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E. P. GRAY.

COMBINED MUFFLER AND ALARM FOR EXPLOSIVE ENGINES.

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Fig. 1

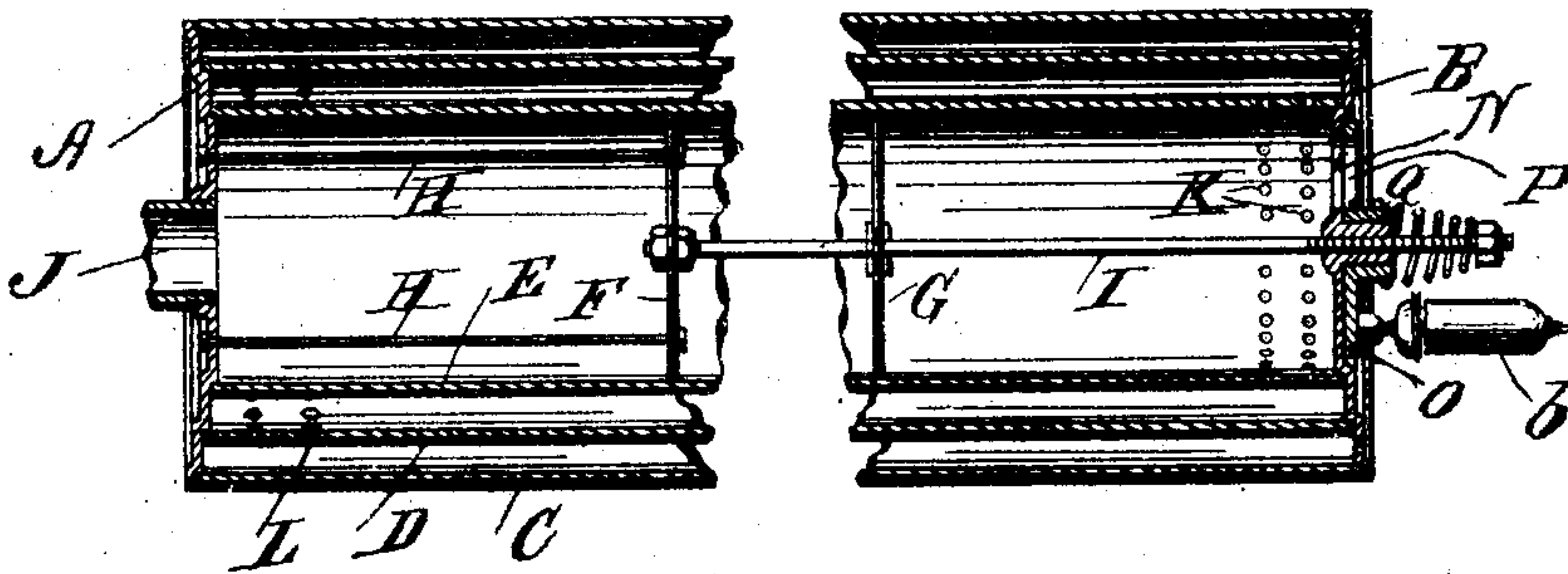


Fig. 2

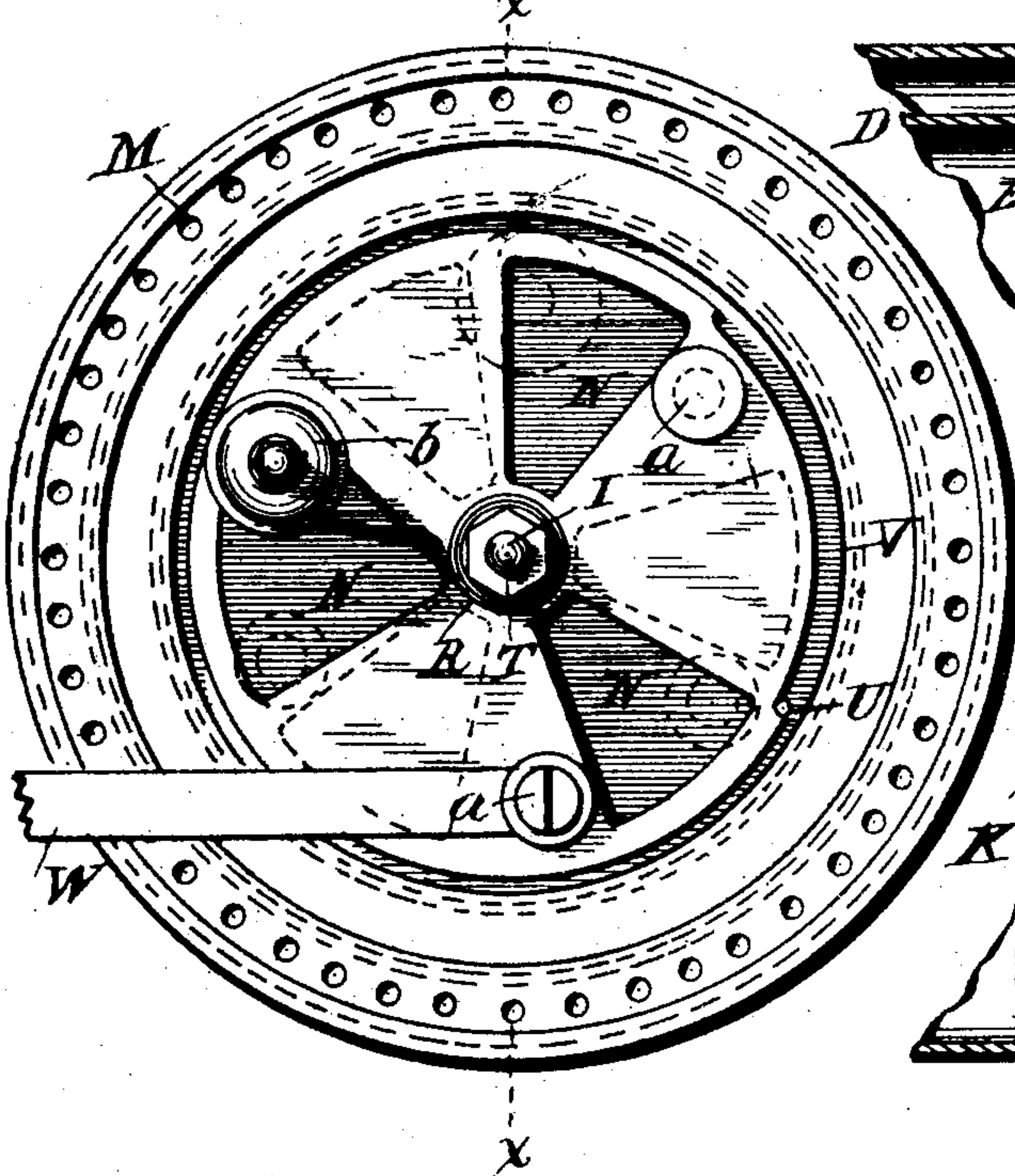
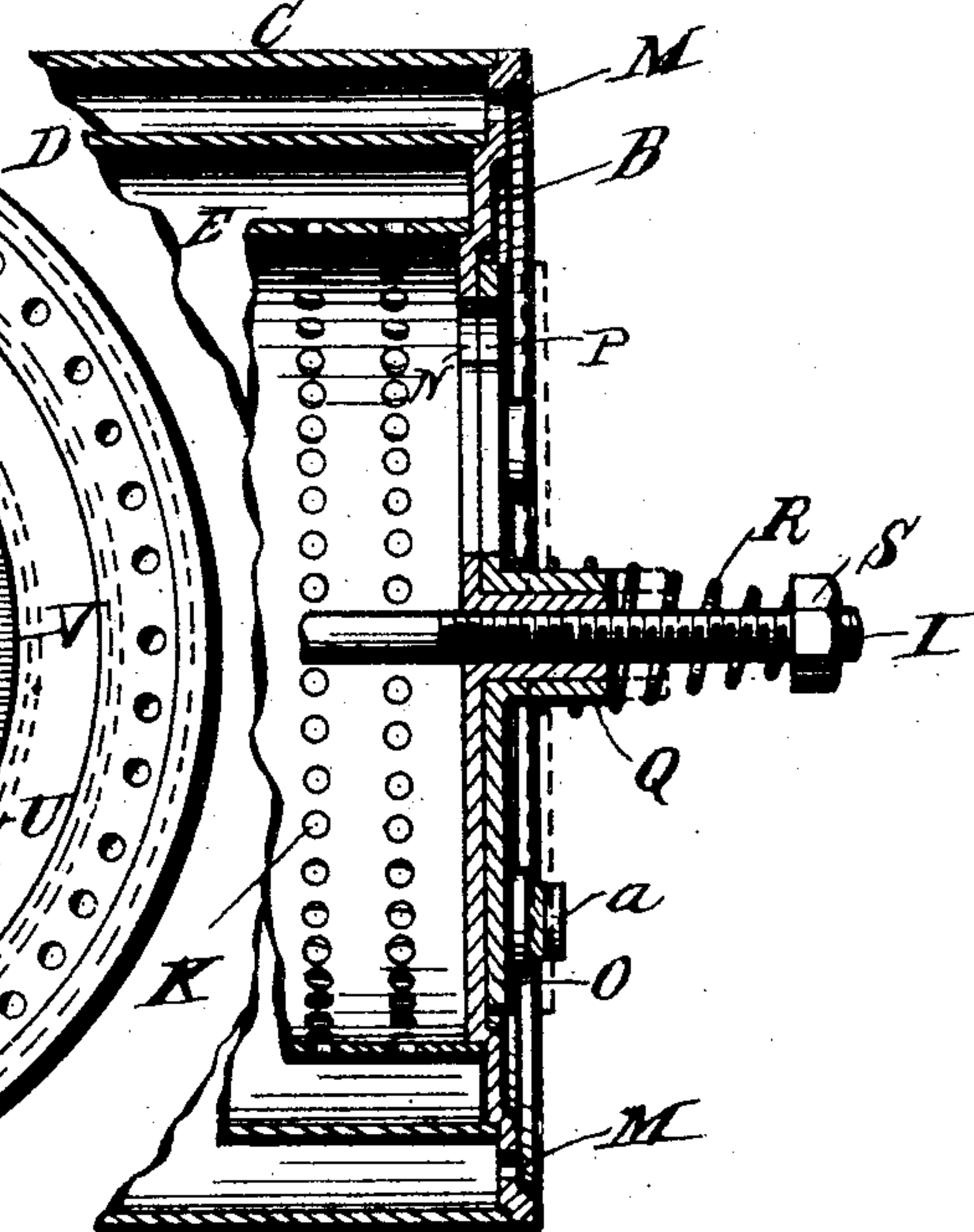


Fig. 3



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UNITED STATES PATENT OFFICE.

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COMBINED MUFFLER AND ALARM FOR EXPLOSIVE-ENGINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EMMET P. GRAY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in a Combined Muffler and Alarm for Explosive-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates particularly to an improved muffler and alarm to be used on automobiles employing explosive or gasoline engines as their motive power; and it has for its object the construction of a simple and efficient muffler to deaden the noise occasioned by the exhaust after the explosions of the engine and at the same time to connect with such muffler an alarm, preferably in the form of one or more whistles, under control of the operator, by which he may give signals to indicate his approach.

It also has for its object the provision of a safety device in the nature of an automatic relief which should unignited gas accumulate in the muffler and then become unexpectedly ignited would permit the escape of such gas without injury to any of the parts of the apparatus.

The novelty of my invention will be hereinafter set forth, and more specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a broken central sectional side elevation of a muffler and associated parts embodying my invention. Fig. 2 is an enlarged end view looking toward the left of Fig. 1. Fig. 3 is a central sectional elevation on the dotted line *x x* of Fig. 2.

The same letters of reference are used to indicate identical parts in all the figures.

In its preferred form my muffler is constructed of two heads A B, which are inwardly stepped or dished and which confine between them three metal cylinders C D E, of which C forms the outside of the muffler, and D and E, each of a smaller diameter, form the inside of the muffler.

The heads A B are suitably tied together to maintain the structure in its proper position, and this is done by passing tie-bolts H through the head A, one of these tie-bolts H being on one side of the exhaust-inlet J and the other

being diametrically opposite and both being passed through a perforated baffle-plate F, disposed at any convenient point within the inner cylinder E. A tie-bolt I extends from the center of this baffle-plate F rearward and through the center of the head B and is secured therein in any suitable manner, such as by screw-threads. If preferred, another perforated baffle-plate G may be strung on the tie-bolt I and suitably secured thereto.

The inner cylinder E is perforated, as at K, at its end opposite the exhaust-inlet J to permit the exhaust-gases to pass from this cylinder into the cylinder D, and this cylinder D is perforated, as at L, at its end adjacent to the exhaust-inlet J to permit the exhaust-gases to pass from the cylinder D into the cylinder C, and the head B is perforated, as at M, Fig. 2, which perforations communicate with the cylinder C and permit the exhaust-gases to pass therefrom into the air, thus so breaking up the volume of exhaust-gas as to deaden all sound caused by the sudden release or exhausting of said gases from the engine.

Frequently it is advisable to run a gasoline-engine without using the muffler, as a muffler always causes more or less back pressure and consequent reduction of power, and for the purpose of cutting out the muffler I provide a series of openings or ports N in the head B, and these ports are adapted to be closed by a disk O, which is provided with ports P, registering with ports N when the muffler is cut out, which occurs when the disk O is turned to the position shown in Fig. 2. The disk O has its bearing upon a sleeve Q, projecting from the center of the head B, and is normally held against said head by a coiled spring R, bearing against said disk at one end and against a nut S, screwed upon the end of the tie-rod I at the other end. The tie-rod I is slotted, as at T, Fig. 2, in which slot is confined one end of the coiled spring R, the other end bearing against some part of the disk O in such manner as to cause the rotation of a disk after the manner of a clock-spring. Any suitable stop U, working in a recess V, Fig. 2, is provided to limit the rotary movement of the disk O, and the spring R is so disposed as to cause the disk to rotate to a point at which the openings or ports N and P register with each other, as will be readily understood.

Any suitable pull W, Fig. 2, is provided to

cause the rotation of the disk O against the spring R to close the ports N, so as to cause the exhaust-gases to pass through the various cylinders of the muffler and be discharged through the openings M.

At suitable points *a* upon the disk O, I provide lugs to which may be attached whistles *b* or any other suitable form of alarm, and there may be as many of these alarms upon the disk O as there are ports in said disk and head B, and these alarms are brought into action by the rotation of the disk O to a point beyond that which is necessary to close the ports in the head B, it being seen that the distance between the ports is greater than the openings of the ports themselves, the dotted lines in Fig. 2 indicating the position of the ports P of the disk O and showing the position of the openings to the alarm, which position will be seen to be over or registering with the ports N, so that a portion of the exhaust-gas will pass through and sound the alarms, as will be readily understood.

When the disk O has been revolved a sufficient distance to close the ports N in the head B and the gases are compelled to pass through the cylinders and exhaust through the openings M in the head B, should the engine fail to ignite its charge of compressed gas and the same be discharged into the muffler unburned and there be ignited from any cause this ignition and consequent explosion of the gas within the muffler will automatically raise the disk O from the head B, the disk sliding on the sleeve Q to a position shown by the dotted lines in Fig. 3, which movement of the disk will entirely open the ports N and allow the burning gas to escape without causing any damage to any of the parts of the muffler, and the spring R will immediately return the disk O to its proper position against the head B, thereby restoring the parts to their proper working positions.

Having thus fully described my invention, I claim—

1. In a muffler of the character described the combination of a chamber adapted to receive the exhaust-gases at one end, ports in said chamber at its opposite end for the discharge of said gases, a second chamber surrounding said first-named chamber for the re-

ception of the discharged gases, a third chamber surrounding the second chamber for the reception of the discharged gases adjacent to the inlet for such gases, outlet-ports at the opposite end of the muffler for the escape of the gases, a movable cover for the ports in the first-named chamber, and an alarm adapted to be brought into action by the moving of said cover to close said ports, substantially as described.

2. In a muffler of the character described, the combination of a chamber adapted to receive the exhaust-gases, a head for said chamber provided with ports for the discharge of said gases, a revoluble cover adapted to close said ports, and an alarm adapted to be brought into action by the moving of said cover to close said ports, substantially as described.

3. In a muffler of the character described, the combination of a chamber adapted to receive the exhausted gases, ports in said chamber for the discharge of said gases, a movable cover adapted to close said ports, an alarm adapted to be brought into action by the moving of said cover to close said ports, and a spring adapted to hold said cover in its proper working position adjacent to said ports and to allow the same to be moved away from said ports should an explosion occur within said muffler, substantially as described.

4. In a muffler of the character described, the combination of a chamber receiving the exhaust, a head thereon for the discharge of said exhaust, a rotatable cover for said head carrying one or more whistles, and means within control of the operator to bring the whistle-openings into communication with the interior of the chamber to receive the exhaust and sound the whistle or whistles.

5. In a muffler of the character described, the combination of a chamber receiving the exhaust, a head thereon for the discharge of said exhaust, a rotatable and outwardly-movable cover for said head for deflecting said exhaust or relieving the same, whereby when said exhaust is deflected said cover may be raised by excessive pressure within the muffler.

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