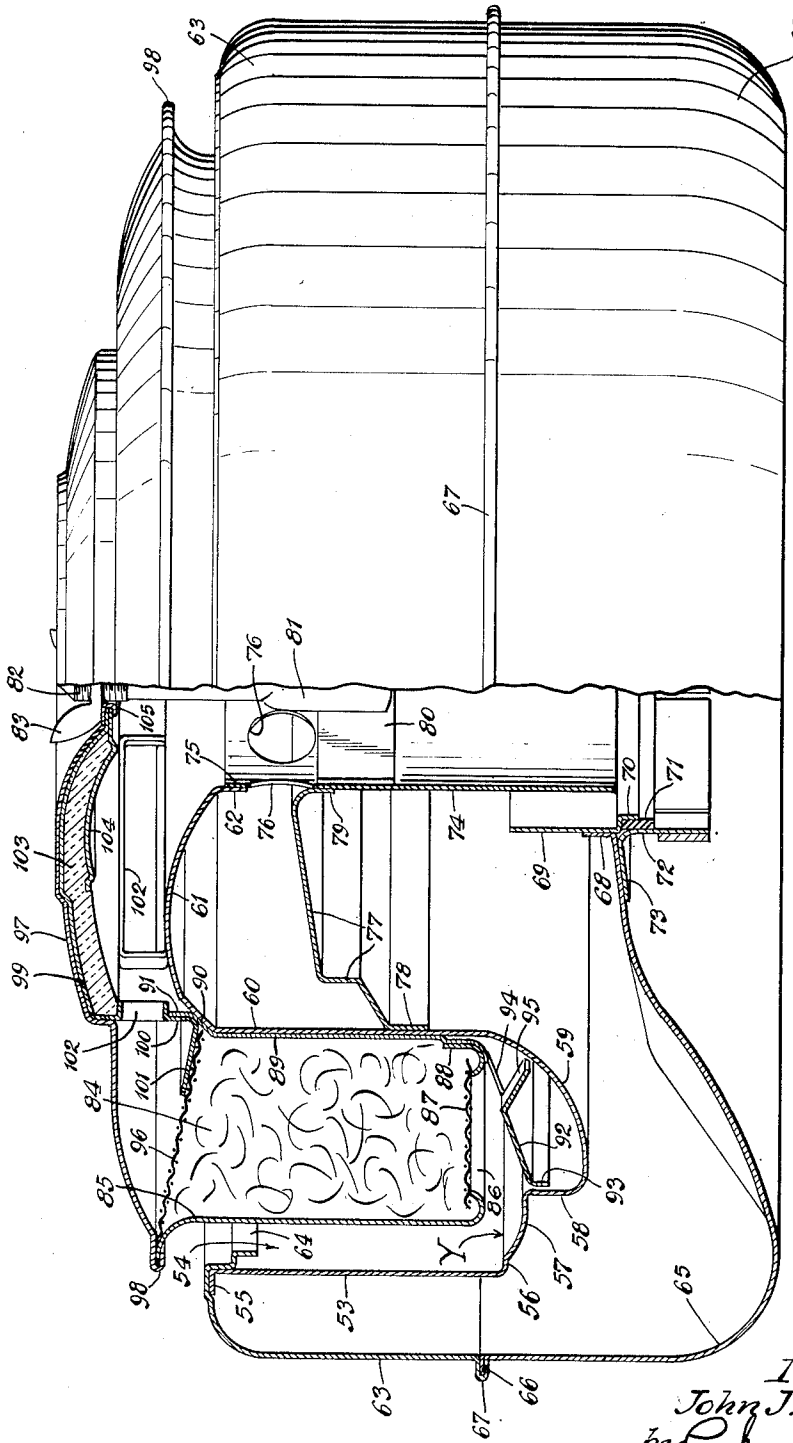
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COMBINATION AIR CLEANER AND SILENCER

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COMBINATION AIR CLEANER AND SILENCER

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This invention relates to an air cleaner or dust separator and has for one object to provide means for removing dust or other foreign matter from a moving stream of air and gas. In particular, however, the invention relates to an air cleaner embodying a silencer which is formed as a part of, or associated with, the air cleaner so that the two become a unit.

It has for an object, therefore, the provision of an air cleaning and silencing means in which the parts are assembled within the smallest possible space with a minimum vertical height or thickness.

Another object is to provide an air cleaner with which a silencing mechanism is associated and in connection with which a part of the silencing means is positioned within the space bounded by the cleaner.

Another object is to provide, in a combined air cleaner and silencer, means for positioning a major part of the silencer mechanism within the area defined by the projection of the cleaner.

Other objects will appear from time to time throughout the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawing, wherein the figure is a partial vertical cross section with parts broken away showing one form of the device.

Like parts are indicated by like characters in the specification and drawings.

As shown, the housing and passage defining members are generally built up from a number of pieces, but they might be formed integrally or unitarily, and the structure shown embodies useful and economical details of construction suitable for present manufacturing practices and the invention is not limited to the specific minor details of construction shown.

In the figure a housing member 53 forms one wall of an annular air inlet 54. This housing member 53 is provided at its upper edge with an outwardly extending flange 55 and is shaped inwardly to provide a shoulder 56 and an inclined, inwardly and downwardly directed portion 57. Inwardly of the portion 57 is a generally vertically disposed portion 58. 59 forms generally the bottom of a sump portion. The portion 59 is continued upwardly in a cylindrical member 60 which is inwardly bent as at 61 and terminates in a cylindrical section 62. It will be seen that the housing member just described forms one wall of an inlet passage, an air and liquid guiding shoulder, a sump and tubular member, and a part of a silencer or resonator chamber.

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A second housing member 63 is secured in part to the shoulder 55 and is provided with an inwardly bent, downwardly depending member 64. This member lies within the air inlet passage 54 and is spaced away from its walls.

A bottom plate 65 is provided with a shoulder 66 which is gripped by a portion 67 formed adjacent the bottom of the member 63. Centrally, the portion 65 is provided with a cylindrical part 68 which is secured to a tubular conduit 69 which is provided with a shoulder 70 beneath which is positioned a gasket 71. A tubular portion 72 is secured to the member 65 by the flange 73 and embraces the gasket 71.

A cylindrical member 74 is positioned within the cleaner and is secured as at 75 to the portion 62 of the member 61. It is provided with one or more perforations 76. A partition member 77 divides the total resonator or silencer space into two chambers. At its outer edge it is provided with a flange 78 which is secured to the member 60. At its inner edge it is provided with a flange 79 secured to the tubular conduit 74.

A bridge member 80 extends across and is fixed in the tubular conduit 74. A stud 81 is fixed to the bridge 80 and is threaded at its upper end as at 82 to receive a thumb nut 83.

A filter mass 84 is positioned within a shell 85 which is cut away along its bottom and shaped to provide spokes or arms 86 which support a screen 87 upon which the filter material rests. Integral with the shell 85 and the members 86 is a ring-like portion 88 which is secured to a generally cylindrical member 89 which forms the inner wall of the filter mass structure. The member 89 is inwardly bent as at 90 and terminates in a flange 91. The member 89 may be made integral with or secured to a baffle 92 which is provided with a peripheral skirt 93 and a plurality of louvers 94 in which downwardly bent portions 95 are positioned. A screen 96 is positioned upon the top of the filter mass 84. A cover plate 97 overlies the cleaner and a substantial part of the silencer chamber, and it is downwardly and inwardly bent at its periphery, as at 98, to engage the outwardly bent edge of the shell 85 and to grip it and the screen 96. A member 99 is positioned beneath and partly in contact with the cover 97 and is provided with a downwardly depending peripheral flange 100 and an outwardly extending peripheral portion 101 beneath which the edge of the screen 96 is positioned. A plurality of slots, perforations or other openings 102 is formed in the member 100.

Sound insulation **103** is fixed beneath the member **99** and is in part held in place by a fastening member **104** which is gripped by the inwardly turned edge **105** of the cover plate **97** which also grips the edge of the member **99**.

Although I have shown an operative form of my invention, it will be recognized that many changes in the form, shape and arrangement of parts can be made without departing from the spirit of the invention, and my showing is, therefore, to be taken as, in a sense, diagrammatic.

The use and operation of this invention are as follows:

In general the device as shown is intended as an air cleaner for internal combustion engines. It is put in communication with the carburetor or other device where the air is required in the operation of the engine. Oil is put into the cleaner sump, and normally when static it lies approximately on the level of the line which defines the upper portion of the shoulder; that is to say, at the line Y of the figure. When the engine to which the device is secured is operated, air moves through the cleaner entering the annular inlet passage, moving downwardly across the shoulder defined by the housing or casing member in which the sump is formed. The air moves upwardly through the filter mass, and oil or other liquid is carried from the sump into the filter mass. The air, after being cleaned in the filter mass, moves inwardly and downwardly through the outlet passage into the carburetor or engine.

Insofar as the cleaning proper is to be considered, the cleaner of this invention is relatively conventional. It is in the arrangement of the silencer chambers that the novelty resides.

It is now well known that noises from engines and elsewhere tend to travel outwardly from the engine through the carburetor, or other path of escape, and through the air cleaner. To prevent this escape of sound, the air cleaner is provided with silencing chambers so positioned and arranged that they silence, reduce or completely eliminate the noises which would otherwise escape to and beyond the cleaner.

In the form of the figure a substantial part of the silencing means is located within the inner margin of the filter mass and above the bottom of the cleaner proper. However, an appreciable part of the total silencing chamber is below the bottom of the cleaner and outside the outer margin of the filter mass.

I claim:

1. In combination in an oil bath air cleaner, casing means defining a liquid sump space, casing means defining an annular filter mass positioned above said sump space, said casing means defining an air inlet to said sump space, outlet conduit defining means positioned to discharge cleaned air from said cleaner, a filter mass shaped to define a cavity within itself, and a silencer positioned in part within the projected area of said filter mass, a substantial portion of said silencer extending into the cavity within said filter mass, and a portion of said silencer surrounding said filter mass, and a portion of said silencer lying below said sump space.

2. In combination in an oil bath air cleaner, casing means defining a liquid sump space, casing means defining an annular filter mass positioned above said sump space, said casing means defining an air inlet to said sump space, outlet conduit defining means positioned to discharge cleaned air from said cleaner, a filter mass shaped to define a cavity within itself, and a silencer positioned in part within the projected area of said filter mass, a substantial portion of said silencer extending into the cavity within said filter mass and lying above the bottom and below the top of said filter mass, and a portion of said silencer surrounding said filter mass, and a portion of said silencer lying below said sump space.

3. In combination in an oil bath air cleaner, casing means defining a liquid sump space, casing means defining an annular filter mass positioned above said sump space, said two casing means defining together an annular air inlet to said sump space outlet, conduit means positioned to discharge cleaned air from said cleaner, a filter mass shaped to define a cavity within itself and a silencer positioned in part within said cavity and in part outside of both said casing means, and in part beneath said filter mass, said liquid sump space and both said casing means.

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