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2,748,883

MUFFLER UNIT

Filed Dec. 3, 1952

2 Sheets-Sheet 1

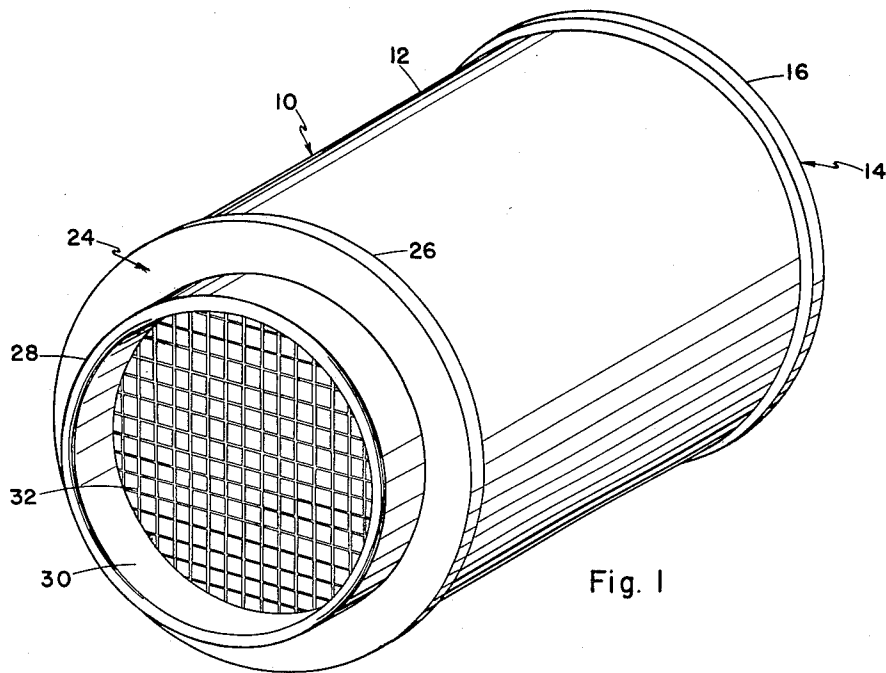


Fig. 1

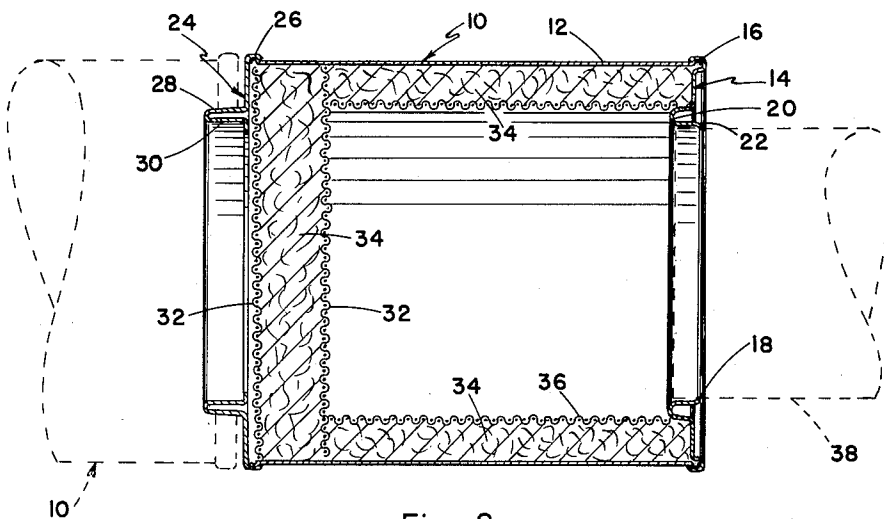


Fig. 2

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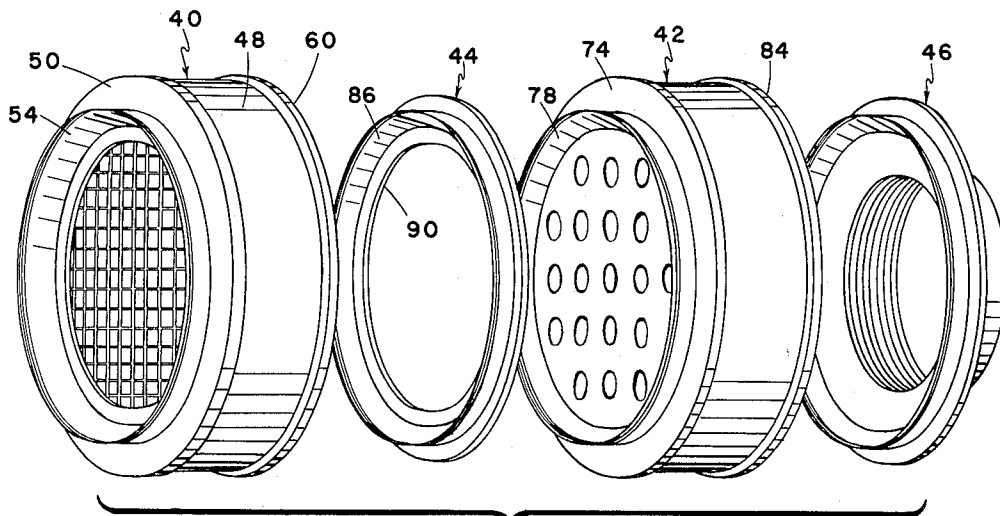


Fig. 3

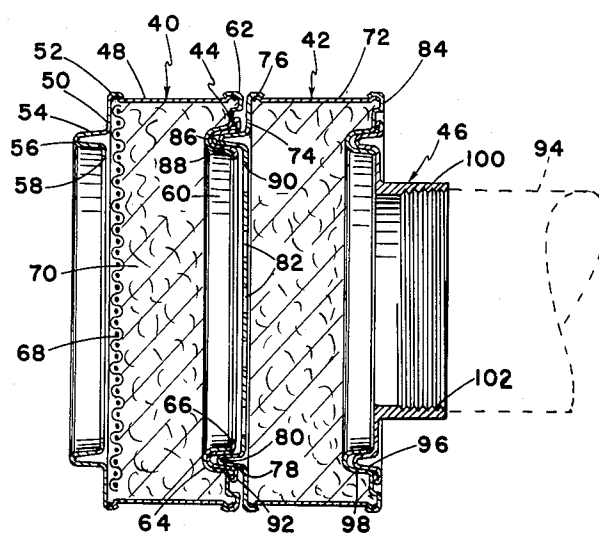


Fig. 4

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7 Claims. (Cl. 181—50)

The present invention relates generally to engine mufflers and more particularly to a muffler unit or section for use in multiple on the exhaust pipe of an internal combustion engine.

The primary object of this invention is to provide a muffler unit or section which may be fitted to the exhaust pipe of a gasoline engine or the like to reduce the noise produced by the engine, the design of the muffler unit or section being such that a plurality of them may be assembled to form a single multiple-stage muffler.

Another object of the invention is to provide a muffler unit which can be used alone or with any small number of like units according to the amount of muffling action required. For example, the householder having a power-lawn mower can use any number of sections found necessary to avoid offending neighbors.

Still another object is to provide a multiple-stage muffler wherein the sections are self-supporting and wherein the sections are self-sufficient units requiring no cartridges. When the section becomes clogged it can be discarded and replaced economically.

Another object of this invention, ancillary to the preceding objects, is to teach the best known mode of implementing the principles of the invention in carrying the invention into actual practice.

Another object of this invention is to provide a muffler unit which is adapted for fabrication from many different materials, so that the choice of material can be according to the dictates of availability and price considerations, the exact sizes and proportions being matters easily determined to suit particular conditions and needs.

Another object of this invention is to provide a muffler unit which is inexpensive and practicable to manufacture.

Finally, it is an object to provide a muffler unit of the aforementioned character which is simple, safe and convenient to use and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure and wherein similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawings, and in which:

Fig. 1 is an isometric view of the muffler unit.

Fig. 2 is a longitudinal sectional view of the muffler unit with an additional similar muffler unit and an exhaust pipe fragmentarily shown in dotted line.

Fig. 3 is an exploded view of a modified type of muffler.

Fig. 4 is a longitudinal cross section of the muffler as shown in Fig. 3.

Referring now to the drawing in detail, the muffler unit, which is indicated by the numeral 10, comprises a substantially cylindrical canister 12 having at one end a

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female end cap 14 which is peripherally secured to said canister by a rolled flange 16. The female end cap 14 is provided with a substantially circular opening 18, the rim of which comprises a substantially U-shaped channel 20 having an inwardly bent lip 22.

The other end of the canister 12 is fitted with a male end cap 24, peripherally secured to said canister by means of a rolled flange 26, and having a substantially circular plug portion 28 comprising a doubled flange 30, the diameter of which is equal to the diameter of the U-shaped channel 20. The doubled flange 30 also provides a certain amount of resiliency so that the plug portion 28 may be inserted in the U-shaped channel 20 of another, similar muffler unit 10, and be firmly retained in that position.

It is a noteworthy feature of this invention that the plug portion 28 and the U-shaped channel 20 are similar in shape to the lid and top rim of certain types of paint cans, thus mufflers of this type may be produced by the use of dies which are used in can manufacture. In the event that the plug portion and U-shaped groove as produced by existing dies do not achieve a snug resilient connection, a ring or perforated disc adapter may be used as shown in Fig. 3, member 44.

The internal structure of the muffler unit includes two perforated, retaining discs 32, of woven wire or perforated metal screen or the like, secured in spaced relationship adjacent to the male end cap 24, the space between said retaining discs being filled with sound absorbent material 34, such as fiberglass, asbestos fiber or the like. Also fitted within the canister 12 is a perforated cylindrical cage 36 of woven wire or perforated metal screen or the like, the inside diameter of said cage being slightly greater than the diameter of the U-shaped channel 20, and the space between said cage and said canister being filled with a layer or sheet of sound absorbent material 34.

The muffler unit 10 may be attached to the exhaust pipe 38 of a gasoline engine or the like as illustrated in Fig. 2. An adapter may be necessary to provide an exact fit between the end of the canister and the exhaust pipe of the engine. One type is shown in Fig. 3, member 26. In many cases, the degree of muffling obtained by using one muffler cartridge may not be sufficient, this being particularly true in the case of an engine in a lawn mower or similar device in use in a residential area where unnecessary noise must be kept to a minimum. The exhaust noise may be muffled to any degree required by attaching additional muffler units by inserting the plug portion 28 of each cartridge into the U-shaped channel 20 of the preceding unit. In this way, multiple muffler units may be assembled to reduce the noise level greatly, yet the efficiency of the gasoline engine or similar device will not be greatly impaired due to the low resistance offered by the absorbent fiber, so preventing the presence of excess back pressure in the exhaust system.

A modified form of the device is illustrated in Fig. 3 in which the muffler assembly comprises an end unit 40, an intermediate unit 42, an adapter ring 44 and an exhaust pipe adapter 46. The end unit 40 consists of a canister 48 having at one end a male end cap 50 which is peripherally secured to said canister by a rolled flange 52. The male end cap 50 is provided with a substantially circular plug portion 54 comprising a doubled flange 56 and lip defining an opening 58. The other end of the canister 48 is fitted with a female end cap 60 peripherally secured to said canister by a rolled flange 62 and having a substantially annular U-shaped channel 64 defining an opening 66. The diameter of the U-shaped channel 64 is substantially equal to the diameter of the plug portion 54, said plug portion having sufficient resiliency to fit firmly within the U-shaped channel of a subsequent muf-

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fler unit. Within the canister 48 is a woven wire or perforated retaining disc 68 fitted adjacent the male end cap, the remainder of said canister being filled with absorbent fiber 70. The glass-fiber is manufactured in sheet form which has a natural tension and will hold the fiber in a cylindrical arrangement without a screen cage which is shown in Figs. 1 and 2. The fiber may be loosely deposited within the canister as shown in Fig. 4.

The intermediate unit 42 consists of a canister 72 having at one end a retaining cap 74 peripherally secured to said canister by a rolled flange 76 and having a substantially circular plug portion 80. At one end of the canister the cap 74 is made perforate as shown at 82 or if desired it may be made to correspond to woven wire disc 68. The other end of the canister 72 is fitted with a female end cap 84 similar in all respects to the female end cap 60, while the inside of said canister is filled with absorbent fiber 70.

The end unit 40 and the intermediate unit 42 are connected together by the adapter ring 44 which has a combined plug and socket portion 86 comprising a doubled flange 88 defining an opening 90, the outer edge of said doubled flange being folded as indicated at 92. The plug and socket portion 86 fits firmly into the U-shaped in cross-section channel 64 of the end unit 40, while the plug portion 78 of the intermediate unit 42 also fits into the concave side of said plug and socket portion 86. It should be noted that any number of the intermediate units 42 may be added, together with the necessary adapter rings 44, to build up the required muffler assembly as previously described.

The assembled muffler units are connected to the exhaust pipe adapter 46 which has a plug portion 96 comprising a doubled flange 98, the diameter of which provides a firm fit in the U-shaped channel 64. The exhaust pipe adapter 46 is provided with a neck 100 having internal screw threads 102 to fit corresponding screw threads on the exhaust pipe 94.

The use of the device is particularly suited to portable lighting plants used in camping, power driven water pumps or cement mixing machines to mention but a few further examples.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention.

Further description would appear to be unnecessary.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. A muffler unit comprising a substantially cylindrical canister having a male end provided with a plug portion and an opening therein, a female end provided with an opening of a diameter substantially equal to the diameter of said plug portion, two perforated discs in spaced relationship within said canister adjacent said male end and covering said opening, a layer of absorbent material between said perforated discs, a perforated cylindrical cage

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within said canister, and a layer of absorbent material between said perforated cylindrical cage and the curved wall portion of said canister.

2. A muffler unit according to claim 1 wherein said plug portion comprises a resilient doubled flange.

3. A muffler unit according to claim 2 wherein the plug portion of one such muffler unit may be inserted into the opening of another similar muffler unit, the resiliency of said doubled flange being sufficient to retain said muffler units firmly together.

4. A series of muffler units comprising interfitting cylindrical canisters, each canister having an annular male resilient flange at one end and a corresponding annular resilient female flange at the opposite end, the male end of each canister having openings therein, an annular adapter positioned between the canisters to provide a snug, resilient connection, and each of said canisters having absorbent material disposed within said canister.

5. A series of muffler units comprising interfitting cylindrical canisters, each canister having an annular male resilient flange at one end and a corresponding annular resilient female flange at the opposite end, the male end of each canister having openings therein, an annular adapter positioned between the canisters to provide a snug, resilient connection, each of said canisters having absorbent material disposed within said canister, and an exhaust adapter having a cylindrical extended portion for connection with an exhaust pipe.

6. A muffler unit comprising a cylindrical canister having a female end and a male end dimensioned to interfit firmly and resiliently with a second female end similar to said female end, said male end having a perforate end wall, a layer of absorbent material inside said canister and adjacent and parallel to one end thereof and a layer of absorbent material covering the interior surface of the cylindrical wall of said canister.

7. A muffler unit comprising a cylindrical canister having a female end and a male end, said female end comprising an annular channel substantially U-shaped in cross section, said male end comprising an annular flange substantially U-shaped in cross-section and dimensioned to interfit firmly and resiliently with a second female end similar to said female end, said male end having a perforate end wall, a layer of absorbent material inside said canister and adjacent and parallel to one end thereof and a layer of absorbent material covering the interior surface of the cylindrical wall of said canister.

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