June 17, 1952 F. SEBOK 2,601,172

SHOCK ABSORBING AND SILENCING MOUNTING ARRANGEMENT FOR AIR CLEANERS

Filed March 31, 1949 2 SHEETS—SHEET 1

Fig. 1

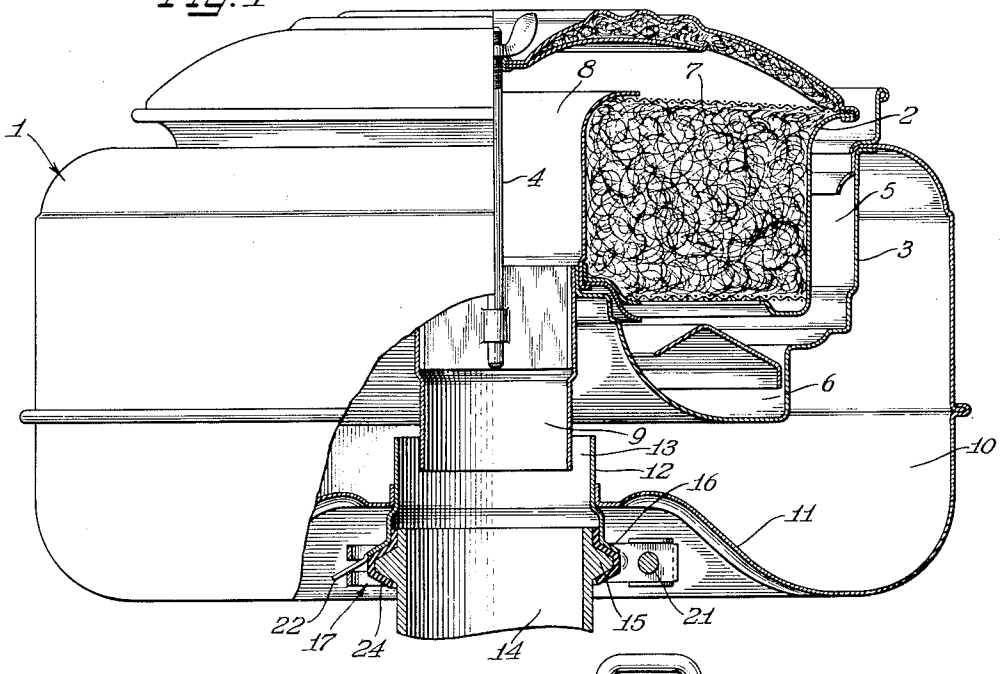
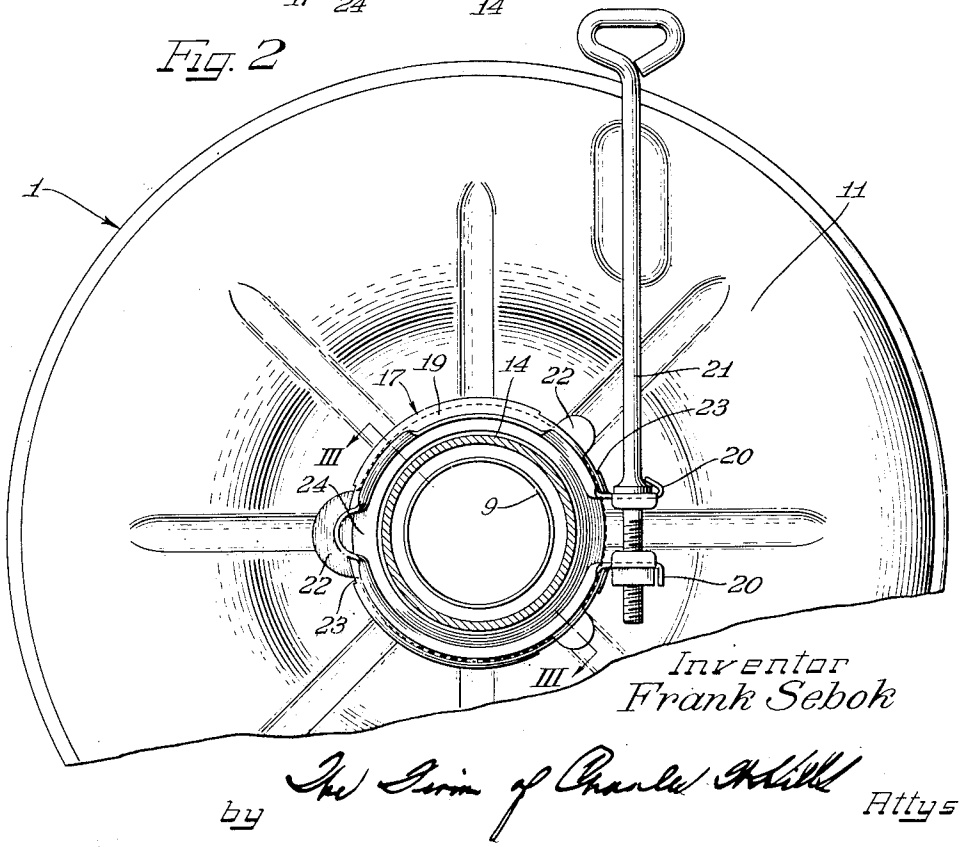


Fig. 2



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Fig. 3

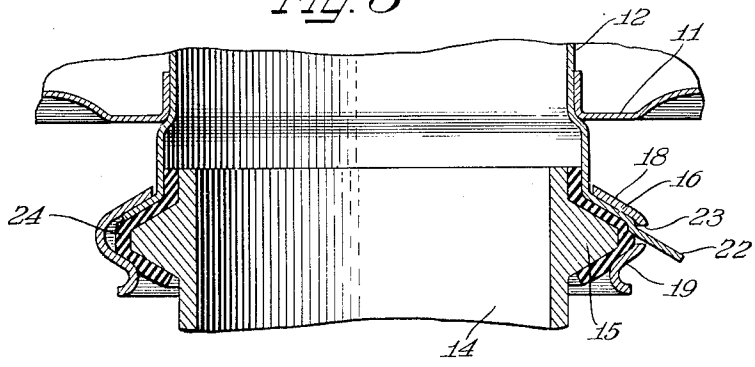


Fig. 4

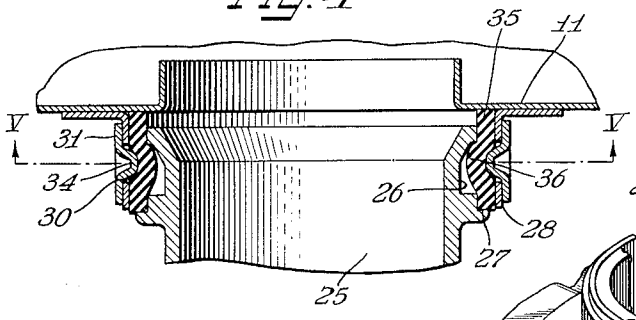


Fig. 6

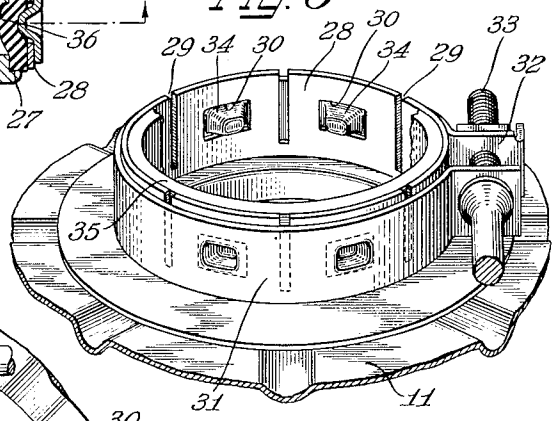
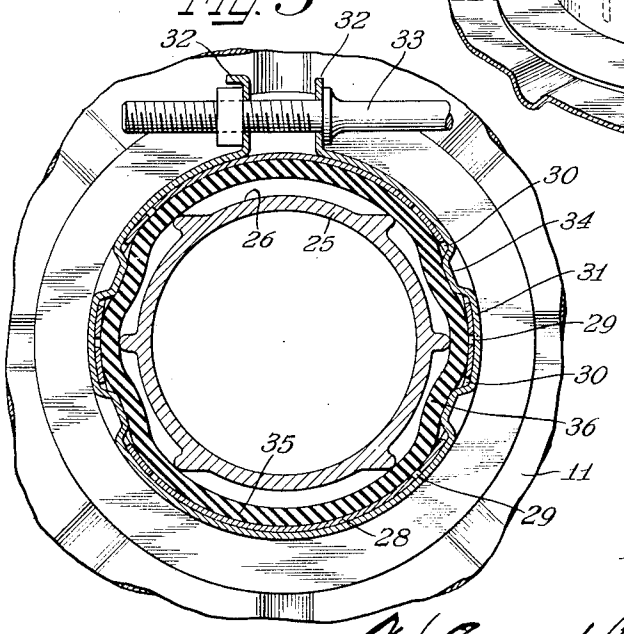


Fig. 5



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UNITED STATES PATENT OFFICE

2,601,172

SHOCK ABSORBING AND SILENCING MOUNTING ARRANGEMENT FOR AIR CLEANERS

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Application March 31, 1949, Serial No. 84,536

7 Claims. (Cl. 183—15)

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This invention relates to improvements in a shock absorbing and silencing mounting arrangement for air cleaners, and more particularly to an arrangement by which the air cleaner may be connected to a carburetor or other air intake horn, the invention being especially desirable for mounting a so-called hat type combination air cleaner and intake silencer to the intake horn of a downdraft carburetor, although the invention will have other uses and purposes as will be apparent to one skilled in the art.

This application is a continuation-in-part of and supersedes my copending application entitled "Shock Absorbing Connection for Air Cleaners," filed May 20, 1948, Serial No. 28,202, now abandoned.

Frequently, especially in passenger type automobiles, and light trucks, downdraft carburetors are utilized and it has been the practice to mount a so-called hat type air cleaner or combination air cleaner and intake silencer directly on the top of the carburetor air intake horn. It is desirable for expediency in servicing as well as economy in manufacture and installation to let the intake horn of the carburetor support the entire air cleaner structure, and avoid the use of any brackets or other supports between the body portion of the air cleaner and the cylinder block of the engine. However, difficulty has been experienced and especially with four cylinder engines, in maintaining the air cleaner structure properly mounted upon the carburetor intake horn, because of the engine vibration. In some instances this vibration has been so bad that the carburetor horn actually broke.

Where the air cleaner is incorporated with an intake silencer, and these are usually of the attenuating chamber type, the air cleaner by virtue of its metal-to-metal connection with an intake horn actually amplified noises created by the vibration and other noises created by piston slap, or loose fitting parts within the engine, of an entirely different wave length for which the attenuating chamber of the air cleaner was designed to silence. Great difficulty has heretofore been experienced in endeavoring to prevent such amplification of these other engine noises, it being understood that the attenuating chamber of the air cleaner is not designed to silence them, but to take care of the predominant tone emanating from the engine and commonly referred to as power roar.

With the foregoing in mind, it is an important object of the instant invention to provide a shock absorbing and silencing connection between the

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combination air cleaner and intake silencer and the intake horn, the connection being such that the air cleaner structure is firmly and securely united with the intake horn.

It is also an object of this invention to provide a mounting arrangement between an air cleaner and an intake horn that is firm and positive in character, but eliminates all metal-to-metal contact between parts of the air cleaner structure and the intake horn.

A further feature of this invention is the provision of a mounting arrangement in which all of the connecting means are entirely carried by the air cleaner structure, and the mounting arrangement being of such character that the air cleaner structure may be mounted directly upon the intake horn of a downdraft carburetor, totally supported by that horn, and the adverse effect of vibration is completely eliminated by the mounting means.

Still another feature of this invention is the provision of mounting means for connecting an air cleaner structure to an intake horn, which mounting means are so constructed that the air cleaner is prevented from amplifying unexpected engine noises other than that for which the silencing part of the air cleaner structure was designed to attenuate.

Still a further feature of this invention is the provision of a mounting arrangement for connecting an air cleaner with an intake horn, which arrangement provides a resilient non-metallic element which alone contacts both the air cleaner structure and the intake horn and completely eliminates any direct contact between any part of the air cleaner structure and the intake horn.

While some of the more 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 fragmentary, part elevational and part sectional view of a combination air cleaner and intake silencer structure mounted upon the intake horn of a carburetor by means embodying principles of the instant invention;

Figure 2 is a fragmentary bottom plan view of the structure of Fig. 1, with the intake horn being shown in section;

Figue 3 is an enlarged fragmentary vertical sectional view taken substantially as indicated by the line III—III of Fig. 2, looking in the direction of the arrows;

Figure 4 is a view similar in character to Fig. 3 showing a mounting arrangement embodying principles of the instant invention of slightly different construction for association with a carburetor or intake horn of different configuration;

Figure 5 is a fragmentary bottom plan sectional view taken substantially as indicated by the line V—V of Fig. 4; and

Figure 6 is a fragmentary pictorial illustration of a mounting arrangement of Figs. 4 and 5, showing the same in inverted position.

As shown on the drawings:

In the first illustrated embodiment of this invention, namely that shown in Figs. 1 to 3 inclusive, there is seen a fabricated combination air cleaner and intake silencer generally indicated by numeral 1. This air cleaner structure includes a pair of separable casing sections 2 and 3 held together in operative position by a bolt 4, the casing sections being of different diameter so as to establish an annular air inlet passage 5 therebetween. The top portion of the lower casing section is shaped to define a sump 6 for a cleansing liquid which commingles with air traveling through the cleaner, and above that sump the upper casing section supports a filter mass 7 disposed around a central outlet conduit 8 in communication with an outlet conduit 9 for clean air carried by the lower section. The lower casing section is also shaped to define a sound attenuating chamber 10, and the bottom 11 of this chamber is connected by spot welding or an equivalent manner with a tubular element 12 concentric with but of greater diameter than the outlet conduit 9 so as to establish an annular passage 13 therebetween through which sound waves may enter the attenuating chamber 10.

In this instance, the cleaner structure is associated with an air intake horn 14 having an outstanding annular flange adjacent the upper end thereof. This flange is of the so-called tapering variety, in that the upper surface of the flange slopes downwardly and outwardly while the undersurface thereof slopes upwardly and outwardly.

With such an intake horn, it is preferable to have the tube 12 extend outside or through the bottom 11 of the cleaner and silencer structure, and at its lower end it is provided with an outwardly and downwardly inclined flange 16, complemental in shape to the upper face of the flange 15 on the intake horn.

With such flange constructions on the air cleaner tube and on the intake horn, a clamp ring is preferably utilized which is of substantially channel shape. This clamp ring is generally indicated by numeral 17, and as seen best in Fig. 3, has an upper portion 18 sloping complementally to the flange 16, and a lower portion 19 sloping complementally to the underface of the intake flange 15. The end portions of the clamp ring are turned outwardly as indicated at 20—20 in Fig. 2, and the space between these end portions may be selectively varied to tighten or loosen the clamp ring by means of a suitable bolt 21. The clamp ring is maintained attached to the air cleaner and silencer structure by means of a plurality of tabs or tongues 22 projecting outwardly from and integral with the aforesaid flange 16, and extending through suitable slots 23 in the clamp ring. When the bolt 21 is moved so as to draw the end portions 20—20 together, the clamp ring by virtue of its shape will cam the flange 16 on the air cleaner structure toward the flange 15 on the intake horn.

The clamp ring structure just above described and shown in Figs. 1, 2 and 3 of the drawings, is more fully set forth, described, and claimed in my copending application entitled "Clamp Arrangement for Connecting Tubular Members," filed March 31, 1949, Serial No. 84,537.

To eliminate any metal-to-metal contact between the air cleaner structure and the intake horn, and to provide a shock absorbing connection therebetween, an element 24 in the form of a resilient sleeve is interposed between the tube 12 and its flange 16 and the intake horn 14 and its flange 15. This resilient sleeve 24 is preferably of synthetic rubber, reinforced with fabric, if so desired. The sleeve 24 might also be initially of substantially true cylindrical shape, or may be formed with a configuration approximating to some extent that of the flange 15 on the intake horn. In either event, the tube is pressed or forced into intimate engagement with and around the flange 15 by virtue of the tube 12, its flange 16, and the action of the clamp ring 17. These parts, and especially the clamp ring, force the resilient sleeve to follow the tortuous contour of the mouth end of the intake horn.

It will be noted, especially from the showing in Fig. 3, that there can be no metal-to-metal contact between the air cleaner structure and the intake horn, a resilient sleeve 24 very effectively prohibiting any such direct metal-to-metal contact. The sleeve 24 has a shock absorbing characteristic in that it will take up or absorb most of the vibration from the engine, even a four cylinder engine, so that there is no danger of breakage of the intake horn or of the respective parts becoming loose. At the same time, unexpected engine noises, due to piston slap or valve knock, as well as vibration noises, are silenced to a material extent in that the bottom 11 of the air cleaner and silencer construction and adjacent parts are prevented from amplifying such noises because metal-to-metal contact between the entire air cleaner structure and the intake horn has been eliminated. The elimination of that metal-to-metal contact is a highly important feature of the instant invention, because at the present time air cleaner structures including an attenuating chamber of sufficient size to silence the major tone of an engine, such as is referred to as power roar, must be of relatively very great diameter since the height of the structure is materially limited by virtue of its disposition beneath the hood of an automotive vehicle. Consequently, without the elimination of the metal-to-metal contact, the amplification of unexpected noises would be far greater than would be the case if the diameter of the cleaner could be materially lessened and the height increased.

In view of the fact that intake horns are of various shapes adjacent the open end thereof, and to emphasize that the shock absorbing and silencing element may be forced to conform to the tortuous contour of an intake horn by the clamping means, I have illustrated another form of construction in Figs. 4, 5 and 6. It is to be especially understood, however, that the instant invention is not limited to the two forms disclosed, these being by way of example and not by way of limitation.

In the structure of Figs. 4, 5 and 6, a well known form of intake horn 25 has been illustrated which is shaped to define an annular groove 26 adjacent the open end thereof. At the lower portion of this groove formation the intake

horn is provided with an outwardly projecting annular seat 27 on which the resilient shock absorbing and silencing sleeve may rest.

With this form of intake horn, it is not necessary that the tube 12 of the air cleaner project through the bottom 11 thereof, and so that tube has been omitted from the drawings. In lieu of the projecting portion of said tube, a depending cylindrical flange 28 is provided on the bottom of the air cleaner, by spot welding or equivalently, and this flange is preferably provided with a plurality of spaced slots 29 therein to permit a squeezing action of the flange when a clamp ring is tightened around it. Through the side wall of this flange spaced openings 30 are provided at intervals, there being four such openings shown in the drawings.

A clamp ring, preferably substantially cylindrical in form, indicated by numeral 31, is disposed around the depending flange 28, and the ends of this clamp ring are turned outwardly into spaced confronting relationship as indicated at 32—32, the space between these ends being selectively variable by means of a bolt 33 which obviously controls the tightening or loosening of the clamp ring. This clamp ring is provided with a plurality of pressed or stamped out inward projections 34 spaced to extend through the aforesaid openings 30 in the flange 28. There is no need ever to expand the clamp ring 31 sufficiently to cause the projection 34 to fully leave the openings 30, so that the clamp ring may always be carried by the cleaner and silencer structure.

As in the previous embodiment, a shock absorbing and silencing resilient element 35 in the form of a sleeve is interposed between the flange 28 and the intake horn. This element 35 is preferably made of a synthetic rubber, reinforced by fabric, if desired. The sleeve 35 may be purely cylindrical, and is preferably placed inside the flange 28 as seen in Fig. 6, and then the structure telescoped over the upper end of the intake horn. When the clamp ring 31 is tightened by manipulation of the bolt 33, the projections 34 force the sleeve 35 into the groove 26 of the intake horn, at least in the vicinity of the projections, and a secure and positive clamping engagement with the intake horn is obtained.

As in the previously described embodiment of the invention, the sleeve 35 will function as a shock absorbing element, taking up or absorbing vibrations, and prevents any part of the air cleaner structure from amplifying unexpected engine noises by eliminating any metal-to-mtal contact between the air cleaner and silencer structure and the intake horn.

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. A shock absorbing and silencing mounting arrangement for connecting an air cleaner to an intake horn having a tortuous surface adjacent its open end, including a flange carried by the air cleaner, a resilient non-metallic element for disposition between said flange and an intake horn, and a clamp member to force said resilient element to follow the contour of the tortuous surface of the intake horn, said resilient element separating both said flange and said clamp member from said horn.

2. In combination, a carburetor intake horn having a tortuous surface adjacent its mouth, an air cleaner carrying means for intimate association with said horn, a resilient sleeve for interpositioning between said means and said horn, and a clamp element contractible to force said resilient sleeve to follow the contour of said horn, said sleeve being of sufficient length to preclude metal-to-metal contact between said means and said horn and between said clamp and said horn.

3. In combination, an air intake horn, an air cleaner, a depending flange on said cleaner for telescopic association with said horn, a resilient member between said flange and said horn, and a clamp to hold the flange connected with the horn through said resilient member, said resilient member extending below said flange and separating said clamp from said horn.

4. A connection for joining an air cleaner and an air intake horn, including a flange on the air cleaner having spaced openings therein, a clamp circumscribing said flange and having projections to enter said openings, and a relatively soft non-metallic shock absorbing element inside said flange for direct contact with the intake horn and separating both the flange and clamp from the horn.

5. A connection for joining an air cleaner to a metallic air intake horn, including metallic means for gripping engagement with the horn, and a relatively soft non-metallic shock absorbing member for disposition inside said means for direct contact with the horn, said member being of sufficient size to maintain said means and the horn out of direct contact with each other.

6. A connection for mounting an air cleaner having a bottom outlet upon an air intake horn, including a flange depending from the cleaner around the outlet and having spaced openings in the wall thereof, a clamp circumscribing said flange and having projections to enter said openings, and a resilient sleeve inside said flange for direct contact with the intake horn, said projections distorting said sleeve into tight engagement with the horn when the cleaner is mounted and said sleeve separating said flange and said clamp from said horn.

7. A connection for mounting an air cleaner having a bottom outlet upon an air intake horn, including a flange depending from the cleaner around the outlet, a clamp to force said flange into gripping engagement with the intake horn, and a resilient sleeve inside said flange to directly contact the intake horn, said sleeve being of greater length than said flange to project therebelow and maintain the cleaner and clamp out of direct contact with the horn.

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