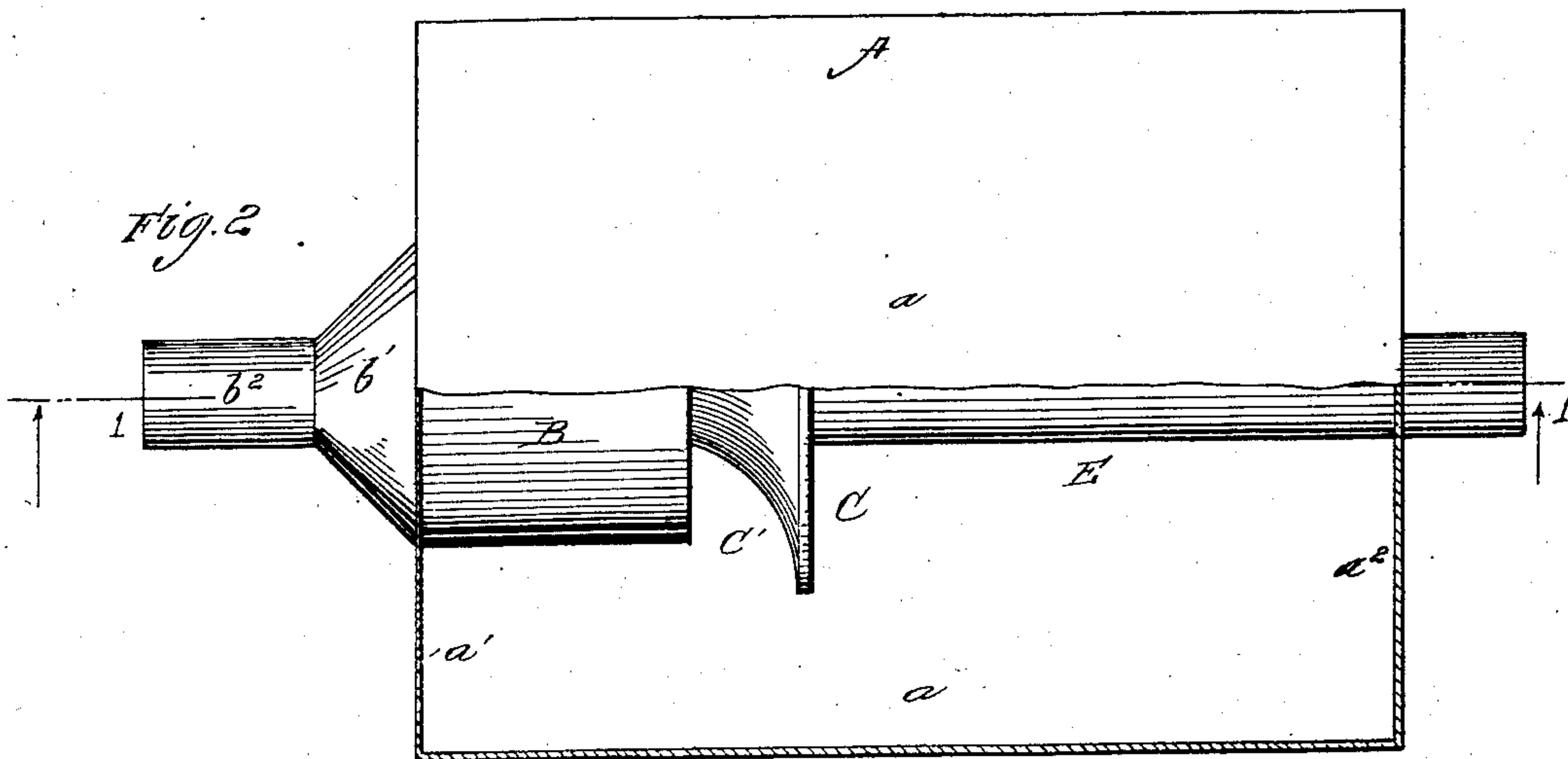
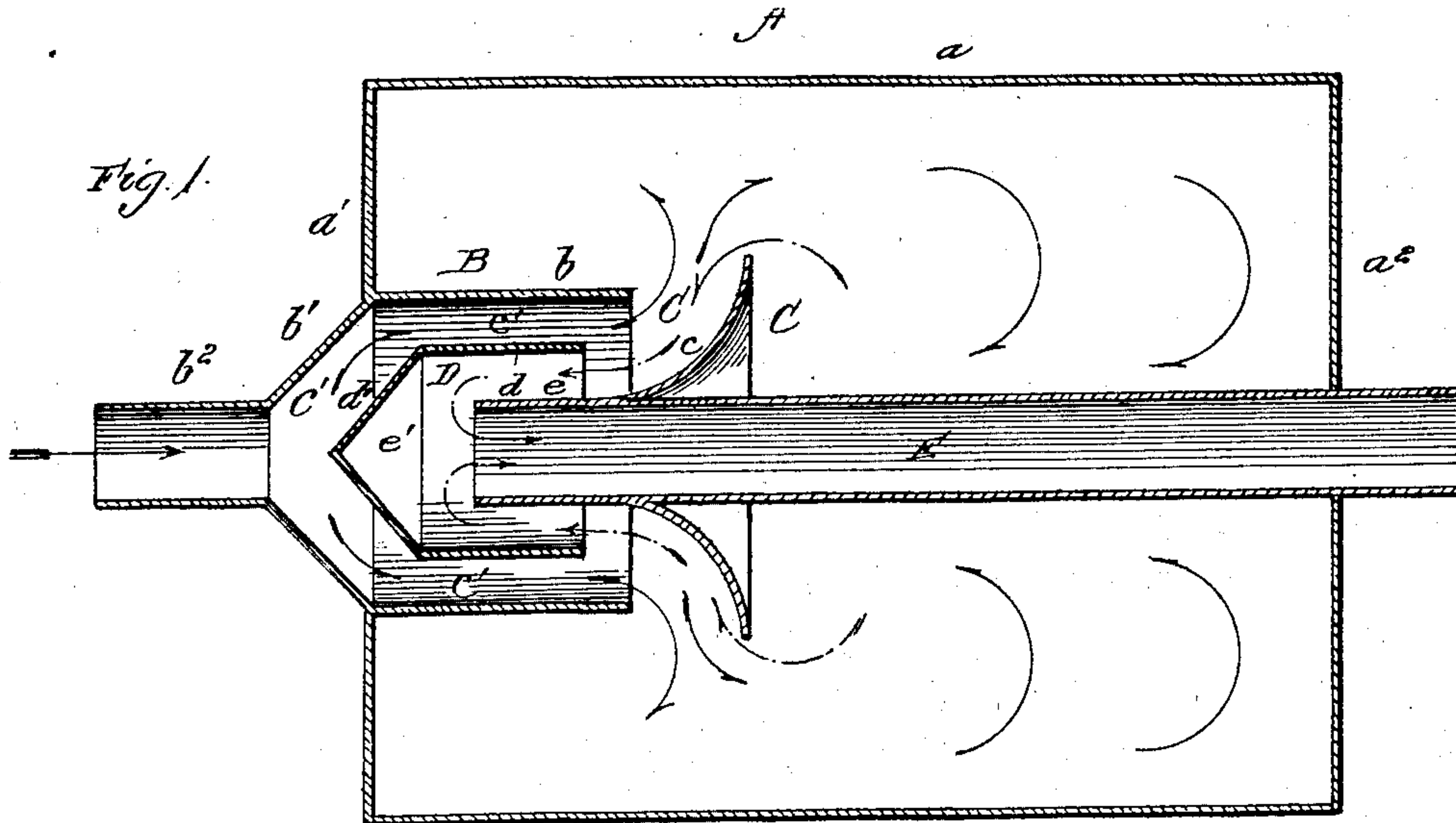


No. 725,379.

PATENTED APR. 14, 1903.

R. P. THOMPSON.
MUFFLER FOR ENGINES.
APPLICATION FILED FEB. 1, 1902.

NO MODEL.



WITNESSES:

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RALPH P. THOMPSON, OF SPRINGFIELD, OHIO.

MUFFLER FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 725,379, dated April 14, 1903.

Application filed February 1, 1902. Serial No. 92,097. (No model.)

To all whom it may concern:

Be it known that I, RALPH P. THOMPSON, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented a certain new and useful Improvement in Mufflers for Engines, of which the following is a specification.

The muffler of this invention is intended more especially for use with gas or explosive engines or motors, but can be applied to and used with engines or motors of other types for preventing or deadening the noise arising from the escape of gases and vapors from explosion or otherwise. It is well known that in engines and motors, especially of the gas or explosive types, and also in those of the fluid-pressure type, the escape of the gases, vapors, or other pressure of a like nature is accompanied with a greater or less amount of noise and with more or less visible projection, which result in creating confusion and in some cases produce injurious effects. This is particularly true with the gas or fluid-pressure engines and motors for driving self-propelled vehicles, and numerous attempts have been made to avoid the objection arising from the projection of the gases, vapors, or steam in the escape thereof, which attempts have been attended with more or less success.

The object of the present invention is to construct a muffler for use with gas or explosive engines and motors and with fluid-pressure engines and motors which can be readily applied to the general type of such engines and motors and when applied will operate to deaden the noise of the escaping gases, vapors, or steam and which will perform the required work in such manner as to lessen the trouble, inconvenience, and ill effects of the visible projections and noise of the escaping products by causing the products to escape in an expanded condition and with but little, if any, pressure attending the discharge.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation on line 1 of Fig. 2; and Fig. 2 is a side

elevation with the lower portion of the main shell or casing broken away, showing the body or wall and the ends or heads in section.

The muffler is constructed with an outer or main shell or casing A, which preferably is of a cylindrical shape in cross-section and may be made of any suitable metal or material, with a wall or body a , an end head or wall a' , and an end head or wall a'' , secured to the body of the wall in any suitable and well-known manner. A drum B, preferably cylindrical in cross-section and having its inner end open, is entered and secured in the main shell or casing. This drum can be made of any suitable metal or material and has a body or wall b , an inclined or tapering end wall b' , and a neck or tubular wall b'' , giving the drum a funnel-shaped appearance in longitudinal section, as shown in Fig. 1. A deflector C, of an annular shape at its periphery and having a concave wall or body, is located within the main shell or casing, adjacent to the open end of the drum B, so as to leave a space or opening C' between the open end of the drum and the periphery and curved body of the deflector, and, as shown, the diameter of the deflector at its periphery is greater than the diameter of the drum. A drum D, preferably cylindrical in cross-section, is located within the interior of the drum B and is made of any suitable metal or material. This drum has a body or wall d , with a tapered or converging end wall d' , forming a closed end for the drum, with the opposite end opened. This drum is of a less length than the length of the drum B and is so located as to leave a space at its open end between its edge and edge of the open end of the drum B and also to leave a channel or passage c' between its tapered end walls and the tapered end wall of the drum B and between the body or wall d and the body or wall b , as shown in Fig. 1. A pipe or tube E is entered into the main shell or casing from the opposite end of the drum, and its inner end lies within the drum D, so as to leave a channel or passage e between the body of the tube and the wall or body d of the drum, with a chamber or space e' between the end of the pipe and the conical end wall of the drum, and the apex end of the curved

body of the deflector C encircles the body of the tube E adjacent to the open end of the drum D in the arrangement shown.

The channel or passage c' between the two drums in the arrangement shown in Fig. 1 forms an inlet for the escaping products from the engine or motor, and the channel or passage between the wall of the drum D and the end of the tube E forms an outlet for the products in the arrangement of Fig. 1; but if the products were escaping from the engine or motor into the pipe or tube E then the channel or passage e would form an inlet for the products into the main shell or casing and the channel or passage c' would form an outlet for the products from the shell or casing. It will thus be seen that the muffler can be used without any change in its parts, so as to have the pipe or tube E the outlet and the neck or tube b^2 the inlet or the tube or pipe E the inlet and the neck or tube b^2 the outlet, as may be desired.

The operation, with the products from the engine or motor escaping into the tube or neck b^2 , is as follows: The escaping products projected through the tube or neck are deflected and turned outwardly by the cone end of the drum D flowing into and through the passage or channel c' between the two drums and entering the main shell or casing at the open end of the drum B, the products entering as shown by the arrows in Fig. 1, and the products will continue to enter the main shell or casing and expand therein until the pressure becomes sufficient to force the products outward in the direction of the arrows in Fig. 1, passing over the peripheral edge of the deflector C and flowing in a stream inside of the inflowing stream entering the shell or casing from the channel or passage c' for the outflowing stream to enter the passage or channel e and flow into the chamber or space e' to pass therefrom into the tube or pipe E and be discharged from the end of such pipe or tube. The projection of the products into the main shell or casing, owing to the capacity of such shell or casing, allows of an expansion of the products many fold, thereby reducing the force or pressure of the products, and when the reduced force or pressure reaches an equilibrium or degree to operate and cause an outflow of the products the force has been so greatly reduced that, after entering the tube or pipe E, the discharge from the pipe will not be attended with any great amount of noise and with but little, if any, projection, with the result of a practically perfect muffling of the discharge.

The operation with the pipe or tube E as the inlet for the products from the engine or motor is essentially the same, except that the channel or passage e becomes the inlet for the products into the main shell or casing and the passage or channel c' becomes the outlet for the products in escaping from the shell or casing, and in this reverse operation the inflowing stream is inside and adjacent

to the wall of the deflector and the outflowing stream is outside and adjacent to the drum B; but the resultant action is the same as with the products moving in the opposite direction. The expansion of the products in the main shell or casing reduces the pressure, so that with the final escape from the neck or tube b^2 practically no noise or projection of the products will occur.

The muffler as a whole is simple in construction and can be applied to and used with the general types of gas, explosive, and fluid-pressure engines and motors, and by its use the noise and projection of the escaping gases and vapors will be decreased to an extent as not to cause appreciable noise and disturbance that will produce ill effects. These results are attained in the operation of the muffler owing to the construction and arrangement of the inlet and outlet for the products, by which the tendency of the inflowing products at first is to create a vacuum in the outlet and also to retard the outflow of the products, which condition pertaining until the pressure of the inflowing products within the main shell or casing reaches an equilibrium which, with an increase beyond the equilibrium-point by the continued inflowing of the products, will force the products into and through the outlet to discharge through the discharge pipe or tube. The direction of the inflowing and the outflowing products into and from the main shell or casing are directly opposite, and until the reduced pressure reaches an equilibrium, by which the inflow is overcome, the inflow will continue through the opening or space between the ends of the drums and the deflector; but with the reduction of the pressure in the main shell or casing to a point for producing an outflow of the products the inflowing stream and the outflowing stream both pass through the opening or space between the ends of the drum and the deflector, moving in streams having opposite directions of flow.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a muffler, the combination of a receiver for the exhaust products, having an inlet thereinto and an outlet therefrom, with the inlet and outlet arranged in juxtaposition to operate and have the inflowing products retard the outflow until the pressure of the expanded products in the receiver reaches a point of equilibrium for the equilibrium of pressure to act and cause an outflow of the products, substantially as described.

2. In a muffler, the combination of a main shell or casing, constituting a receiver, an annular inlet and an annular outlet, having a common mouth, furnishing communication with the interior of the receiver and located in juxtaposition, for the common mouth to serve as an induction-passage and an education-passage for the inflow and outflow in opposite directions of the escaping products, substantially as described.

3. In a muffler, the combination of a main shell or casing, constituting a receiver for the escaping products, an inlet and an outlet, one within the other and having a common mouth or opening furnishing communication with the interior of the receiver for inducting and educting the escaping products, and have the inflow and outflow of the escaping products travel in opposite directions, substantially as described.

4. In a muffler, the combination of a main shell or casing, constituting a receiver, internal passages or channels within the receiver at one end thereof and forming an inlet and an outlet for the receiver, with the passages or channels arranged one within the other and having a common mouth or opening furnishing communication with the interior of the receiver for the induction and eduction of the escaping products and having a correlation for the pressure or force of the inflowing product to clear the passage or channel for the outflow through the outlet channel or discharge, substantially as described.

5. In a muffler, the combination of an outer shell or casing, an outer drum within the outer shell or casing at one end thereof having a cylindrical wall or body, a tapered end

wall and a straight neck or wall, an inner drum within the outer drum and having a cone-shaped end, and a discharge-pipe leading from the inner drum, substantially as described.

6. In a muffler, the combination of an outer shell or casing, an outer and inner drum within the shell or casing at one end thereof both drums having an open end and the outer drum having a neck or tube, a deflector adjacent to the open end of the drums, and a tube or pipe leading from the interior of the inner drum to the outside of the shell or casing, substantially as described.

7. In a muffler, the combination of a main shell or casing, an outer drum and an inner drum within the shell or casing, a pipe or tube entered into the interior of the inner drum and leading to the outside of the main shell or casing, a channel or passage between the outer and inner drum, a channel or passage between the inner drum and the pipe or tube, and a deflector in juxtaposition to the ends of the drum, substantially as described.

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Witnesses:

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