

July 17, 1928.

1,677,570

C. E. STADE

MUFFLER

Filed June 25, 1924

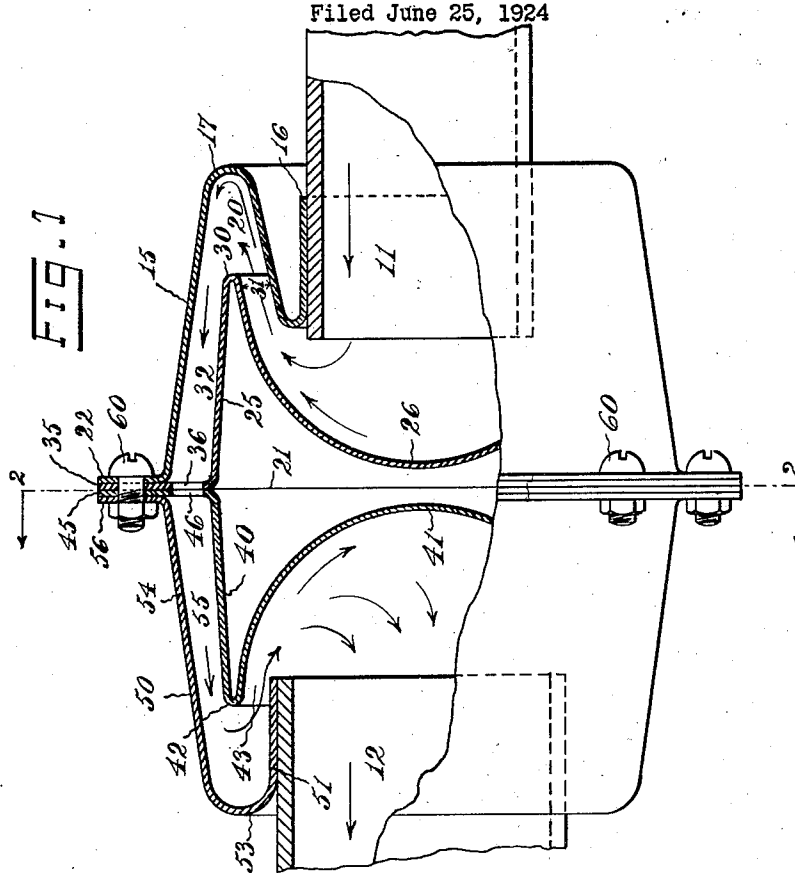


FIG. 1

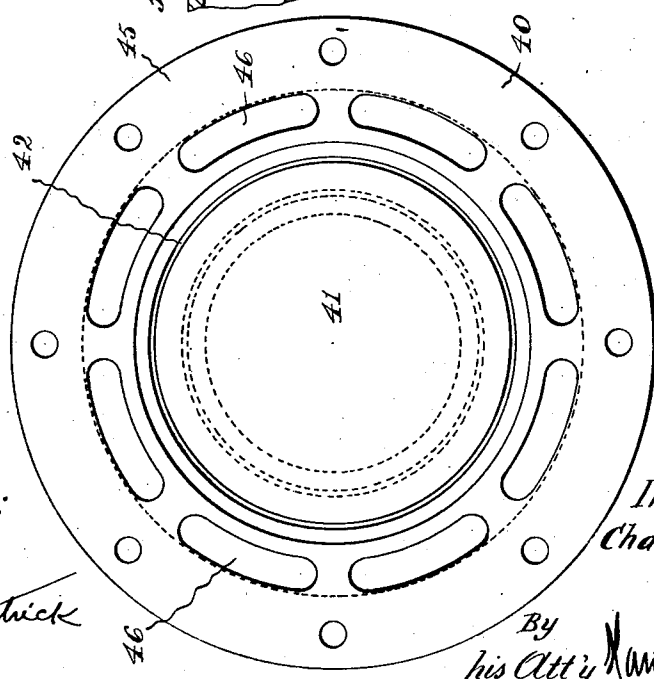


FIG. 2

Witnesses:
H. M. Kilpatrick

Inventor:
Charles E. Stade

By
his Att'y *Harold D. Penney*

Patented July 17, 1928.

1,677,570

UNITED STATES PATENT OFFICE.

CHARLES E. STADE, OF NEW YORK, N. Y.

MUFFLER.

Application filed June 25, 1924. Serial No. 722,294.

This invention relates to a muffler for use in connection with internal combustion engines generally, but more specifically in connection with automobile gas engines.

One object of the invention is to provide a muffler that is light, compact and in which the hot gases while passing therethrough are peculiarly baffled and directed into a gradually enlarging passage and thereby retarded against an increasing cooling surface.

Another object of the invention is to provide a muffler wherein the gas stream is reversed and permitted to expand several times before emission to atmosphere, thereby thoroughly mixing the gas stream and aiding in reduction of the temperature thereof.

Other objects of the invention are to improve generally the simplicity and efficiency of such devices and to provide a device of this kind which is durable, economical to manufacture and operate and which will not easily get out of order.

The inventive features for the accomplishment of these and other objects are embodied in an improved muffler which, briefly stated, comprises a casing and a baffled member mounted on an exhaust pipe of an engine and together form a conducting passage extending from said pipe laterally, outwardly, backwardly, and then forwardly with increasing cross-section. A second casing member and a second baffle member together form a conducting passage from said first passage and extend forwardly with gradually diminishing cross-section, then backwardly and inwardly and forwardly.

Other objects of the invention will appear as the description proceeds; and while herein details of the invention are described, the invention is not limited to these, since many and various changes may be made without departing from the scope of the invention as claimed.

In the accompanying drawing, showing by way of example one of many possible embodiments of the invention,

Fig. 1 is a longitudinal vertical view of my device, partly in sectional elevation;

Fig. 2 is a view on the line 2-2 of Fig. 1, looking in the direction of the arrow.

As shown in Fig. 1 my device comprises an exhaust pipe 11 of an internal combustion engine and an enlarged discharge pipe 12 coaxial with, but spaced apart from, said exhaust pipe. An annular sheet metal casing member, generally denoted by 15, the

central portion of which is formed into a sleeve 16, is received on the end of said exhaust pipe 11 and curved outwardly and rearwardly to a point 17 to the rear of the end of said exhaust pipe 11, and then forwardly and outwardly, forming a forwardly opening trough 20 and extending to a plane 21 about midway between the ends of said pipes 11 and 12, and terminating in an outwardly extending flange 22.

A baffle member, generally denoted by 25, having a hemispherical or cup-like central portion 26, is disposed adjacent the open end of said exhaust pipe 11 for directing outwardly, and then backwardly, out-coming gas, the rim 30 of said cup-like portion 26 extending backwardly into said trough 20 and forming with said casing 15 a restricted area 31 therebetween. The member 25 then continues forwardly and outwardly forming with said casing 15 a gradually enlarging annular passage 32 and terminates in a lateral flange 35 of greater width than first said flange 22, the outer portion of flange 35 engaging flat against said first flange 22 and the inner portion being provided with elongated openings 36, Fig. 2, approximately equal in area to, and forming outlets from, said passage 32.

A second baffle member, generally denoted by 40, having a hemispherical or cup-like central portion, 41, is disposed adjacent the inlet end of said discharge pipe 12 for directing the outgoing gases therethrough, and then extends outwardly and forwardly to a point 42 slightly in advance of said discharge pipe 12 and forms therewith a backwardly opening trough 43. From point 42 baffle 40 extends backwardly and outwardly and terminates in a lateral flange 45 engaging flat against said flange 35 and having openings 46 registering with said elongated openings 36.

A second annular sheet metal casing member, generally denoted by 50, having its inner edge portion forming a sleeve 51, is received on the end of said discharge pipe 12, the outer portion being curved outwardly, as at 53, and then rearwardly outwardly, as at 54, and forming with said second baffle member 40 a gradually enlarging annular passageway 55 and terminating in a lateral flange 56 disposed against the flange 45 of said second baffle member 40.

Bolts 60 passing through said flanges 32, 35, 45 and 56 clamp said casing members and

baffle members rigidly and tightly together.

The operation of my device is as follows:

The gases coming out of pipe 11 strike the portion 26 of baffle member 25 and are reversed and directed into the annular passage 31, and then into the trough 20, again being reversed and mixed and rolled against the cooling surface at 17, and then into the enlarging passage 32 where the flow is less rapid and where the cooling surface becomes greater. The gases continue through the openings 36 and 41 through the diminishing passage 55 into the trough 43 where they are again reversed and again mixed and directed against the cup-like portion 41 of baffle member 40, again reversed and go out through pipe 12 to atmosphere.

It is understood, of course, that my muffler may be of sufficient size to reduce the temperature of the gases passing from pipe 11 to pipe 12, or a series of mufflers may be employed.

Having thus described my invention, I claim:

1. A muffler of the class described, comprising, in combination with spaced ends of two pipes, a substantially cylindrical outer casing; and a spaced inner baffle member, the last mentioned member having reversed semispherical walls therein and having cylindrical walls spaced within the outer casing and having means thereon to engage the casing for intermediate support.

2. A muffler of the class described, comprising, in combination with spaced ends of two pipes, a substantially cylindrical outer casing made in two parts; and a spaced two part inner baffle member, the last mentioned member having reversed semispherical walls therein and having cylindrical walls spaced within the outer casing and having means thereon to engage the casing for intermediate support.

3. A muffler of the class described, comprising, in combination with spaced ends of two pipes, a two part flanged cylindrical casing having pipe engaging means on opposite ends, and a two part flanged inner baffle member having reversed semispherical walls therein and having cylindrical walls spaced within the outer casing, the flanges of the casing and baffle member being joined together for supporting each other in operating position.

4. A muffler of the class described, comprising, in combination with spaced ends of two pipes, a two part flanged cylindrical casing having pipe engaging means on opposite ends, and a two part flanged inner baffle member having reversed semispherical walls therein, the flanges of the casing and baffle member being joined together for supporting each other in operating position, the flanges of said inner baffle being apertured to provide a gas passage therethrough.

5. A muffler of the class described, comprising, an outer casing composed of two metal flanged shells provided with pipe engaging apertures, means on the flanges for connecting the shells together, an inner baffle composed of two substantially cylindrical shells spaced within the outer casing and having bowl-like baffle walls arranged thereon, and perforated flanges on said baffle having means thereon to cooperate with the flanges on the casing whereby to lock all of said shells in operative relation.

6. In combination, a combustion engine exhaust pipe; a discharge pipe adjacent said exhaust pipe; an annular casing member having a central sleeve portion received on said exhaust pipe and a portion extending outwardly therefrom curved forwardly and rearwardly and terminating in a flange; a baffle member disposed adjacent the end of said exhaust pipe and forming with said casing a gradually enlarging annular passage, and terminating in a flange of greater width than said first flange and having its outer portion disposed against said first flange and its inner portion provided with openings; a second baffle disposed adjacent the end of said discharge pipe extending outwardly and rearwardly and then forwardly and terminating in a flange having openings registering with the openings in the flange of the first mentioned baffle member; and a second casing member having a central sleeve portion received on said discharge pipe and a portion extending outwardly therefrom curved outwardly and forwardly and terminating in a flange disposed against the flange of said second baffle member, and forming with said second baffle member a gradually enlarging passage from said discharge pipe.

7. In combination, the exhaust pipe of an internal combustion engine; an enlarged discharge pipe coaxial with but spaced apart from said exhaust pipe; an annular sheet metal casing member, the central portion of which is formed into a sleeve received on the end of said exhaust pipe, said casing then curving outwardly and forwardly to a point forward of the end of said exhaust pipe, then rearwardly and outwardly and thereby forming a rearwardly opening trough extending to a plane about midway between the ends of said pipes, and terminating in an outwardly extending flange; a baffle member having a hemispherical or cup-like central portion disposed adjacent the open end of said exhaust pipe for directing incoming gas outwardly and then forwardly, the rim of said cup-like portion extending forwardly into said trough and forming with said casing a restricted area therebetween, and then continuing rearwardly and outwardly and forming with said casing a gradually enlarging annular

passage and terminating in a lateral flange of greater width than the first mentioned flange, the outer portion engaging flat against said first flange and the inner portion being
5 provided with elongated openings therein approximately equal in area to, and forming outlets from, said passage; a second baffle member having a hemispherical or cup-like central portion disposed adjacent the inlet
10 end of said discharge pipe for directing the outgoing gases therethrough and extending outwardly and rearwardly to a point slightly in advance of the inlet of said discharge pipe, and then forwardly and outwardly and
15 terminating in a lateral flange engaging flat against said second flange and having openings registering with said elongated open-

ings; a second annular sheet metal casing member having its inner edge portion forming a sleeve received on the end of said
20 discharge pipe, the intermediate portion being curved outwardly and then forwardly outwardly and forming with said second baffle member a gradually enlarging annular passageway and terminating in a lateral
25 flange portion disposed against the flange of said second baffle member; and bolts passing through said flanges for clamping said casing members and baffle members together.

Signed at New York in the county of New
30 York and State of New York this 24th day of June, A. D. 1924.

CHARLES E. STADE.