Sept. 22, 1925. 1,554,351

R. K. JACK

MUFFLER FOR INTERNAL COMBUSTION ENGINES

Filed Sept. 11, 1922

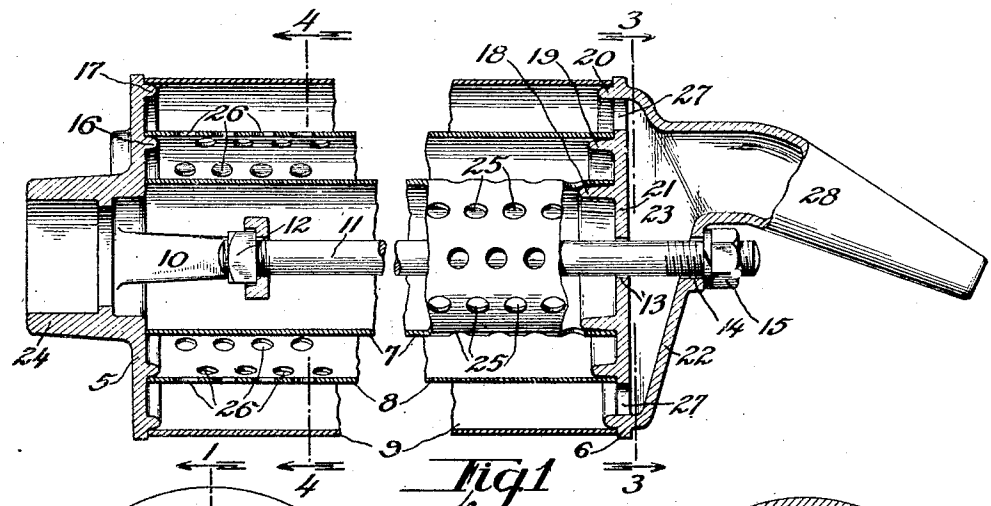


Fig. 1

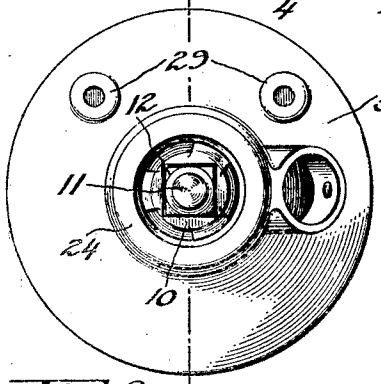


Fig. 2

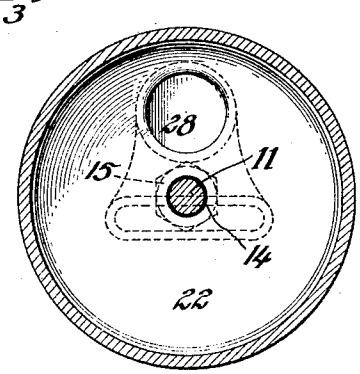


Fig. 3

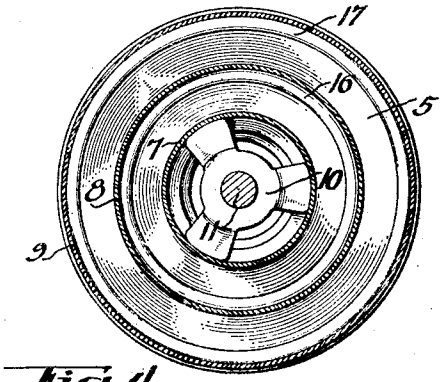


Fig. 4

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UNITED STATES PATENT OFFICE.

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MUFFLER FOR INTERNAL-COMBUSTION ENGINES.

Application filed September 11, 1922. Serial No. 587,429.

To all whom it may concern:

Be it known that I, ROBERT K. JACK, a subject of the King of Great Britain, and a resident of Lansing, county of Ingham and State of Michigan, have invented certain new and useful Improvements in Mufflers for Internal-Combustion Engines, of which the following is a full, clear, concise, and exact description, such as will enable others skilled in the art to which the invention relates to make and use the same, reference being made therein to the accompanying drawings, which form a part of this specification.

My invention relates to mufflers designed for use with internal combustion engines employed to drive automobiles and similar self propelled vehicles, to lessen the noise of the exhaust from the engine of the power plant thereof; and the principal objects of my invention are to provide an improved muffler which will be simple in construction and effective for the purpose for which it is provided, and one having features of construction whereby the parts thereof may be more readily assembled than has heretofore commonly been the case; thus materially reducing the cost of the muffler as such devices have to be assembled by hand.

The drawing accompanying and forming a part of this specification illustrates the preferred embodiment of my invention, and therein:

Figure 1 is a view showing a section of my improved muffler upon a central plane extending longitudinally thereof, and indicated by the line 1—1, Figure 2.

Figure 2 is a view showing the same in elevation, and as seen from a position to the left of Figure 1.

Figure 3 is a view showing a section upon a transverse plane indicated by the line 3—3, Figure 1, certain features of the head to the right of said plane appearing in elevation.

Figure 4 is a view showing a section upon a transverse plane indicated by the line 4—4, Figure 1, with parts to the left of said plane in elevation.

Referring to the drawing, the reference numerals 5, 6 designate two heads made commonly from cast iron, and 7, 8 and 9 a plurality of concentrically arranged tubular members held in place between said heads; the head 5 having a centrally disposed spider or stirrup 10 having a hole through which a tie rod or bolt 11 extends, and a recess for receiving the head 12 of said bolt and preventing it from turning, and the head 6 having holes at 13, 14 arranged in line with one another through which the said bolt extends; the bolt having a nut 15 at its right hand end and the same serving to hold the parts of the muffler together and secure a single unitary structure, as will be appreciated.

The head 5 has concentric annular ridges 16, 17 which lie just within the ends of the tubular members 8 and 9 and hold them properly positioned relative to the head, and the bases of the arms of the spider 10 hold the corresponding end of the inner tube 7 in proper position. The head 6 has likewise annular ridges 18, 19 & 20 concentric with the axially extending tie rod 11 and which serve to properly space the other ends of the tubes 7, 8 & 9; said ridges being upon an inner transverse wall 21 of the head 6 which, in connection with the external wall 22 thereof, provides an internal chamber 23 within the said head 6.

The planes of the inner faces of the heads 5, 6 are at right angles to the longitudinal axis of the muffler so that the tubes are all of the same length, and the ridges 17, 18 & 19 are of progressively increasing height measured from the transverse wall 21 from which they project; that is the outer ridge 20 is the least in height, the intermediate ridge 19 the next in height, and the inner ridge 18 the highest of said several ridges. This feature facilitates the assembling of the muffler as the upper ends of the tubes, which are not unlike pieces of stove pipe and are awkward to handle may, when said tubes are properly supported upon the head 5 lying in a horizontal position, be more readily positioned relative to the head 6 which is then the upper head than would be the case if said ridges 18, 19 & 20 were all of the same height. In putting the said head in place the inner ridge 18 first enters the tube 7 and holds it in position while the upper ends of the tubes 8 and 9 are both free to be manipulated. Afterward and after the upper end of the tube 8 is properly placed the head is moved downward and its ridge 19 enters the tube 8, thus holding both the tubes 7 and 8, but leaving the tube 9 free to be manipulated; and after the upper end of the said tube 9 has been properly placed

the head is moved further downward and into its final position wherein all the tubes are held properly spaced by the ridges upon the head; whereupon the parts are fastened together by the bolt 11, as will be understood.

While in the form of my invention illustrated the ridges of progressively increasing height are associated with or carried by the outlet head of the muffler, this is immaterial, as said ridges may be upon either head; and it will also be appreciated that the diameters of the tubes and ridges may be such that the tubes fit within instead of about the outside of the ridges, should such an arrangement be deemed preferable or desirable by one building the muffler wherein my invention consists.

Exhaust gases from the engine enter the muffler through a conduit connected with a hollow neck 24 upon the head 5 and pass between the arms of the stirrup 10 and along the inner tube 7. This tube has holes 25 at its far end through which the gas passes, whereupon said gases flow back between the tubes 7 and 8 and through holes 26 in the latter, in a manner common in mufflers, and into the space between the tubes 8 and 9.

The exhaust gases flow from the space between the tubes 8 and 9 through a series of holes 27 spaced circumferentially in the transverse wall 21 of the head 6, two of said circular series appearing in the central section Figure 1, and into the chamber 23 within the said head; and flow from said chamber through a passage in an outlet conduit or spout 28 located to one side of the axis of the muffler and the discharge end of which is preferably flattened so as to discharge the gases in a fan-shaped horizontally disposed stream. This spout or nozzle which is preferably made an integral part of the head 6 is offset relative to the axis of the muffler and to the tie bolt 11, so that the nut 15 may be readily tightened in assembling the device; and the presence of the internal chamber 23 in the head 6 provides a muffler wherein a better flow of gas therethrough occurs as the gas, being free to flow from the outer space between the tubes 8 and 9 through the holes 27 and into the said chamber all around the said space, naturally enters said space throughout the entire circumference thereof. The flow from the inner tube 7 is therefore radial and substantially uniform throughout its circumference, as is likewise the flow from between the tubes 7 and 8 into the space between the tubes 8 and 9; and said flow is uniformly distributed circumferentially as it occurs from said last mentioned space through the holes 27 and into the space or chamber 23 inside the head 6.

The head 5 is shown as provided with suitable bosses 29 whereby that end of the muffler may be fastened to a supporting bracket by suitable screws, and similar bosses are also present upon the head 6; although as a matter of course the manner in which the muffler is supported from the frame of the vehicle with which it is supposed to be used is quite immaterial.

Having thus described and explained my invention I claim and desire to secure by Letters Patent:

1. A muffler of the class described comprising two integral single piece heads, one provided with an inlet opening for permitting the flow of exhaust gas into the muffler, and the other of said heads having an internal transverse wall provided with a series of circumferentially spaced holes, an outer wall spaced apart from said transverse wall to thereby provide an internal chamber into which said holes lead, and a discharge spout or conduit located to one side of the axis of said head; a plurality of concentric tubes extending between said heads and which tubes are of progressively increasing diameter to thereby provide annular spaces between successive tubes, said tubes being all of substantially the same length; a plurality of concentric ridges formed upon the inner faces of said heads, and by which ridges the ends of the tubes aforesaid adjacent said heads are held properly spaced from one another; a centrally located spider integral with one of said heads and extending into the inner one of the tubes aforesaid; and a bolt extending from said spider and along the axis of the innermost of said tubes and through holes provided in the other of said heads, and whereby said several parts are fastened together to thereby provide a unitary muffler structure.

2. In a muffler of the class described, an integral single piece head having an inner transverse wall provided with a plurality of concentrically arranged ridges of progressively increasing height from the outer to the inner ridge, and a series of circumferentially spaced holes adjacent the periphery of said wall; an outer end wall spaced apart from said inner transverse wall to thereby provide an intervening chamber into which said holes lead; holes in said transverse and outer walls arranged in alignment with one another and axially of the said head; and a discharge spout or conduit located to one side of the axis of said holes, and which conduit extends from the end wall aforesaid of said head.

In testimony whereof I affix my signature.

ROBERT K. JACK.