Jan. 17, 1961 J. COCKER III 2,968,359

MUFFLER CONSTRUCTION

Filed Dec. 4, 1958

FIG. 1

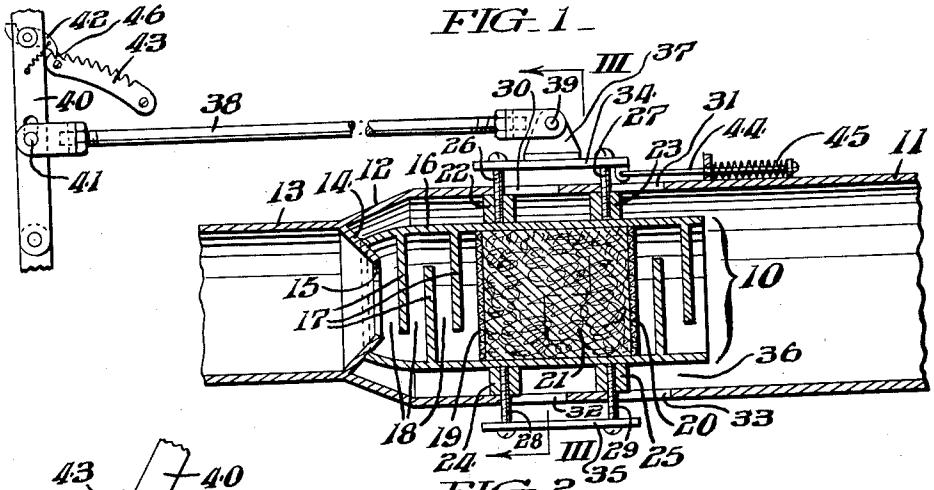


FIG. 2

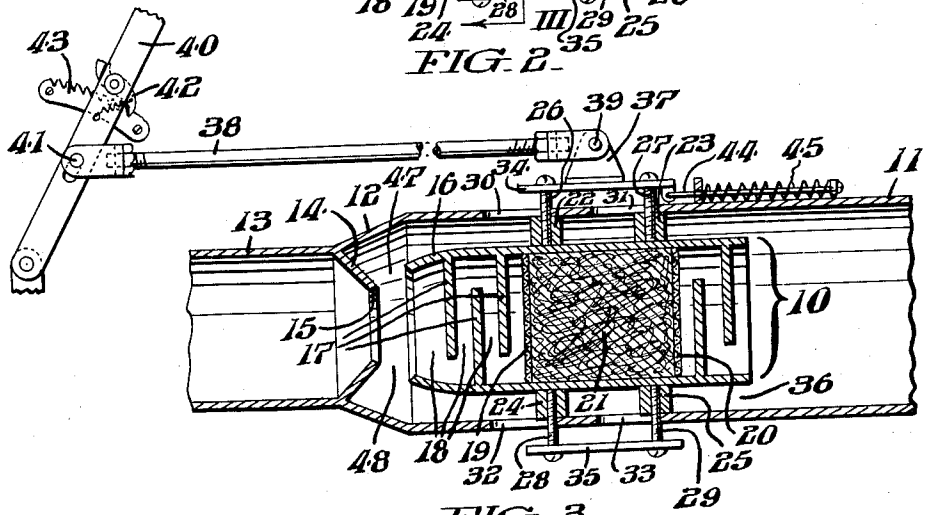
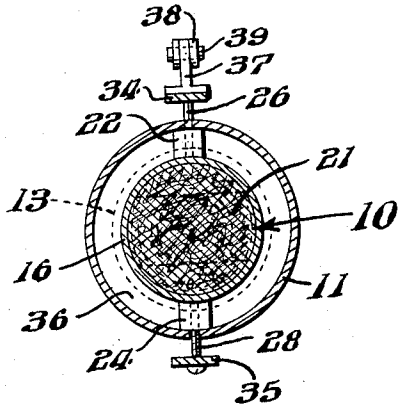


FIG. 3



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MUFFLER CONSTRUCTION

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This invention relates to muffler construction of the kind used to quiet the exhaust of internal combustion engines. More particularly this invention relates to a combined muffler and muffler cut-out to be used in connection with the internal combustion engine of an automotive vehicle.

It is well known that the muffler of the exhaust of any automotive vehicle, while quieting the noises produced from the exhaust gases of the internal combustion engine by breaking up and dissipating the sound waves which precede such exhaust gases, also considerably reduces engine efficiency by creating a back pressure. For this reason it is sometimes desirable to use a muffler cut-out in order to produce greater power from the engine. In the past such muffler cut-outs have been arranged conventionally in a Y-shaped pipe construction in which one pipe feeds through a standard muffler or pack and the other pipe extends straight from a manifold out to the back of the automotive vehicle. Conventionally a deflector valve is positioned at the conjunction of the Y which may divert the exhaust gases either through the muffler or through the straight exhaust pipe. The arrangement, however, has not been entirely satisfactory owing to the fact that the exhaust gases corrode and destroy the valve action, the seating action and the pivotal action. Moreover, the actual seating of the valve itself has never been completely satisfactory.

Accordingly, it is an object of this invention to provide an improved muffler and cut-out therefor in which deflector valves of the kind heretofore used are altogether eliminated.

It is another object of this invention to provide a muffler of simple and economical construction, yet light, strong and compact.

It is another object of this invention to provide a muffler and cut-out therefor in which the cut-out may be accomplished easily by a simple manipulation from the driver's seat of the automotive vehicle.

It is another object of this invention to provide a muffler and cut-out therefor in which the tendency of the exhaust gases to corrode, eat up, destroy, or cause sticking of the moving parts thereof is reduced to a minimum.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings wherein:

Fig. 1 is a view in longitudinal section of the apparatus according to this invention showing one specific arrangement thereof.

Fig. 2 is a view in longitudinal section of the apparatus according to this invention showing another specific arrangement thereof.

Fig. 3 is a cross sectional view of the apparatus according to this invention taken as indicated by the lines and arrows III—III which appear in Fig. 1.

The following description is directed to the specific form of the apparatus and method as shown in the drawings and is not intended to be addressed to the scope

of the invention itself which is capable of being practiced in a wide variety of forms and arrangements.

Adverting herewith to the specific form of the invention illustrated in the drawings, a muffler 10, of generally cylindrical shape, is situated within a housing 11, likewise of generally cylindrical construction and of larger diameter than the muffler cylinder 10. The housing 11 has a tapering wall 12 attached to an exhaust pipe 13. The tapering walls 14 extend within the tubular housing 11 to form a frusto-conical inlet having an orifice 15 for the admission into the muffler apparatus of the exhaust gases emitted from the exhaust pipe 13. Cylindrical wall 16 of the muffler 10 is inwardly curved at its end adjacent the tapered inlet of the housing 11 to fit snugly against the tapered walls 14 when the muffler is in the position shown in Fig. 1. Within the cylindrical muffler 10 are positioned baffles 17 extending alternately from opposite sides of the muffler wall 16 and leaving spaces 18 for the passage of gases through the muffler. Centrally within the muffler cylinder 10 are arranged perforated walls 19 and 20, between which is arranged a packing 21 of wool, brass wool, or other suitable noise-dissipating material. The muffler cylinder 10 is mounted within the housing 11 by means of blocks 22, 23, 24 and 25 through which pass studs 26, 27, 28 and 29. Studs 26, 27, 28 and 29 pass respectively through slots 30, 31, 32 and 33 positioned vertically on the opposite sides of housing 11. Studs 26 and 27 are affixed to a metal plate 34 and studs 28 and 29 are affixed to another metal plate 35 on the opposite side of housing 11. The mounting of muffler 10 is so arranged within the housing 11 that a space 36 remains between the cylindrical wall 16 and the housing 11 as a conduit for the passage of exhaust gases therethrough when desired. Attached to the metal plate 34 is a bracket 37 to which a connecting arm 38 is secured by a pin 39. At its other end connecting arm 38 is attached to the lever 40 by means of the pivot pin 41. A latching arrangement in connection with the lever 40 is provided in the form of a pawl 42 and toothed segment 43. To one end of a rod 44 which is secured at its other end to plate 34, is attached the spring 45, the compression force of which normally urges the muffler cylinder 10 into the cut-out position shown in Fig. 2.

In operation whenever it is desired to operate the automotive vehicle with the sounds of the engine exhaust muffled, the muffler cylinder 10 will normally be positioned as shown in Fig. 1. When the lever 40 is drawn into the vertical position shown in Fig. 1, against the compression force of the spring 45, the muffler cylinder 10 is forced forward into close register with the tapered walls 14 of the housing 11. The pawl 42 slips into an appropriate notch 46 of the toothed segment 43 and thereby holds the muffler cylinder 10 firmly in position as shown in Fig. 1. The inwardly curved wall 16 of the muffler 10 fits snugly against the tapered walls 14 of the housing 11 so that the exhaust gases emitted through orifice 15 are forced through the muffler cylinder past baffles 17, and through the perforated wall 19, packing 21, and perforated wall 20, thereby effectively dissipating the sound waves accompanying such exhaust gases.

When it is desired, however, to operate the automotive vehicle in a manner to obtain maximum power and avoid the back pressure of the exhaust gases resulting from their being forced through the muffler cylinder, the driver will release the pawl 42 of the aforementioned latching arrangement, whereupon the compression force of the spring 45 will cause the backward longitudinal movement of the muffler cylinder 10 away from the tapered inlet 14 of housing 11. If desired, the muffler cylinder 10 can be moved backward from the housing inlet to the maximum extent permitted by the slots 30, 31, 32, and 33, as shown in Fig. 2. Alternatively, muffler

cylinder 10 can be secured variously in positions intermediate of the positions shown in Fig. 1 and Fig. 2 by allowing the pawl 42 to rest in any of the notches of toothed segment 43 intermediate of the extreme positions. The particular position of the muffler cylinder 10 that is selected will depend upon the extent to which a cut-out of the muffler is desired.

When the muffler cylinder 10 has been secured in the position shown in Fig. 2, the exhaust gases emitted from the orifice 15 of the housing inlet may then pass freely through open space 36 provided between the muffler cylinder wall 16 and housing 11 to be emitted directly into the atmosphere. Exhaust gases passing into the muffler 10 when in the position shown in Fig. 2, will encounter the obstacle of baffles and packing within the muffler cylinder, and consequently, back pressure is developed which aids in the forcing of the exhaust gases through the spaces 47 and 48 into the straight exhaust conduit 36 and from there into the atmosphere.

It will be apparent that one of the important advantages of this invention is the elimination of deflecting valves of the kind which have heretofore caused most of the difficulty in the continual and efficient use of muffler cut-out devices; since there are no valves to corrode, stick, or fail to seat properly, the invention herein described is both efficient and reliable in its operation and effectiveness and far more durable and longlasting as well.

Another significant advantage of this invention lies in its essential simplicity and economy of construction.

Although this invention has been disclosed with reference to specific forms and embodiments thereof, it will be evident that a great number of variations may be made without departing from the spirit and the scope of this invention. For example, parts may be reversed, equivalent elements may be substituted for those specifically disclosed, and certain features of the invention may be used independently of other features, all without departing from the spirit and scope of this invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A muffler apparatus for the exhaust pipe of an internal combustion engine comprising a housing having an inlet connected to receive the exhaust from said pipe, muffing means shiftably mounted in said housing for movement toward and away from said inlet, said muffling means having an inlet which is constructed and arranged to connect with the inlet of said housing, means forming a by-pass between said muffling means and the walls of said housing which communicates with said inlet and by-passes said muffling means when said muffling means is shifted away from said inlet, and moving means attached to said muffling means and extending through the walls of said housing for shifting said muffling means toward and away from said inlet.

2. The apparatus defined in claim 1 wherein said moving means is provided with a spring affixed to the exterior of said housing, said spring normally urging said muffling means away from said inlet.

3. The apparatus defined in claim 2 wherein latching means is connected to said moving means exterior of said housing and arranged to hold said muffling means in the desired proximity to said inlet against the action of said spring.

4. The apparatus defined in claim 3 wherein said latching means is connected with actuating means operable from a remote point.

5. A muffler apparatus for the exhaust pipe of an internal combustion engine comprising a housing having an inlet connected to receive the exhaust from said pipe, muffling means shiftably mounted in said housing for movement toward and away from said inlet, said muffling means having an inlet which is constructed and arranged to connect with the inlet of said housing, means forming a by-pass in said housing between said muffling means and the walls of said housing which communicates with said inlet and by-passes said muffling means when said muffling means is shifted away from said inlet, said muffling means having a flow resistance which is substantially greater than the flow resistance of said by-pass whereby a back pressure of exhaust gases is developed within said muffling means to force said gases into said by-pass, and means attached to said muffling means and extending through the walls of said housing for shifting said muffling means toward and away from said inlet.

6. A muffler apparatus for the exhaust pipe of an internal combustion engine comprising an outer housing having an inlet connected to receive the exhaust from said pipe, muffling means shiftably mounted within said outer housing for movement toward and away from said inlet and comprising an inner housing spaced apart from said outer housing, a series of baffles within said inner housing forming a labyrinth therein, perforated walls spaced apart from one another and disposed centrally of said baffles, and a sound-dissipating material arranged between said perforated walls, said muffling means having an inlet which is constructed and arranged to connect with the inlet of said outer housing, means forming a by-pass between the walls of said inner housing and the walls of said outer housing which communicates with said inlet and by-passes said muffling means when said muffling means is shifted away from said inlet, said muffling means having a flow resistance which is substantially greater than the flow resistance of said by-pass whereby a back pressure of exhaust gases is developed within said muffling means to force said gases into said by-pass, and means connected to the walls of said inner housing for shifting said muffling means toward and away from said inlet.

7. A muffler apparatus for the exhaust pipe of an internal combustion engine comprising an outer housing having an inlet connected to receive the exhaust from said pipe; muffling means shiftably mounted within said outer housing for movement toward and away from said inlet and comprising an inner housing spaced apart from said outer housing, said space between said inner housing and said outer housing forming a by-pass which communicates with said inlet and by-passes said muffling means when said muffling means is shifted away from said inlet, a series of baffles within said inner housing forming a labyrinth therein, perforated walls spaced apart from one another and disposed centrally of said baffles, and a sound-dissipating material arranged between said perforated walls, said muffling means having an inlet which is constructed and arranged to connect with the inlet of said outer housing, said muffling means having studs attached to the exterior of said inner housing, said outer housing having slots for the passage of said studs therethrough; moving means attached to said studs for shifting said muffling means toward and away from said inlet and latching means connected with said moving means for holding said muffling means in the desired proximity to said inlet.

References Cited in the file of this patent

UNITED STATES PATENTS

315,732	Coale	Apr. 14, 1885
1,187,581	Weil	June 20, 1916
1,729,027	Brennan	Sept. 24, 1929
1,756,897	Bilsky	Apr. 29, 1930
1,807,512	Culp	May 26, 1931
1,990,249	Pieron	Feb. 5, 1935