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J. J. DREZNES

2,815,825

CLEANER AND INLET AIR CONTROL

Filed April 22, 1955

3 Sheets-Sheet 1

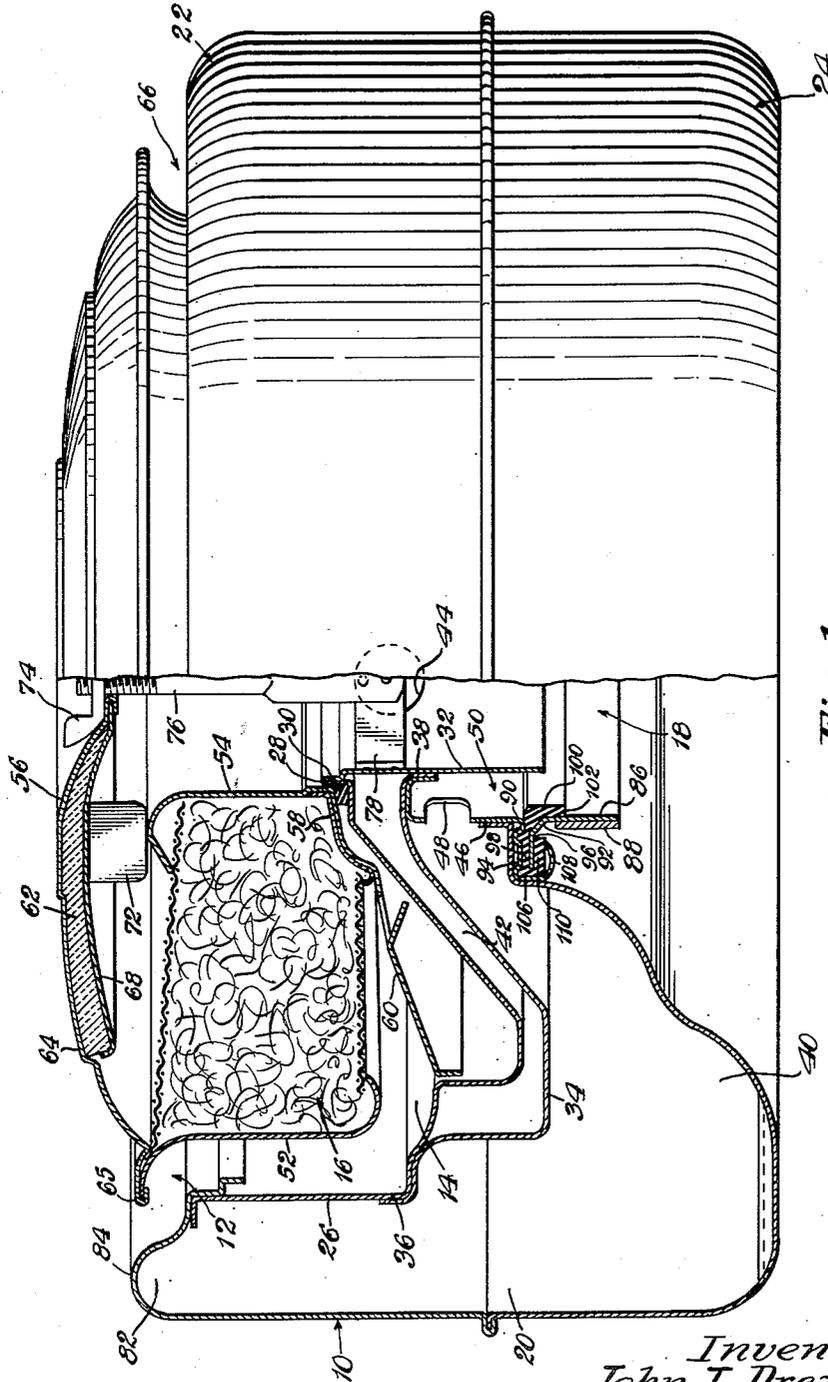


Fig. 1

Inventor
John J. Dreznes

by Parker & Carter
Attorneys

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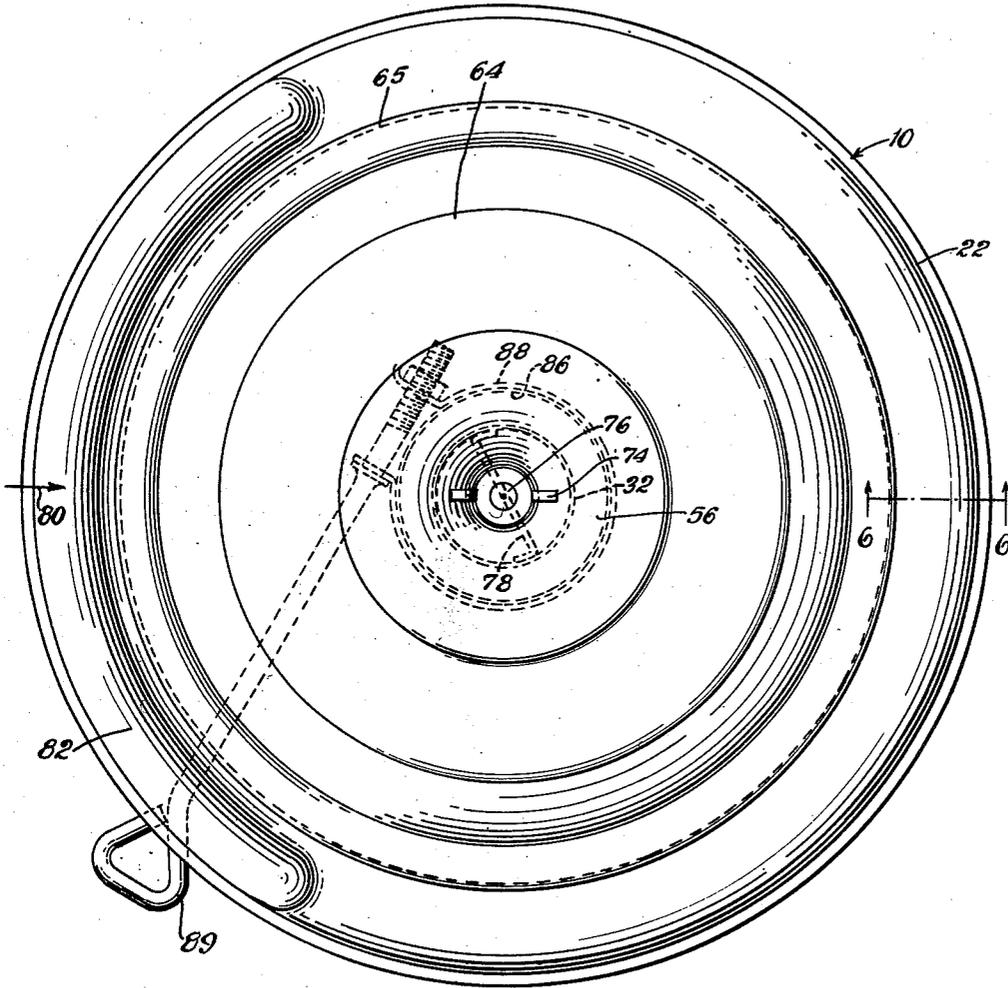


Fig. 2

Inventor
John J. Dreznes
by Parker & Carter
Attorneys

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J. J. DREZNES

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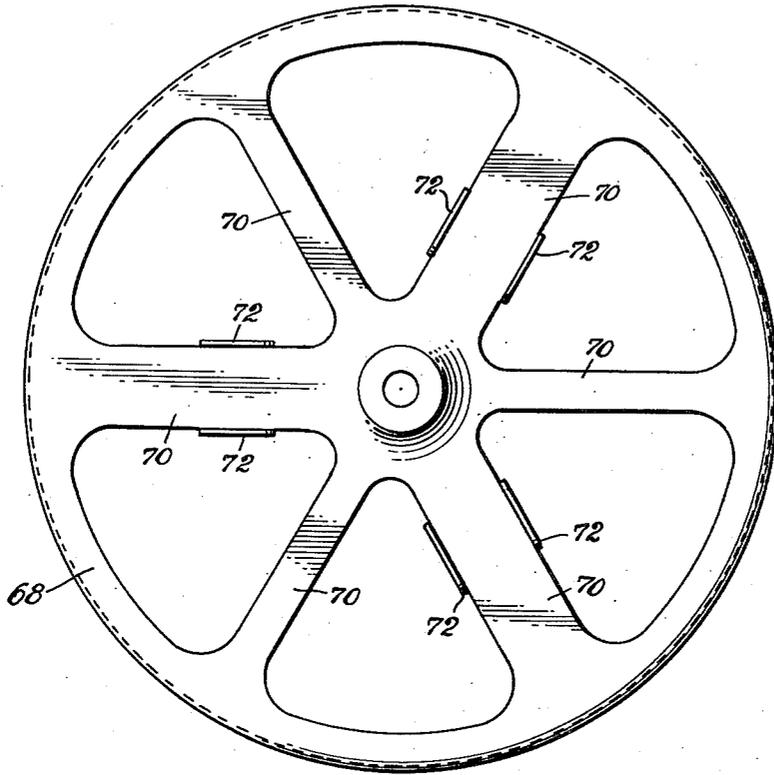


Fig. 3

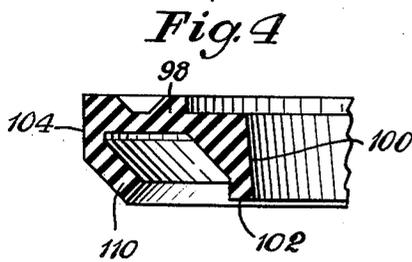


Fig. 4

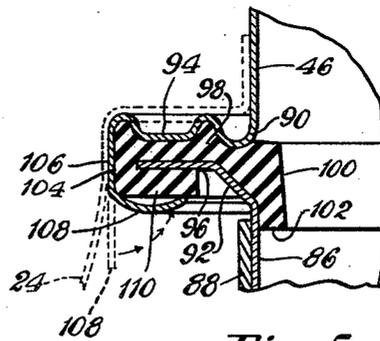


Fig. 5

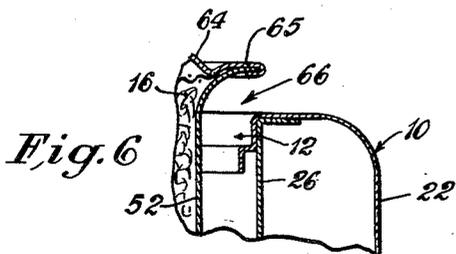


Fig. 6

Inventor
John J. Dreznes
by Parker & Carter
Attorneys

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2,815,825

CLEANER AND INLET AIR CONTROL

John J. Dreznes, Chicago, Ill., assignor to United Specialties Company, Chicago, Ill., a corporation of Delaware

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3 Claims. (Cl. 183—43)

This invention resides in the field of air cleaners of the type generally usable with air-consuming devices, such as internal combustion engines, although it is not necessarily restricted in this respect, and such a cleaner is generally referred to as a hat-type liquid bath air cleaner.

A primary object of my invention is a liquid bath air cleaner structure usable with an automobile engine or the like and constructed so that the incoming air to the cleaner will be more evenly and uniformly distributed over the cleaner's inlet.

Another object of my invention is a liquid bath air cleaner of the above type constructed so that liquid will not pull over, under normal circumstances and during conventional operation, from the cleaner's filter medium into the carburetor and the engine.

Another object of my invention is a cleaner of the above type constructed so that the efficiency of the cleaner will be greatly improved.

Another object of my invention is a cleaner of the above type constructed so that blast air from the engine's fan will have little or no effect on it.

Another object of my invention is a liquid bath air cleaner of the above type constructed to effect more even distribution of the liquid throughout the filter medium during normal operation.

Another object of my invention is a new and improved moisture and wind guard or shield for the leading edge of the inlet of a hat type air cleaner.

Another object of my invention is a blast air guard or shield on a hat type cleaner of the above type which is much cheaper than previous guards or shields.

Another object of my invention is an air cleaner usable with an internal combustion engine and adapted to be mounted on the carburetor of the engine and constructed so that vibration from the carburetor will not be transmitted to the body of the cleaner.

Another object of my invention is a mounting for a cleaner of the above type which, while effecting a positive connection between the horn of the carburetor and the body of the cleaner, nevertheless insulates the two with respect to noise and vibration.

Another object of my invention is a cleaner of the above type with a center pull down stud for the filter's top cap and with means to prevent undue flexing of the top cap and at the same time to effect a positive compression through the various elements of the filter housing.

Other objects will appear from time to time in the ensuing specification and drawings in which:

Figure 1 is a side view, partly in section, of my new and improved cleaner;

Figure 2 is a top view of the cleaner in Figure 1;

Figure 3 is a bottom view of the cleaner's top cap;

Figure 4 is a sectional view of the mounting gasket shown in Figure 1 but on an enlarged scale;

Figure 5 is a sectional view of the gasket in Figure 4 as mounted; and

Figure 6 is a section taken on line 6—6 of Figure 2.

In Figure 1 an air cleaner housing is indicated generally

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at 10 and is composed of annular air inlet 12 communicating with a liquid sump 14 by an air passage which extends through a suitable filter element or medium 16 to a clean air outlet 18. The housing includes a resonator or silencer chamber 20 composed generally of upper and lower housing members 22 and 24 and an inner housing member 26 joined by any suitable means to the upper housing member 22 and formed, in its lower regions, into the sump 14 for a suitable liquid, such as oil or the like. The inner edge of the inner housing extends inwardly from the sump and rises to a flanged edge 28 to provide a seat for suitable gasket 30. A center tuning tube 32 is secured at its upper edge to the flange 28 by any suitable means and extends downwardly toward the clean air outlet.

An intermediate wall 34 divides the silencer chamber into two compartments or sections and is secured at one end at 36 to the inner wall 26 in any suitable manner and at the other end at 38 to the center tuning tube. Thus a large silencer chamber 40 is provided which extends from the clean air outlet below the liquid sump and rises around the filter element, while a smaller silencer chamber 42 is provided which conforms generally to the liquid sump and is positioned below it and opens into the center tuning tube by a suitable number of openings 44, for example four in number, in the center tube. An outer tuning sleeve 46 is positioned in spaced relationship around the center tube 32 and, at its upper end conforms generally to the inner wall of the resonator or silencer chamber and is secured to the center tube at the same point, if desired, as the intermediate wall by any suitable means. A suitable number of openings 48 are provided through this tuning sleeve, for example six in number, to place the larger silencer chamber 40 in communication with an annular tuning duct 50 formed between the outer tuning sleeve and the inner tuning duct or center tube.

A filter housing fits down into the depression or cavity formed in the silencer chamber or housing and includes an outer wall 52, an inner wall 54, and a top cap or cover 56. The inner wall is provided with an abutment 58 which is opposed to and rests on the gasket 30 and then extends outwardly into a suitably baffle formation 60 disposed in the sump below the normal liquid level. The top cap 56 is composed of double walls with insulation or sound-deadening material at 62 between them, the top wall 64 extending outwardly to join the peripheral edge of the outer wall at 65 to define an outwardly facing, annular opening 66 for the inlet passage. The lower wall 68 of the top cap is a spider-type structure having a plurality of spokes 70 as shown in Figure 3, and every other spoke and a plurality thereof having downwardly struck depending tabs 72 which are formed as an integral part of the spider structure and are punched from the openings between the spokes. The tabs 72 are generally aligned with the inner wall 54 of the filter element, and when compression is applied to the top cap by a wing nut 74, center stud 76 which is secured to the center tube 32 through a suitable cross bracket 78, the tabs 72, in effect, function as an intermediate support to prevent undue flexing of the top cap. They further transmit the compression of the center stud through the inner wall of the filter housing to form a tight seal with the gasket structure 30.

The larger silencer or resonator chamber 40 along its upper edge defines the outwardly facing annular inlet opening 66 with the peripheral edge 65 of the filter housing. When the cleaner is positioned securely on the intake horn of a carburetor, one side or portion of the housing will be positioned forward and will receive high velocity blast air from the cooling fan generally used with an automotive engine. The arrow 80 in Figure 2 indicates generally the direction of this blast air.

My cleaner is provided with a raised, rolled arcuate section 82 formed as an integral part of the silencer

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chamber 40 extending a substantial arcuate distance on each side of the direction of incoming blast air to prevent the liquid in the forward portion of the sump and filter from being carried over into the carburetor and engine by the high pressure, high velocity air. For best results this arcuate raised portion of the silencer chamber should extend approximately 55 degrees on each side of the center line of the incoming air to effect an arcuate baffle or shield of approximately 110 degrees. As shown in Figure 1, the horizontal tangent of this rolled section forms an upper edge 84 which is at least on a level with the peripheral edge 65 of the filter housing and may possibly be higher so that the inlet 66 in this area is effectively protected against the blast air.

The outer tuning sleeve 46 is generally aligned with an outlet tube 86 which is suitably slotted for compression by a clamp 88 which is adapted to be actuated in the usual manner by a manually operable stud 89 as shown in Figure 2. The outer tuning sleeve and the outlet tube have opposed edges 90 and 92 respectively and are provided with outwardly extending flanges 94 and 96, respectively, which are disposed in spaced relationship. An annular gasket or insulation member is positioned between these two flanges and extends inwardly to an integral inner cylindrical portion 100 having a lower edge 102 adapted to resiliently abut the carburetor horn. The main body portion of the gasket extends outwardly to a cylindrical portion 104 which is disposed generally concentric with the inner portion 100 and is positioned beyond the extremity of the flange 96 on the outlet tube so as to overlie it. The flange 94 on the tuning sleeve is formed into a downward cylindrical portion 106 which surrounds portion 104 of the gasket and depends downwardly and is shaped into a retaining portion 108 which overlies and surrounds a locking portion 110 on the gasket.

This locking portion is adapted normally to be disposed at approximately a 45 degree angle as shown in Figure 4 with relation to the main body portion 98 of the gasket. However, the lower portion 108 of the sleeve is rolled or crimped inwardly to compress the gasket locking portion around the flange 96 on the outlet tube to effect a rigid mounting.

The use, operation and function of my invention are as follows:

I provide what is generally termed a liquid bath air cleaner of the hat type adapted to be mounted on the intake of a carburetor on an automobile engine or the like.

Such engines are generally provided with a fan which is used to draw air through a radiator for cooling and removing the heat from the cooling fluid for the engine. Such a fan creates a strong current of air which, if allowed to hit the outwardly disposed radial annular inlet for the air cleaner, will force all of the liquid out of the sump and filter medium on the side toward the fan. The velocity head of the air will be converted to static head creating a pressure differential across the circumferential opening of the air cleaner. For example, this pressure differential causes spill-over of oil and poor efficiency. For example in Figure 1 all of the liquid in the sump under the baffle 60 could normally be blown out of the sump into the filter and a large portion of the liquid would be carried over from the filter medium into the carburetor and into the engine.

To prevent this I provide a raised blast shield which extends a substantial arcuate distance around the outwardly disposed inlet to protect it. At the same time any moisture, such as rain or the like, is also blocked from the inlet. The shield does in no way hinder the admission of air into the cleaner as it is spaced laterally a distance equal to the normal inlet opening 66. Furthermore the shield is formed as an integral part of or an extension of the silencer chamber that surrounds the filter medium and liquid sump. Thus the efficiency and

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pullover property of the cleaner will be greatly improved. At the same time the shield is formed as an integral part of the main housing during the same drawing operation does not require any separate pieces or parts which have to be attached during manufacture and it cannot come loose or be damaged in any unnormal way. At the same time the volume of the silencer chamber is increased without increasing the space taken up by the cleaner under the hood of the automobile.

The top cap of the filter element is provided with a plurality of depending downwardly struck tabs which, during manufacture, are cut as an integral part of the lower wall of the top cap and are bent approximately at 90 degrees so as to oppose the inner wall of the filter element. During the compression effected by the center stud, these tabs prevent undue flexing and support the top cap, and at the same time they transmit the compression of the center stud through the filter element or housing to the sealing gasket between the housing and filter unit. These depending tabs are made as an integral part of the cap and when the spider element that holds the silencing mat in position is stamped, the tabs are merely cut from the material that forms the spokes of the spider element. This effects a substantial saving in the amount of material needed, the tabs are integral with the top cap, and an unnecessary step generally required to secure separate tabs in position on the top cap is eliminated.

It is very desirable that the cleaner housing be rigidly mounted on the intake horn of the carburetor, but at the same time it is desirable that these two elements be insulated or gasketed from each other so that vibration and noise will not be transmitted directly from the carburetor to the cleaner housing.

To do this I have provided generally aligned tubes for the outlet, the upper tube being a portion of the annular tuning duct, each tube having at its opposed edges turned outwardly into spaced flanges with the gasket element positioned between them. The inner edge of the gasket element has a cylindrical member which has an abutting edge adapted to oppose and engage the inlet of the carburetor. The outer edge of the gasket element overlies the flange of the outlet tube and has a portion adapted to overlie and surround it and to be locked into position around it when the outer cylindrical portion of the tuning tube is rolled around it. Thus the two tubes, even though completely separated at all points, nevertheless are interlocked and a positive mechanical connection is provided between the cleaner housing and the tube adapted to be mounted on the carburetor. Furthermore, the tube that is adapted to be mounted on the carburetor is locked positively through the gasket to the center tuning tube which thus effects a positive connection between the filter housing, the structure forming the liquid sump and the silencer chamber structure. It should also be noted that a single gasket element performs these functions: It insulates the carburetor mounting tube from the tuning tube above it. It forms a positive connection between the carburetor mounting tube and the silencer housing. It forms a cushion seat for the inlet horn of the carburetor. And it secures the silencer chamber and the carburetor mounting tube to the sump structure and, indirectly, to the filter housing.

While I have shown and described a preferred form of my invention, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I, therefore, wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. In an air cleaner, a housing having a dirty air inlet and a clean air outlet with an air passage between them and a filter medium therein, a tube in the center of the housing forming the clean air outlet with a silencer

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chamber in the housing around the tube, the tube including two generally aligned but non-contacting portions, one above the other, and having opposed edges, the lower portion being adapted to be mounted on the intake of a carburetor, the opposed edges having outwardly extending spaced flanges, and a gasket element between the flanges preventing metal-to-metal contact, the gasket element having an outer portion which overlies and surrounds the end of the flange on one of the tube portions, the flange on the other tube portion having an extension surrounding the outer portion of the gasket and flange. **5**

2. The structure of claim 1 in which the gasket element has an annular portion disposed inwardly of the tube adapted to engage the carburetor. **10**

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3. The structure of claim 1 in which the outer portion surrounds the flange on the lower tube portion.

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