P. W. MASTEN.

MUFFLER.

APPLICATION FILED JAN. 6, 1913.

**1,094,667.** Patented Apr. 28, 1914.

Fig. 1

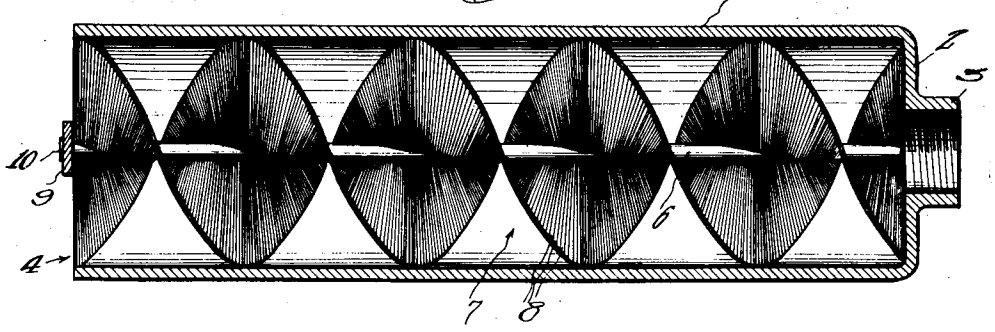



Fig. 2

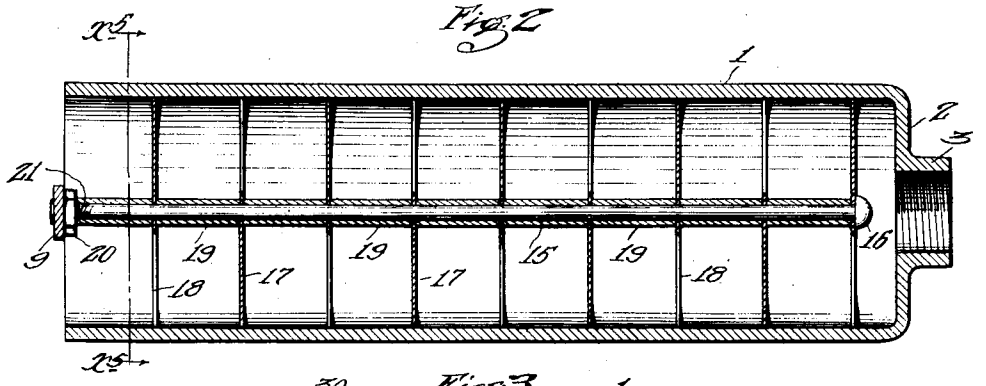



Fig. 3

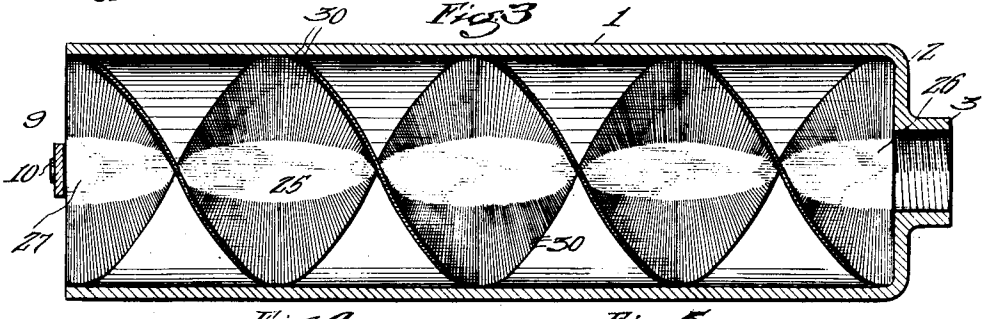



Fig. 4

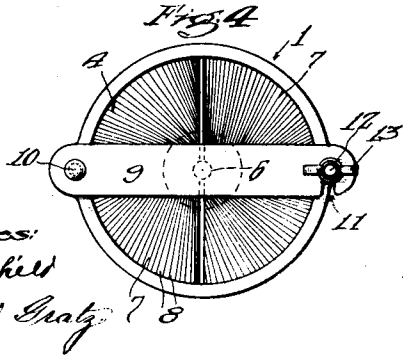
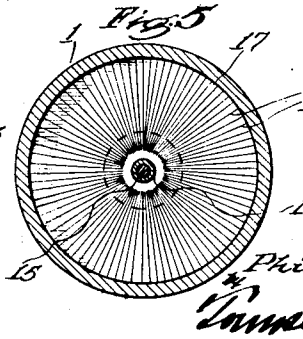



Fig. 5




Witnesses:
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# UNITED STATES PATENT OFFICE.

PHILO W. MASTEN, OF LOS ANGELES, CALIFORNIA.

## MUFFLER.

1,094,667. Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed January 6, 1913. Serial No. 740,556.

*To all whom it may concern:*

Be it known that I, PHILO W. MASTEN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Muffler, of which the following is a specification.

My invention relates to improvements in mufflers used in connection with internal combustion engines.

The exhaust from internal combustion engines produces a sharp report or noise at each time the exhaust leaves the cylinder of the engine, which noise is due to the fact that the exhaust is usually discharged from the cylinder at two or three times an atmosphere and the resultant impart and expansion of the exhaust.

My invention is particularly designed to break up the exhaust and to allow the same to expand to nearly an atmosphere within the muffler.

It is a further object of my invention to produce a muffler of simple form and construction in which the muffler comprises a hollow cylindrical body, and a removable means within the body for breaking up the exhaust, which may be readily removed from the cylindrical body at the same time removing from the interior of the body all foreign substances.

Referring to the drawings, which are for illustrative purposes only: Figure 1 is a longitudinal, sectional view of the muffler embodying a form of my invention. Fig. 2 is a longitudinal, sectional view of the muffler embodying a modified form of my invention. Fig. 3 is a longitudinal, sectional view of the muffler embodying another modified form of my invention. Fig. 4 is an end view of the muffler shown in Fig. 1. Fig. 5 is a sectional view on line $x^5$—$x^5$ Fig. 2.

The muffler shown in Figs. 1 and 4 consists of a cylindrical body or casing 1 provided at its inner end 2 with an interiorly threaded circular flange 3 adapted to be connected by means of any common form of pipe or coupling (not shown) to the exhaust of an internal combustion engine, the outer end 4 of the casing 1 being open, as shown. Arranged longitudinally with the body or casing 1 within the same is a rod or core 6 of a spiral brush 7, which spiral brush 7 consists of a series of wires 8, the inner ends of which are secured to the core 6 in any well known manner, and the outer ends of which extend to the inner walls of the casing 1 thereby supporting the brush within the casing. The brush 7 extends throughout the entire length of the muffler and is held in fixed longitudinal relation to the casing within the same by means of a plate or latch 9 pivoted at 10 to the end 4 of the casing, the latch 9 being provided with a notch 11 adapted to be engaged by a threaded pin 12 mounted on the end 4 of the casing opposite to the pivotal point of the latch 9. 13 designates a thumb nut on the pin 12 by means of which the latch 9 may be secured in fixed relation against the end of the casing.

In the form shown in Fig. 2 the means for breaking up the exhaust within the casing 1, which casing is of substantially the same form as that shown and described with relation to Fig. 1, consists of a rod 15 having a head 16 on the inner end thereof. Upon the rod 15 is mounted a series of thin metallic disks 17 each provided with a series of radial slots 18 which extend inwardly from the outer edge of the respective disks toward the center of the same. The plates 17 are spaced apart on the rod 15 by means of sleeves 19, there being a sleeve 19 on the rod 15 between each disk. 20 designates a nut on the outer threaded end 21 of the rod 15, which nut 20 abuts against the last sleeve on the outer end of the rod 15 thereby holding the respective disks 17 in fixed relation to the rod 15. The outer end 4 of the casing 1 is provided with a locking bar 9 of the same form and construction as shown in Figs. 1 and 4, the locking bar in this case, however, providing means for engaging the nut 20 on the rod 15 thereby retaining the rod 15 and the disks 17 thereon within the casing.

In the form shown in Fig. 3 the means within the casing for breaking up the exhaust consists of a thin metal plate 25 bent in spiral form, the inner end 26 of the plate abutting against the inner end 2 of the casing, and the outer end 27 of the plate 25 abutting against the locking bar 9. In this form the plate is slotted inwardly from the outer edge thereof toward the center of the same there being a series of slots 30 extending throughout the length of the plate.

In each form of my invention the casing 1 is made of considerably larger diameter than the inlet of the same from the exhaust

and in each case the exhaust breaking up means within the casing extends entirely across the internal diameter of the casing.

In the form shown in Figs. 1 and 3 the exhaust breaking up means is in spiral form so that the exhaust as it enters the casing is given a spiral movement passing through a spiral passage formed in Fig. 1 by the spiral brush and in Fig. 3 by the spiral plate. As the exhaust passes through the spiral passage so formed in the respective forms of muffler shown in Figs. 1 and 3, the expansion of the exhaust causes the same to pass or expand through the bristles of the brush in the form shown in Fig. 1, or through the slots 18 in the plate 25 shown in Fig. 3, as the case may be.

In the form shown in Fig. 2 the exhaust is caused to pass through the slots in the respective disks 17, there being no passage leading from one end of the muffler to the other. I prefer, however, the form of muffler shown in Figs. 1 and 3, which is in general terms a cylindrical casing having therein a divisional wall, spiral in form, extending longitudinally through the casing, which wall is provided with a series of slots or openings therein, resulting in a spiral movement of the exhaust through the muffler which accelerates the breaking up of the exhaust as the same is permitted to expand either through the bristles of the brush shown in Fig. 1 or through the slots in the plate shown in Fig. 3; but it is understood that I do not limit myself to the particular form and construction of the breaking up means disclosed in either Fig. 1 or Fig. 3 of the drawings, but intend that my invention shall cover any form of muffler in which the exhaust is broken up by means of obstruction within the muffler, which obstruction is provided with a slotted form of breaking up means.

What I claim is:—

1. A muffler comprising a cylindrical casing having an open outer end, inlet means on the opposite end for introducing engine exhaust into said casing, a removable longitudinally disposed spiral wall in said casing, said wall having a series of radially disposed slots extending inwardly from the edge thereof, and means for retaining said wall in said casing.

2. A muffler comprising a cylindrical casing having an open outer end, inlet means on the opposite end for introducing engine exhaust into said casing, a removable longitudinally disposed spiral wall in said casing, said wall having a series of radially disposed slots extending inwardly from the edge thereof, a plate pivoted on one side of said casing at the outer end thereof adapted to extend across the outer end thereof, a threaded pin on the opposite side of said casing, said plate having a notch adapted to be engaged by said pin, and a nut on said pin for securing said plate in fixed position across the outer end of said casing.

3. A muffler comprising a hollow cylindrical casing having exhaust and admission openings at opposite ends, a brush center located at the axis of said cylinder, and brush members forming a perforated wall extending spirally around said center from end to end of said casing.

4. A muffler comprising a hollow cylindrical casing having exhaust and admission openings at opposite ends thereof, and a removable spiral brush extending longitudinally in said casing and adapted to engage the inner wall of said casing and to clean said wall when said brush is being removed.

5. A muffler comprising a casing having exhaust and admission openings at opposite ends thereof, a rod placed axially in said casing, and a spiral wall extending from said rod to said casing, said wall having openings to relieve excessive pressure and said wall being attached to said rod and removable therewith.

6. A muffler comprising a hollow cylindrical casing having exhaust and admission openings at opposite ends, and brush members forming a perforated wall extending spirally around said center from end to end of said casing, said brush members being attached to said brush center and removable therewith.

7. A muffler comprising a hollow cylindrical casing having an opening at one end to admit gases and an opening at the other end to allow the gases to pass out, a central rod at the axis of said casing, and a wall extending from said center to the inner surface of said casing and forming a spiral passage between said openings, said wall having openings to relieve excessive pressure and being attached to said rod and removable therewith.

8. A muffler comprising a hollow cylindrical casing provided with admission and exhaust openings at opposite ends, a removable longitudinally disposed spiral wall engaging the inner surface of said cylinder, said wall having openings therein, and means for retaining said spiral wall in said cylinder.

9. A muffler comprising a hollow cylindrical casing having openings at either end thereof, and a brush forming a spiral passage between the openings, said brush being removable and engaging and cleaning the walls of said casing during removal.

10. A muffler comprising a hollow casing, a brush center in said casing, and brush members extending from said center to the inside of said casing.

11. A muffler comprising a hollow casing a removable brush center in said casing, and brush members secured to said center and

extending from said center to the walls of said casing.

12. A muffler comprising a hollow cylindrical casing, a brush center located at the axis of said casing and brush members extending from said center to the inside of said casing.

13. A muffler comprising a hollow cylindrical casing having admission and exhaust openings at either end thereof, a brush center located at the axis of said casing and readily removable therefrom, and brush members extending from said center to the inner walls of said casing.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 30th day of December, 1912.

PHILO W. MASTEN.

In presence of—
FRANK L. A. GRAHAM,
LORRAINE E. DURROW.