

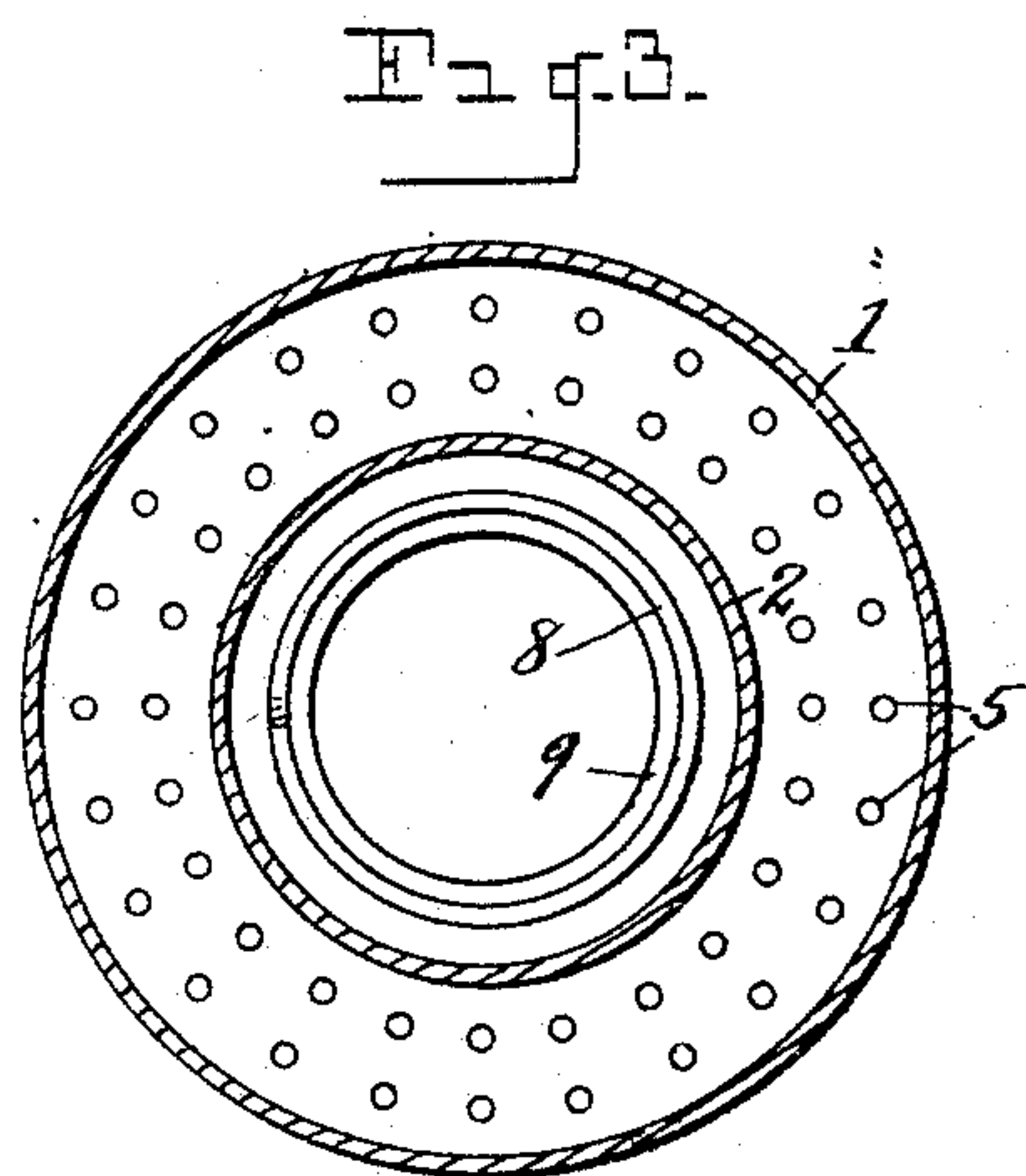
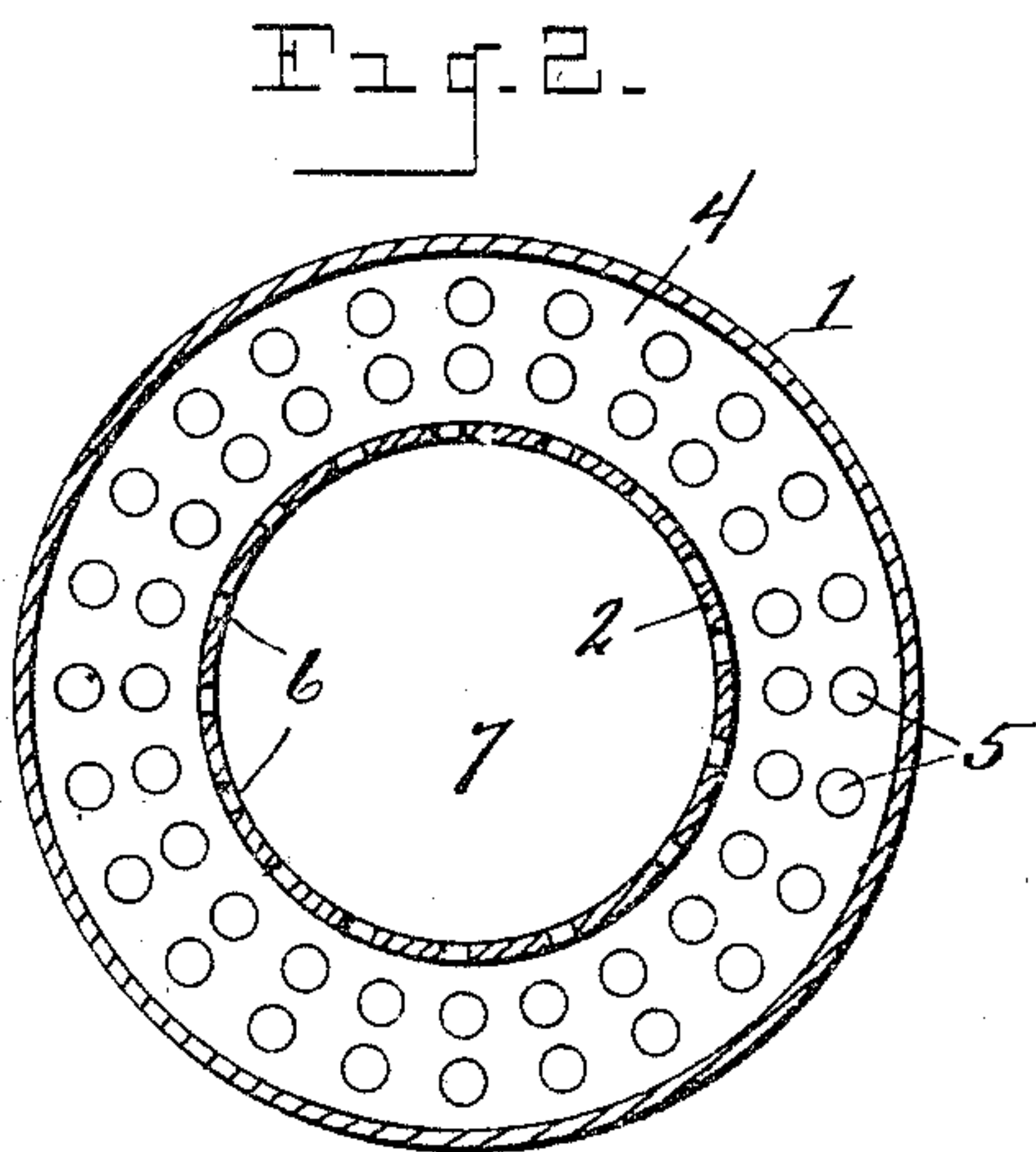
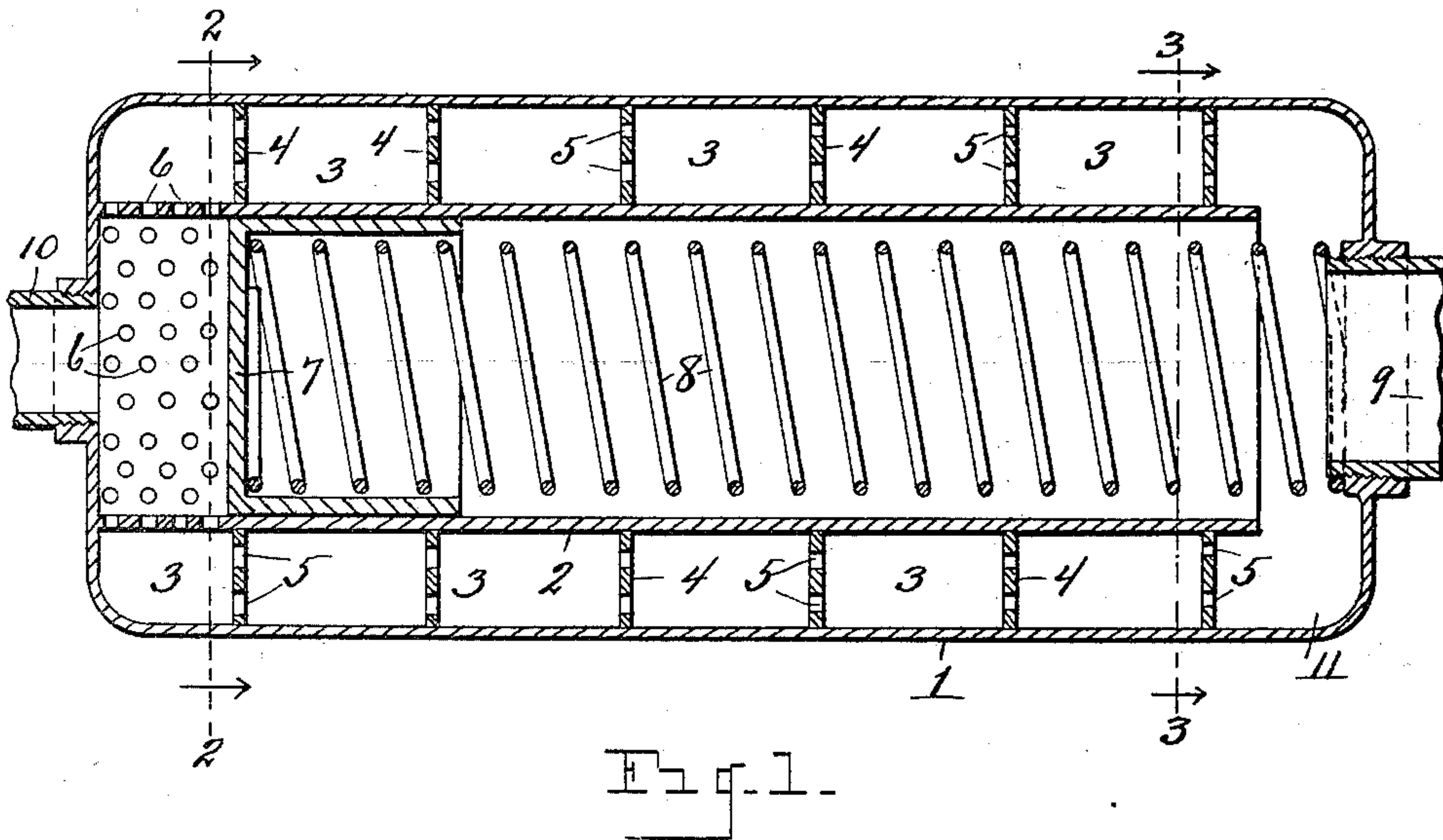
No. 863,342.

PATENTED AUG. 13, 1907.

E. T. ALBER.

MUFFLER.

APPLICATION FILED DEC. 20, 1906.



WITNESSES

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# UNITED STATES PATENT OFFICE

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## MUFFLER.

No. 863,342.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed December 20, 1906. Serial No. 348,697.

*To all whom it may concern:*

Be it known that I, ERHARD T. ALBER, a citizen of the United States, residing at Ann Arbor, in the county of Washtenaw, State of Michigan, have invented certain new and useful Improvements in Mufflers; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in mufflers for explosive engines, and consists in the construction and arrangement of parts hereinafter fully set forth and pointed out particularly in the claims.

The object of the invention is to provide simple and efficient means for overcoming the loud explosive sound incident to exhausting directly into the atmosphere, and to arrange for reducing said sound to the minimum by directing the exhaust from the engine into a muffler having a variable exhaust chamber, whereby said exhaust in its varying quantity may be handled without materially increasing the back pressure, provision being made for overcoming the distinct pulsations and causing the burned gases to escape in a comparatively even flow from the exhaust end of the muffler. The above object is attained by the structure illustrated in the accompanying drawings, in which:—

Figure 1 is a central longitudinal section through a muffler embodying my invention. Fig. 2 is a transverse section on line 2—2 of Fig. 1. Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Referring to the characters of reference, 1 designates the exterior casing or body of the muffler, which is preferably cylindrical in form, and within which is located a central cylinder 2, said parts being so arranged as to form an annular space between the central cylinder and the wall of the case, which space is divided into a number of compartments 3 by means of the circular partitions 4 which surround the central cylinder and extend into peripheral contact with the wall of the casing. The partitions 4 are provided with a number of apertures 5 through which the several compartments 3 are made to communicate.

The forward end of the cylinder 2 extends into contact with the end of the casing and is provided with a number of small perforations 6 through its wall between the end of the casing and the first of the partitions 4.

Seated within the cylinder 2 to move longitudinally thereof is a piston 7. Extending longitudinally of the cylinder 2 is a coiled spring 8, the forward end of which is confined within the piston and the rear end of which engages over the inwardly projecting end of the exhaust pipe 9.

Communicating with the forward end of the cylinder

4 through the end of the outer casing is an induct pipe 10 which is smaller in diameter than the exhaust pipe 9 and through which the burned gases from the engine, not shown, are directed into the muffler. Should the exhaust which enters the muffler through pipe 10 be comparatively small in volume, and of relatively low pressure, the piston 7 will not be affected, but the gases comprising said exhaust will pass through the perforations 6 in the forward end of said cylinder and enter the first of the compartments 3, and thence pass sequentially through the remainder of said compartments by way of the apertures 5 through the partitions 4, passing from the last of the compartments 3 into the rear chamber 11 at the end of the casing and escaping through the exhaust pipe 9 communicating with said chamber. As the volume of the exhaust increases and the pressure thereof becomes greater, the piston 7 will recede against the action of the spring 8, thereby greatly increasing the area of the induct chamber at the forward end of the cylinder 2, permitting the gases to expand and decreasing the pressure thereof in a corresponding ratio, relieving the gases from the impelling force which discharges them into the muffler and overcoming the loud noise incident to an exhaust under high pressure. The rapid recurrence of the explosions in the engine and the consequent intermittent entrance into the muffler of the exhausted gases under a high pressure, will cause the piston 7 to constantly reciprocate within the cylinder between the pulsations of the exhaust, whereby said pulsations will be largely broken up and the sustained pressure within the muffler rendered nearly uniform, causing the exhausted gases which finally pass from the pipe 9, to escape in a continuous flow and at a relatively low pressure.

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

1. In a muffler, the combination of the non-perforated casing, a central cylinder therein disposed to form an annular space between it and the wall of the casing, the wall of the cylinder at its forward end being provided with perforations which communicate with said annular space, a movable piston within the cylinder, an induct pipe communicating with the forward end of said cylinder, and an educt pipe communicating with said annular space through the rear end of said casing.

2. In a muffler, the combination of the non-perforated casing, a cylinder disposed centrally within the casing, the wall of the cylinder being provided with perforations at its forward end which communicate with the interior of the casing, an induct pipe communicating with the forward end of said cylinder, a movable piston within the cylinder, a compressible spring engaging said piston, and an educt pipe leading from the rear end of the casing.

3. In a muffler, the combination of the non-perforated exterior casing, a central cylinder within the casing forming a chamber which initially receives the exhaust, said cylinder communicating with the interior of the casing, an induct pipe communicating with the forward end of said cylinder, an educt pipe leading from the rear end of

said casing, and means for increasing the area of the exhaust chamber at the end of the cylinder upon an increase in the pressure of the exhaust.

4. In a muffler, the combination of the non-perforated  
5 exterior casing, a central cylinder disposed within the case to form an annular space between the wall of the casing and the wall of the cylinder, perforated partitions dividing said space into circular compartments, the forward end of the cylinder having perforations which establish communication between its forward end and the first  
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of said compartments, an induct pipe communicating with the forward end of the cylinder, an educt pipe communicating with the interior of the casing at the rear, a piston within the cylinder and a spring engaging said piston.

In testimony whereof, I sign this specification in the 15 presence of two witnesses.

ERHARD T. ALBER.

Witnesses.

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I. G. HOWLETT.