

M. KARMINSKI & C. PETERS.
MUFFLER.

APPLICATION FILED NOV. 30, 1910.

991,515.

Patented May 9, 1911.

Fig. 1.

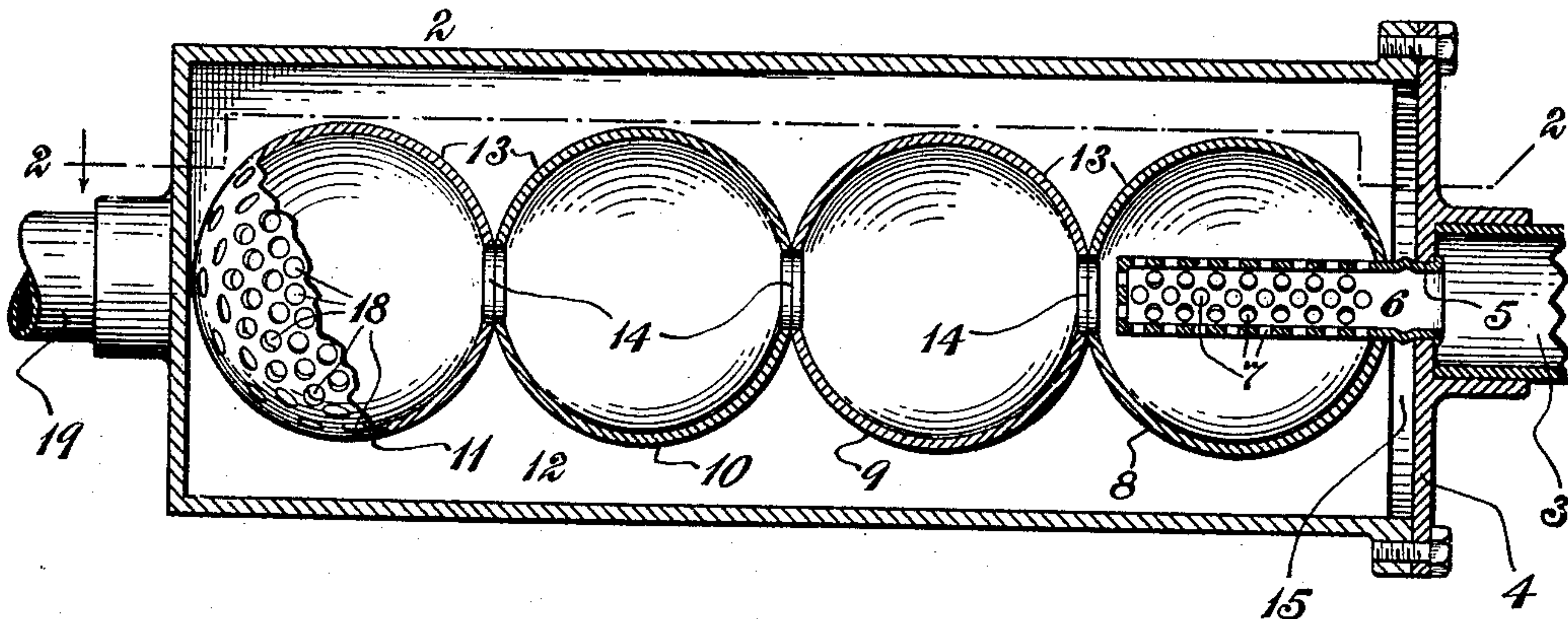


Fig. 2.

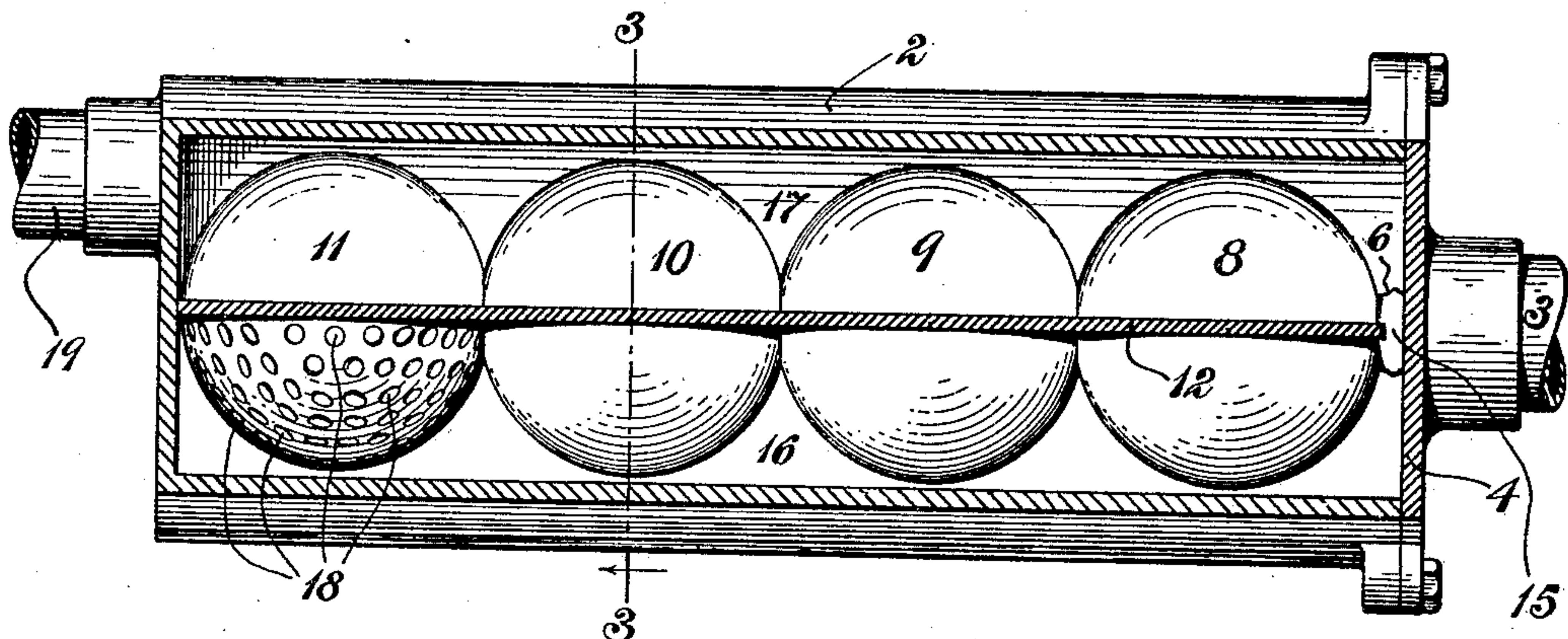
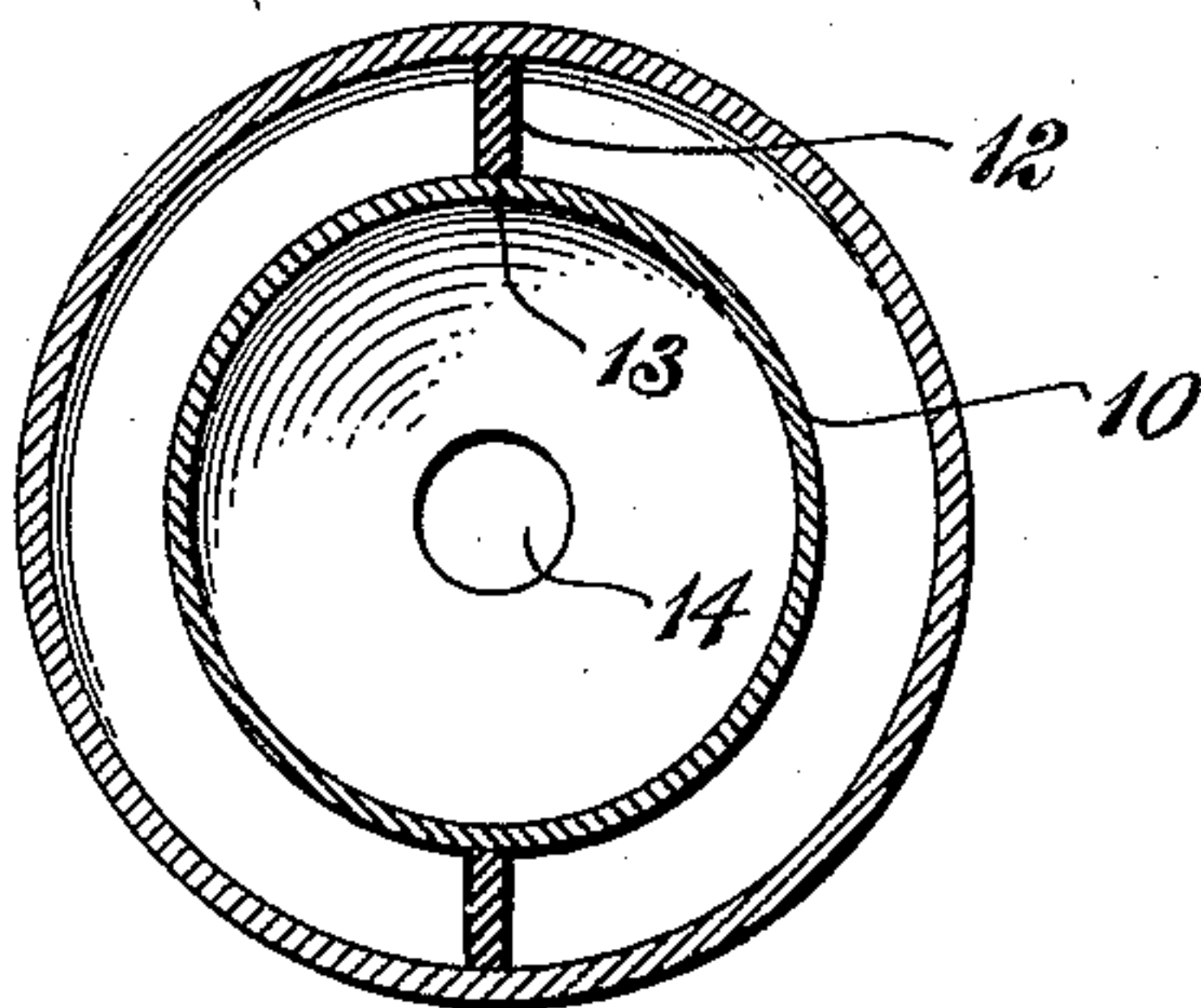


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MUFFLER.

991,515.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed November 30, 1910. Serial No. 594,847.

To all whom it may concern:

Be it known that we, MAXIM KARMINSKI and CHARLES PETERS, subjects of the Emperor of Germany, residing at Thompsonville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Mufflers, of which the following is a specification.

This invention relates to mufflers, and while it is conceivable that a muffler embodying our invention can be utilized with advantage in many different connections, it is of especial utility when employed in conjunction with an engine or motor using a gaseous fluid—such as gasoline—for its operation.

Among the objects of the invention are the provision of a simple and compact device of the character noted which has means for effectually deadening the noise of the exhaust, and the elimination of back pressure.

In the drawings accompanying and forming part of the present specification, we have illustrated in detail one convenient form of embodiment of the invention, which to enable those skilled in the art to practice the same will be fully outlined in the following description, this showing being made to enable those skilled in the art to practice the invention. From such observations it will be apparent that we do not restrict ourselves to the disclosure of said drawings and description, as we may depart therefrom in several respects within the scope of our invention included in the claims succeeding said description.

Referring to the drawings: Figure 1 is a vertical longitudinal sectional view of a muffler comprising our invention. Fig. 2 is a horizontal longitudinal sectional view of said muffler, and, Fig. 3 is a cross section of the same.

Like characters refer to like parts throughout the several figures of the drawings.

The muffler preferably involves in its organization a casing, and this casing may be of any desirable kind; that shown is denoted in a general way by 2, and is shown as cylindrical. We have illustrated an engine exhaust pipe 3 connected with the

muffler, said pipe serving as a suitable means for conveying the spent gases from a hydrocarbon engine or the like into the muffler. As a suitable means for connecting the discharge pipe 3 with the muffler body or casing 2, the internally threaded coupling 4 rigidly connected with the inner head or end of the muffler, may be provided. Said inner head or end is shown having an opening or port 5, and in this opening there is represented fitted the nozzle 6 which is preferably inclosed in the casing 2 and which extends toward the outer end thereof. While any desirable means may be provided for holding the nozzle in place, this result can easily be accomplished by spinning. It will be understood that the exhaust pipe 3 delivers the exhaust from the engine into this nozzle 6. The latter is represented as closed at its free or forward end, and said forward end and body preferably have outlets such as the perforations 7 for the escape of the gases into an expanding chamber into which the said perforated nozzle or tube extends, and by this relation the gases are directed into said chamber in a number of separated streams or jets, and this at the outset breaks up the body of gas and has a muffling effect. As will hereinafter appear there is a succession or chain of these expanding chambers, and the gases pass through the first into the second and so on losing their force in transit. In the present case there are four of such expanding chambers, and they are denoted respectively by 8, 9, 10 and 11, it being evident that the nozzle or perforated tube 6 discharges into the first chamber 8. While these chambers may be of any desirable shape, we prefer that they be spherical, as in this way we can within a relatively small space provide for considerable cubical area and the elimination of angles. While we do not restrict ourselves to the formation of these chambers of any particular material, we prefer to use aluminum for this purpose which we have found after experiments is best adapted to our purpose, in that the said material possesses a very low resonant effect by reason of which the gases strike the inner surface of the chambers practically without noise.

While the several gas expanding chambers may be supported in any desirable manner, the partition or dividing wall 12 answers satisfactorily in this connection, said wall, as will hereinafter appear, dividing the casing 2 interiorly into two separate or distinct but communicating compartments. The opposite edges of the wall preferably closely fit the top and bottom of the casing interiorly thereof, said wall preferably having circular openings, all for convenience denoted by 13, to receive closely the respective spherical chambers. The two intermediate chambers 9 and 11 have diametrically opposite ports, while the terminal chambers 8 and 11 have similar ports on their inner sides and for sake of simplicity all said ports are denoted by 14. The chambers fit together and their ports in the present instance are in line. From this it will be clear that the first chamber 8 can deliver its gases into the communicating second chamber 9, the latter into the third chamber 10 and the third chamber 10 into the fourth chamber 11. While we have shown four of said chambers, there may be cases where this number may be increased or decreased, the invention not respecting this detail or others. The several chambers are preferably rigidly united for instance by welding or brazing, to the dividing wall 12, so that the wall with the chambers carried thereby presents practically a unit, and it can be introduced as such into the casing 2.

In practice the outer end of the wall or partition 12 fits firmly or solidly against the corresponding head of the casing 2, while the inner end of said wall extends short of the inner head of said casing, so that a passage 15, acting practically as a port, connects the two compartments at opposite sides of said dividing wall. We might distinguish these two compartments as primary 16 and secondary 17, these designations not being employed because one of the compartments is of less importance than the other, but simply to more readily explain the apparatus. The exhaust gases from the final chamber 11 are discharged into the primary compartment 16 from the final chamber 11, said final chamber 11 for this purpose having circumferential and lateral perforations 18 which open only in the primary chamber or compartment 16, that part of the outer expanding chamber 11 located in the secondary chamber 17 being imperforate. After the gases have traveled through the several expanding chambers 8, 9, 10 and 11 they will leave the latter by way of the perforations 18 and pass into the entering end of the primary chamber 16 and owing to the partition 12 will travel circuitously first through the primary compartment 16 and

then into the secondary compartment 17 by way of the connecting passage 15. Said gases may be discharged to atmosphere by the pipe 19 connected with the outer end or head of the casing 2. We find that not only can we noiselessly muffle the exhaust of an engine such as that to which we have hereinbefore referred, but that the gases when they emerge from the final discharge pipe 19 are practically without power.

What we claim is:

1. A muffler having a casing, a partition extending longitudinally of the casing for dividing the same interiorly into primary and secondary compartments, a plurality of communicating gas expanding chambers supported by said partition, means for delivering gas into the first chamber, the final chamber having means for discharging the gas into the primary compartment, the secondary compartment having a discharge port to atmosphere, and a passage connecting said two compartments, at a point remote from said port.

2. A muffler having a casing, a partition extending longitudinally of the casing and dividing the same interiorly into primary and secondary compartments, a plurality of communicating gas expanding chambers supported by said partition, the final chamber having means to discharge the gas into the primary compartment, the secondary compartment having a discharge port to atmosphere at approximately one end of the casing, and a passage connecting the two compartments at substantially the other end of said casing.

3. A muffler having a casing, a partition extending longitudinally of the casing and dividing the same interiorly into primary and secondary compartments, a plurality of communicating gas expanding chambers supported by said partition, means for delivering gas into the first chamber at the head end of the casing, the final chamber discharging the gas into the primary compartment substantially at the outer end of the casing, said secondary compartment having a discharge port opening to atmosphere substantially at said outer end, and a passage connecting the two compartments approximately at the head end of the casing.

4. A muffler having a series of communicating chambers, a partition dividing the muffler into interior compartments, means for delivering gases into one of the chambers, another chamber having outlet means opening into one of the compartments, the other compartment having an outlet to atmosphere, and a passage connecting the two compartments.

5. A muffler comprising a casing, a partition in said casing fitting against one end

thereof and extending short of the other, a series of connecting chambers supported by said partition, a perforated nozzle extending into the first chamber, the final chamber having perforations located in one of the compartments near one end thereof, the other compartment approximately at the same end having an opening to atmosphere.

In testimony whereof we affix our signatures in presence of two witnesses.

MAXIM KARMINSKI.
CHARLES PETERS.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
