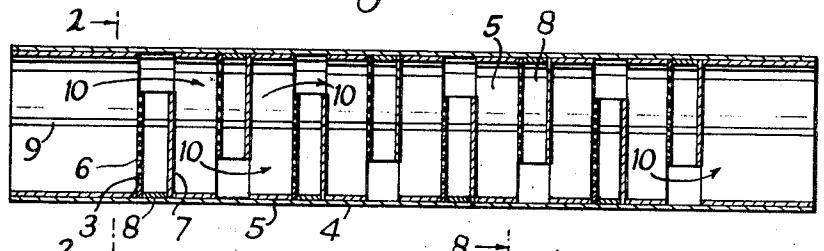
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INTERNAL COMBUSTION ENGINE SILENCERS

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Fig. 1.



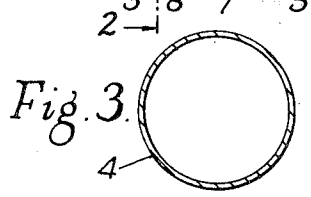


Fig. 3.

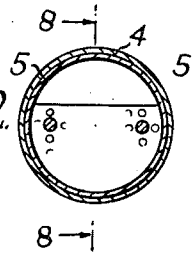


Fig. 2.



Fig. 8.

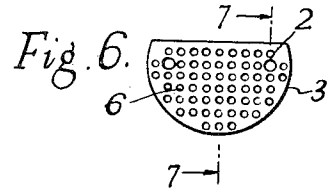


Fig. 6.



Fig. 7.

Fig. 4.

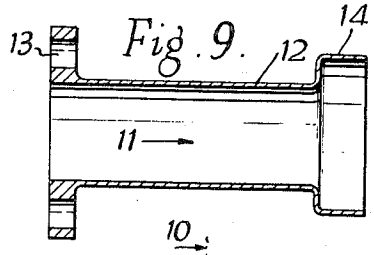


Fig. 9.

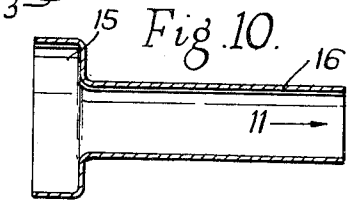


Fig. 10.

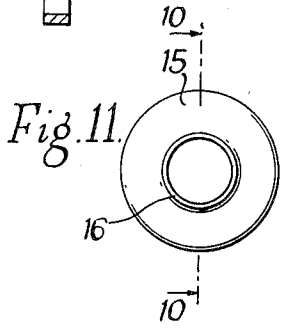
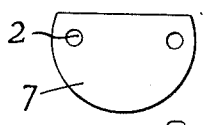


Fig. 11.

Fig. 5.



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Fig. 12.

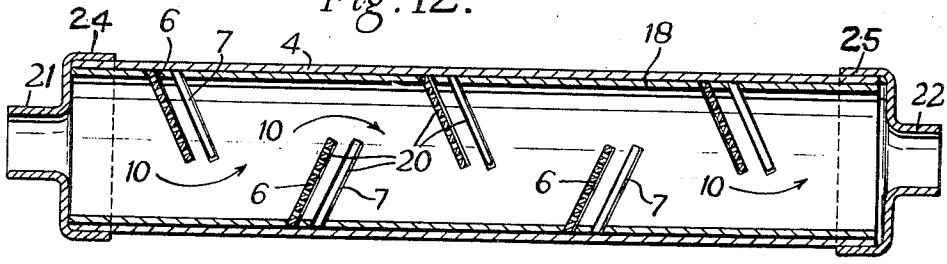


Fig. 13.

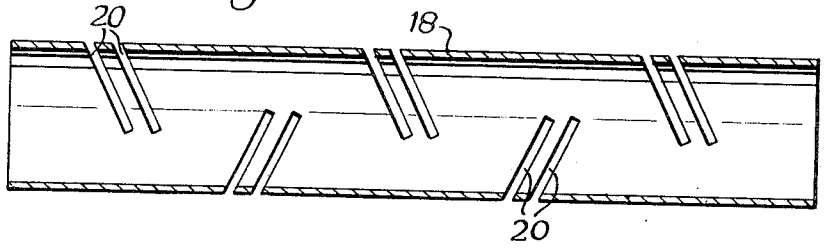
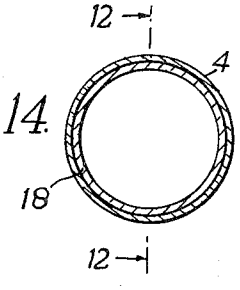


Fig. 14.



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INTERNAL COMBUSTION ENGINE SILENCERS

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Filed Dec. 21, 1959, Ser. No. 860,938
Claims priority, application Belgium Dec. 29, 1958
6 Claims. (Cl. 181—68)

The present invention relates to silencers for internal combustion engines.

It is an object of this invention to provide a silencer which is superior to that of known silencers.

The present invention provides a silencer of novel internal construction and highly efficient action.

The silencer according to the invention comprises a casing, a plurality of double-walled baffles and means for fixing the baffles in position within the casing, the casing being thus divided into a plurality of intercommunicating compartments by means of the baffles, the baffles being staggered so that exhaust gases from the engine must follow a sinuous course, and each of the baffles being constituted from a plane perforate wall and a plane imperforate wall, such walls being separated by a short distance, whereby a chamber is formed between them into which the exhaust gases may expand.

The perforations in the baffle are conveniently of circular shape and about 2 to 3 mm. in diameter. Owing to the perforated wall of the segmentary member on which the exhaust gases impinge, a characteristics reduction in noise is obtained as a consequence of a known physical effect and a silencer is thus given which is much more effective than known silencers.

In one embodiment of the invention, the baffles are fixed in position perpendicular to the longitudinal axis of the casing. In this embodiment, the fixing means can conveniently comprise spacing rings between the baffles, and longitudinal rods passing through holes in the baffles.

In another, preferred, embodiment, the baffles are fixed in position at an oblique angle to the longitudinal axis of the casing. The fixing means can in this embodiment consist of a lining member inserted within the casing and being provided with pairs of grooves which engage with the baffles. The casing and lining can thus be two pipes of sufficiently differing diameters as to allow one pipe, which bears pairs of grooves on its inner surface, to slide within the other pipe. The two pipes may be held together by two cap members, one at each end of the silencer, which members, also carry the inlet and outlet pipes for the exhaust gases.

This second embodiment is a very effective silencer, and substantially reduces any excess internal pressure. The preferred fixing method is easy to assemble and the lining member increases the rigidity of the silencer.

Other characteristics of the invention, which are only given by way of example, will appear from the following description taken in conjunction with the accompanying drawings. In the drawings:

FIG. 1 shows a longitudinal section of a first embodiment of the invention;

FIG. 2 is a transverse sectional view of the silencer taken along section line 2—2 of FIG. 1, as seen from the left hand end of FIG. 1;

FIG. 3 is a transverse section of the casing;

FIG. 4 is a perspective view of one of the double-walled baffles;

FIGS. 5 and 6 show, respectively, the plane and perforate walls of a baffle, and FIG. 7 is a vertical sectional view of the perforate wall taken along the line 7—7 of FIG. 6;

FIG. 8 shows a spacing ring in vertical cross-section, as it would appear along the line 8—8 of FIG. 2;

FIGS. 9 and 10 show, in longitudinal cross-section, the pipes connecting, respectively, the silencer with the engine and with the atmosphere;

FIG. 11 is an end elevational view of the pipe shown in FIG. 10;

FIG. 12 is a longitudinal sectional view of a second embodiment of the silencer, also showing the cap members;

FIG. 13 is a longitudinal cross-section of the inner pipe alone of FIG. 12; and

FIG. 14 is a transverse section through the two inner pipes of FIG. 12 as assembled.

The silencer shown in FIGS. 1–11 consists of a casing 4 (FIGS. 1–3) within which are arranged at intervals double-walled baffles, which are spaced apart by means of spacing rings 5 (FIGS. 1, 2 and 8) and are held in position by two longitudinal rods 9, one of which is seen in FIG. 1, which pass through holes in the baffles. As is seen from FIG. 1, the baffles are staggered so as to cause the exhaust gases from the engine to take the path shown by the arrows 10.

It will be seen from FIGS. 4–8 that each of the double-walled baffles consists of a plane wall 7 and a wall 3 perforated by a number of small holes 6, the two walls being joined by a part-annular segment 8. Holes are provided in the walls for the passage of the rods 9.

The exhaust gases from the engine enter the pipe 12, which is connected to the engine by the cap member 13 and to the silencer 4 by the cap member 14, travel in the direction of the arrow 11 in FIG. 9, and enter the silencer, where they impinge successively against the perforated walls 3, thus lessening the noise. The gases finally escape in the direction of the arrow 11 in FIG. 10 to the atmosphere through the exhaust pipe 16 mounted on the silencer by means of the cap member 15.

According to the preferred embodiment shown in FIGS. 12 to 14, the inner pipe 18 is provided with pairs of grooves 20 located in staggered relationship into which the associated perforated walls 3 and imperforate walls 7 are mounted and fixed obliquely.

The inner pipe 18 is concentrically surrounded by the outer casing pipe 4 and it will be seen from FIG. 12 that the walls of the baffles are mounted in the pairs of grooves 20 and that each pair contains a perforated wall 6 and an imperforate wall 7. Each pair of adjacent wall elements 6 and 7 cooperate to form a double-walled baffle. These double-walled baffles are staggered so that the exhaust gases are caused to take the path shown by the arrows 10 in FIG. 12.

The two concentric pipes are maintained in position by cap members 24 and 25 which are provided respectively with an exhaust gas inlet pipe 21 and an exhaust gas outlet pipe 22.

This inclined arrangement of the baffles in the preferred embodiment considerably facilitates discharge of the exhaust gases and reduces any excess pressure inside the device. The provision of the inner pipe 18 and the cap members 24 and 25 considerably facilitate assembly of the device and increase its rigidity.

It should be mentioned that, without exceeding the scope of the present invention, the oblique disposition of the baffles in the preferred embodiment can be provided by any other device, located inside the silencer, which is equivalent to the inner pipe provided with grooves. Any suitable thermal and acoustic insulating material can be inserted between the inner pipe and the outer pipe by adapting their diameters accordingly.

I claim:

1. A silencer for internal combustion engines, compris-

ing a casing, a plurality of double-walled baffles, and means for fixing the baffles in position within the casing, the casing being thus divided into a plurality of intercommunicating compartments by means of the baffles, the baffles being staggered so that exhaust gases from the engine must follow a sinuous course, and each of the baffles being constituted from a plane perforate wall and a plane imperforate wall, such walls being separated by a short distance whereby a chamber is formed between them into which the exhaust gases may expand.

2. A silencer for internal combustion engines, comprising a casing, a plurality of double-walled baffles, and means for fixing the baffles in position perpendicular to the longitudinal axis of the casing, the casing being thus divided into a plurality of intercommunicating compartments by means of the baffles, the baffles being staggered so that exhaust gases from the engine must follow a sinuous course, and each of the baffles being constituted from a plane perforate wall and a plane imperforate wall, such walls being separated by a short distance whereby a chamber is formed between them into which the exhaust gases may expand.

3. A silencer for internal combustion engines, comprising a casing, a plurality of double-walled baffles, and means for fixing the baffles in position at an oblique angle to the longitudinal axis of the casing, the casing being thus divided into a plurality of intercommunicating compartments by means of the baffles, the baffles being staggered so that exhaust gases from the engine must follow a sinuous course, and each of the baffles being constituted from a plane perforate wall and a plane imperforate wall, such walls being separated by a short distance whereby a chamber is formed between them into which the exhaust gases may expand.

4. The silencer of claim 2, wherein the means for fixing the baffles in position within the casing includes spacing rings located between successive pairs of baffles and longitudinal rods passing through holes in the baffles.

5. The silencer of claim 3, wherein the means for fixing the baffles in position within the casing consists of a lining member inserted within the casing, the lining member being provided with pairs of grooves engaging with the peripheral portions of the respective baffles.

6. A silencer according to claim 5, which also comprises a cap member at each end for connection of the silencer to a gas inlet pipe and a gas outlet pipe, the cap members serving to secure the lining member to the casing.

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