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EXHAUST MUFFLER FOR MOTOR CARS

Filed Nov. 21, 1921

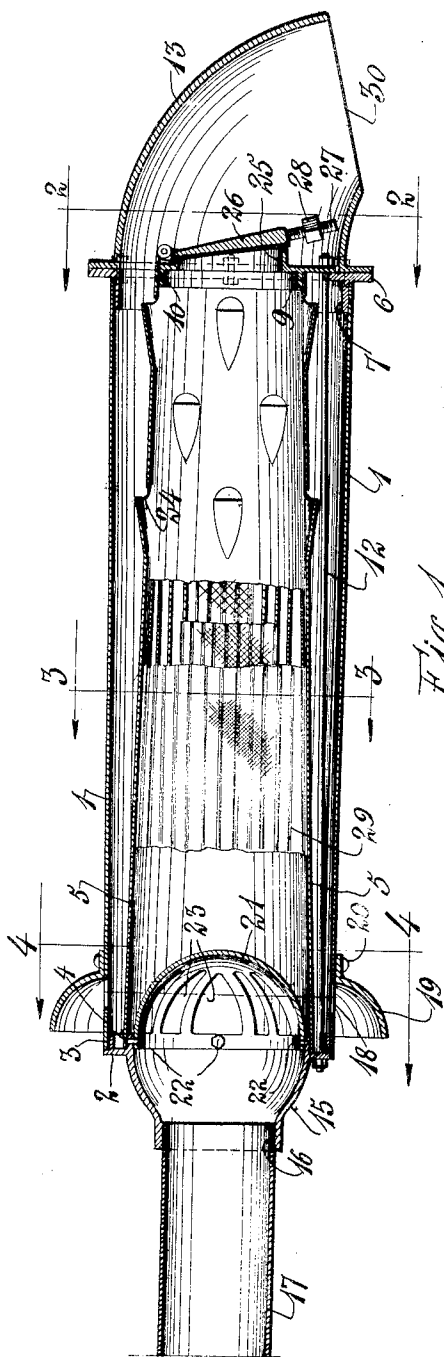


Fig. 1.

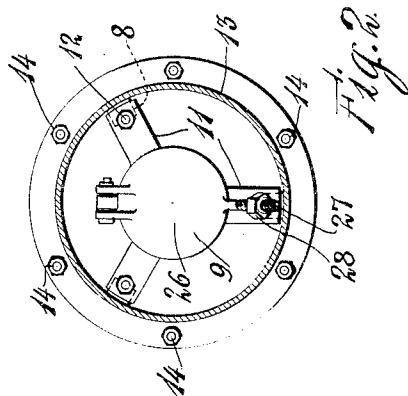


Fig. 2.

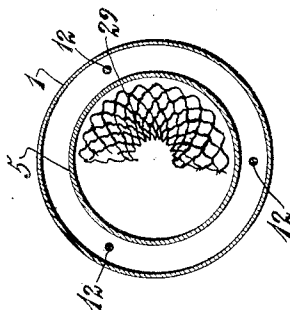


Fig. 3.

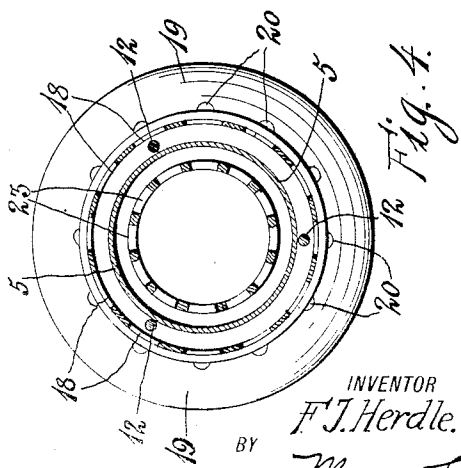


Fig. 4.

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EXHAUST MUFFLER FOR MOTOR CARS.

Application filed November 21, 1921. Serial No. 516,693.

To all whom it may concern:

Be it known that I, FREDERICK J. HERDLE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Exhaust Mufflers for Motor Cars, of which the following is a full, clear, and exact description.

My invention relates to improvements in exhaust mufflers for motor cars, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a muffler which has means for reducing the back pressure upon exhaust gases passing therethrough.

A further object of my invention is to provide a device of the type described which has means therein for effectually baffling the exhaust gases.

A further object of my invention is to provide a device of the character described which has automatic means for instantly expelling the exhaust gases when the pressure therein has exceeded a predetermined pressure.

A further object of my invention is to provide a device of the character described which is simple in construction, easy to assemble, and which is not likely to easily get out of order.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which—

Figure 1 is a longitudinal section through the device,

Figure 2 is a section along the line 2—2 of Figure 1,

Figure 3 is a section along the line 3—3 of Figure 1, and

Figure 4 is a section along the line 4—4 of Figure 1.

In carrying out my invention, I provide an outer cylinder 1 which is slightly conical in shape. An end plate 2 is provided with an annular flange 3 over which the smaller end of the cylinder 1 is disposed. The end 2 is also provided with an annular flange 4 which is disposed inside of the flange 3 and is concentric therewith. A conical-shaped cylinder 5 is disposed in the cylinder 1 and

around the flange 4. This cylinder has its larger opening disposed adjacent the end 2. It will thus be seen that I provide a space between the cylinder 1 and the cylinder 2 which is tapered from the end 2. The two cylinders 1 and 5 are substantially of the same length. A ring 6 is disposed at the opposite end of the cylinder 1 and has an annular flange 7 which is disposed in the cylinder 1. As clearly shown in Figure 2, the ring 6 is also provided with three inwardly projecting lugs 8. These lugs are provided with curved recesses at the inner ends thereof. The cylinder 5 is provided with an end plate 9 which has an annular flange 10 that projects into the open end of the cylinder. The end 9 has three outwardly extending lugs 11 which are adapted to be alined with the lugs 8 of the ring 6 and to overlie the same. The lugs 11 have openings therein in which bolts 12 are disposed. These bolts are substantially as long as the cylinders 1 and 2 and are disposed in the alined openings of the ring 6 and the end plate 2, whereby these two members are rigidly secured to the cylinders 1 and 2. I show three of these bolts, although any number so desired may be used. A curved pipe 13 is secured to the ring 6 by means of bolts 14. The end 2 has a spherical-shaped dome integral therewith, the dome being provided with a threaded opening 16 therein. The end plate 2 can therefore be secured to an exhaust pipe 17 by merely screwing the end plate 2 onto the pipe 17. The cylinder 1 has a plurality of openings 18 therein which are disposed adjacent to the plate 2. A funnel-shaped member 19, secured to the cylinder 1 by means of rivets 20, is so disposed on the cylinder 1 that the openings 18 are adjacent to the inner side thereof. A baffle plate 21 of the shape shown in Figure 1, is secured to the flange 4 by means of screws 22. It will be observed that the baffle plate has openings 23 through which the exhaust gases from the pipe 17 are permitted to pass. The cylinder 1 has a plurality of openings 24 therein which are disposed adjacent the ring 6. As shown in Figure 1, the wall of the cylinder 5 is bent outwardly adjacent each of the openings so as to permit the exhaust gases in the cylinder to readily pass through the openings 24. The plate 9 has a central opening 25 therein which is substantially the same size as the opening 16. A weighted

door 26 is hingedly secured to the plate 9 and is adapted to cover the opening 25 and to swing away therefrom when the pressure of the exhaust gases in the cylinder 5 exceeds a predetermined pressure. An asbestos pad is carried by the door and tends to deaden the sound when the door swings back to normally closed position. The door 26 is also provided with a threaded rod 27 on which a weighted nut 28 is disposed. It will be seen that a rotation of the nut 28 in either direction will cause a greater or less pressure of the exhaust gases, as the case may be, in the cylinder to open the door 26. A baffle screen 29 is disposed in the cylinder 1 and extends substantially the entire length thereof. As shown in Figure 3, the screen 29 is corrugated and is rolled up before being inserted into the cylinder 1. One end of the screen 29 is made of a fine mesh and the opposite end thereof is made of a coarse mesh. When rolling the screen, the coarse mesh is disposed in the middle of the roll. This construction permits the exhaust gases to readily pass through the first few rings of the screen, since the rings are composed of coarse mesh, but hinders the gases from rapidly passing on through the outer rings of the screen, since these rings are composed of a finer mesh.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. It will clearly be seen that as the gases from the pipe 17 pass into the cylinder 5, they will be diverted from their course by the baffle plate 21. The gases then pass on through the screen 29 and out through the openings 24 into the cylinder 1. As heretofore stated, the gases are effectually baffled, since the mesh of the screen 29 varies from coarse to fine. It will also be observed that the member 19 directs a column of air through the openings 18 and into the space between the cylinders 1 and 5. This air passes on through the spaces between the lugs 11 and out of the pipe 13. The rush of the air between the cylinders 1 and 5 reduces the back pressure that is prevalent in mufflers of ordinary construction. It is obvious that the exhaust gases which are expelled from the cylinder 5 into the space between the cylinders 1 and 5 are carried out through the opening of the pipe 13. It will also be observed that the opening 30 of the pipe 13 is larger than the opening 16 of the plate 2 and therefore permits the exhaust gases and the air which is drawn through the openings 18 to readily pass therethrough. In many instances when the engine of a motor car is started, unburnt gases are forced into the cylinder 5 and when the first explosion takes place in the engine, the gases in the cylinder 5 are ignited, thus causing an explosion in the cylinder. An explosion in the mufflers of ordinary type

would put the muffler out of commission, whereas in my device the exploded gases would force the door 26 open and would pass through the opening 25 and out through the opening 30. As heretofore stated, the weight of the door 26 can be varied by means of the nut 28 so that the door will normally keep the opening 25 closed when the ordinary amount of the exhaust gases are passing through the muffler.

The muffler can be readily disassembled by merely unloosening the bolts 14 and removing the pipe 13 and then unloosening the nuts on the bolts 12 and removing the cylinders 1 and 5 from the plate 2. As will be seen in Figure 2, the bolts 12 are received in the recesses of the lugs 8 and thereby prevent the ring 6 and the pipe 13 from rotating with respect to the cylinders 1 and 5. As heretofore stated, the device consists of a minimum of parts, is effective for the purpose intended, and will not easily get out of order.

I claim:

1. A muffler comprising an outer conical-shaped cylinder and an inner conical-shaped cylinder, the larger end of said inner cylinder being disposed adjacent to the smaller end of said outer cylinder, said outer cylinder having openings adjacent to the smaller end thereof, a funnel-shaped member carried by said outer cylinder and disposed adjacent to the openings, said inner cylinder having openings adjacent to the smaller end thereof and having an exhaust inlet adjacent to the larger end thereof, a rolled screen disposed in said inner cylinder, and a gravity door carried by said inner cylinder and communicating with said outer cylinder.

2. A muffler comprising an inner conical-shaped cylinder, an outer conical-shaped cylinder, a plate secured to the adjacent ends of both cylinders, said plate having an exhaust inlet communicating with said inner cylinder, a baffle plate disposed in said inner cylinder and secured to said plate, a rolled screen disposed in said inner cylinder, and a gravity door carried by said inner cylinder and communicating with said outer cylinder.

3. A muffler comprising an inner conical-shaped cylinder, an outer conical-shaped cylinder, a plate secured to the adjacent ends of both cylinders, said plate having an exhaust inlet communicating with said inner cylinder, a baffle plate disposed in said inner cylinder and secured to said plate, and a rolled screen disposed in said inner cylinder, said screen being corrugated and having a coarse mesh in the inner circles thereof, which gradually decreases to a fine mesh in the outer circles thereof.

4. A muffler comprising an inner casing, an outer casing, said inner casing having openings in the side wall thereof, a gravity actuated door adapted to close one end of

said inner casing, a threaded shank rigidly secured to said door, and a nut adjustably carried by said shank.

5 In an exhaust muffler, a casing having outlet openings in its peripheral wall and having an inlet opening, a roll of screen disposed in said casing, said screen having a

coarse mesh in the inner circles thereof which gradually decreases to a fine mesh in the outer circles thereof and a gravity actuated door adapted to normally close one end of said casing. 10

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