Jan. 5, 1932. C. BREER 1,840,082

MUFFLER

Filed May 28, 1927

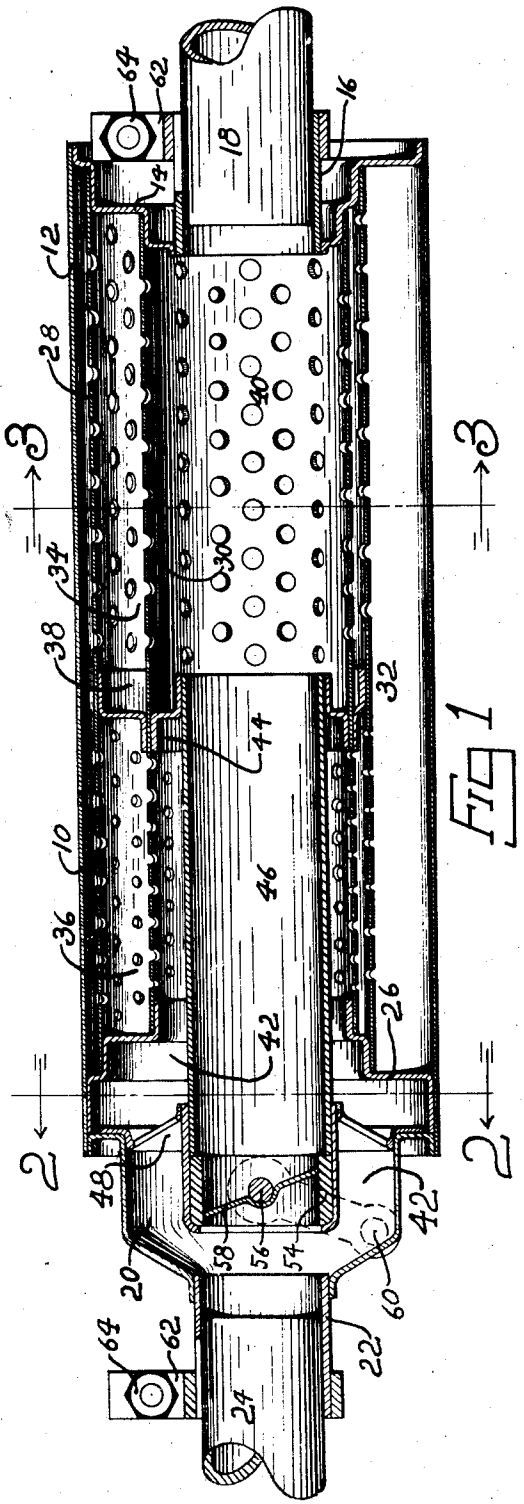


FIG 1

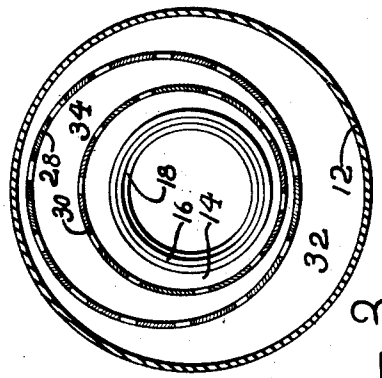


FIG 3

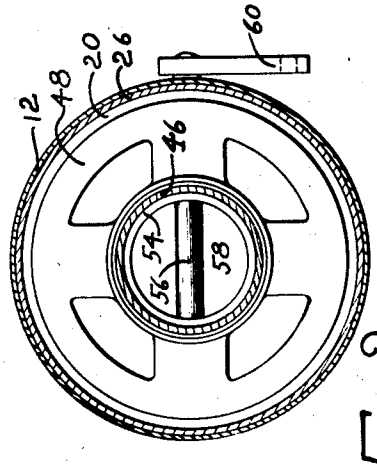


FIG 2

INVENTOR
CARL BREER.
BY Young Harness
ATTORNEY

Patented Jan. 5, 1932 1,840,082

UNITED STATES PATENT OFFICE

CARL BREER, OF DETROIT, MICHIGAN, ASSIGNOR TO CHRYSLER CORPORATION, OF HIGHLAND PARK, MICHIGAN, A CORPORATION OF DELAWARE

MUFFLER

Application filed May 28, 1927. Serial No. 194,909.

My invention consists in new and useful improvements in the construction of a muffler for the exhaust gases of an internal combustion engine of the type used in automotive vehicles.

An important object of my invention is to provide a muffler in which the exhaust gases may pass directly thru the muffler or may be diverted thru chambers which deaden the noise of the escaping gases.

Another object of the invention is to provide means for permitting an expansion of the exhaust gases when they are permitted to pass directly thru the muffler; in other words, the pressure is relieved rather than muffled.

A further object is to provide a chamber which forms a cushion for gradually checking the shock as by retarding the intermittent forces with the elastic exhaust gases when they are diverted thru the muffling chamber.

These and other objects of my invention will more fully appear from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of my improved muffler.

Fig. 2 is a sectional view on a vertical plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is a sectional view on a vertical plane indicated by the line 3—3 of Fig. 1.

Referring to the drawings the muffler 10 has an outer shell 12. There is an end plate 14 within the right hand end of the shell 12 which has secured to it a split bushing 16 in which an exhaust pipe 18, from an engine, is clamped and this constitutes the inlet end of the muffler.

The left hand end of the shell 12 is closed by a cup shaped end plate 20 which has secured to it a split bushing 22 in which the exhaust or outlet pipe 24 is clamped.

An intermediate shell 28 and an inner shell 30 are supported within the outer shell 12 and the intermediate shell 28 is eccentrically mounted with respect to the outer and inner shells, providing crescent shaped chambers, one between the outer shell and the intermediate shell and another between the inner and intermediate shells. The shells 28 and 30 have their opposite ends supported by the end walls 14 and 26.

The chamber between the inner shell 30 and the intermediate shell 28 is formed into two expansion chambers 34 and 36 by a partition 38. The shells 28 and 30 are perforated to allow exhaust gases to circulate from one chamber to another. The space within the inner shell is divided into two expansion chambers 40 and 42 by a partition 44.

A tube 46 is supported at one end by the partition 44 forming a communication between the chambers 40 and 42 so that the exhaust gases may pass directly from the chamber 40 thru the bypass tube 46 to the chamber 42 without passing thru the chambers 34, 32 and 36. A member 48 secured to the end plate 20 acts as a support for the left hand end of the by pass tube 46. The bypass tube 46 is approximately the same diameter as the pipes 18 and 24 and its opposite ends are spaced from the inner ends of the pipes 18 and 24 to permit an expansion of the gases at both ends of the tube 46 while passing directly thru the muffler.

At the left end of the tube 46 there is a bushing 56 having a shaft 54 journaled therein upon which is secured a butterfly valve 58 so that by movement of a lever 60, also secured to the shaft 56, the end of the by-pass pipe 46 may be opened or closed.

The pipe 46 is in axial alignment with the inlet and outlet pipes 18 and 24 so that when the butterfly valve 58 is open the exhaust gases from the tube 18 are allowed to pass directly thru the muffler. The expansion chambers 40, 34 and 32 act as a means for relieving the high pressure gases from the inlet pipe 12 before they enter the bypass pipe 46 and the chamber 42 acts as means for relieving the high pressure gases from the bypass pipe 46 before they enter the pipe 24.

Therefore, altho a straight bypass is accomplished the pressure is twice relieved on passing thru the muffler thus aiding materially in muffling the bypass exhaust without restricting its flow therethru. When the butterfly valve 58 is closed the exhaust gases pass thru the expansion chambers 40, 34, 32, 36 and 42 in the order in which they are

mentioned thereby being completely muffled.

The column of exhaust gas in the bypass tube 46, when the valve 58 is closed, acts as a cushion for resiliently deadening the velocity of the exhaust gases coming from the pipe 18 thereby aiding in the muffling of the gases before they enter the expansion chamber 34.

The pipe 24 is secured in the bushing 22 in the same manner as the pipe 18 is clamped in the bushing 16. Split collars 62 are slipped over the split ends of the bushings 16 and 22 and clamped tightly by turning nuts 64.

Altho I have only described the path of the gases thru my improved muffler with the butterfly valve open or closed it is understood that the valve may be held half open thereby obtaining a half muffling and half bypass of the gases.

What I claim is:

1. In a muffler, the combination of a series of interconnected inner and outer expansion chambers, radial partitions separating said chambers axially, a tube extending from one partition to another connecting the two outer of said chambers for the purpose of permitting exhaust gases to bypass around the other of said chambers and a valve in said tube to control the amount of bypass.

2. In a muffler, the combination of an expansion chamber, a pipe leading into said chamber, a crescent shaped intermediate expansion chamber in communication with and around said first chamber, an outer crescent shaped chamber in communication with said intermediate chamber, another intermediate crescent shaped chamber in communication with said outer crescent shaped chamber, an inner chamber in axial alignment with said first named chamber and communicating with said other intermediate chamber, an outlet pipe for said inner chamber, and a pipe forming a communication between said inner chamber and said first named chamber.

3. In a muffler, the combination of a series of shells mounted one within the other, partitions between some of said shells to form expansion chambers and having openings to form a communication from one chamber to another, conduits in each end of said muffler, a conduit within said muffler in axial alignment with and spaced from said first mentioned conduits and extending from one partition to another, and a valve within said inner conduit for controlling the flow of gas therethru.

4. In a muffler, the combination of an outer shell, a perforated intermediate shell in said outer shell, a perforated inner shell in said first two mentioned shells, a radial partition between said inner and intermediate shells centrally located between the opposite ends of said muffler, a tube in the inner shell, a partition in radial alignment with said first mentioned partition supporting one end of said tube, a perforated partition adjacent the outer end of said muffler supporting the opposite end of said tube, and a valve in said tube adjacent its outer end.

5. In a muffler, the combination of an expansion chamber, an inlet pipe leading into said chamber, an intermediate expansion chamber in communication with and around said first chamber, an outer chamber in communication with said intermediate chamber, another intermediate chamber in communication with said outer chamber adapted to receive only exhaust gases from said outer chamber, an inner chamber in axial alignment with said first named chamber and communicating with said other intermediate chamber, an outlet pipe for said inner chamber, a conduit in axial alignment with the aforesaid inlet and outlet pipes extending from the first named chamber toward said outlet pipe, and a valve in said last named conduit.

CARL BREER.