Feb. 5, 1929. 1,700,841

H. M. GRAUL

COMBINED MUFFLER AND HEATER

Filed July 20, 1927

Fig. 1.

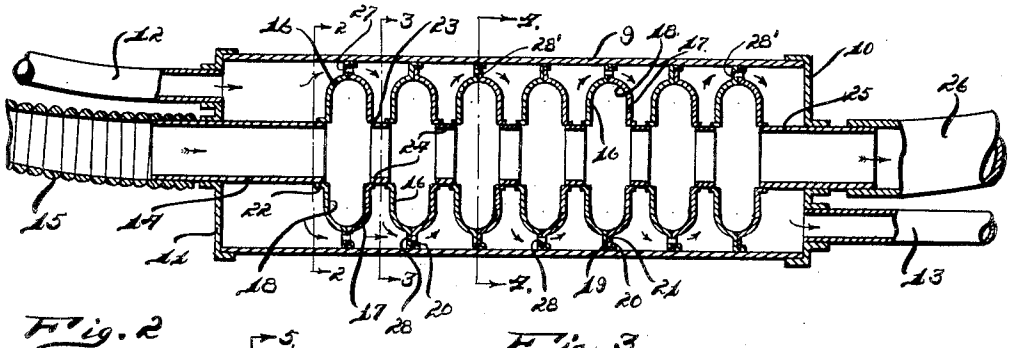


Fig. 2

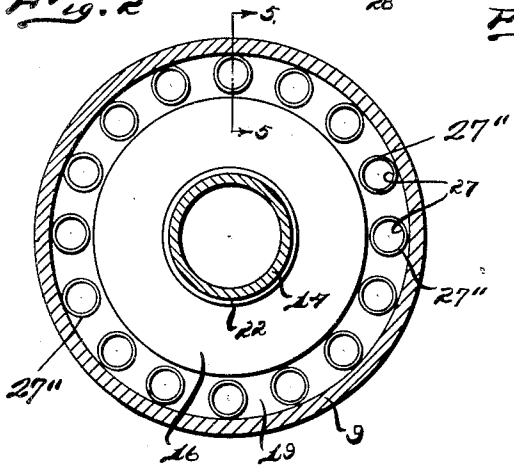


Fig. 3.

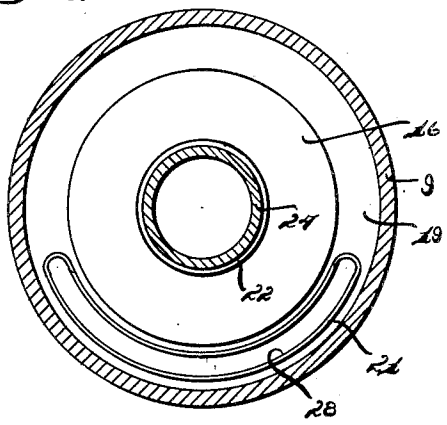


Fig. 4.

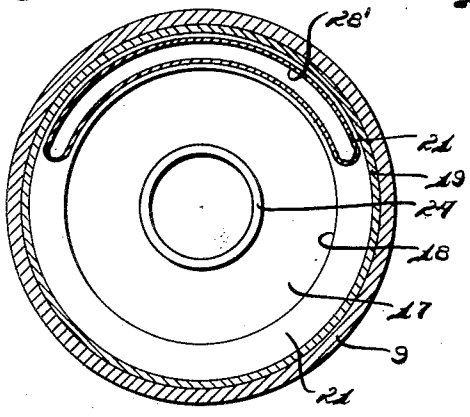
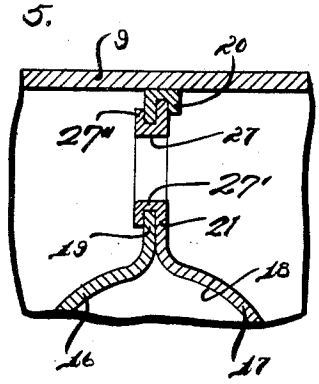


Fig. 5.



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Patented Feb. 5, 1929. 1,700,841

UNITED STATES PATENT OFFICE.

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COMBINATION MUFFLER AND HEATER.

Application filed July 20, 1927. Serial No. 207,037.

My invention relates to a new and useful improvement in a combination muffler and heater adapted for use on internal combustion engines particularly that type used with vehicles.

It is an object of the present invention to provide a device which may be used as a muffler for muffling the explosions of the engine and also utilized for providing hot air for heating purposes in the vehicle.

It is another object of the present invention to provide a device of this class which will be simple in structure, economical of manufacture and highly efficient in use.

Another object of the invention is the provision of a device of this class in which the exhaust gases of the engine may be used for heating air and in which a baffling of these gases may take place to afford a maximum efficiency so far as heating is concerned.

Another object of the invention is the provision of a device of this class in which a plurality of communicating compartments are provided in which the air is retarded and around which the exploded gases are passed for heating the air contained therein.

Other objects will appear hereinafter.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood by a reference to the accompanying drawing which forms a part of this specification and in which,

Fig. 1 is a longitudinal, central, vertical, sectional view of the invention.

Fig. 2 is a sectional view taken on substantially line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on substantially line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on substantially line 4—4 of Fig. 1.

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Fig. 2.

In the invention as I have illustrated the same in the drawings, I provide a preferably cylindrical housing 9 having its ends closed by the caps 10 and 11. Leading into the housing 9 through the cap 11 is the exhaust pipe 12, and an outlet pipe 13 for the exhaust gases communicates with the housing 9 through the cap 10. Projected through the cap 11 is a pipe 14 which communicates with the conduit or pipe 15 extending to the atmosphere and adapted to conduct into the pipe 14 in the direction indicated by the arrows, air from the atmosphere. Positioned in the housing 9 are a plurality of chambers each formed in a similar manner so that a description of one will serve as a description of all. These chambers are formed from discs 16 and 17 which are dished out intermediate their ends to provide a chamber 18; the flange 19 on the section 16 is doubled upon itself as at 20 to lie over the edge of the flange 21. The end chamber adjacent the cap 11 is connected in communication with the pipe 14, an outwardly projecting flange 22 being formed about a central opening formed in the section 16. A similar flange 23 projects outwardly from the face of the section 17 about a central opening formed therein. A pipe 24 communicates with the opening in the section 17 and with a similar opening in the section 16 of the adjacent compartment. The end compartment adjacent the cap 10 communicates with a pipe 25 extended through the cap 10 and communicating with a conduit 26 which serves to conduct the air to the place desired to be heated as, for instance, the body of the vehicle.

Formed in the flanges 19 and 21 of the sections 16 and 17 which are positioned adjacent the cap 11, are a plurality of openings 27 through which the exhaust gases may pass in travelling lengthwise of the housing 9 in the direction indicated by the arrows. In the flanges 19 and 21 of the next compartment proceeding through the housing 9, is formed at the lower side thereof an arcuate slot 28 as shown in Fig. 3. In the next compartment a similar arcuate slot 28′ is formed at the upper edges of the flanges alternating from top to bottom as progress is made through the housing 9 so that the compartments serve to baffle the exploded gases and cause them to travel in the direction indicated by the arrows. As clearly appears in Fig. 5, the flange 21 is provided with a sleeve 27′ which projects through the opening formed in the flange 19. This sleeve is provided with a locking flange 27″ formed preferably by upsetting the sleeve after projection of the same through the opening. In this way a sealing of the compartment 18 from the interior of the housing at the opening 27 is effected.

The air lead into the chambers 18 will be retarded as will likewise be the gases while passing through the housing 9 so that a maximum efficiency in the heating of the device may be

effected and a large volume of highly heated air delivered from the housing 9 through the conduit 26.

With a device constructed in this manner on account of retarding the air and on account of retarding the gases, a compact structure becomes possible as its size may be considerably reduced over the size required were not the baffling and the retarding effected.

The device in addition to serving its functions as a heater will also serve to muffle the explosions so that the use of an additional muffler may be dispensed with.

The formation permits of a light structure so that economy in manufacture may be effected while at the same time sufficient flexibility is possessed in the device to assure of its durability particularly when subjected to constant vibrations.

While I have illustrated and described the preferred form of my invention I do not wish to limit myself to the precise details of structure shown, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A combination heater and muffler of the class described, comprising: a cylindrical housing; a cap for closing each end of said housing; an exhaust gas conduit mounted in one of said caps and communicating with said housing for leading exhaust gases thereinto; an exhaust gas outlet conduit mounted in the other cap and communicating with said housing for conducting exhaust gases from said housing; an air conduit extending through one of said caps into said housing; an air outlet conduit extending through the other of said caps into said housing; a plurality of chambers mounted in said housing, the endmost chamber at one end of said housing communicating at its center with said air inlet conduit and the endmost chamber at the opposite end of said housing communicating with said outlet conduit; means for connecting adjacent chambers at their center in communication with each other, said chambers being circular and of less diameter than the inside diameter of said housing; a radially extending flange on the periphery of each of said chambers engaging the inner surface of said housing, said chamber communicating with said air inlet conduit having a plurality of openings formed in said flange, the flanges on the remainder of said chambers having non-aligned arcuate openings formed therein.

2. In a device of the class described, a cylindrical housing, a compartment-forming structure comprising a pair of circular discs dished within their marginal limits and fixed with their concave surfaces opposed, the portion of said discs extending beyond said dished portion forming engaging flanges, the edge of the flange of one of said discs being doubled over the periphery of the flange portion of the other disc to retain the same in fixed relation, the flange on said first named disc being provided with a plurality of spaced openings; a plurality of necks projecting outwardly from one face of the other of said discs and projected through said openings; and a flange on the projected end of said neck engaging the surface of the flange of said first named disc for further locking said discs in fixed relation, said doubled over portion of said flange engaging the inner surface of said housing; and inlet and outlet conduit means communicating with said compartment forming structure and extending exteriorly of said housing.

In testimony whereof I have signed the foregoing specification.

HERMANN M. GRAUL.