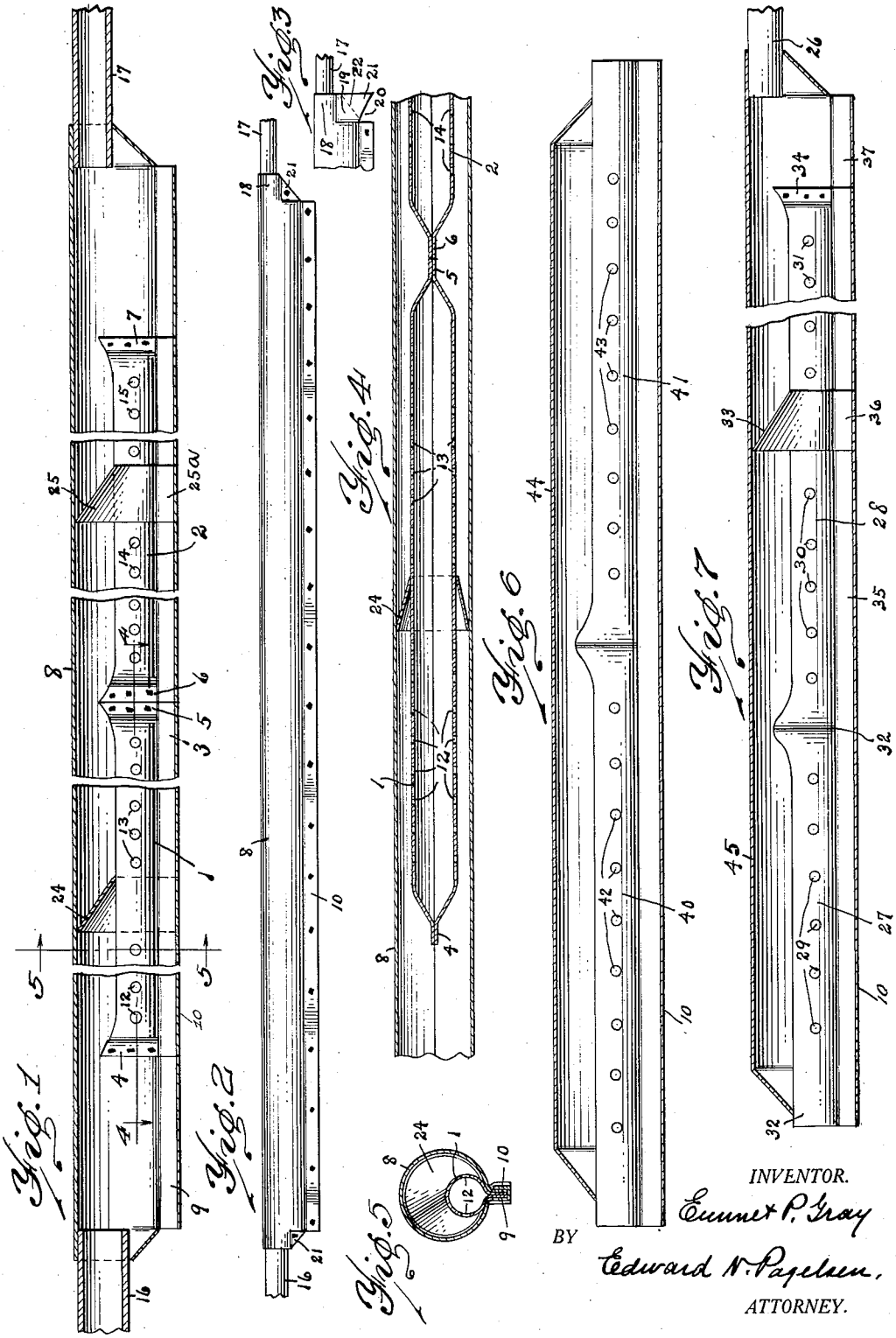
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MUFFLER

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MUFFLER.

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This invention relates to means for reducing the sound of the exhaust of internal combustion engines, and its object is to provide a series of chambers through which the exhaust passes and in which it is permitted to expand and in which the intermittent impulses are merged into a single continuous discharge, this object being obtained with the least amount of back pressure.

In the accompanying drawing, Fig. 1 is a longitudinal section of this improved muffler. Fig. 2 is a side elevation thereof. Fig. 3 is a view showing one of the steps in the construction of the muffler. Figs. 4 and 5 are sections on the lines 4—4 and 5—5 of Fig. 1. Figs. 6 and 7 are longitudinal sections similar to Fig. 1 of two modified forms of this muffler.

Similar reference characters refer to like parts throughout the several views.

In the several views the exhaust is supposed to travel from left to right, although the direction is immaterial in Fig. 6. The structure shown in Figs. 1 to 5 inclusive is made up of two tubes, one within the other, the inner tube being shown made up of two parts 1 and 2, although it may be made of one piece. The edges 3 of the sheets of which these tubes are formed are brought together to constitute flanges, and these extend radially from the body of each tube, as shown in Fig. 5. The ends 4, 5, 6 and 7 are flattened and preferably spot-welded together, but if a single tube is used, it may be flattened intermediate its ends, as at 5—6, and spot-welded as stated.

Enclosing this tube is the outer shell 8 also formed by bending a sheet and causing the longitudinal flanges 9 to extend radially. I prefer to make one flange sufficiently long to provide a flap 10 which may be folded around the other flange 9 when the muffler is assembled with the flanges 3 of the inner tube nested between the flanges 9 of the outer tube, as shown in Fig. 5.

The inner tube is formed with groups of perforations 12, 13, 14 and 15, the total area of the perforations of each group being greater than that of the inlet pipe 16. In order to secure the inlet pipe and the tail pipe 17 in position, I press the metal of the ends 18 of the shell around these pipes, as shown in Fig. 3, bringing the parts 19 together, then form the notch 20 and fold the flap 21 along the line 22 to the position shown in Fig. 2, spot-welding at each step.

Within the shell 8 and filling the space between it and the inner tubes 1 are the substantially frusto-conical shields 24 and 25 having flanges 25^a extending between the nested flanges 3 and 9 of the tubes 1 and 2 and the shell 8. As the exhaust enters the shell through the pipe 16, it cushions against the shield 24 and flows through the holes 12 into the tube 1, out through the holes 13 into the space between the shields, then through the holes 14 into the tube 2, out through the holes 15 into the rear end of the shell and out through the tail pipe 17. The shield 25 again causes a cushioning of the gas and this cushioning action of the two shields not only helps to resolve the individual impulses of the exhaust into a continuous stream, but the piled up gas acts as a dampener on the shell itself and prevents the drumming noise which is so often noticed in automobiles.

The construction is very inexpensive as it requires only pieces of sheet metal which can be bent on the simplest kinds of machines usually used for this purpose. The diameter of the outer shell 8 need ordinarily not be more than twice the diameter of the exhaust pipe, so that this muffler requires a minimum of space. The tail pipe 17 may be omitted if desired.

In Fig. 7 I have shown the shell 45 having a tail pipe 26 secured in position as before described and a continuous inner tube formed of the sections 27 and 28 provided with groups of holes 29, 30 and 31 respectively. The exhaust enters at the end 32 of the inner tube and the outer shell is attached thereto in the manner indicated in Fig. 2. The inner tube is flattened between its ends at 32 to divide it into the two sections and a shield 33 is mounted within the shell 45 to cushion the gases that enter the space within the shell through the holes 29 and causes these gases to pass through the holes 30 and 31 into the space back of this shield from which they escape through the tail pipe 26. The end 34 of the inner tube is closed.

In this case again, the inner tube has radial flanges 35, the shield has flanges 36 and the shell has flanges 37, all of which are nested and the lower edge of one flange 37

is brought up around the nested flanges, as indicated in Fig. 5, after which these flanges are all spot-welded together.

In Fig. 6 the shields are omitted and the inner tube is formed in two sections, 40 and 41, provided with holes 42 and 43 respectively. The ends of the shell 44 are fitted around the ends of the inner tube and the action of the muffler is substantially the same as of those above described, excepting that the action of the shields in cushioning the gases is omitted. The tube and shell are again formed with nested flanges as shown in Fig. 5.

The details of construction and the proportions of the parts may all be changed by those skilled in the art without departing from the spirit of my invention as set forth in the following claims.

I claim:—

1. In a muffler, the combination of a cylindrical shell having inlet and outlet openings in its ends for exhaust gases, a tube within the shell comprising a plurality of independent sections having closed ends, each section being formed with two groups of holes to permit the passage of exhaust gases, and shields mounted in the shell to prevent the passage of gases longitudinally of the shell, one shield being mounted between the two groups of holes of each tube section, the tube and shell being formed with radial flanges and the tube contacting with the shell at the flanges thereon and the flanges of the tube extending between the flanges of the shell.

2. In a muffler, the combination of a cylindrical shell having inlet and outlet openings in its ends for exhaust gases, a tube within the shell comprising a plurality of independent sections having closed ends, each section being formed with two groups of holes to permit the passage of exhaust gases, and shields mounted in the shell to prevent the passage of gases longitudinally of the shell, one shield being mounted between the two groups of holes of each tube section, the tube, shields and shell having nested radial flanges.

3. In a muffler, the combination of a cylindrical shell and a tube therein of less diameter than the shell, one end of the tube within the shell being closed, said tube being formed with a series of groups of holes to permit the passage of exhaust gases, the tube being closed between two of the groups of holes, and a shield mounted on the tube between two groups of holes to prevent the passage of the gases longitudinally of the shell at that point, said shield, shell and tube being formed with nested parallel radial flanges which are united together, one of the outer flanges of the shell being bent around the nested flanges and attached to the other flange of the shell.

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