Oct. 1, 1963 C. L. BRUCE 3,105,752

MUFFLER

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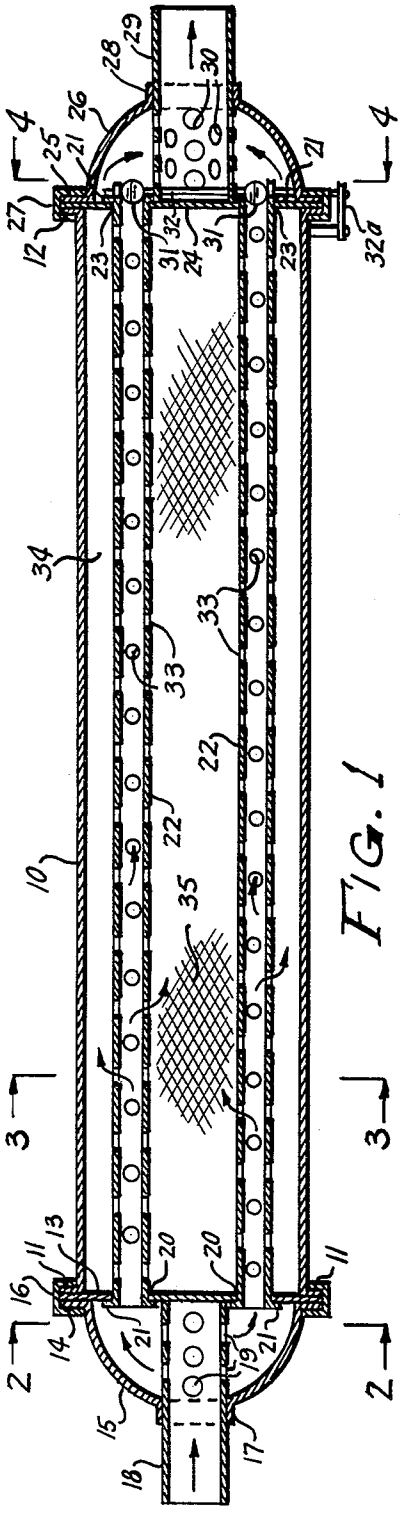


FIG. 1

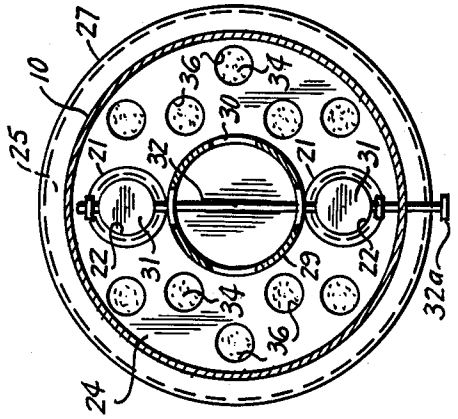


FIG. 4

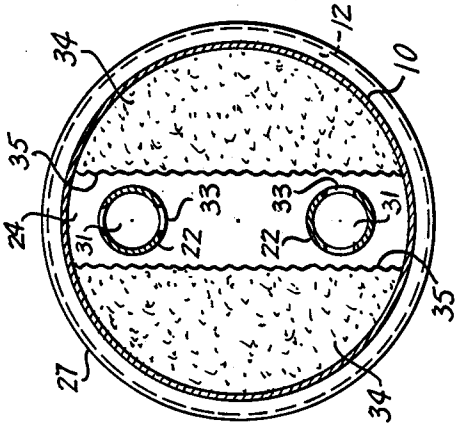


FIG. 3

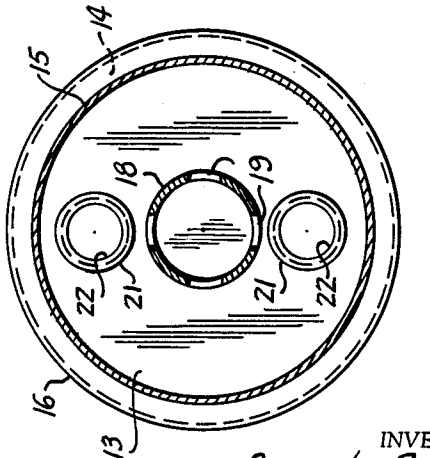


FIG. 2

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FIG. 5

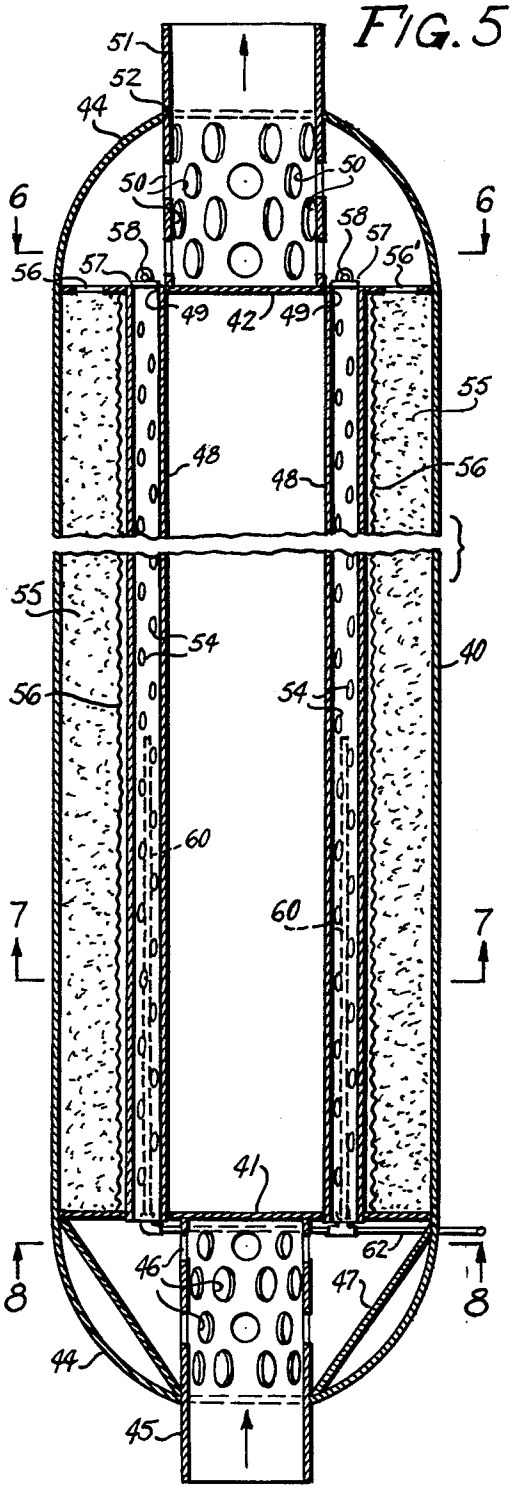



FIG. 6

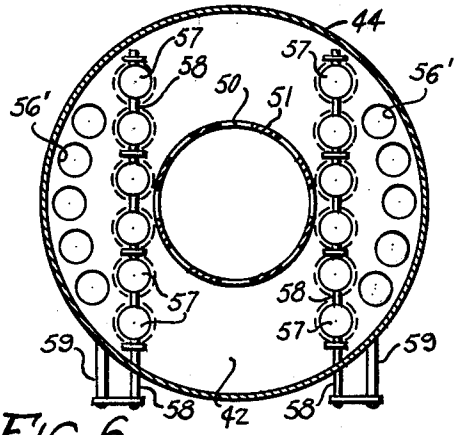



FIG. 7

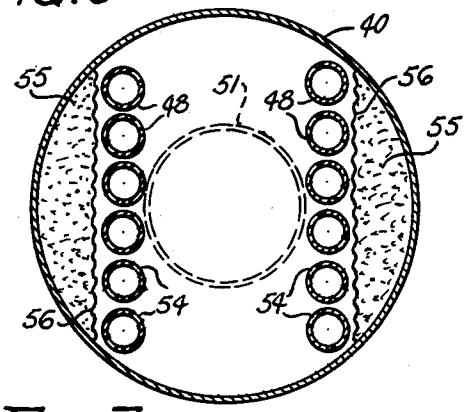
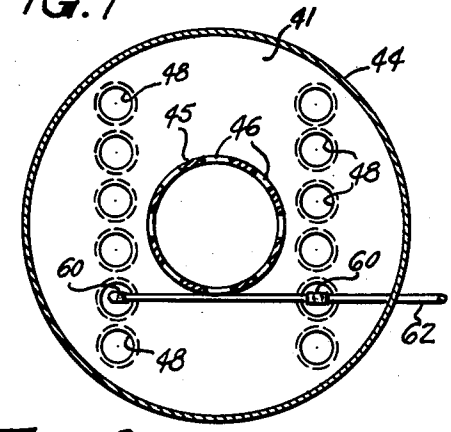



FIG. 8




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3,105,752

# MUFFLER

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3 Claims. (Cl. 55—302)

This invention relates to a muffler and has as its primary object the provision of an improved muffler for internal combustion engines adapted not only to silence the engine, but to reduce the toxic content of the gaseous exhaust, as well as the odors therefrom, to a minimum.

An additional object of the invention is the provision of a muffler of this character which may be readily cleaned with a minimum of effort and difficulty.

A further object of the invention is the provision of a device of this character having an integral built-in steam line to facilitate the cleaning thereof.

Still another object of the invention is the provision of such a device characterized by a plurality of internal pipes entering a core of filter material, and provided with selective closure means at their ends, so as to further facilitate cleaning when the muffler becomes clogged.

Still another object of the invention is the provision of a device of this character which is sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture and utilize.

Still other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out hereinafter and disclosed in the accompanying drawings wherein there are shown preferred embodiments of this inventive concept.

In the drawings:

FIGURE 1 is a longitudinal vertical sectional view taken substantially through the center line of a small muffler adapted for pleasure cars or the like.

FIGURE 2 is a sectional view taken substantially along the line 2—2 of FIG. 1 as viewed in the direction indicated by the arrows.

FIGURE 3 is a sectional view taken substantially along the line 3—3 of FIG. 1 as viewed in the direction indicated by the arrows.

FIGURE 4 is a sectional view taken substantially along the line 4—4 of FIG. 1 as viewed in the direction indicated by the arrows.

FIGURE 5 is a sectional view similar to FIG. 1 but showing a modified form of muffler construction particularly adapted for large engines such as trucks, buses, or other large type motor vehicles.

FIGURE 6 is a sectional view taken substantially along the line 6—6 of FIG. 5 as viewed in the direction indicated by the arrows.

FIGURE 7 is a sectional view taken substantially along the line 7—7 of FIG. 5 as viewed in the direction indicated by the arrows; and

FIGURE 8 is a sectional view taken substantially along the line 8—8 of FIG. 7 as viewed in the direction indicated by the arrows.

Similar reference characters refer to similar parts throughout the several views of the drawings.

One form of muffler embodying elements of the instant invention is shown in FIGS. 1 to 4, inclusive, and comprises a cylindrical casing 10, which is flanged at its ends as at 11 and 12, respectively. The flange 11 seats against the inner side of a header 13, which in turn seats against the flange 14 of a hemispherical end cap 15, a sealing ring 16 being provided to hold the components in related assembly. Hemispherical member 15 has a central bushing 17, through which extends a pipe 18, which is connected directly with the exhaust line of a motor vehicle.



A plurality of openings 19 are provided in the inlet pipe 18, which is closed by the header 13 and its inner end. In order to achieve the best results it has been found that the total area of the holes in the intake pipe must exceed the total inside area of the pipe within the hemispherical end cap 15.

Openings 20 on opposite sides of header 13 accommodate the flanged ends 21 of tubular pipes 22 which extend the full length of tubular member 10, and extend through openings 23 in a header 24 at the opposite end of the device. The header 24 seats against the flange 12, and the flange 25 of an opposite hemispherical cap member 26, a clamping ring 27 being provided to hold the components in position. The header or hemispherical member 26 is provided with a centrally disposed bushing 28 surrounding a central opening through which extends an outlet pipe 29 which is provided with a series of openings 30 similar to the openings 19. Closure dampers 31 are provided for the open ends of pipes 22, and are mounted on an operating rod 32 provided with an operating handle 32*a* for selectively opening or closing the ends of the pipes 22. Normally the dampers 31 are in closed position permitting the exhaust fumes to pass through a series of holes or openings 33 in each of the pipes 22 into a body of filter material 34, which is held in position by suitable screens 35 or the like on opposite sides of the pipes 22. The filter material is preferably metallic in nature and may comprise such materials as beryllium, cadmium, chromium and Calite.

In the use and operation of the device gaseous fumes enter the pipe 18 from the exhaust of the motor, and pass into the pipes 22, the dampers 31 being closed and thence outwardly through the openings 33 through the filter material 34. They are then exhausted through openings 36 (see FIG. 4) in header plate 24, passing into the dome or hemispherically shaped member 26, and thence through the openings 30 to the outlet pipe 29. When it is desired to clean the apparatus live steam may be inserted in any desired manner, and the dampers 31 are suitably opened to permit passage of cleansing rods therethrough, or of live steam as may be desired.

The filter material effectively muffles the sound of the motor, and at the same time purifies the exhaust gases.

A modified form of construction is disclosed in FIGS. 4 to 7, inclusive. This modification is particularly adapted for the use of heavy duty vehicles, such as trucks or the like and comprises an outer tubular cylinder 40 which is provided with end headers 41 and 42, within dome shaped hemispherical end pieces 43 and 44, respectively. The inlet dome 44 is provided with an intake 45, which is apertured as at 46 in the same manner as the intake shown in the previous modification, baffles 47 being provided interiorly of the dome shaped member 44 for reinforcement or the like. A series of pipes 48 in opposite parallel alignment extend longitudinally the entire length of the tubular member 40 to the header 42, and outwardly through openings 43 in the header interiorly of dome 49. The gas is then passed through openings 50 into an outlet pipe 51 which extends through an opening 52 in the end of dome-shaped hemispherical member 44.

The pipes 48 are provided with a relatively large number of openings or apertures 54 which permit gas therefrom to pass into filter material 55 which is retained by screens 56 between the pipes and the outer walls of the muffler. After the exhaust gas is passed through the filter material 55 it may exit through openings 56 in the header 42, and thence through the openings 50 of the outlet 51.

Dampers 57 are provided for closing the end openings 49 of the pipes 48, and are operated by operating rods 58 having operating handles 59 exteriorly of the casing 40.

Steam lines 60 having relatively small openings 61

therein extend through certain of the pipes **48**, and are provided with live steam through a line **62** extending from any desired source.

The use of this device is substantially identical to that of the previous modification, in that the dampers **57** are normally retained closed, and permit the passage of gas through the filter material and out through the exhaust pipe **51** in the same manner to that of the previously described modification. In this construction, however, the dampers may be opened or closed when the device is steam cleaned through the lines **60**, the device is thus readily subject to automatic cleaning.

From the foregoing it will now be seen that there is herein provided an improved muffler construction which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative, and not in a limiting sense.

I claim:

1. A muffler construction comprising a tubular member having a header at each end, a plurality of perforated tubes extending through said tubular member and opening through one of said headers, means closing the other end of said tubes, a hemispherical cap sealed to each header, each cap having a central opening therein, an internal pipe having apertures therein extending from each opening to the adjacent header, one of said pipes being connected to the exhaust pipe of a vehicle, said one pipe being adjacent the opening of said tubes through said one header to pass exhaust gases from the exhaust into said tubes and out of the perforations therein, filter material surrounding said tubes through which said exhaust gases pass, the other of said headers having holes therein through which gases pass from said filter material through the apertures in the other of said pipes to be exhausted to the atmosphere, said means closing the other ends of said tubes comprising movable dampers and means operable from the exterior of said tubular member for controlling said dampers.

2. A muffler construction comprising a tubular member having a header at each end, a plurality of perforated tubes extending through said tubular member and opening through one of said headers, means closing the other end of said tubes, a hemispherical cap sealed to each header, each cap having a central opening therein, an internal pipe having apertures therein extending from each opening to the adjacent header, one of said pipes being connected to the exhaust pipe of a vehicle, said one pipe being adjacent the opening of said tubes through said one header to pass exhaust gases from the exhaust into said tubes and out of the perforations therein, filter material surrounding said tubes through which said exhaust gases pass, the other of said headers having holes therein through which gases pass from said filter material through the apertures in the other of said pipes to be exhausted to the atmosphere, said means closing the other ends of said tubes comprising movable dampers and means operable from the exterior of said tubular member for controlling said dampers, and live steam lines extending through certain of said tubes.

3. A muffler construction comprising a tubular member having a header at each end, a plurality of perforated tubes extending through said tubular member and opening through one of said headers, means closing the other end of said tubes, a hemispherical cap sealed to each header, each cap having a central opening therein, an internal pipe having apertures therein extending from each opening to the adjacent header, one of said pipes being connected to the exhaust pipe of a vehicle, said one pipe being adjacent the opening of said tubes through said one header to pass exhaust gases from the exhaust into said tubes and out of the perforations therein, filter material surrounding said tubes through which said exhaust gases pass, the other of said headers having holes therein through which gases pass from said filter material through the apertures in the other of said pipes to be exhausted to the atmosphere, said means closing the other ends of said tubes comprising movable dampers and means operable from the exterior of said tubular member for controlling said dampers, and live steam lines extending through certain of said tubes, said filter material comprising metallic beryllium, cadmium, chromium and Calite.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,811,762 | Schnell | June 23, 1931 |
| 2,108,087 | Thayer | Feb. 15, 1938 |
| 2,557,557 | Newcum | June 19, 1951 |