April 1, 1958 J. C. CLARK 2,828,830

NON-DIRECTIONAL MUFFLER

Filed Oct. 8, 1956

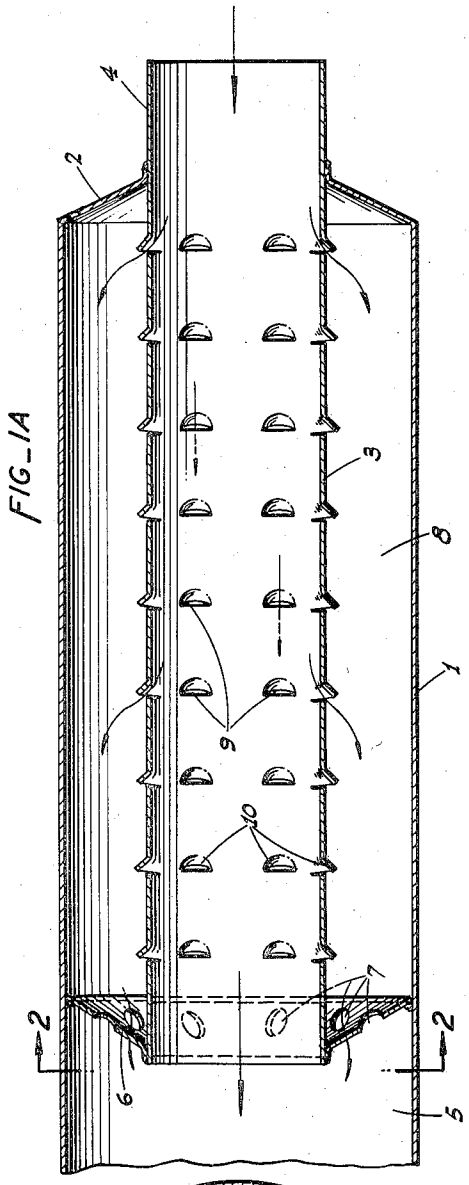


FIG_1A

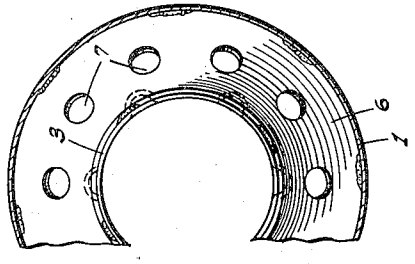


FIG_2

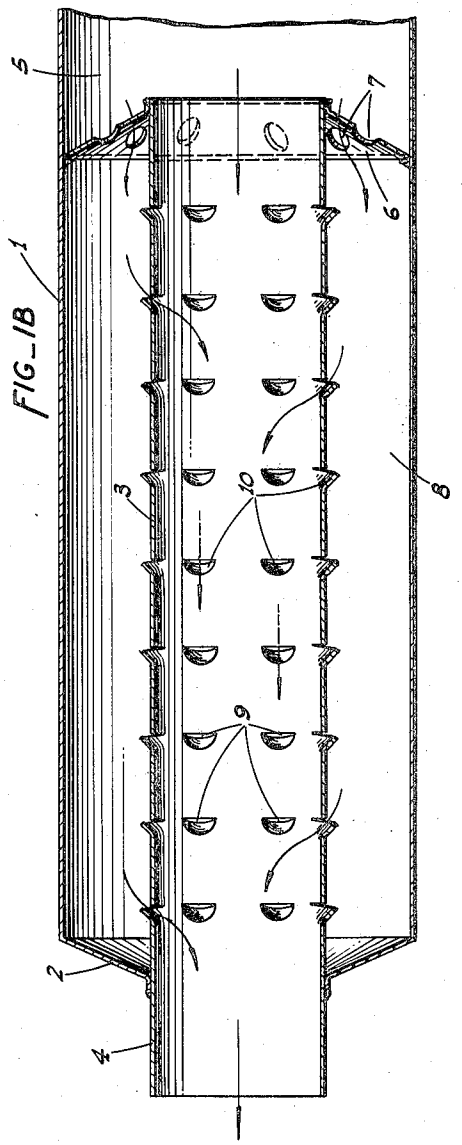


FIG_1B

INVENTOR.
John C. Clark
BY
Webster & Webster
ATTORNEYS

United States Patent Office 2,828,830
Patented Apr. 1, 1958

2,828,830

NON-DIRECTIONAL MUFFLER

John C. Clark, Perkins, Calif.

Application October 8, 1956, Serial No. 614,413

1 Claim. (Cl. 181—47)

This invention relates in general to a muffler for silencing the exhaust noise of an internal combustion engine or the like.

In particular the invention is directed to, and it is a major object to provide, a muffler which is non-directional; i. e., constructed so that the exhaust gases can be fed into, and flow through, the muffler from either end, and yet accomplish equal sound muffling action.

This non-directional feature of the muffler is of substantial advantage as it permits of ready installation without having to first orient a particular end of the muffler to the exhaust pipe leading from the engine. Further, there is no possibility of the muffler being installed in a reverse or inoperative position relative to the direction of flow of the exhaust gases.

Another important object of the invention is to provide a muffler which, while of non-directional characteristic, is, nevertheless, relatively simple in structure and very effective in use to damp or muffle exhaust gas noise.

It is also an object of the invention to provide a muffler which is designed for ease and economy of manufacture.

Still another object of the invention is to provide a practical, reliable, and durable non-directional muffler, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings:

Figs. 1A and 1B together comprise a longitudinal sectional elevation of the muffler; the figures illustrating, broken apart, the opposed but identical halves of such muffler.

Fig. 2 is a transverse section, partly broken away, on line 2—2 of Fig. 1A.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the muffler comprises an elongated, cylindrical outer shell 1, of sheet metal, formed at the ends with outwardly tapering, frusto-conical end plates 2.

A reduced-diameter tube 3 is fixed in connection with and extends through each end plate 2; the outer end portion of such tube 3 extending outwardly of the related end plate 2 whereby to provide an attachment neck, indicated at 4.

Each tube 3 extends axially inwardly from the related end plate 2 a substantial distance, but at its inner end terminates in spaced relation to the corresponding end of the other tube 3, whereby an open or unobstructed intermediate chamber 5 remains in the shell 1.

The tubes 3, which are of course in axial alinement, are each supported, at the inner end, by an inwardly tapering, frusto-conical baffle 6 fixed between the tube 3 and shell 1. In addition to providing support for the inner end of the tubes 3, the baffles 6, which are perforate or ported, as at 7, serve as a functional part of the muffler.

As the tubes 3 are of considerably lesser diameter than the inside diameter of the shell 1, an annular passage 8 of substantial radial extent exists in the muffler about each tube between the corresponding end plate 2 and baffle 6.

The tubes 3 are each formed, for substantially the full length thereof, i. e. between the corresponding end plate 2 and baffle 6, with a multiplicity of relatively small, spaced openings 9; said openings preferably being in symmetrical row arrangement, both circumferentially and longitudinally of the tube.

The openings 9 are formed by outward punching or stamping of the metal of the tubes 3, and the metal, which is deformed outwardly, remains as substantially half cups 10 which overlie said openings and cause the same to be directional; i. e., to open generally toward the corresponding baffle 6.

As each half of the described muffler is identical, except being in opposition, the muffler is wholly nondirectional and it makes no difference which of the attachment necks 4 is connected to the exhaust pipe leading from the engine.

However, it is assumed, for the purpose of this specification, and the following description of the flow of exhaust gases therethrough, that the exhaust pipe from the engine would be coupled to the right hand attachment neck 4.

As the exhaust gases enter the muffler a considerable portion of such gases flow directly through the entry one of the tubes 3, pass into the intermediate chamber 5, and then flow out through the discharge one of said tubes; the entry tube in the present illustration being shown in Fig. 1A, and the discharge tube being shown in Fig. 1B.

While a substantial amount of the exhaust gases flow directly through the tubes 3, as above, there is also a considerable bypassing of such gases through the openings 9 in the entry one of said tubes and into the adjacent passage 8, with the flow toward the corresponding baffle 6.

With such flow of certain of the exhaust gases through the baffle 6 corresponding to said entry one of the tubes 3, such flow, in part by reason of the expansion and contraction of the gases, produces a turbulence in the intermediate chamber 5, and which turbulence is an important factor in the reduction of exhaust noise by the muffler.

From the intermediate chamber 5 certain of the exhaust gases feed through the baffle 6 corresponding to the discharge one of said tubes 3, and thence, after flowing in the related passage 8, pass inwardly through the openings 9 in said tube and for discharge therefrom.

As the half cups 10, over the openings 9, on the discharge one of the tubes 3, face contra to the flow of exhaust gases, such half cups function somewhat scoop-like to assure proper flow through said openings.

With the muffler constructed as above, not only is the the non-directional feature accomplished, but the muffler functions very effectively in the reduction of the noise of exhaust gases passing through the device.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

A non-directional muffler comprising an elongated cylindrical outer shell, closure plates on the ends of the shell, each closure plate having a circular central opening therein, tubes of the same diameter and length extending through the central openings in the plates and secured to the latter, the tubes being axially alined and terminating

at their inner ends in spaced relation, an annular frusto-conical ported baffle extending between and fixed to the shell and the inner end portion of each tube and tapering axially inward; a central chamber being thus formed in the shell between the baffles and end chambers in the shell extending unbrokenly between the closure plates and the adjacent baffles; each tube inside the shell having a multiplicity of openings therethrough along substantially the full length thereof, and substantially half-cups formed on the tubes in overlying outwardly projecting relation to said openings and to cause the latter to be directional generally toward the corresponding baffle.

References Cited in the file of this patent

UNITED STATES PATENTS

1,857,845	Hamilton	May 10, 1932
1,993,397	Berg et al.	Mar. 5, 1935
1,998,385	Powell	Apr. 16, 1935
2,016,253	Noblitt et al.	Oct. 1, 1935
2,083,840	Haas	June 15, 1937

FOREIGN PATENTS

579,275	France	July 29, 1924
976,458	France	Oct. 25, 1950