Dec. 30, 1924. 1,521,400

H. SHAW

EXHAUST EDUCTION ATTACHMENT AND MUFFLER FOR INTERNAL COMBUSTION ENGINES

Filed Aug. 22, 1923

Fig. 1

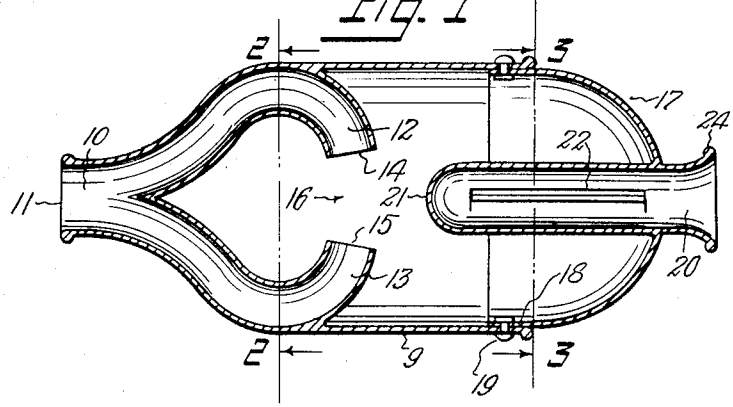
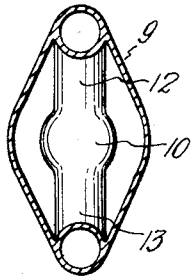


Fig. 2



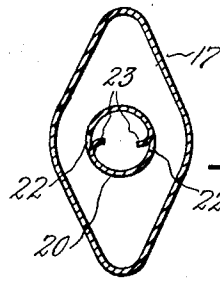


Fig. 3

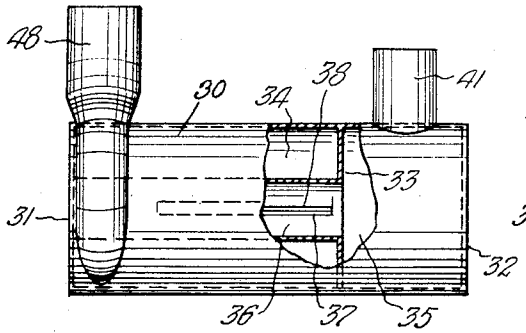


Fig. 4

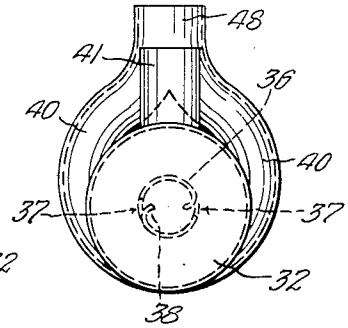


Fig. 5

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By Atty.

Patented Dec. 30, 1924.

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UNITED STATES PATENT OFFICE.

HENRY SHAW, OF HOMEBUSH, NEW SOUTH WALES, AUSTRALIA.

EXHAUST EDUCTION ATTACHMENT AND MUFFLER FOR INTERNAL-COMBUSTION ENGINES.

Application filed August 22, 1923. Serial No. 658,676.

To all whom it may concern:

Be it known that I, HENRY SHAW, subject of the King of Great Britain, residing at "Lyrad," Concord Road, Homebush, New South Wales, Australia, have invented certain new and useful Improvements in Exhaust Eduction Attachments and Mufflers for Internal-Combustion Engines, of which the following is a specification.

This invention relates to an attachment for exhaust pipes of internal combustion engines, which has been designed with the object of improving evacuation of exhaust gases and silencing the noise ordinarily incidental to their evacuation; thereby to augment the efficiency of engines to which it is fitted, and to render the riding of cycles and cars on which it is fitted less irksome by reason of the substantial absence of exhaust noise.

The silencing device in which the invention consists is an improvement in mufflers of the type in which the stream of exhaust gases is divided and the two streams are caused to collide within a vessel in which expansion takes place, and from which the expanded gases are evacuated through a tail pipe.

In the accompanying drawings:

Fig. 1 is a longitudinal section through my muffler;

Fig. 2 is a transverse section taken on the line 2—2 Fig. 1;

Fig. 3 is a transverse section taken on the line 3—3 Fig. 1;

Fig. 4 is a side elevational view of my muffler adapted to set transversely of the exhaust line; and

Fig. 5 is a corresponding end elevation.

Referring to Figs. 1 to 3, 10 is a tubular throat piece the stem end 11 of which is adapted to be connected to an exhaust pipe leading from the exhaust valve casing of an engine. This throat piece forms the junction of two re-entrantly curved pipes 12 and 13, the open mouths 14—15 of said pipes being disposed oppositely with a clearance space 16 between them about equal to two diameters of those pipes. The throat piece 10 is by preference structurally integral with the cylindrical body or barrel 9 of the muffler. To simplify construction and to offer facility for opening the muffler for cleaning purposes the back end cover 17 of the muffler is made as a separate member which is spigotted at 18 into the open end of the body 9 and secured by screwed pins or bolts 19. The end cover 17 carries the eduction vent pipe 20. Said pipe 20 is closed at its forward end 21 within the muffler body and it is slotted (22) lengthwise at opposite sides of it. One lip 23 of each slot 22 may be inset angularly with the object of imparting whirling motion to gases passing into the pipe from the muffler body.

The open rear end of the vent pipe 20 may be flared as shown at 24 to disperse the outflowing gases and reduce their velocity.

A structural adaptation of the muffler for cases in which it is required to dispose it transversely of the direction of the exhaust line from the engine is shown in Figs. 4 and 5. The muffler body 30 is a cylindrical structure closed at the ends 31 and 32 and fitted with a transverse diaphragm 33 which divides it into two chambers 34 and 35. A pipe 36 is axially disposed in the primary chamber 34, extending from the closed end 31 of said chamber through an aperture in the diaphragm 33. This pipe is slotted (37) along either side, and one lip 38 of each slot is inset similarly to and with the like object as the insets 23, Fig. 3. The throat piece 48 is split to form two half pipes 40 which embrace the body 30 near the end 31 and the body sides are apertured to provide passageways from the half pipes 40 into the chamber 34. 41 is the exhaust vent pipe which passes out of one side of the chamber 35, usually parallel with the throat piece 48 into which the end of the engine exhaust pipe is connected.

The exhausting gas which passes into the throat 11 from the engine exhaust pipe is split into two streams which rush through the opposed vents 14 and 15 and come into collision in the clearance space 16 and disperse in the muffler body, the gas temperature and its volume falling. The dispersed gas still under more or less plenum rushes into the vent pipe 20 through the oppositely disposed lateral slots 22 in it, the two streams again colliding and then dispersing in said pipe and finally passing out of its back and to atmosphere. When the slot lips are inset angularly the gas in the vent pipe 20 has whirling motion imparted to it, whereby its dispersion is promoted.

In the case of the transverse body arrangement (Figs. 4 and 5) the operation is substantially the same.

By means of these mufflers the noise of the exhaust is effectively silenced without causing back pressure such as is incident to the passing of the exhaust through throttling mufflers, the silencing effect being such that all explosive force is lost and a coughing exhaust noise only results even when the engine in which the apparatus is filled is operated under load at high speed.

What I claim as my invention and desire to secure by Letters Patent is:—

An exhaust muffler comprising a forked gas inflow pipe having its forked ends inbent with their mouths disposed opposite each other, a wide clearance space being provided between said mouths, an expansion chamber having the ends of said forked pipes entering one end of it, and an outlet pipe projecting into the other end of said chamber, said outlet pipe being closed at its inner end and slotted along each side of it within said chamber, with one lip of each side slot inbent and adapted to procure a whirling motion in the gases in said pipe.

In testimony whereof, I affix my signature.

HENRY SHAW.