

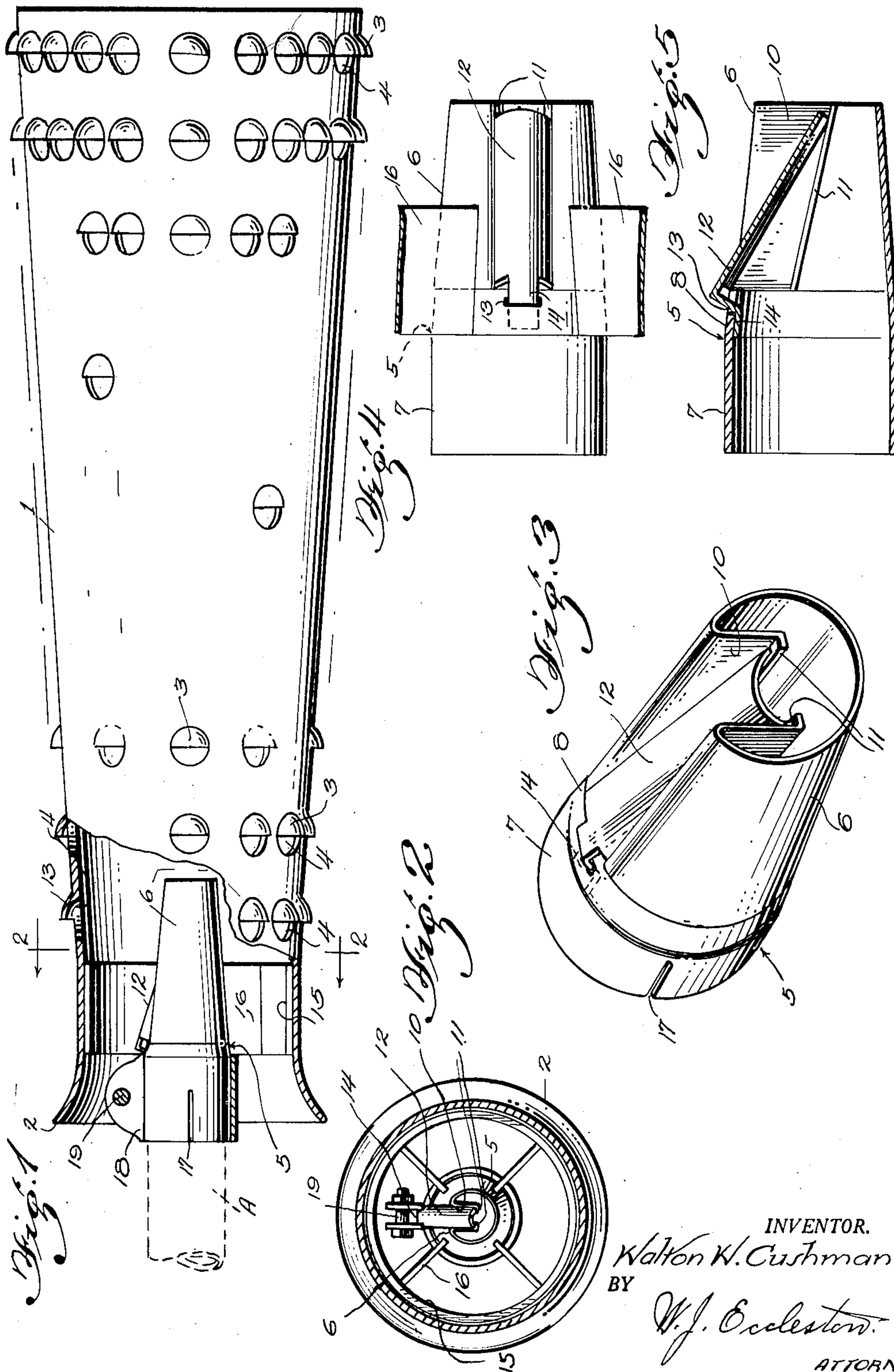
Feb. 24, 1953

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2,629,455

EXHAUST MUFFLER WITH FLUID MINGLING

Filed Oct. 21, 1948



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2,629,455

EXHAUST MUFFLER WITH FLUID MINGLING

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Application October 21, 1948, Serial No. 55,743

5 Claims. (Cl. 181—43)

(Granted under Title 35, U. S. Code (1952),
sec. 266)

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The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to mufflers for the exhaust of internal combustion engines, and has for its primary object to provide an attachment for or modification of mufflers such as shown in my application Serial No. 4,221, filed January 26, 1948, for Muffler, so as to provide a substantially constant pressure and velocity of the exhaust gases entering the muffler, with a resultant high efficiency of the muffler at all times, regardless of the speed or load on the engine.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which,

Figure 1 is a side elevational view of a muffler and the novel attachment therefor, parts being broken away to more clearly illustrate the construction;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figures 3 and 4 are perspective and plan views, respectively, of the attachment; and

Figure 5 is a longitudinal sectional view thereof.

The muffler attachment of the present invention is illustrated in connection with the muffler disclosed in my application referred to above, but it is to be understood that the attachment is also useful on any type of muffler which relies upon the introduction of atmospheric air to its interior in performing the sound-deadening function, etc.

The muffler comprises a hollow tubular body portion 1 formed of metal or the like and of substantially frusto-conical shape. The smaller and forward end of the body 1 is preferably flared outwardly, as indicated by the numeral 2, for the purpose of trapping a larger quantity of atmospheric air and directing it into the interior of the muffler, and the body of the muffler itself is provided with a plurality of annular series of struck-up tongues 3 associated with apertures 4. The tongues 3 are directed toward the small and forward end of the muffler body, and thus supplement the action of the flared portion 2 of the muffler in directing air into the interior thereof. It is to be understood, of course, that while these tongues and apertures 3 and 4 are indicated as uniformly arranged in annular series, they may be arranged in any preferred manner so long as they cover a substantial portion of the

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wall of the muffler and extend throughout the major portion of its length.

The attachment for the muffler body as just described, or any other muffler of this general type, is indicated generally by the numeral 5, and comprises a hollow tubular sleeve or casing formed of metal or the like, and of substantially frusto-conical shape. This member 5 includes the rearwardly tapered portion 6, the forward cylindrical portion 7 and an intermediate portion 8 inclined at an angle somewhat less than the inclination of the element 6. This tapered portion 6 is provided with a longitudinally extending slot 9 having inwardly extending walls 10, terminating in substantially horizontally spaced ledges 11.

Pivotaly connected to the inclined portion 8 is a flap valve 12, the pivot being formed by means of a slot 13 in the portion 8, and an L-shaped extension 14 on the end of the flap valve member, which is adapted to be positioned with the slot 13, as clearly indicated in Figures 3 to 6 inclusive. The body portion of the flap valve is preferably transversely curved to conform to the curvature of the frusto-conical element 6 and when in its innermost position has its free end resting upon the ledges 11.

This attachment 5 is mounted in the interior of the muffler at its forward end so that its walls are reversely inclined with respect to the walls of the muffler, as clearly indicated in Figure 1. The member 6 is of substantially smaller diameter than the diameter of the smaller end of the muffler body 1, and thus provides for the passage of air to the interior of the muffler by reason of the annular passage between the elements 1 and 6. A ring 15 is provided for connecting the body portion 1 of the muffler to the member 6 and for this purpose is provided with a plurality of inwardly directed webs 16, secured to the exterior of the sleeve 6, and itself being secured, by welding or the like, to the narrower end to the body 1. The cylindrical portion 7 of the attachment is preferably slotted, as indicated by the numeral 17, and may be clamped over the exterior end of the exhaust pipe A of an internal combustion engine as by means of the split band 18 and clamping screw 19.

In the operation of the present device, the rearwardly constricted sleeve or casing 6 serves in effect as a venturi in controlling the passage of air into the interior of the body 1. It is desirable, of course, that the pressure and velocity of the atmospheric air entering the muffler body vary in accordance with the amount of exhaust gases

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entering the muffler, and to this end the pivoted flap valve 12 is adapted to automatically vary the size of the opening at the rear end of the casing 6. Consequently, the flap valve 12 is pivoted to the upper side of the attachment 5, and automatically gravitates to the position shown in Figures 3 and 5 with the free end supported on the inwardly directed ledges 11 of the walls 10. Therefore at low engine speeds the velocity of the exhaust gases passing through the small opening at the rear of the casing 6 will, for all intents and purposes, be substantially the same as the velocity of the gases passing through the larger opening at higher engine speeds when the flap valve 12 is moved to its fully open position by the gases passing through the member 6. It will thus be apparent that the intake of the atmospheric air into the interior of the muffler is regulated substantially in accordance with, or in proportion to, the amount of exhaust gases passing into the interior of the muffler per unit of time.

One specific construction of the attachment has been illustrated and described herein in connection with one specific type of muffler namely, that shown in my application Serial No. 4,221 but it is to be understood that the attachment may take various forms so long as it serves to automatically vary the intake of atmospheric air into the interior of the muffler, and the muffler itself may vary in wide limits so long as it is provided with means permitting the entrance of atmospheric air into its forward end.

1. A muffler including a substantially tubular body portion having an inner end adapted to be attached to and spaced radially from the exhaust pipe of an internal combustion engine, an inwardly tapered sleeve or casing axially mounted in the inner end of the muffler in spaced relation to the wall thereof, and provided with a longitudinally extending slot, a plate hinged to the casing at the rear end thereof, and stop means on the interior of said casing for limiting the inward movement of the plate about its hinge.

2. A muffler including a substantially tubular body portion having an inner end adapted to be attached to and spaced radially from the exhaust pipe of an internal combustion engine, an inwardly tapered sleeve or casing axially mounted in the inner end of the muffler in spaced relation

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to the wall thereof, and provided with a longitudinally extending slot, walls extending inwardly from the edges of the slot, a transversely curved plate hinged to the casing at the outer end of the slot, and a stop on the inner end of one of said walls for limiting the inward movement of the plate.

3. A muffler for internal combustion engines including a hollow, substantially frusto-conical body portion open at its forward and smaller end for the admittance of atmospheric air, and a hollow, substantially frusto-conical sleeve mounted in the smaller end of the body portion with its smaller end directed toward the larger end of the body portion and its larger end adapted to be engaged about an exhaust pipe, and means for securing the larger end of said sleeve over the exhaust pipe of the engine.

4. An attachment for a muffler, comprising a hollow, substantially frusto-conical sleeve provided with a longitudinal slot in its side, walls extending inwardly of the slot, and a flap valve mounted in the slot between the inwardly-extending walls.

5. An attachment for a muffler, comprising a hollow, substantially frusto-conical sleeve provided with a longitudinal slot in its side, walls extending inwardly of the slot, a flap valve mounted in the slot between the inwardly-extending walls, and ledges on the inwardly-extending walls against which the free end of the flap valve is adapted to rest.

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