

Oct. 27, 1964

A. S. HAINING

3,154,174

DUAL PURPOSE MUFFLER WITH VALUED BY-PASS MEANS

Filed Nov. 30, 1962

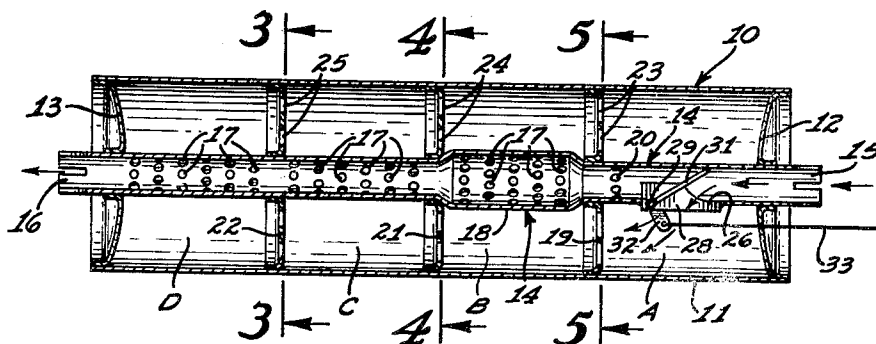


FIG. 1

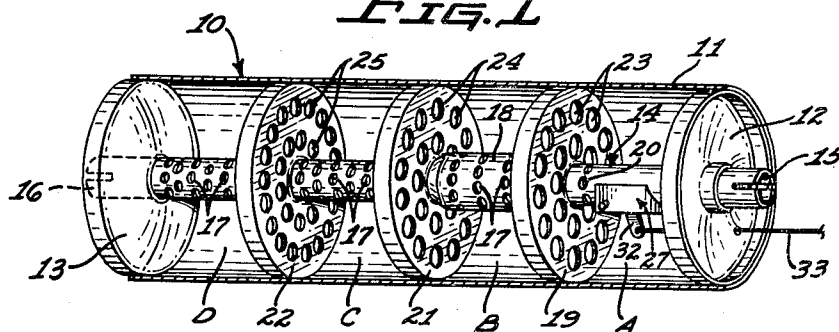


FIG. 2

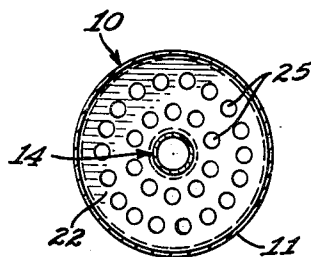


FIG. 3

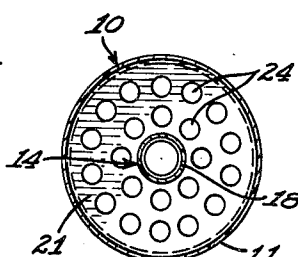


FIG. 4

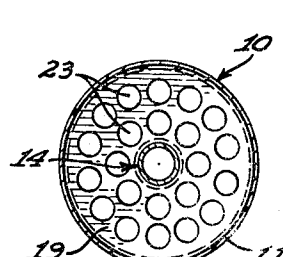


FIG. 5

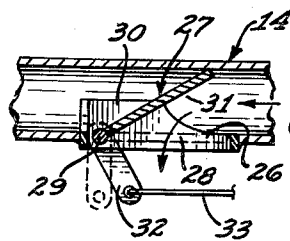


FIG. 6

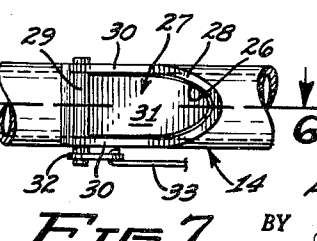


FIG. 7

INVENTOR.
ALVIN S. HAINING.

BY

J. H. Haining

ATTORNEY.

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3,154,174

DUAL PURPOSE MUFFLER WITH VALVED BY-PASS MEANS

Alvin S. Haining, 1304 E. Broadway, Phoenix, Ariz.

Filed Nov. 30, 1962, Ser. No. 241,428

5 Claims. (Cl. 181-45)

The present invention relates to a muffler of the type provided in connection with internal combustion engines to serve in reducing the sound effect and more particularly to a muffler having a cut-out for use when required.

The conventional muffler as applied to an automotive vehicle, as is well known, serves to quiet the sound resulting from the discharge of the exhaust gases from the engine and at the same time causing back pressure which reduces the efficiency of the engine. It is therefore often desirable to provide what is termed a cut-out to permit the free flow of the gases and increase the engine power.

In accordance with the present invention a dual purpose muffler is provided with an improved form of explosion chamber to muffle the sound of discharged gases in combination with a cut-out unit which serves in combination with the sound reducing muffler for the release and rapid discharge of the exhaust gases in the absence of back pressure upon the engine.

An object of the invention is to provide a muffler proper enclosing a cut-out unit wherein the muffler and cut-out unit cooperate to bring about an improved result.

Another object of the invention is to provide a combined muffler and cut-out unit of simple construction for efficient and economical performance.

Other objects and advantages of the invention will be more clearly understood by reference to the following description together with the accompanying drawing in which:

FIG. 1 is a longitudinal cross sectional view of the muffler and cut-out unit;

FIG. 2 is a perspective view of the muffler with a portion of the outer casing removed to show the baffles and location of the cut-out unit;

FIGS. 3, 4 and 5 are transverse cross sectional views taken on lines 3-3, 4-4 and 5-5 respectively of FIG. 1;

FIG. 6 is a cross sectional view of a valve member, and

FIG. 7 is a view of the under side of the valve shown in FIG. 6.

As shown in the drawing, the present muffler, indicated as a whole by the reference character 10, is of cylindrical form having an outer casing 11 and end walls 12 and 13. In axial alignment with the casing is a tubular member which, in conjunction with the casing, serves as a cut-out unit or member indicated as a whole by the reference character 14. When the muffler is in use, an end 15 of the unit 14 is connected to the discharge outlet of the car motor. End 16 of the unit 14 extends from end wall 13 and serves as the discharge outlet for the muffler as a whole.

The tubular cut-out unit 14 is provided with perforations 17 and having one portion 18 of the unit of enlarged diameter. As will be noted, the perforations 17 are arranged in spaced apart rows and each row is formed of a plurality of spaced apart perforations about the circumference of the tubular unit 14.

At each end of the enlarged portion 18 of the unit are disks 19 and 21 and intermediate disk 21 and end wall 13 is a third disk 22. The disks serve to support the cut-out unit 14 in axial alignment with casing 11 and divide the muffler into compartments or chambers A, B, C and D.

That portion of the cut-out unit 14 in compartment A

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is provided with a single row of apertures 20. The portion 18 of the cut-out unit having an enlarged diameter and located in chamber B is provided with five rows of apertures while the portions of the cut-out unit in chambers C and D are each provided with six rows of apertures. The disks 19, 21 and 22 are also provided with apertures arranged in spaced apart relation and in spaced apart concentric rows.

The apertures in the respective disks vary in diameters and as shown, apertures 23 in disk 19 are of selected relatively large diameters. Apertures 24 in disk 21 are of a lesser diameter and apertures 25 in disk 22 are the smallest in diameter.

The function and result attained by means of the multiple passage arrangement in the control of the discharge gases will be explained.

As stated, the end 15 of the cut-out unit 14 connects with the discharge outlet of the engine and the discharged gases pass through the cut-out unit. Under normal driving conditions, however, the discharge gases are prevented from passing directly through the cut-out unit and are caused to flow into chamber A.

As shown more clearly in FIGS. 6 and 7, the unit 14 is provided with an outlet passage 26 in the wall thereof through which the discharge gases flow into chamber A under normal operating conditions at which time the cut-out passage is closed by means of a valve indicated as a whole by numeral 27. The valve (see FIGS. 6 and 7) consists of a bracket 28 fitted and secured in outlet 26. At one end of the bracket is a shaft 29 journaled in side walls 30 of the bracket. Mounted on shaft 29 is a baffle member 31 for movement to close the passage through the cut-out unit when the baffle is in position as shown in FIG. 6. An arm or lever member 32 is secured to shaft 29 and a control rod 33 is attached to one end of the lever 32. The control rod 33 may extend to within reach of the operator of the vehicle, and tension means (not shown) are provided for actuating the control rod to normally maintain the baffle 31 in position to, under normal driving conditions, divert the flow of gases for discharge into chamber A. Thus the valve member 27 serves to control the direct flow gases into the unit 14.

Upon entering chamber A the gases pass through apertures 23, 24 and 25 in disk 19, 21 and 22 respectively and through apertures 20 and 17 into the cut-out unit member 14 and to the atmosphere through discharge outlet 16.

When the baffle 31 is moved to close outlet passage 26 the gases pass into cut-out unit 14 and, as in the case of when the outlet 26 is open, the gases will pass out through discharge outlet 16.

As will be evident, the present invention provides a combined conventional muffler and cut-out, both of which cooperate in the performance of the other.

When the end 15 of the cut-out unit 14 is connected to the discharge outlet of an engine and baffle 31 is in a normal position to open passage 26 in the wall of the cut-out unit 14, the gases flow into chamber A and through apertures 23 in disk 19 and into chamber B and through apertures 24 in disk 21 and into chamber C and through apertures 25 in disk 22 and into chamber D. The arrangement of the perforated disks, as shown, serves to break down acceleration of the moving gases and reduce the back pressure resulting in a reduction in muffling the sound.

The retarded gas flow then passes through apertures 17 in the cut-out unit 14 through which the gases pass to the atmosphere from outlet 16. It has been found advantageous to provide disk 19 with apertures 23 of 1/2 inch in diameter and to provide disk 21 with apertures 24 3/8 inch in diameter and disk 22 with apertures 25 of 1/4 inch in diameter.

With the arrangement shown the gases are subjected to a gradual retardation avoiding back pressure before passing through apertures 17 and discharge from end 16 of the cut-out unit.

If the cut-out is to be put into operation the baffle member 31 may be readily moved by means of rod 33 to close outlet 26. The gasses then flow through the unit member and are discharged through end 16 of the unit. The enlarged diameter 18 of the unit serves to permit initial expansion of the gases reducing the sound effect and, as shown, the moving gases are free to expand through apertures 20 and 17 provided in the unit member. When the pressure rises the gas is forced through the apertures in the unit member and out from the discharge end thereof.

Although a preferred embodiment of the invention is shown and described herein, it is to be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the accompanying claims.

What is claimed is:

1. In a muffler the combination of a tubular casing having opposite end walls, a plurality of spaced apart disks dividing said casing into a plurality of chambers, a tubular cut-out unit supported by said disks in axial alignment with said casing and extending from said opposite end walls, each of said disks having a plurality of apertures, the apertures of each disk differing in diameters from the diameters of the apertures of adjacent disks, said tubular cut-out unit having a plurality of apertures in the wall thereof, said unit having an outlet passage in the wall thereof for the flow of gases into said chambers and a valve member for controlling the flow of gases through said outlet passage.

2. In a muffler the combination of a tubular casing having opposite end walls, a plurality of spaced apart disks dividing said casing into a plurality of chambers, a tubular cut-out unit supported by said disks in axial alignment with said casing and extending from said opposite end walls, each of said disks having a plurality of apertures, the apertures of each disk differing in diameters from the diameters of the apertures of adjacent disks, said tubular cut-out unit having a plurality of apertures in the wall thereof, said unit having an outlet passage in the walls thereof for the flow of gases into said chambers and a valve member for controlling the flow of gases through said outlet passage, and means for manually actuating said valve member.

3. In a muffler the combination of a tubular casing having end walls, a plurality of spaced apart disks dividing said casing into a plurality of chambers, a tubular cut-out unit supported by said disks in axial alignment with

said casing and extending from said opposite end walls, each of said disks having a plurality of apertures, the apertures of each disk differing in diameters from the diameters of the apertures of adjacent disks, said tubular cut-out unit having a plurality of apertures in the wall thereof and an outlet passage for the flow of gases into said chambers and a valve member for controlling the flow of gases through said outlet passage and a control rod for actuating said valve.

4. In a muffler the combination of a tubular casing having an end wall at the receiving end of the casing and an end wall at the discharge end of the casing, a plurality of spaced apart disks dividing said casing into a plurality of chambers, a tubular cut-out unit supported by said disks in axial alignment with said casing and extending from said opposite end walls, each of said disks having a plurality of apertures, said unit having a portion of greater diameter than the remaining portion disposed intermediate two of said disks and having an outlet passage for the flow of gases into said chambers and a valve member for controlling the flow of gases through said outlet passage.

5. In a muffler the combination of a tubular casing having an end wall at the receiving end of the casing and an end wall at the discharge end of the casing, three spaced apart disks dividing said casing into a plurality of chambers, a tubular cut-out unit supported by said disks in axial alignment with said casing and extending from said opposite end walls, each of said disks having a plurality of apertures, the apertures of the disk adjacent the receiving end of the casing being of greater diameters than the diameters of the apertures of the intermediate disk, the disk adjacent the discharge end of the casing having apertures of lesser diameters than the diameters of the apertures of the intermediate disk, said tubular cut-out unit having a plurality of apertures in the wall thereof and having an outlet passage for the flow of gases into said chambers, and a valve member for controlling the passage of gases through said outlet.

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