E. HOLZWARTH.

ENGINE MUFFLER.

APPLICATION FILED MAY 20, 1913.

1,084,883. Patented Jan. 20, 1914.

Fig. 1.

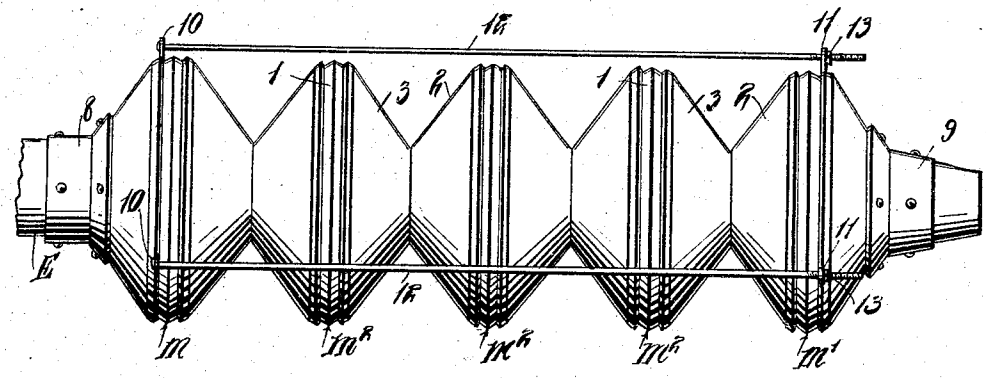


Fig. 2.

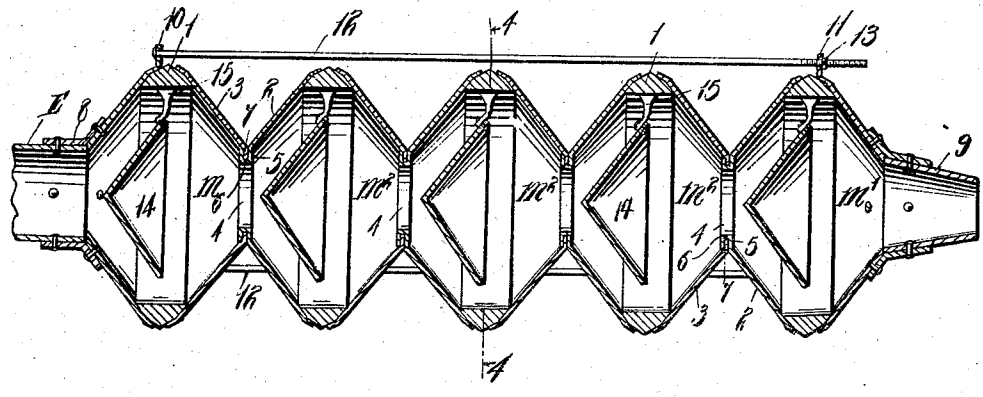


Fig. 3.

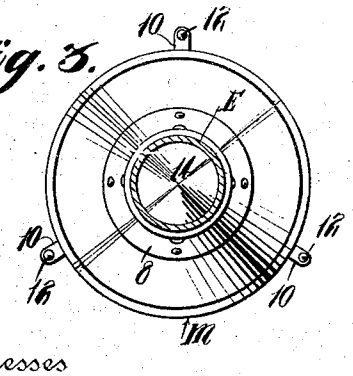
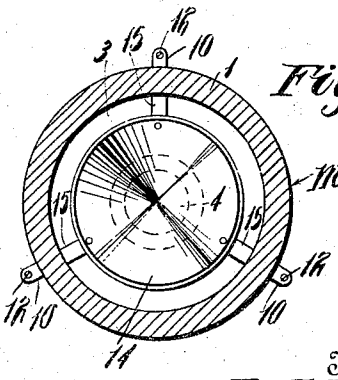


Fig. 4.



Witnesses

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ENGINE-MUFFLER.

1,084,883. Specification of Letters Patent. Patented Jan. 20, 1914.

Application filed May 20, 1913. Serial No. 768,837.

To all whom it may concern:

Be it known that I, EDWARD HOLZWARTH, a citizen of the United States, residing at Miller, in the county of Hand, State of South Dakota, have invented certain new and useful Improvements in Engine-Mufflers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to certain novel and useful improvements in a muffler adapted to be connected with an engine for the purpose of silencing the noises produced by the explosive exhaust from the engine.

In carrying out my invention it is my purpose to provide a simple, compact and efficient device of the class mentioned which is designed particularly for use in connection with internal combustion engines from which the gaseous exhaust is expelled with a great deal of objectionable noise.

A further object of my invention is the provision of a muffler formed of a series of connected sections, the walls of which are exposed to the atmosphere, so that the exhaust gases which are designed to be passed in a zig zag path through the muffler are not only gradually reduced in pressure, but are also reduced in volume through cooling, so that such gases will be expelled noiselessly from the muffler.

Still a further object of my invention is the provision of a muffler which is so constructed that the liability of the same becoming choked or clogged with the products of combustion carried along by the exhaust gases is obviated, and furthermore, when necessary, my muffler may be easily and readily dismantled for the purpose of cleaning.

A further object of my invention is to construct the muffler of relatively few parts, these parts being of such nature that the device may be manufactured and marketed at a relatively low cost.

With the above recited objects and others of a similar nature in view, my invention consists in the construction, combination and arrangements of parts set forth in and falling within the scope of the appended claims.

In the accompanying drawings: Figure 1 is a view in side elevation of a muffler embodying my invention. Fig. 2 is an end view taken at the inlet end thereof. Fig. 3 is a vertical longitudinal sectional view. Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 1 and looking in the direction of the arrows.

The muffler is composed of a series of intercommunicating sections, the front or inlet section of the device being indicated by the letter *m*, the rear or discharge end section by *m'*, while the intermediate sections are shown at m^2. Each muffler section is formed of a peripheral band or ring 1, to the edges of which are secured the oppositely disposed frusto conical walls 2 and 3, each wall having a central opening 4 therein, the openings of all the walls being arranged in alinement when the muffler is assembled. To connect the muffler sections together, each wall 2, except the wall 2 of the front section *m*, is formed with a circular flange 5, which is U-shaped in cross section and surrounds the opening 4, the groove 6 of each of such flanges being designed to receive and seat the circular flange 7, surrounding the opening 4 of the abutting wall 3 of the adjacent section of the muffler. The wall 2 of the front section *m* is provided with a collar 8 surrounding the opening 4, this collar constituting a means for attaching the exhaust pipe E of the engine to the muffler. The wall 3 of the rear end section *m'* has attached thereto a discharge pipe 9 which communicates with the opening 4 of such wall and through which pipe the exhaust gases escape from the muffler. The wall 2 of the front section *m* of the device is further formed with a series of spaced perforated ears 10 extending from the periphery thereof, these ears alining with similarly arranged perforated ears 11 on the wall 3 of the rear section *m'* of the muffler.

Longitudinally arranged connecting rods 12 extend between and are carried by these ears, these rods being fastened by nuts 13. It will thus be seen that all the sections of the muffler are securely held in assembled relation. In order to cause the body of gases to take a staggered or zig zag path through the muffler, thereby separating or breaking up the gaseous column entering the muffler through the pipe E, I provide each section with a vertically disposed conical baffling plate 14, which is held spaced apart from the walls and peripheral ring of its sections by means of a recess of spaced lugs 15 which extend inward from the ring 1 of the section and are secured at their inner

ends to the peripheral edge of the muffler plate. It will thus be seen that a circular passage for the gases is formed between the edge of each baffle plate and the adjacent ring 1 of the section containing such plate.

From the above description of the mechanical features of my invention, taken in connection with the accompanying drawings, the construction and operation of my improved device will be readily apparent.

As the exhaust gases leave the exhaust pipe E, they strike the apex of the conical baffle plate in the first or front section *m* of the muffler and are broken up and directed toward the edge or periphery of the baffle plate 14 therein, passing over the latter, and are then directed toward the apex of the baffle plate in the next sections by the rear frusto conical wall 3 of the first section, the gases passing into the second section of the muffler through the openings 4, where such gases strike the apex of the conical baffle plate of such second section and are then directed outward over the peripheral edge of the plate and thence downward again to the next section. This continues until the gases pass out through the discharge opening 9 of the muffler as will be readily apparent. It will thus be seen that on account of the zig zag path which the gases are obliged to take through the muffler by reason of the shape of the walls of the muffler sections and the baffle plate therein, the velocity or pressure of the gases is gradually reduced until such gases pass silently through the discharge 9. Furthermore it will be noted that the walls of the muffler are exposed in direct contact with the outer atmosphere instead of being incased as is usually the practice so that the gases are cooled in their passage through the muffler and are consequently reduced in volume as well as in velocity.

While I have herein shown and described one particular embodiment of my invention, I wish it to be understood that I do not confine myself to all the precise details of construction herein set forth by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

What I claim is:

1. In a muffler, the combination of a series of communicating hollow sections, each section comprising a ring member, and a pair of oppositely disposed frusto conical walls connected with the ring member, said walls having central alining openings therein, and a conical baffle plate within each section and connected spaced apart to the ring thereof.

2. In a muffler, the combination of a series of communicating sections, each section including a ring member and a pair of oppositely disposed frusto conical walls connected with the ring section, said walls having alining openings in the center thereof, a series of spaced lugs projecting inward from the ring of each section, a conical baffle plate supported by said lugs in spaced relation to the ring, an inlet at one end of said muffler and an outlet at the opposite end thereof.

3. In a muffler, the combination of hollow end sections and hollow intermediate sections, the walls of said sections having central alining openings therein, the walls of one section interlocking at their inner edges with the walls of the adjacent sections, a conical baffle plate located within each section and held spaced apart from the walls thereof, the apex of each baffle plate extending in opposition to the path of the gases through the muffler, a gas inlet leading to one of the end sections, a gas outlet leading from the other end section and binding means connecting the two end sections together.

In testimony whereof, I affix my signature, in the presence of two witnesses.

EDWARD HOLZWARTH.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."