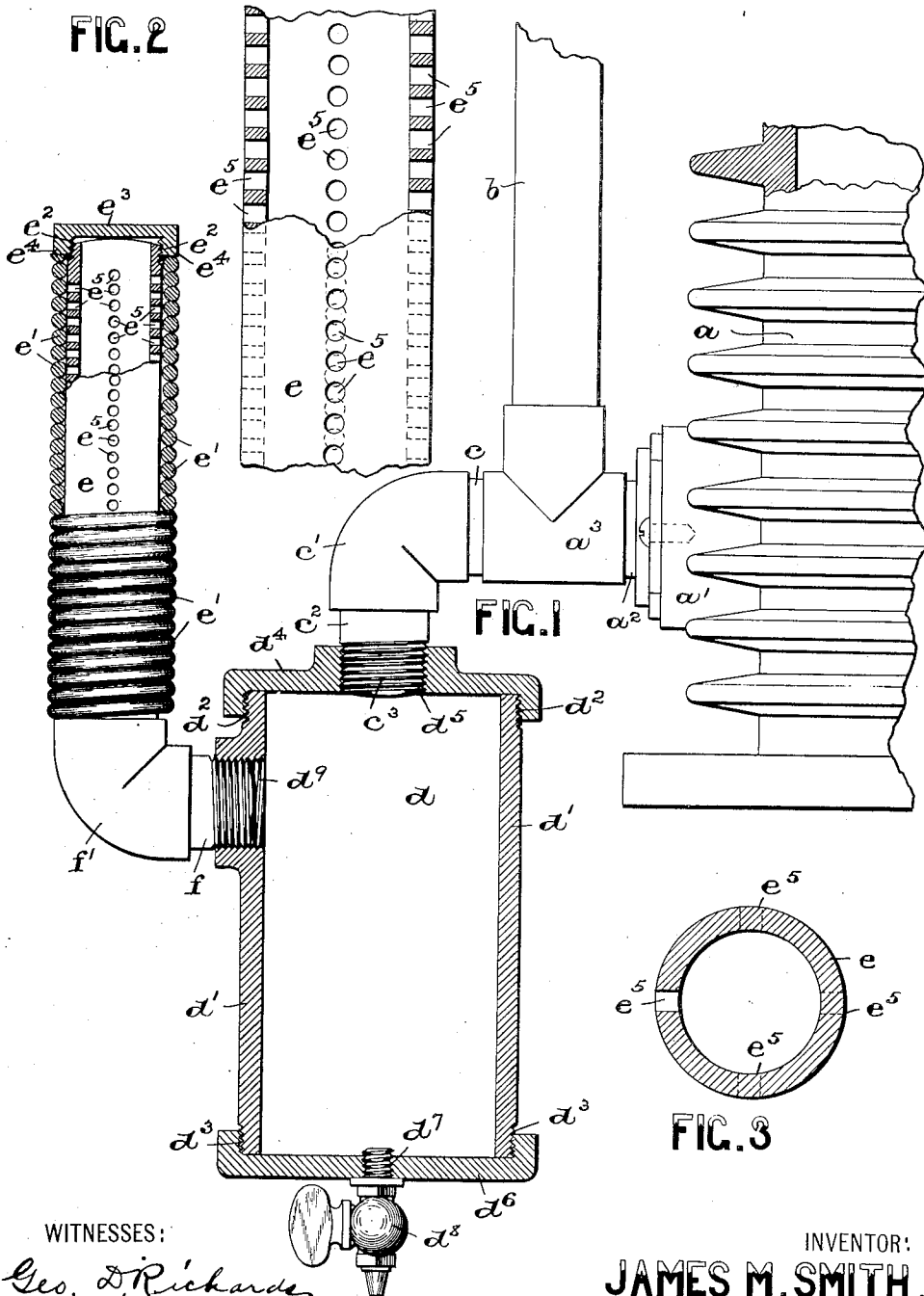


No. 659,456.

Patented Oct. 9, 1900.

J. M. SMITH.
MUFFLER FOR ENGINES.
(Application filed Feb. 2, 1900.)

(No Model.)



WITNESSES:
Geo. D. Richards
Marcy J. Dunsell

INVENTOR:
JAMES M. SMITH.
BY
Fred L. Frantzel,
ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES M. SMITH, OF NEWARK, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE OXFORD MANUFACTURING COMPANY, OF OXFORD, PENNSYLVANIA.

MUFFLER FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 659,456, dated October 9, 1900

Application filed February 2, 1900. Serial No. 3,667. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. SMITH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Mufflers for Engines; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention has reference to a novel device to be employed in connection with explosive-gas or other engines for the deafening or muffling of the sound made by the exhaust from the engine-cylinder.

My invention therefore has for its primary object to provide a novel and simple construction of muffling device for engines which is especially adapted for use in connection with explosive-gas engines, and is more especially for the purpose of allowing the exploded gas as it escapes or exhausts from the cylinder of the engine to expand in a relief-chamber, and, finally, after its force has thus been almost entirely expanded permitting it to noiselessly pass from an eduction-pipe into the air. My invention consists in the novel construction of muffler hereinafter described and in the several novel arrangements and combinations of the parts thereof, all of which will be fully set forth in the accompanying specification and then finally embodied in the clauses of the claim thereto appended.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 represents the muffler embodying the principles of this invention, the relief-chamber being represented in vertical section and an eduction pipe or duct and certain parts connected therewith being illustrated partly in elevation and partly in vertical section, said view also showing the application of the muffler to the exhaust duct or ducts of an engine-cylinder. Fig. 2 is a part elevation and part section of a portion of the eduction-pipe, represented on an enlarged scale; and Fig. 3

is a horizontal cross-section of the said eduction-pipe.

Similar letters of reference are employed in all of the said above-described views to indicate corresponding parts.

In said drawings, *a* indicates any suitable construction of cylinder of an explosive-gas engine, the construction herein shown being of the type of cylinder employed in the gas-engine for which I have made application for Letters Patent, filed December 21, 1899, Serial No. 741,087. The said cylinder is provided with an exhaust-chamber *a'*, in which is secured the exhaust-pipe *a''*, having in said construction a T connection or fitting *a'''*, and a second exhaust-pipe *b*, which is connected with the upper portion of the cylinder *a* in the manner illustrated in the drawings of said application, Serial No. 741,087. Connected with the said T-fitting *a'''* is a pipe *c*, an elbow *c'*, and a pipe *c''*, from the screw-end *c'''* of which is suspended the muffling device embodying the principles of this invention. Said muffling device comprises a relief-chamber *d* and an eduction pipe or duct *e*, which is encircled by the coils of a relief-spring *e'*, substantially as and for the purposes to be hereinafter more fully described. The said relief-chamber *d* consists, essentially, of a cylindrical or other suitably-shaped main body portion *d'*, provided at the top with screw-threads *d''* and at the bottom with screw-threads *d'''*. Screwed down upon the screw-threads *d'''*, so as to close the upper portion of said main portion *d'*, is a cover *d''''*, provided with a screw-threaded opening *d'''''*, in which the screw end *e'''* of the pipe *c''* is secured for the suspension therefrom of the said relief-chamber *d*. Screwed upon the lower arrangement of screw-threads *d'''* of the main body portion *d'* is a cap *d''''*, which may be provided with a screw-threaded opening *d'''''*, in which I have secured a petcock *d''''''* for the well-known purpose of drawing off any water due to condensation or for the purpose of withdrawing the exhausted gas or fluid if found necessary to do so. In one side of the body portion *d'* is a screw-threaded opening *d''''''*, in which is secured the end of a pipe *f*, which pipe is pro-

vided with an elbow f' , which carries the exhaust pipe or duct e , hereinabove mentioned. Of course it will be evident that the casing forming the said relief-chamber may be of any desirable configuration and that the main body portion d' and the caps or covers d^2 and d^3 may all be made in one integral piece.

The eduction pipe or duct e is usually an ordinary piece of pipe or tubing, having its lower end secured in the elbow f' , its upper end having a screw-thread e^2 , on which is screwed a cap or cover e^3 for closing the end of the said pipe e . Encircling the said pipe e , between the upper edge f^2 of the elbow f' and the annular edge of the flange e^4 of said cap or cover e^3 , are the helical coils of a suitable spring e' , as clearly illustrated. The cylindrical walls of the pipe e are provided with any desirable number of holes or perforations e^5 , which radiate toward or from the longitudinal central axis of said pipe e , the center of said holes or perforations being preferably placed in such a manner that they are on an imaginary line, forming a helix around the outer cylindrical surface of the said pipe e . In this manner when the several coils of the spring e' have been compressed, so as to lie in close contact, as illustrated, by the screwing down of the cap or cover e^3 , the center of the said holes or perforations e^5 will be on the central helical axis of the coils of the said spring. It will thus be seen that the several coils of the spring fully close up the several openings or holes e^5 in the pipe e , the spring-coils having such resiliency to produce a retarding effect upon the escaping gas, steam, or the like during the escape of the same, and the passage of such previously-compressed gas or steam will be noiselessly effected, and more especially so in view of the employment of a relief-chamber, as d , in which the gas or steam is permitted to expand and lose much of its expansive power.

From the above description it will be seen that I have devised a simply-constructed and an effective muffler, which is especially adapted for use with explosive-gas engines, but which may also be employed in connection with steam or other engines and, in fact, in connection with mechanism of the various kinds from which compressed gas or steam is exhausted to deaden or entirely overcome the noise made.

I am aware that some changes may be made in the various arrangements and combinations of the several parts, as well as in the de-

tails of the construction thereof, without departing from the scope of this invention. Hence I do not limit my invention to the exact arrangements and combinations of the parts as herein described, and illustrated in the accompanying drawings, nor do I confine myself to the exact details of the construction of such parts.

Having thus described my invention, what I claim is—

1. In a muffler for engines, an exhaust or eduction pipe or duct, having a closed top and an inlet for receiving the exhausted medium, and provided with radially-extending and helically-disposed holes or perforations, and a spring encircling the outer surface of said pipe or duct, the central helical pitch-line of the coils of said spring corresponding to an imaginary helical line around said pipe or duct on which said holes or perforations have their centers, substantially as and for the purposes set forth.

2. In a muffler for engines, the combination, of a casing forming a relief-chamber, having a means of ingress and egress for the medium to be exhausted, of an exhaust-pipe connected therewith, having a closed top, and provided with radially-extending and helically-disposed holes or perforations, and a spring encircling the outer surface of said pipe, the central helical pitch-line of the coils of said spring corresponding to an imaginary helical line around said pipe on which said holes or perforations have their centers, substantially as and for the purposes set forth.

3. The herein-described muffler for engines, consisting, essentially, of a casing d' , a top and bottom cover therefor, said top cover having an opening, and a means of ingress therein for the admission of the medium to be exhausted, said casing having an opening in one side thereof, and an eduction-pipe e connected with said opening in the side of said casing, said pipe e being provided with helically-disposed openings or perforations e^5 , and a spring e' encircling said pipe and arranged over said holes or perforations, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 30th day of January, 1900.

JAMES M. SMITH.

Witnesses:

FREDK. C. FRAENTZEL,
WM. C. SMITH.