Feb. 19, 1924.

1,484,526

M. J. O'CONNOR

MUFFLER

Filed May 3, 1921

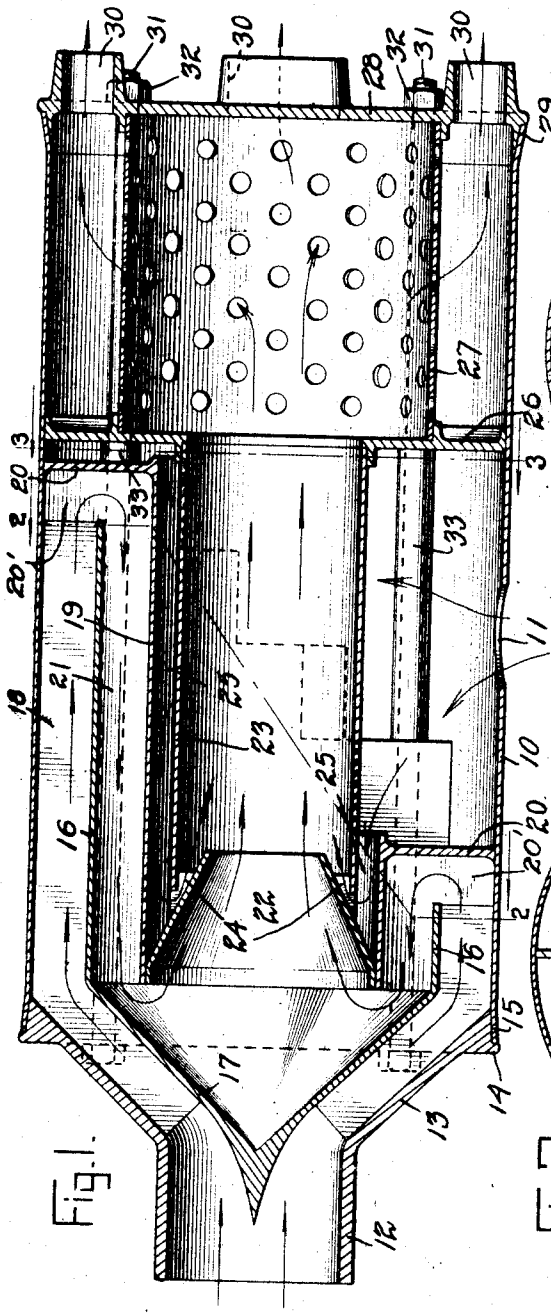


Fig. 1.

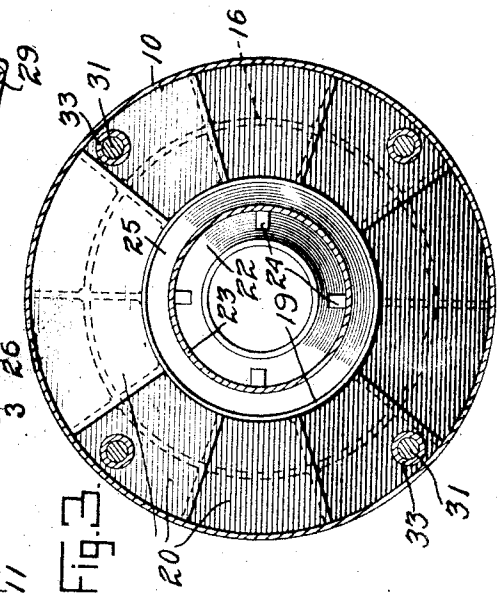


Fig. 3.

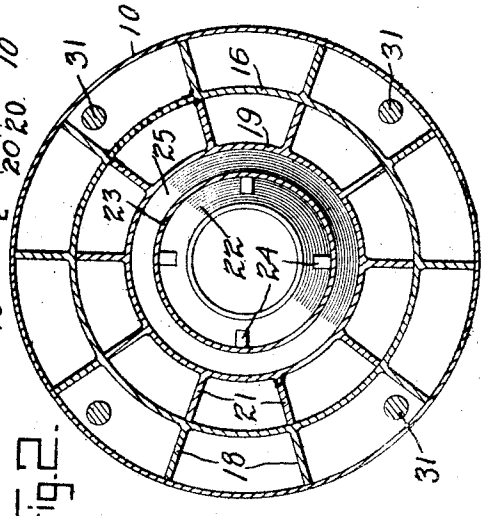


Fig. 2.

Inventor

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Attorney

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UNITED STATES PATENT OFFICE.

MICHAEL J. O'CONNOR, OF BLOOMINGDALE, NEW JERSEY.

MUFFLER.

Application filed May 3, 1921. Serial No. 466,593.

To all whom it may concern:

Be it known that I, MICHAEL J. O'CONNOR, a citizen of the United States, residing at Bloomingdale, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Mufflers, of which the following is a specification.

My said invention relates to a muffler for internal combustion engines and it is an object thereof to provide a muffler consisting of parts that may be readily separated, as for cleaning.

A further object of my invention is to provide a muffler that operates on a new principle disclosed also in my co-pending application No. 319,002, filed August 21, 1919, whereby the successive discharges of exhaust gas may be released to the external air in a step-by-step fashion so as to diminish the noise of the exhaust and in such a manner as not to create a back pressure on the motor.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 shows a central longitudinal section of my improved muffler,

Figure 2 a transverse section on line 2—2 of Figure 1, and

Figure 3 a transverse section on line 3—3 of Figure 1.

In the drawings reference character 10 indicates an outer enclosing casing for the parts of the muffler, this casing having an opening 11 for entrance of air. A sleeve 12 attached to the motor exhaust pipe has a conical enlargement 13 terminating in a flange 14 adapted to abut against the end of the casing 10 and a tapered annular portion 15 extends rearward from the flange, the flaring forward end of casing 10 engaging within said tapered portion. Within the casing 10 is a sleeve 16 preferably concentric therewith. At its forward end this sleeve has a tapering portion 17 forming a cone with sides co-axial with the conical portion 13 of the sleeve 12 and diminishing to a point. Ribs 18 extend between sleeve 16 and casing 10 and are extended down between the conical portions 13 and 17 to hold the parts in proper relation to each other. It will be seen from Figure 1 that the rear end of the sleeve extends much farther back at the top than at the bottom while the ribs 18 are of corresponding length and are cut off squarely at their rear ends. Sleeve 19 is preferably concentric with the casing 10 and sleeve 15, a vertical flange 20 at its rear end extending out to the casing 10 and forming the rear wall of a continuation of the passages between the ribs 18. Fixed to the sleeve 19 are also a series of ribs 21 equal in number to the ribs 18, the space between each pair of ribs forming with the space in front of flange 20 a continuation of a space between a corresponding pair of ribs 18. Said passages are completed at the rear of the sleeve 16 by members 20′ which are preferably extensions of the ribs 21. The members 20′ are preferably but not necessarily secured at their rear edges to the flanges 20 by brazing or the like and are adapted to abut the rear ends of the ribs 18 to form continuations thereof so as to connect the passages formed by the ribs 18 and 21. Fitting within the sleeve 19 is a funnel 22 communicating with each of the passages between ribs 18. This funnel in turn communicates with a longitudinal passage in an internal sleeve 23, the funnel having radially extending flanges at 24 by which one end of the sleeve 23 is supported. Passages 25 extend between the sleeves 19 and 23 and intermediate the flanges 24 into the central passageway. The rear end of sleeve 23 is supported by a transversely extending web 26 having a central flange resting against the interior of casing 10. This web also has an intermediate flange forming a support for a perforated drum 27 supported at its rear end by a flange on a rear web 28. This web has a tapered forwardly extending flange at 29 fitting within a flaring portion of casing 10 and also has a series of openings 30.

The entire device is held in assembled position by bolts 31 extending from front to rear and having nuts 32 thereon. Spacers 33 surrounding said bolts are provided between the web 26 and the flanges 20 of sleeve 19.

In the operation of the device the charge of exhaust gas will enter the pipe 12 and be distributed among the various passages between ribs 18. As will be evident from the consideration of Figure 1 the passage at the upper part of the figure is much longer than that at the lower part and the difference is increased due to the relative arrangement of passages between ribs 21, the longest passage between ribs 18 opening into the longest passage between ribs 21 and vice versa.

Consequently a portion of gas entering between ribs 18 has a much longer path to travel before it reaches the funnel 22 and from the shortest passage to the longest, the passages vary in length by regular increments so that successive portions of gas will enter the central passage in sleeve 23 at regularly spaced intervals. At the same time that they enter said passage a certain amount of air admitted through opening 11 enters the central passage by way of passages 25 to cool the gases before they reach the atmosphere. As each portion of gas passes out of sleeve 23 it is further broken up by the perforations in sleeve 27 and then goes out through openings 30 to the atmosphere. The length of the different passages may be so regulated that at some ordinary speed, as for example, 20 miles per hour, the sub-divided portions of escaping gas from successive charges may follow each other at regularly spaced intervals.

I have shown a preferred form of the invention but it is obvious that the parts may be held together in various ways, as by brazing, soldering, etc., and also that certain parts now fixed could be loose and vice versa. Various other changes may be made within the scope of my invention therefore I do not limit myself to the specific device shown in the drawings and described in the specification but only as indicated by the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. A muffler for explosive engines comprising, a casing, a passage leading from the casing to receive the gases from the exhaust pipe of the engine, a series of separated passages leading rearwardly therefrom, a flange extending inwardly of the casing and having a series of portions each forming a rear wall for each of the said series of separated passages the wall portions of said flange being located at varying distances from the engine, other passages for conducting the exhaust gases from the wall portions toward the engine, and a common passage receiving the gases from the last said passages, substantially as set forth.

2. A muffler for explosive engines comprising a common passage adjacent the engine, branches of varying length extending rearwardly therefrom, a common passage to which said branches lead, means to subdivide the exhaust gases after leaving the last named common passage, and means surrounding the entrance of the last named common passage for admitting air thereto, substantially as set forth.

3. A muffler for explosive engines comprising an outer casing, means supported by the casing for receiving the successive exhausts from the engine, mechanism supported in the casing comprising means for sub-dividing the exhausts from the engine and causing the divided parts to traverse paths of varying length, a sleeve positioned centrally of and spaced from the casing providing a common path for the successively arriving portions, a perforated drum mounted concentrically of the casing and having direct communication with the sleeve for further dividing said gases, and a web at the rear of the drum supported by the casing and having a plurality of outlets for the exhaust gases, substantially as set forth.

4. A muffler for explosive engines comprising a casing, a sleeve within the casing and extending lengthwise thereof, longitudinal ribs spacing the sleeve from the casing, a second sleeve within the first and similarly located, said second sleeve having an annular imperforate extension bearing against the casing, longitudinal ribs extending between said sleeves and radial ribs on said flange registering with ribs of said inner and outer sets, said sets of ribs forming recurved passages of varying length, a common passage leading from the motor exhaust pipe to said passages and a common exit passage located centrally of said sleeves and connected to each of said passages, substantially as set forth.

5. A muffler for explosive engines comprising a casing, a sleeve within the casing and extending lengthwise thereof, longitudinal ribs spacing the sleeve from the casing, a second sleeve within the first and similarly located, said sleeve having an annular imperforate flange bearing against the casing, longitudinal ribs extending between said sleeves and lying in the same planes as corresponding ribs of the first set, said sets of ribs forming walls of re-curved passages of varying length, a common passage leading from the motor exhaust pipe to said passages and a common exit passage located centrally of said sleeves and connected to each of said passages comprising a funnel attached to the second sleeve, an inner sleeve having one end supported by the funnel and a perforated drum at the rear end of the sleeve and having means to support the other end of the same, substantially as set forth.

6. A muffler for explosive engines comprising a casing, a sleeve within the casing and extending lengthwise thereof, longitudinal ribs spacing the sleeve from the casing, a second sleeve within the first and similarly located, said sleeve having an annular imperforate extension bearing against the casing, longitudinal ribs extending between said sleeves, said sets of ribs forming walls of re-curved passages of varying length, a common passage leading from the motor exhaust pipe to said passages and a common exit passage located centrally of

said sleeves and connected to each of said passages comprising a third sleeve concentric with the other sleeves and the casing and air passages leading into the last named sleeve adjacent to its forward end, substantially as set forth.

7. A muffler for explosive engines comprising a casing, a sleeve within the casing and extending lengthwise thereof, longitudinal ribs spacing the sleeve from the casing, a second sleeve within the first and similarly located, said sleeve having an annular imperforate extension bearing against the casing, longitudinal ribs extending between said sleeves, said sets of ribs forming walls of re-curved passages of unequal length, a common passage leading from the motor exhaust pipe to said passages and a common exit passage mounted centrally of said sleeves and connected to each of said passages comprising a third sleeve concentric with the casing and located within the other sleeves, means at the forward end of the sleeve for supporting the sleeve and admitting air thereto, a perforated drum at the rear of the sleeve for further dividing the exhaust gases and a web between the last named sleeve and the drum and embodying means for supporting an end of each, substantially as set forth.

8. A muffler for explosive engines comprising a casing, a sleeve within the casing and extending lengthwise thereof, longitudinal ribs spacing the sleeve from the casing, a second sleeve within the first and similarly located, said sleeve having an annular imperforate extension bearing against the casing, longitudinal ribs extending between said sleeves, said sets of ribs forming walls of re-curved passages of varying length, a common passage leading from the motor exhaust pipe to said passages and a common exit passage mounted centrally of said sleeves and connected to each of said passages comprising a third sleeve concentric with the casing and located within the other sleeves, means at the forward end of the sleeve for supporting the sleeve and admitting air thereto, a perforated drum at the rear of the sleeve for further subdividing the exhaust gases and a web between the last named sleeve and the drum and embodying means for supporting an end of each and a web supported by the end of the casing, said web having means to support an end of the perforated drum and having a plurality of exit passages for further dividing the exhaust gases, substantially as set forth.

9. A muffler for explosive engines comprising a tube forming the central passageway for the exhaust from the engine, means comprising tubes mounted concentrically of the first for dividing the exhausts from the engine and feeding them seriatim to the tube and means surrounding the central common passageway for mixing cold air with such divided portions of the exhausts as they enter the central common passageway, substantially as set forth.

10. A muffler for explosive engines comprising a casing, a flange extending substantially transversely of the casing and having a series of wall portions located at varying distances from the engine, a series of separated passages extending longitudinally of the casing for conducting the gases to the series of wall portions respectively, a second series of separated passages for conducting the gases from the wall portions of the flange, and a common passage for receiving the gases, substantially as set forth.

11. A muffler for explosive engines comprising a casing, a flange extending substantially transversely of the casing and having a series of wall portions located at varying distances from the engine, a series of separated passages extending longitudinally of the casing for conducting the gases to the series of wall portions respectively, a second series of separated passages for conducting the gases from the wall portions of the flange, a common passage for receiving the gases, and means for conducting cold air to the common passage, substantially as set forth.

12. A muffler for explosive engines comprising a casing, a flange extending substantially transversely of the casing and having a series of wall portions located at varying distances from the engine, a series of separated passages extending longitudinally of the casing for conducting the gases to the series of wall portions respectively, a second series of separated passages for conducting the gases from the wall portions of the flange, a common passage for receiving the gases, means for conducting cold air to the common passage, and means for further dividing the gases received by the common passage, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Bloomingdale, New Jersey, this 9th day of April, A. D. nineteen hundred and twenty-one.

MICHAEL J. O'CONNOR. [L. S.]

Witnesses:
EDWARD J. DUNN,
CLARENCE KAHMAN.