

H. J. CORDLE.

MUFFLER.

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Patented Apr. 5, 1910.

953,778.

FIG. 1

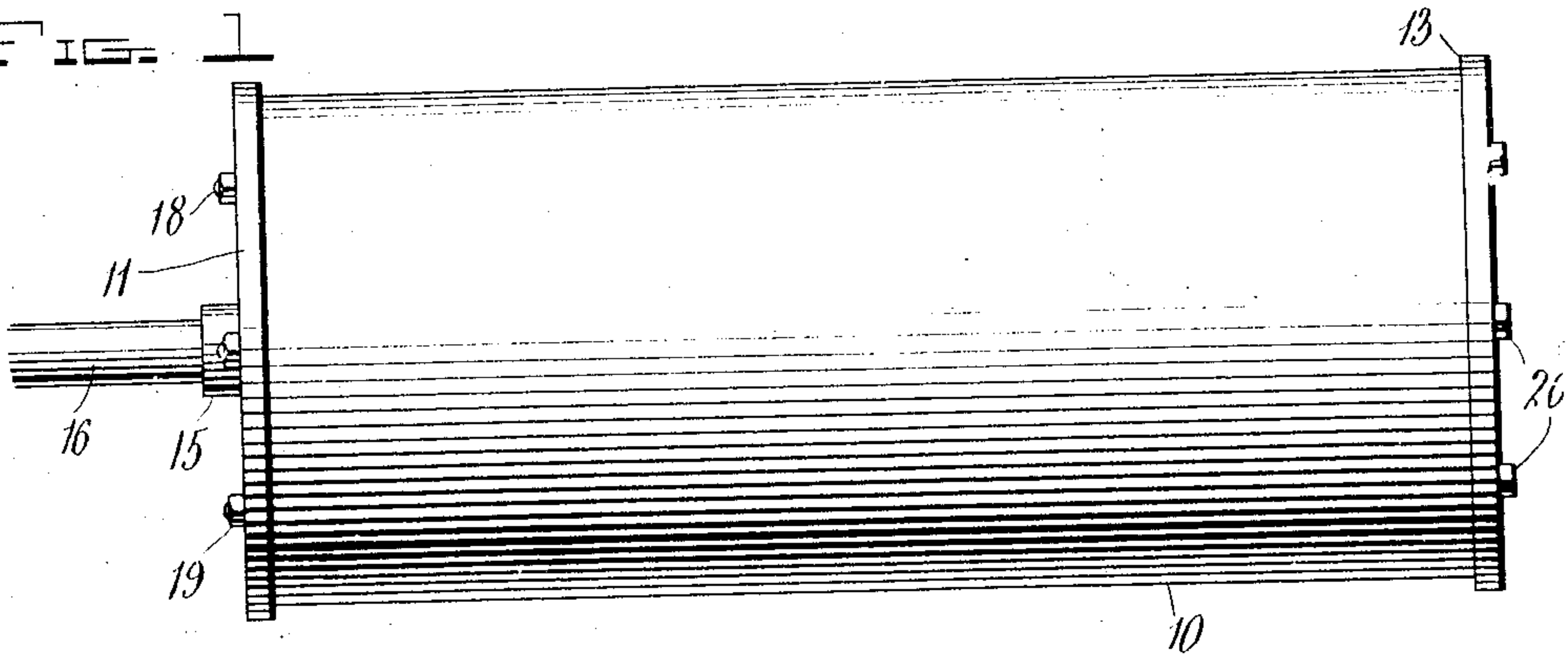


FIG. 2

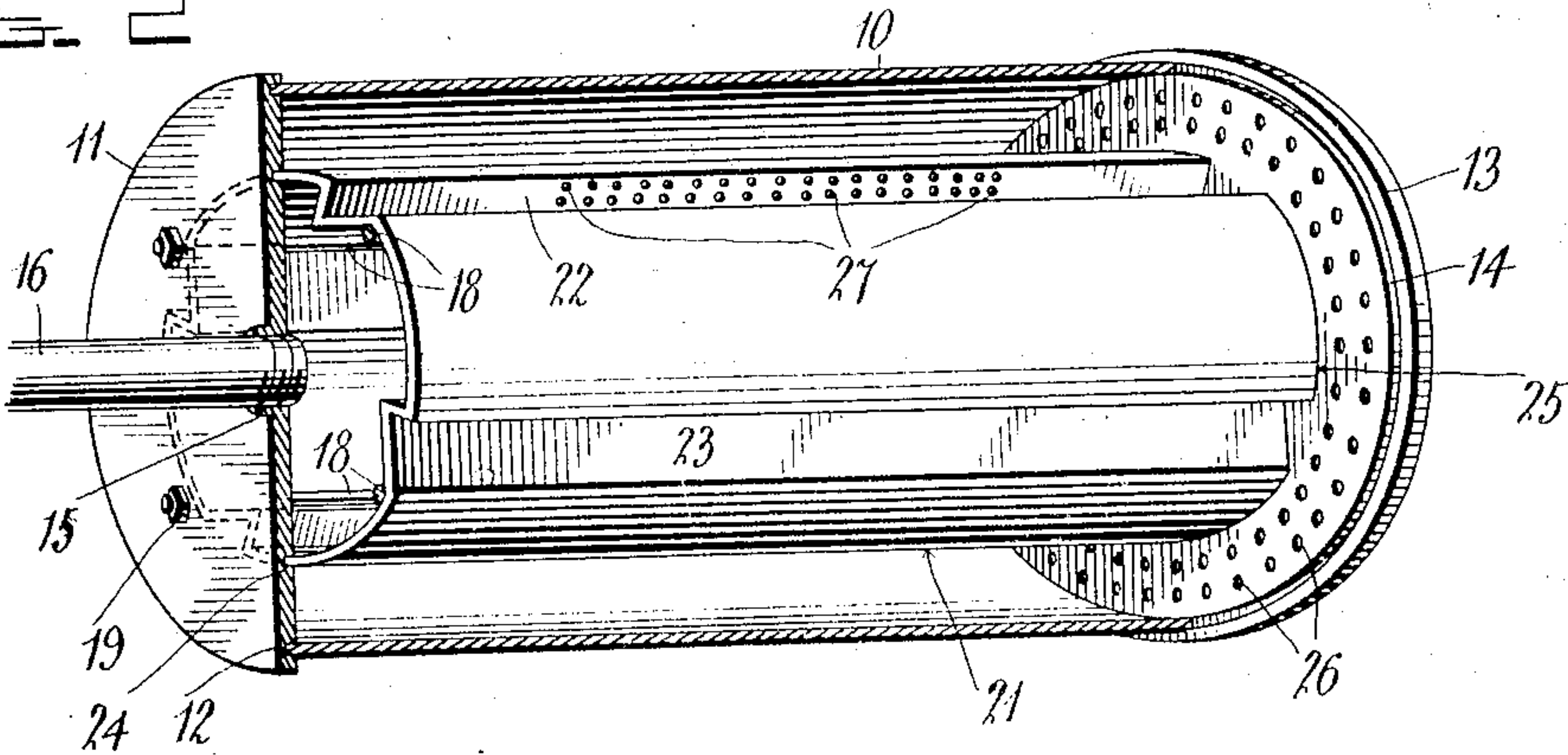
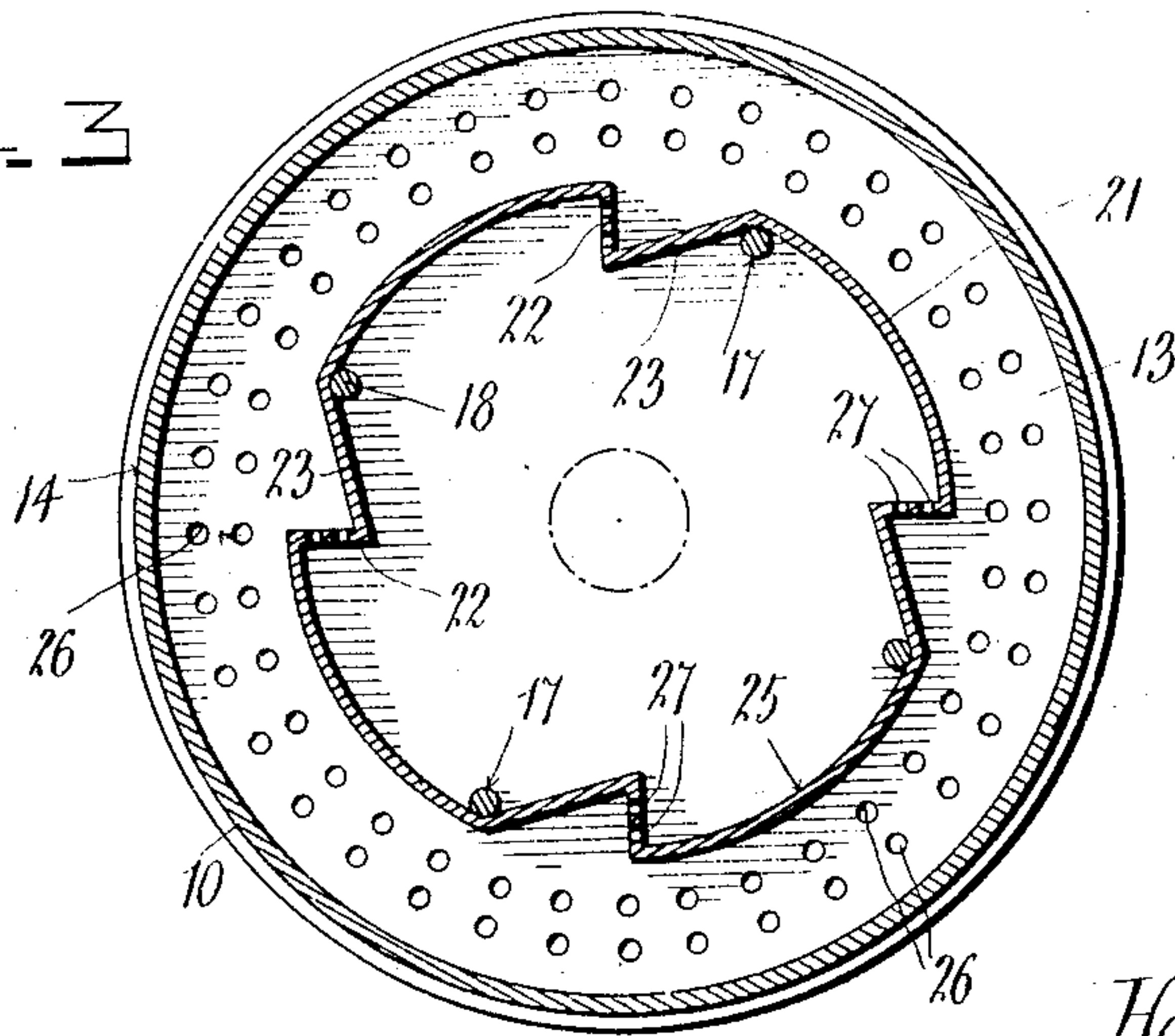


FIG. 3



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Witnesses

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MUFFLER.

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To all whom it may concern:

Be it known that I, HAMNER J. CORDLE, a citizen of the United States, residing at Littleton, in the county of Halifax, State of North Carolina, have invented certain new and useful Improvements in Mufflers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mufflers such as are used on internal combustion engines to reduce the noise made by the escape of the gases of combustion into the atmosphere.

One object of the invention is to improve the general construction of devices of this character.

Another object of the invention is to cause the escaping gases to travel in a helical path within the muffler until the force of escaping gases has been greatly reduced.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of an inner and outer casing, the inner casing being of novel form, and improvements formed in the inner and outer casings arranged to cause the escaping gases to travel in a helical path while escaping.

The invention further consists in certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a side elevation of a muffler constructed in accordance with this invention. Fig. 2 is a perspective view partly in section to show the interior of the muffler. Fig. 3 is a transverse sectional view through the muffler looking toward the escape end.

The muffler embodied in this invention consists of an outer casing 10 preferably of cylindrical form and this outer casing is provided with a back head 11 having an annular groove 12 in the inner face thereof adjacent the periphery. This annular groove 12 receives the end of the outer casing 10.

At 13 is indicated the front head of the casing and this front head is provided with an annular groove 14 similarly arranged to

the groove 12 and adapted to receive the front edge of the casing 10.

The casing 10 is imperforate but the back head 11 is provided with a central boss 15 perforated and threaded to receive the end of an exhaust pipe 16 which is threaded to engage the threads of the boss 15. Both the front and back heads are provided with bolt receiving apertures 17 wherethrough pass bolts 18 provided with nuts 19 at one end and head 20 at the other, these bolts and nuts being for the purpose of holding the heads securely in position on the casing 10.

Within the outer casing 10 is an inner casing 21 of a general cylindrical form, but this form is broken at spaced intervals by longitudinal depressions, one side of each of said depressions forming a tangent with respect to the axis of the cylinder as clearly indicated at 22, while the other side forms a secant extending from the inner edge of the tangent portion as indicated at 23. The inner casing 21 is of substantially uniform length with the outer casing 10 and the end edges of this inner casing are held respectively in suitable grooves 24 in the back head and 25 in the front head, so that the inner casing 21 is at all times kept in concentric relation to the outer casing 10. In order to support this inner casing as well as to keep the bolts 18 out of the path of the escaping gases these bolts are so positioned that they lie in the angles between the secant portions of this casing and the arcuate portions thereof, this being clearly seen from an inspection of Fig. 3.

Within the inner casing the head 13 is imperforate but exterior to said inner casing and between this casing and the outer casing 10 this head is provided with a plurality of series of perforations 26, said perforations having their axes parallel to the axis of the muffler so that gases escaping from within the muffler through said perforations are directed longitudinally of the muffler.

It will be observed that the exhaust pipe 16 opens to the interior of the inner casing. In order to provide for the escape of gases from this inner casing and to cause said gases to travel in a tangential direction at the instant of escape, the radial portions 22 of the inner casing are provided with a plurality of series of perforations 27 arranged

perpendicular to planes extending radially from the axis of said casing.

In the operation of the device the gases of combustion pass from the engine through the exhaust pipe 16 into the inner casing 21. There these gases expand to some extent and pass out through, what may be termed, the tangential perforations 27. Passing out in this way the gases are caused to rotate around the inner casing and within the outer casing. From the space between the two casings the gases leave the muffler and pass into the atmosphere through the perforations 26. By reason of this the rapidly rotating gases which lie between the two casings are drawn slowly and uniformly toward the front head of the muffler thus combining motion in a circular path with motion in a rectilinear path; thus moving in a helical path through the combined effects or resultant of the two motions. By reason of this the escaping gases pass from the muffler in a regular and quiet manner and without the production of explosive noises. There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of this invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope of the appended claims.

Having thus described the invention, what is claimed as new, is:--

1. A muffler comprising an outer casing and an inner casing, one of which is provided with an exhaust and the other of which is provided with an inlet for the spent gases, and with unobstructed means for directing said spent gases to the former casing and causing said gases to travel with a whirling motion to the exhaust.

2. In a muffler, an inner casing, an outer casing, one of said casings being provided with unobstructed means to permit the es-

cape of gases therefrom to the other casing in a circular path, and the other casing being provided with means to permit the escape of gases therefrom in a path longitudinally of said casings, whereby the escaping gases travel in the last mentioned casing in a helical path.

3. In a muffler, an inner casing provided with an inlet and with unobstructed escape passages arranged to direct the outflowing gases at an acute angle to said casing, and an outer casing provided with exhaust passages to direct the outflowing gases in streams parallel to the axis of said casing.

4. In a muffler, an inner casing, an outer casing, said inner casing having depressions in the walls thereof provided with perforations arranged at right angles to planes extending radially from the axis of said casing, and heads closing the ends of said casings, one of said heads being provided with an inlet opening into the inner casing, and one of said heads being provided with exhaust passages in axial alinement with the outer casing.

5. In a muffler, an outer casing, an inner casing having the walls thereof depressed to form longitudinal grooves spaced circumferentially around said inner casing, one wall of each of said grooves being radial with respect to the axis of said casing and having a plurality of series of perforations formed perpendicularly therethrough, and heads closing the ends of said casings, one of said heads being provided with a centrally disposed inlet opening communicating with the inner casing, the other of said heads being provided with concentric series of exhaust passages leading from the space between said casings to the atmosphere, said passages being parallel to the axis of said casings.

In testimony whereof, I affix my signature, in presence of two witnesses.

HAMNER J. CORDLE

Witnesses:

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