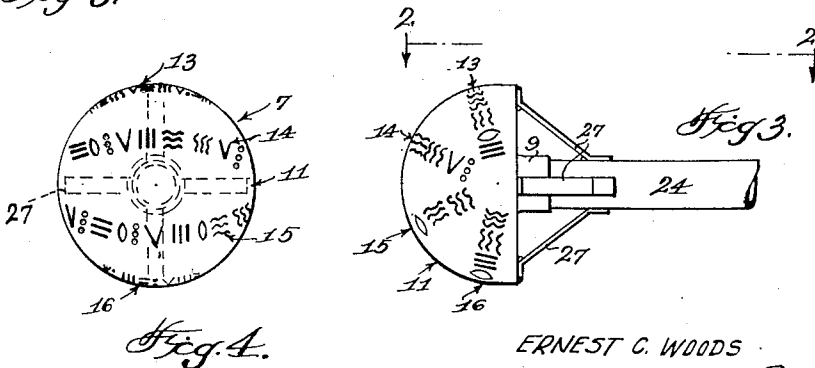
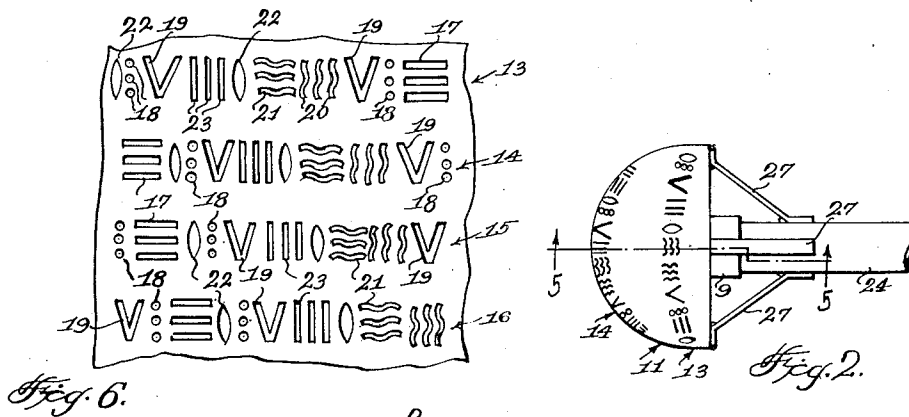
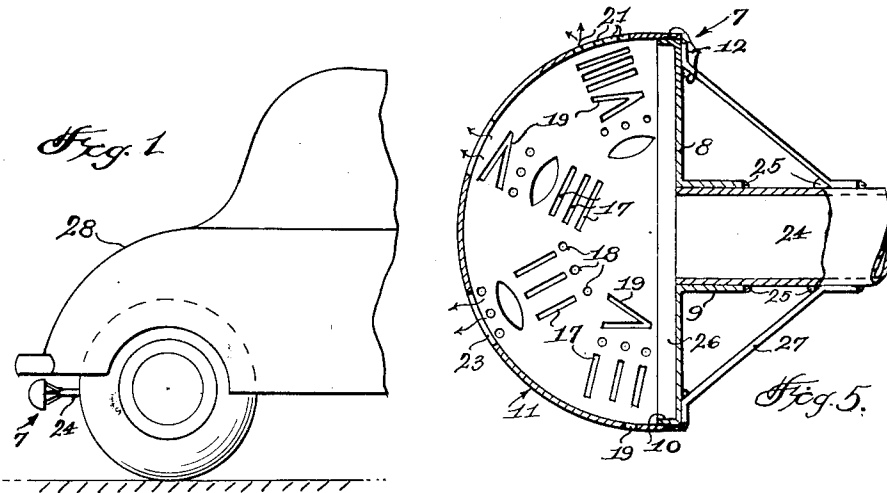


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E. C. WOODS
MUFFLER WITH A HEMISPHERICAL OUTER WALL
HAVING A PLURALITY OF APERTURES
OF VARIOUS SIZES AND SHAPES
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Inventor

ERNEST C. WOODS

By

John N. Randolph

Attorney

UNITED STATES PATENT OFFICE

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MUFFLER WITH A HEMISPHERICAL OUTER WALL HAVING A PLURALITY OF APERTURES OF VARIOUS SIZES AND SHAPES

Ernest C. Woods, Omaha, Nebr.

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This invention relates to a novel muffler or exhaust silencer for internal combustion engines and more particularly to a muffler having numerous small outlets in a variety of sizes and shapes which will effectively break up the sound waves from the exhaust of internal combustion engines to reduce the noise to a minimum.

Another object of the invention is to provide a muffler of extremely simple construction which is capable of being readily mounted on the outlet end of an exhaust pipe and from which the exhaust gas will be released to the atmosphere through a multiplicity of restricted openings of a variety of sizes and shapes to thereby most effectively separate the exhaust gases as they are discharged to the atmosphere to effect a maximum muffling of the sound of the engine.

Another object of the invention is to provide a muffler capable of being readily made in various sizes for fitting internal combustion engines of various sizes which may be employed effectively either with motor vehicle propelling engines or stationary engines and which may be very effectively utilized with small low horse power engines or large stationary or vehicle engines.

A further object of the invention is to provide a muffler which can be very economically manufactured and sold yet which will be extremely efficient and durable.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view of the rear portion of a motor vehicle showing the muffler applied thereto;

Figure 2 is an enlarged top plan view of the muffler;

Figure 3 is a side elevational view thereof;

Figure 4 is an end elevational view looking from left to right of Figures 2 and 3;

Figure 5 is an enlarged substantially central sectional view taken substantially along a plane as indicated by the line 5—5 of Figure 2, and

Figure 6 is a fragmentary plan view of a portion of a flat sheet illustrating a preferred arrangement of the muffler discharge apertures.

Referring more specifically to the drawing, the novel muffler or exhaust silencer constituting the invention is designated generally 7 and in its preferred form as illustrated in the drawing, includes an inner end wall 8 which is substantially disk shaped and has a centrally disposed boss 9 projecting from one side thereof and an annular peripheral flange 10 which projects from its opposite side and which is likewise disposed sub-

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stantially perpendicular to the plane of said wall 8. The muffler or silencer 7 also includes a substantially hemispherical outer wall 11 the open side of which fits snugly over and is suitably secured to the flange 10, as by welding, as seen at 12. The hemispherical outer wall 11 is provided with a plurality of rows of exhaust or discharge apertures or openings, in the embodiment as disclosed, the outer wall 11 being shown provided with four such rows designated generally 13, 14, 15 and 16, each of which rows is preferably substantially straight from end-to-end thereof so that the intermediate portions of the rows of openings or apertures are spaced a greater distance apart than the end portions thereof, as is illustrated in Figures 3 and 4. However, it will be understood that the number of rows of discharged openings or apertures may be varied depending upon the size of the muffler 7 and the size of said muffler may vary depending upon the size of the internal combustion engine with which it is employed.

Figure 6 is a plan view only intended to illustrate the arrangement of the individual openings of the rows of openings and is not intended to show the spacing of these rows of openings relatively to one another, which is clearly shown in Figures 2 to 5. The four rows of openings as shown in Figure 6 are numbered from top to bottom corresponding to the arrangement of the four rows of openings as shown in Figures 3, 4 and 5. As illustrated in Figure 6, each of the four rows of openings includes a group of longitudinally elongated openings 17 of which there is preferably three, a group of circular openings 18 arranged in transverse alignment and likewise preferably including three openings and which are followed by a substantially V-shaped transversely disposed opening 19. Each row of openings also includes three transversely extending wavy openings 20 and three longitudinally extending undulating or wavy openings 21. Immediately to the left of the openings 21 there is an oval shaped opening 22 disposed transversely of the row, followed by three transversely extending openings 23 each of a shape corresponding substantially to the opening 17 but disposed transversely rather than longitudinally of the row. Another transversely disposed V-shaped opening 19 is disposed to the left of the openings 23 followed by another series of openings 18 and another opening 22. The row of openings 13 commences with a series of openings 17 and preferably terminates with the series of openings 18 followed by the opening 22 while the next row 14 disposed therebeneath commences with a series of openings 18 followed by an opening 19 and terminates with a series of

openings 17. The next to the bottom row 15 commences with an opening 19, followed by a series of openings 20 and terminates with the series of openings 18 disposed immediately to the left of a series of openings 17. The bottom row 16 commences with a series of openings 20 and terminates with an opening 19 disposed immediately to the left of the series of openings 18.

It will be understood that a greater or lesser number of openings 17 to 23 could be provided in each of the four rows of openings for varying the total overall discharge area afforded by said openings. It will also be noted that the bottom row of openings 16 is disposed substantially at the bottom-most part of the muffler 7 so that the openings disposed intermediate of the ends of the row 16 will additionally function effectively as drainage openings to permit condensation or other moisture to drain from the interior of the muffler 7.

The outlet end of an internal combustion engine exhaust pipe 24 is disposed in the boss 9 and may be suitably secured thereto in any desired manner, as by soldering, as indicated at 25, so that the exhaust pipe discharge end 24 opens into the interior 26 of the muffler 7. The muffler 7 is also provided with a plurality of diagonal braces 27 having outer ends which are secured in any suitable manner as by welding, as indicated at 12, to the outer surface of the wall 8 and having opposite adjacent ends which are soldered or otherwise suitably secured as indicated at 25 to circumferentially spaced portions of the exhaust pipe 24.

When the muffler or exhaust silencer 7 is mounted on the discharge end of the exhaust pipe 24 of a motor vehicle engine it will ordinarily be disposed adjacent the rear end of said vehicle, as illustrated in Figure 1, wherein a portion of the rear end of a motor vehicle is illustrated and designated generally 28. However, it will be apparent that the muffler or silencer 7 may be mounted on the discharge end of an exhaust pipe 24 located in any desired position and unlike most mufflers does not require a tail pipe as the exhaust gases discharge to the atmosphere directly from the muffler.

The multiplicity of discharge openings or apertures afforded by the four rows 13, 14, 15 and 16 will effectively function not only to materially break up and diffuse the exhaust gases discharged from the muffler 7 but also to similarly affect the sound waves to reduce the sound emitted from the muffler to a minimum. Likewise, any condensation within muffler chamber 26 will readily drain through the openings or apertures located intermediate of the bottom row 16 so that damage to the muffler through rust or corrosion will be reduced to a minimum.

As previously stated, the size of the muffler or silencer 7 may be varied depending upon the size of the engine with which it is to be used and the number of rows of discharge openings or apertures may also be varied and the number of openings or apertures provided in each row may likewise be increased or decreased in number from the number illustrated in Figure 6. Various other modifications and changes are likewise contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as is hereinafter defined by the appended claims.

I claim as my invention:

1. A muffler for an internal combustion engine comprising a body portion consisting of a sub-

stantially hemispherical outer wall and a substantially flat inner wall secured to and closing the open side of said outer wall and combining therewith to define a substantially hemispherical exhaust chamber, said inner wall having a central opening adapted to receive the discharge end of an exhaust pipe from which the exhaust gases and sound waves are discharged into said exhaust chamber, said outer wall being provided with a plurality of substantially straight rows of discharge openings and apertures, said rows being circumferentially spaced relatively to one another and each including a multiplicity of apertures of various sizes and shapes through which the exhaust gases and sound waves are adapted to be discharged to the atmosphere for breaking up and diffusing the exhaust sounds, said exhaust chamber communicating with the atmosphere only through said discharge openings and apertures.

2. An exhaust muffler as in claim 1, the intermediate portions of the rows of openings being spaced a greater distance apart than the end portions thereof, the end portions of each of said rows of openings and apertures being disposed at substantially the same level, one of said rows of openings and apertures having an intermediate portion disposed in substantially a bottom-most position relatively to the muffler body whereby the openings and apertures of said intermediate portion form drainage openings for the exhaust chamber.

3. A muffler or exhaust silencer comprising a hollow body portion including a substantially flat inner wall and a concavo-convex outer wall combining with said inner wall to define a hemispherical muffler chamber, said inner wall having an opening adapted to engage the discharge end of an exhaust pipe for mounting the muffler thereon whereby the exhaust gases and sound waves from the exhaust pipe will be discharged into said muffler chamber, said concavo-convex outer wall having a plurality of rows of discharge openings and apertures, said muffler chamber communicating with the atmosphere only through said discharge openings and apertures, each of said rows being substantially straight and including a multiplicity of openings and apertures of a variety of sizes and shapes through which the exhaust gases and sound waves are adapted to be emitted to the atmosphere from the muffler chamber and diffused and broken up for reducing the exhaust sound to a minimum.

4. A muffler or exhaust silencer as in claim 3, certain of said openings or apertures being disposed adjacent the bottom-most portion of the muffler and forming drainage openings for moisture and condensation accumulating in said muffler chamber.

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