the bolt 23 extends through the cover 3 and is engaged by a thumb nut 24 externally of the cover by means of which the two casing sections may be clamped together or released and separated for servicing of the cleaner when needed.

The tuning tube 20 is of greater diameter than the air outlet conduit 19, and is provided with a reduced upper portion 25 which is spot welded or equivalently secured to the conduit 19. This tube is also provided with one or more openings 26 in the side wall thereof to provide communication between the annular space 27 between the two tubes and the interior of the attenuating chamber 18. It will be noted from the showing in Fig. 2 especially that the tuning tube terminates below the upper end of the air outlet conduit 19 and thereby forms an abrupt shoulder 28. When the outlet assembly is connected with the cleaner and silencer structure, the exposed portion of the outlet conduit 19 is press fitted into the aforesaid cylindrical flange 17, as seen in Fig. 1, and the abrupt shoulder 28 on the tuning tube may afford a stop so that the outlet tube is not pressed in too far, in some cases. In many cases, however, it will be desirable to have the shoulder 28 spaced below the gasket seat of the bottom 12 as an added precaution against development or amplification of noises from vibration caused by the engine.

The tuning tube 20 preferably extends below the outlet conduit 19 and the carburetor flange 21 is provided with an upright flange 29 secured around the lower portion of the tuning tube. Immediately below that flange 29, the carburetor flange is bent to provide a laterally extending portion 30 which functions as a seat for an annular gasket 31 which is preferably of non-metallic material, such as leather, rubber, or synthetic rubber, or the equivalent. Below the gasket seat the carburetor flange is reversely bent as at 32 to reduce the diameter of the cylindrical portion extending therebelow so as to provide between itself and the lower end of the tuning tube a seat for another annular gasket 33.

As seen best in Fig. 2, the cylindrical portion of the carburetor flange 21 slips over the upper end of a carburetor air horn 34 or other air intake which is preferably provided with an annular groove 35. Carburetor flange is provided with a plurality of apertures 36 through which projections 37 on a split ring clamping element 38 extend to positively connect a combined cleaner and silencer structure with the air intake 34. The upper portion of the intake horn seats against the aforesaid interior gasket 33 so as to insure a positive air tight seal.

It should be especially noted that when the outlet assembly is press fitted into position in the cleaner and silencer structure, the aforesaid gasket 31 on the outside of the assembly is disposed beneath a horizontal annular shoulder 39 on the bottom 10 of the low casing section. As seen best in Fig. 2, the bottom 10 terminates inside the shoulder 39 with an upstanding annular flange 40, there being a definite space 41 between that flange and any other part of the outlet assembly. Preferably, the bottom 10 of the lower casing section is preferably so sized that when the outlet

assembly is press fitted into position, the bottom 10 is sprung inwardly slightly, at least to a sufficient extent to insure a positive seal against the gasket 31.

Thus, it will be noted that there is no metal-to-metal contact between the bottom 10 of the silencing portion of the combined structure and the outlet assembly, intake horn, or parts associated therewith. Without that metal-to-metal contact, the bottom 10 will not amplify some such engine noise as piston slap or the equivalent, a noise of the character the attenuating chamber 18 was not designed to silence. The maintenance of that bottom 10 out of direct metal-to-metal contact with other interior parts of the entire structure solves the major problem of eliminating amplification of unexpected engine noises in a most effective way.

Further, it should be noted that during the manufacture of the air cleaner, it is a simple expedient to handle the air outlet conduit 19, the tuning tube 20, and the carburetor flange 21, while these parts are being secured together in the proper concentric relationship, whereas heretofore great difficulty was experienced in so manipulating the parts because the entire large bottom 10 was also spot welded to the tuning tube or adjacent structure and had to be handled along with these parts during their assembly. The novel outlet assembly herein shown and described reduces the cost of manufacture to such an extent as to more than compensate for the additional expense of the exterior gasket 31.

In operation, air is drawn through the cleaner by virtue of suction produced in the apparatus with which the cleaner is associated, such for example as an internal combustion engine. This air passes downwardly through an inner inlet 14, commingles with liquid in the sump 15, passes upwardly through the filter mass 8, and descends through the outlet conduits 6 and 19 entering the intake horn 34. At the same time, the predominant noise developed in the engine will be attenuated by the chamber 18, the wave lengths from the sound passing upwardly through the annular passage 27 between the outlet conduit 19 and the tuning tube 20, and entering the chamber through the port or ports 26. The bottom 10 of the combined cleaner and silencer structure being maintained out of metal-to-metal contact with adjacent parts is effectively prevented from providing any amplification of sound developed in the engine from some unexpected or unintended source.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. An outlet tube assembly for association with a combination air cleaner and intake silencer structure embodying a fabricated casing having air cleaning means in a portion thereof and defining a sound attenuating chamber in a silencer portion thereof, including an air outlet tube for connection with the air cleaner portion of the combination structure, a tuning tube concentrically disposed around said outlet tube and secured thereto, said tuning tube having an opening in the wall thereof to establish communication between the space between said tubes and the attenuating chamber of the silencer portion

of the combination structure, and a carburetor flange secured to the outside of said tuning tube adjacent the lower end thereof.

2. An outlet tube assembly for association with a combination air cleaner and intake silencer structure embodying a fabricated casing having air cleaning means in a portion thereof and defining a sound attenuating chamber in a silencer portion thereof, including an air outlet tube for connection with the air cleaner portion of the combination structure, a tuning tube concentrically disposed around said outlet tube and secured thereto, said tuning tube having an opening in the wall thereof to establish communication between the space between said tubes and the attenuating chamber of the silencer portion of the combination structure, a carburetor flange secured to the outside of said tuning tube adjacent the lower end thereof, said carburetor flange having a bent and laterally extending portion, and a gasket carried on said portion for the bottom portion of the combination structure to seat upon out of contact with the remainder of said assembly.

3. An outlet tube assembly for a combination air cleaner and intake silencer structure, including a pair of concentrically disposed tubes secured together, and a carburetor flange secured to the lower part of the outer of said tubes, a laterally extending portion on said flange forming a seat for an external gasket, and a depending portion on said flange below said seat defining between itself and the lower end of said outer tube a seat for an internal gasket.

4. A combination air cleaner and intake silencer structure having a central outlet, including a casing section, air cleansing means therein, an outlet conduit extending centrally through said cleansing means, a casing section having a top dished to define a liquid sump below said cleansing means and the inner margin of which is turned to define a cylindrical flange, the second said casing section having a side wall and bottom defining an attenuating chamber open on the inside, and an outlet assembly including an air outlet tube press fitted into said flange, a tuning tube having an opening in the wall thereof surrounding said outlet tube and closing off said attenuating chamber except for said opening, a carburetor flange shaped to exteriorly support a gasket and secured to said tuning tube, and a gasket on said carburetor flange to receive the bottom of the second said casing section and maintain the same out of contact with the rest of said assembly.

5. A combination air cleaner and intake silencer structure having a central outlet, including a casing section, air cleansing means therein, an outlet conduit extending centrally through said cleansing means, a casing section having a top dished to define a liquid sump below said cleansing means and the inner margin of which is turned to define a cylindrical flange, the second said casing section having a side wall and bottom defining an attenuating chamber open on the inside, and an outlet assembly including an air outlet tube press fitted into said flange, a tuning tube of greater diameter concentrically disposed around said outlet tube over the open side of said chamber and having an opening in the side wall thereof, said tuning tube being reduced in size and secured to said outlet tube and terminating short of the end of said outlet tube to act as a stop when the latter is press fitted

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into said flange, and carburetor engaging means carried by said tuning tube.

6. In a combination air cleaner and intake silencer structure, a casing shaped in the lower part to define a sound attenuating chamber, air cleaning means in said casing, said casing having a central outlet opening through the bottom thereof, an outlet assembly extending through said opening for association with an air intake, and a gasket carried exteriorly thereof by said assembly upon which the bottom of said casing rests around said opening, said gasket holding

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the casing out of contact with the remainder of said assembly.

JOSEPH B. SEBOK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

10	Number	Name	Date
	2,287,629	Mieras	June 23, 1942
	2,459,428	Jacobi	Jan. 18, 1949