No. 738,858. PATENTED SEPT. 15, 1903.

G. F. SWAIN.

EXHAUST MUFFLER.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.

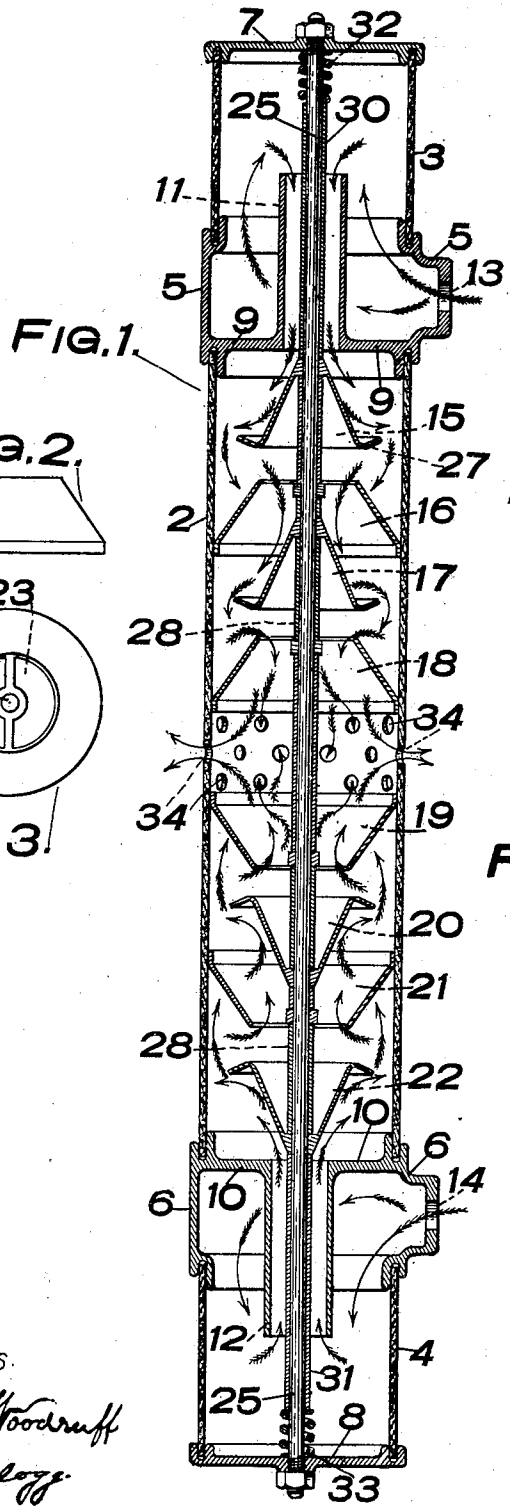


FIG. 1.

FIG. 2.

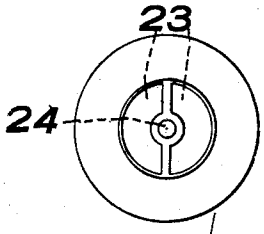
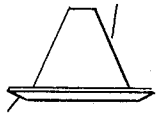


FIG. 3.

FIG. 4.



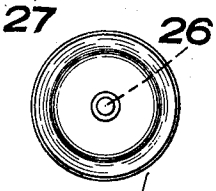


FIG. 5.

WITNESSES.

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No. 738,858. Patented September 15, 1903.

UNITED STATES PATENT OFFICE.

GEORGE F. SWAIN, OF HARVEY, ILLINOIS, ASSIGNOR OF ONE-HALF TO HENRY E. KELLOGG, OF HARVEY, ILLINOIS.

EXHAUST-MUFFLER.

SPECIFICATION forming part of Letters Patent No. 738,858, dated September 15, 1903.

Application filed October 20, 1902. Serial No. 128,050. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. SWAIN, a citizen of the United States, residing at Harvey, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Exhaust-Mufflers for Gas-Engines, of which the following is a specification.

My invention relates to mufflers for the exhaust-gas of gas, petroleum, gasolene, or other similar internal-combustion engines; and my object is to provide means adapted to diffuse the waste gas without undue back pressure to such a degree by virtue of eddy-currents, caused by a series of specially-formed and relatively arranged bafflers, that the final escape into the atmosphere will be free from the disagreeable noise always present when a free exhaust is permitted.

Still another object is to construct the device so that a few simple parts only are necessary to attain the desired result, and such parts are so relatively arranged that they may be quickly and easily assembled or taken apart, even after long use, by a comparatively unskilled person, the same being fully described hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is an axial section of all the parts with exception of an axial rod for supporting the baffles and the nuts for the rod which hold the latter from longitudinal movement and retain the parts of the casing in proper position. Figs. 2 and 3 are respectively a side elevation and a plan of a hollow truncated cone adapted to be secured to an axial rod within the casing shown in section in Fig. 1. Figs. 4 and 5 are respectively a side elevation and plan of a truncated cone adapted to also be mounted upon an axial rod and is provided with a base flange or ledge of smaller diameter than the inside of the casing shown in Fig. 1.

Similar numerals indicate like parts throughout the several views.

The main body 2 of the casing in this instance and in the end portions 3 and 4 are made of double metal walls having a filling of asbestos or some other similar heat-resisting and low-heat-conducting material in the interspace between the walls. The end portions 3 and 4 of the case are each connected with the main body by means of short hollow coupling-pieces 5 and 6, which have annular grooves to receive the ends of the casings. Caps 7 and 8 cover the outer ends of parts 3 and 4 of the casing and have annular grooves to receive the ends of the latter.

9 and 10 are partitions in the coupling-pieces, and short tubes 11 and 12 join the partitions and form passage-ways through the latter, and thus connect the end chambers with the main body portion of the casing, the end chambers receiving waste gas through the holes 13 and 14.

In the baffles comprising truncated cones from 15 to 22, inclusive, cones 16, 18, 19, and 21 are hollow and have a central orifice or orifices 23, Fig. 3, a cross-piece bridging the central orifice and having a hole 24, through which is disposed the axial supporting-rod 25, upon which they are mounted. Cones 15, 17, 20, and 22 each have a hole 26 to receive rod 25, upon which they are mounted, and these cones have each a base-flange 27, which should subtend about a right angle to the sides of the cone and have a diameter smaller than the inner diameter of casing 2. All the cones are held in longitudinal position on axial rod 25 by means of sleeves, as indicated by 28, and by end sleeves 30 and 31, which are held against the end cones by means of springs 32 and 33, the latter contacting the covers 7 and 8, through which rod 25 is disposed and held by the screw-threaded nuts, as shown.

At the intermediate-of-length portion of casing 2 are holes 34 between cones 18 and 19 for the outlet of the diffused waste gas. The arrows indicate the course of the waste gas after its entrance at holes 13 and 14, thence through the end chambers and the short pipes 11 and 12, after which it is thrown outwardly into eddies by contact with the sides and base-flanges of cones 15 and 22, thence inwardly against the sides of the large cones 16 and 21, and so on, until by a succession of similar movements in whirling currents it is admitted to the central chamber and out through holes 34.

In practice the muffler, as shown and described, produces at each half end portion

only a duplicate effect of the opposite end, but is better adapted to a double-cylinder engine than if it were made single.

The arrangement of mounting all the cones on an axial rod permits part of them, such as 16, 18, 19, and 21, to have the rim thereof in removable contact with the inside of the casing, and thereby hold the comparatively light axial rod firmly in position, and with the other cones 15, 17, 20, and 22 suspended within the casing entirely out of contact with the sides thereof, so that the entire set is easily removed. The placing of the cones with the small end one way in each end group permits of an easy flow of the waste gas, yet produces so many eddy-currents that sufficient diffusion is attained without undue back pressure upon the engine-piston.

I claim as my invention—

1. In an exhaust-muffler for gas-engines, the combination with a chamber for confining the exhaust-gas and having inlet and outlet passage-ways of a rod mounted in the chamber, a series of cones mounted on the rod of alternately-different diameters, and passage-ways in those of the largest diameter near the rod.

2. In an exhaust-muffler for gas-engines, a casing having a centrally-disposed rod therethrough, a double series of alternately-disposed differently-sized truncated cones mounted on the rod at a short distance apart, one series of cones having a central passage-way therethrough and the base-rims thereof in close proximity to the casing, the other series of cones having the rims disposed at a short distance from the casing, which latter is provided with an inlet-orifice at one end of the series of baffles, and an outlet-orifice at the opposite end thereof.

3. In an exhaust-muffler for gas-engines, a casing having a centrally-disposed rod therethrough, a series of separated truncated cones mounted on the rod, and each cone having a passage-way therethrough near the rod and the base-ring thereof in close proximity to the casing, in combination with a series of cones mounted on the rod in alternate order relative to the first-named cones, but separate therefrom, and with the base-rims disposed a short distance from the casing, and passage-ways leading into and out of the casing and between the several cones, substantially as stated.

4. The combination with a casing formed with inlet and outlet passages, of removable covers therefor, a rod arranged in said casing and projecting through said covers, securing means in the ends of said rod, and baffles removably arranged on said rod.

5. The combination with a casing formed with inlet and outlet passages, of two continuous series of baffles arranged in said casing, the baffles of each series being oppositely disposed to the baffles of the other series, and means for supporting the said baffles.

6. The combination with a casing provided with inlet and outlet passages, of a rod mounted in said casing, baffles loosely mounted on said rod, means for holding said baffles in their relative positions, and a spring-pressed means engaging the end baffles.

7. The combination with a casing provided with inlet and outlet ports, and a plurality of resiliently-mounted baffles arranged therein.

8. The combination with the casing, of a rod arranged in said casing, a plurality of baffles loosely mounted on said rod, and spring-pressed supporting means for said baffles.

9. The combination with the casing provided with inlet and outlet openings, of removable covers for said casing, a rod arranged in said casing and extending through said covers, baffles mounted on said rod, sleeves interposed between said baffles and covers, and springs interposed between the end sleeves and covers.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE F. SWAIN.

Witnesses:
OSCAR SNELL,
HENRY E. KELLOGG.