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N. J. AMLOTT ET AL

3,413,780

AIR CLEANER AND SILENCER ASSEMBLY

Filed May 10, 1967

2 Sheets-Sheet 1

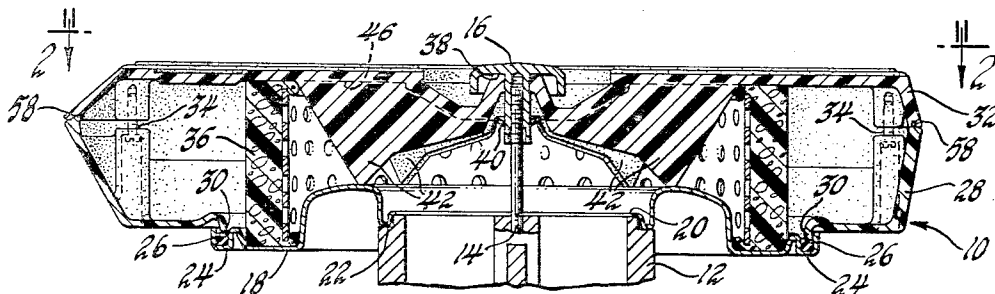


Fig. 1

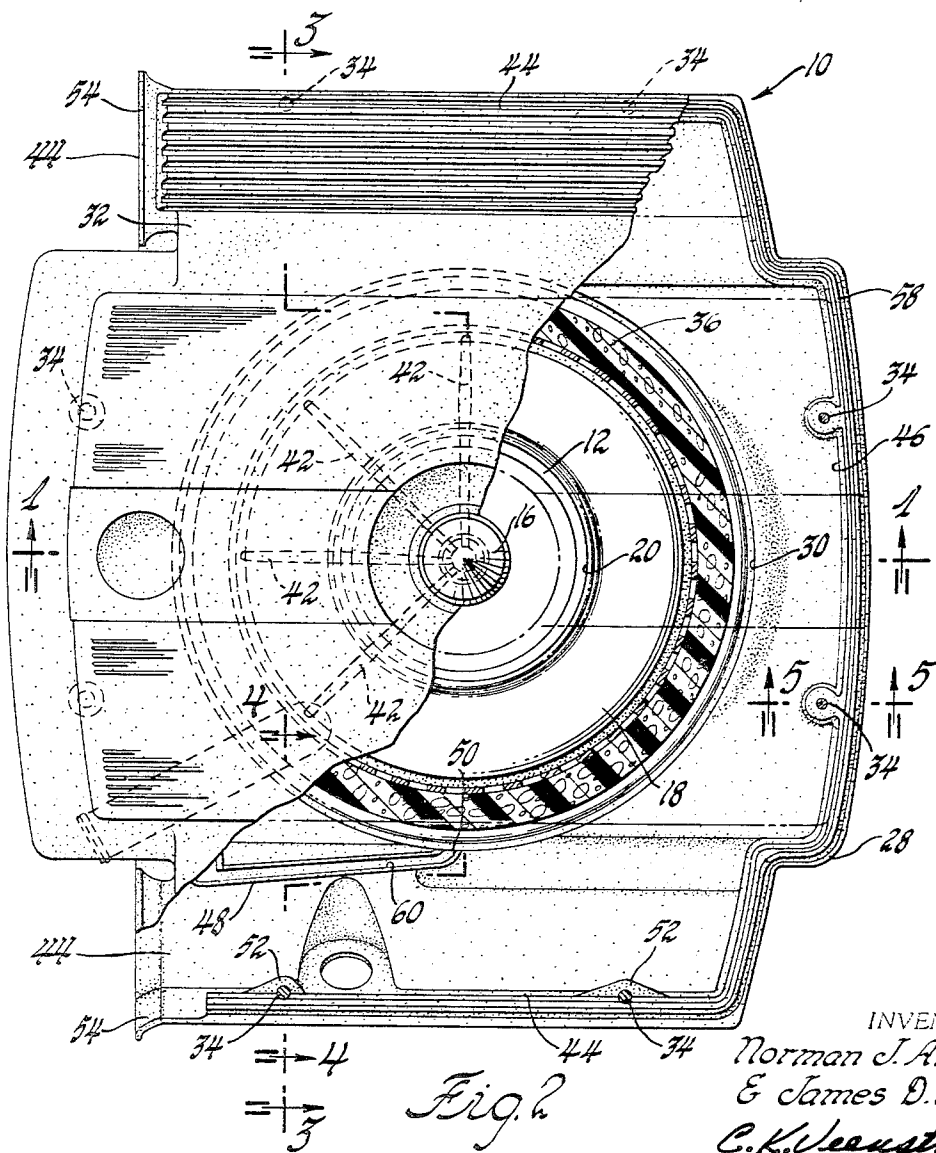


Fig. 2

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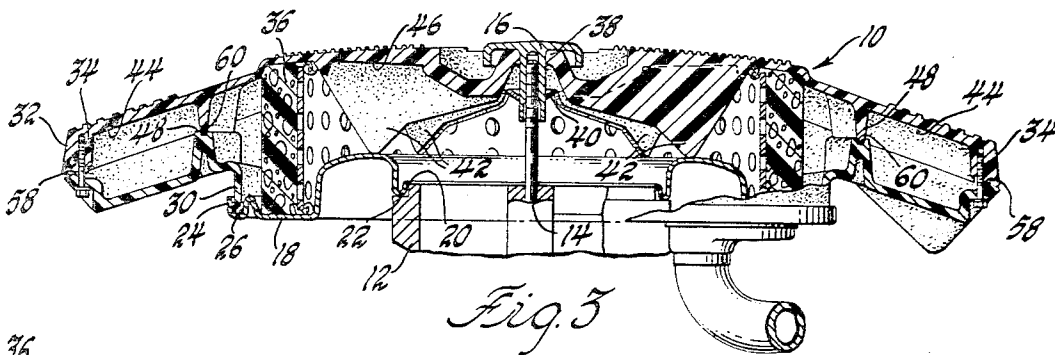
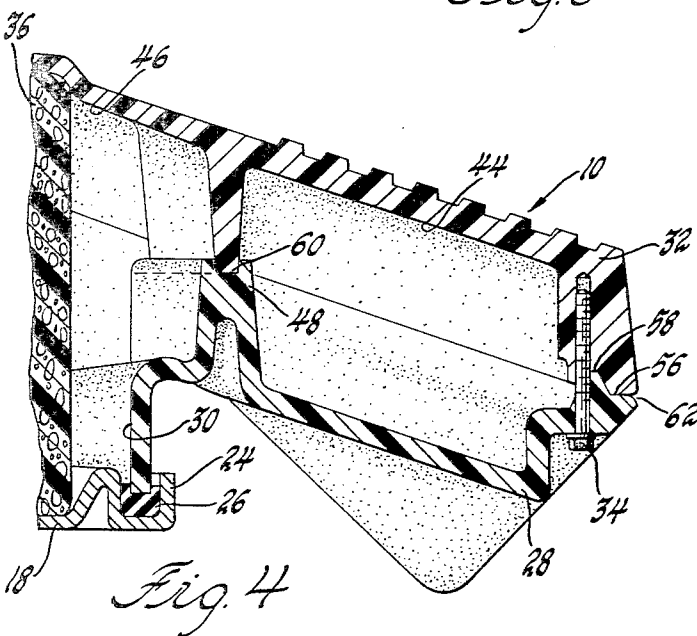
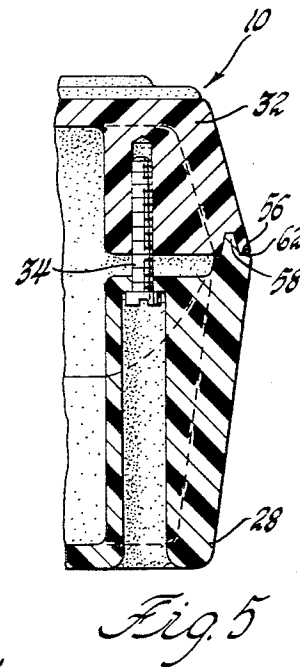
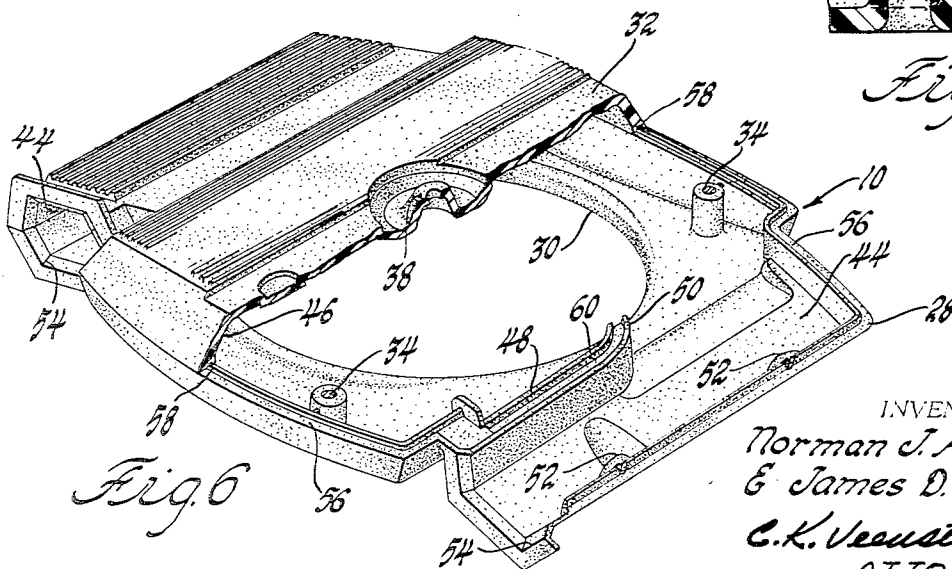
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AIR CLEANER AND SILENCER ASSEMBLY
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1 Claim. (Cl. 55—276)

ABSTRACT OF THE DISCLOSURE

An automotive air cleaner and silencer is provided with a pair of parallel snorkels integral with and extending along opposite sides of a substantially rectangular housing. The housing comprises upper and lower plastic members supported on the carburetor by a metal base plate and provided with a peripheral tongue and groove joint.

Background of the invention.—In recent years automotive air cleaner and silencer housings have generally been fabricated from sheet metal. However, the design of such housings is limited by the extent to which the metal can be worked.

Air cleaner and silencer housings molded from plastics do not have the same design limitations, but proper support, sealing, and air flow characteristics have been difficult to obtain with such materials.

Summary of the invention.—This invention provides a two-piece plastic air cleaner and silencer housing which is mounted on a metal carburetor base plate having sufficient strength to support the housing. The two-piece housing is removable as a unit from the metal base plate to permit servicing of the air filter element.

A tongue and groove joint is provided about the perimeter of the housing between the two plastic parts to provide proper alignment between the parts and to strengthen and seal the joint.

Partitions having an inverted tongue and groove alignment and sealing joint are provided to separate and define inlet snorkels which improve the inlet silencing characteristics. Screws, utilized to secure the upper and lower housing members, are located in screw bosses which are disposed to minimize the restriction to air flow through the snorkels.

In order to improve the appearance of the housing a slight peripheral gap is intentionally provided about the perimeter of the housing between the upper and lower members. This gap is provided with the thought that it would not be practical to achieve perfect mating of the edges of the upper and lower members in a mass-production molding operation and that there would thus be an occasional gap between the members at some point on the perimeter or an occasional overhang or underhang of the upper and lower members, either of which would be quite noticeable. The intentional gap provided in this housing makes the perimeter uniform and makes such irregularities unnoticeable.

The details as well as other objects and advantages of this invention are discussed in the remaining portion of the specification and shown in the drawings of a preferred embodiment of this invention.

Description of the drawings.—Figure 1 is a longitudinal sectional view of the air cleaner and silencer assembly taken along line 1—1 of FIGURE 2 and showing its strengthening ribs and its carburetor mounting arrangement;

FIGURE 2 is a top plan view of the air cleaner and silencer assembly showing the disposition of the snorkels and screw bosses;

FIGURE 3 is a transverse sectional view along line

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3—3 of FIGURE 2 further illustrating the disposition of these snorkels;

FIGURE 4 is an enlarged view of a portion of FIGURE 3, taken along line 4—4 of FIGURE 2, illustrating details of the sealing and mounting features;

FIGURE 5 is an enlarged sectional view along line 5—5 of FIGURE 2 illustrating further details of the mounting and sealing features; and

FIGURE 6 is an overall view of the housing removed from the base plate with parts broken away to illustrate its general arrangement.

Description of the preferred embodiment.—Referring to the drawings, an air cleaner and silencer assembly indicated generally by 10 is mounted on a carburetor air horn 12 as shown in FIGURES 1 and 3. A stud 14 extends upwardly from carburetor air horn 12 and is threaded to receive a cap 16 which retains the air cleaner and silencer 10 on carburetor air horn 12.

Air cleaner and silencer 10 includes a metal base plate 18 which has an air outlet opening 20 in registration with the carburetor air horn 12. Plate 18 is supported on carburetor air horn 12 by an annular rim 22.

Plate 18 has a peripheral channel 24 in which a resilient sealing material 26 is retained.

The plastic housing includes a lower base member 28 supported by an annular flange 30 in channel 24. An upper cover member 32 is secured to lower member 28 by eight screws 34.

An annular filter element 36 is supported on base plate 18 and is sealed at the bottom on base plate 18 and at the top on cover member 32. A central annular surface 38 on cover member 32 provides a surface against which the cap 16 may exert a clamping pressure when screwed down on stud 14 both to seal the ends of filter element 36 and to seal flange 30 of the housing in channel 24. A clip 40 is provided on cap 16 to prevent cap 16 from being withdrawn from cover member 32, reducing the possibility of damage or loss. Eight ribs 42 support the central portion of cover member 32 on metal base plate 18 to reduce the stresses caused by the clamping pressure exerted on surface 38.

A pair of inlet conduits or snorkels 44 are disposed along opposite sides of air cleaner and silencer assembly 10 and are separated from the generally rectangular inner chamber 46 by a pair of dividers 48. As may be seen best in FIGURES 2 and 6, dividers 48 are straight along a substantial portion of their length but flare toward chamber 46 at the outlet end 50. This configuration improves air flow through snorkel 44 to chamber 46.

As may also be noted in FIGURES 2 and 6, two screw bosses 52 project into each snorkel 44. These bosses 52 are remotely located from the outlet end 50 of the dividers 48 to reduce the restriction to air flow through snorkels 44.

As may be noted especially in FIGURE 2, the inlets 54 to snorkels 44 are the most restricted portion of snorkels 44 and the flow area of snorkels 44 gradually increases in the direction of air flow toward chamber 46. One screw boss 52 in each snorkel 44 is located adjacent and just downstream of the restricted inlet 54. This location has been found to provide the least restriction to air flow through snorkels 44.

Cover member 32 and lower member 28 have flat mating surfaces 56 (FIGURES 4 and 5) extending entirely about the sides and back of the housing and across the front between inlets 54. These surfaces 56 seal the upper and lower members 32 and 28 to provide an enclosed silencing arrangement. A tongue and groove joint 58 achieves alignment of surfaces 56 and assists in maintaining a tight seal. A reverse tongue and groove joint 60 is provided on dividers 48 to achieve proper strength and

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alignment in this portion of the housing and to maintain a seal between chamber 46 and snorkels 44.

As may also be noted in FIGURES 4 and 5, a slight peripheral gap 62 is provided outboard of the mating surfaces 56. This intentional gap 62 renders negligible the otherwise obvious imperfections in mating of upper and lower members 32 and 28 which might result from a mass-production molding operation, thus presenting a uniform edge to the viewer.

The upper and lower members 32 and 28 of the housing are molded of a 12% glass-filled polyester resin which has been found to withstand the extremes of temperature to which an air cleaner and silencer is subjected during automotive engine operation.

We claim:

1. An air cleaner and silencer assembly, comprising a metal base plate having an upwardly opening peripheral channel and an inner annular rim defining an air outlet opening, said rim adapted for registration with an air horn of a carburetor; a two-piece housing having a plastic base member and a plastic cover member, said base member having an annular flange formed in the lower surface thereof received within said channel to form a sealed joint therebetween; said base member and cover member having mating peripheral rims and a pair of mating internal dividers spaced from said rims and defining a pair of inlet conduits at the sides of said housing, said inlet conduits disposed in parallel spaced relationship, each of said inlet conduits expanding from a commonly facing restricted inlet opening to a flared discharge opening, said base member and said cover member cooperating with said base plate to provide a silencing chamber between said discharge openings and said air outlet opening, said inlet conduits also defining an air flow from said inlet openings to said air outlet opening; mating tongue-and-groove elements formed on said peripheral rims and said internal dividers providing sealed joints between said base member and said cover member; flared surfaces formed along said

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rims providing a gap extending along the exposed portion of said joint between said base member and said cover member; fastener means including bosses located adjacent said peripheral rims and within said housing for securing said cover member to said base member, said fastener means being disposed to minimize the restriction to air flow through said inlet conduits and within said silencing chamber; an annular filter element supported on said base plate within said silencing chamber, said filter element having opposite ends in sealing engagement with said base plate and said cover member whereby said filter element is disposed across said air flow path such that air flows generally radially inward therethrough; and means for applying clamping pressure to said cover member to secure the housing to said base plate and said air horn and for releasing the clamping pressure such that the housing is removable as a unit from said base plate for servicing said filter element.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,413,780

December 3, 1968

Norman J. Amlott et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 21, after "Plate" insert -- 18 --. Column 3, line 34, after "flow" insert -- path --.

Signed and sealed this 10th day of March 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents