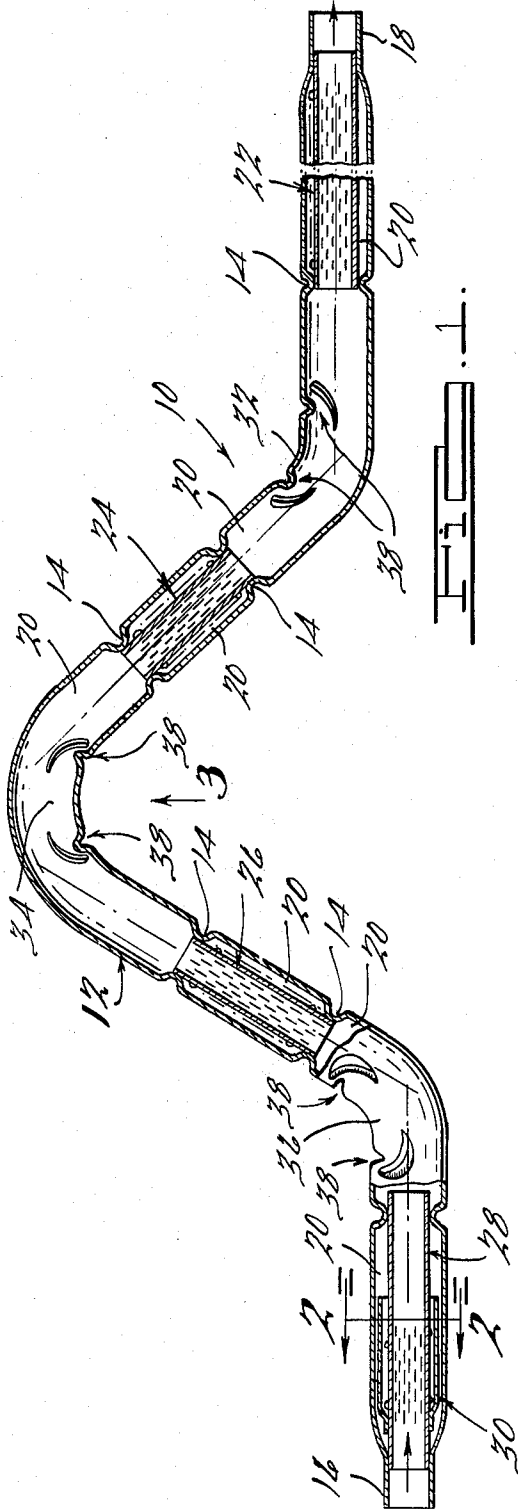
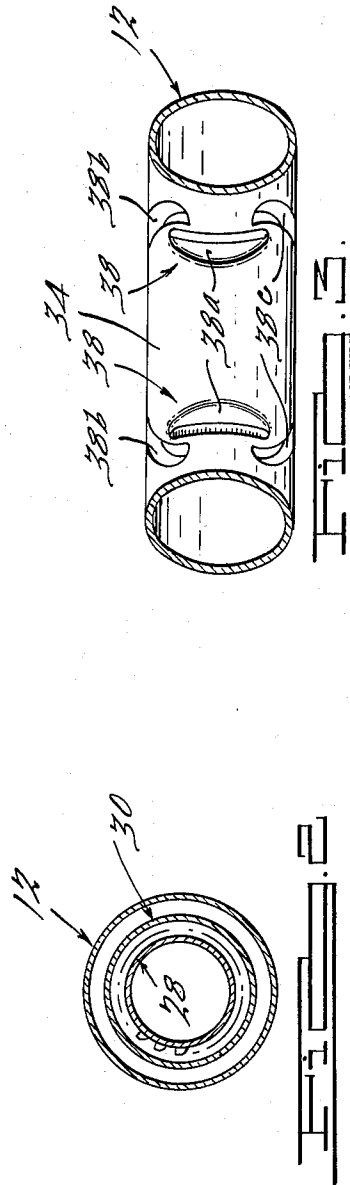


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EXHAUST PIPE SILENCER WITH SIDE BRANCH CHAMBERS
AND BAFFLED ELBOW SECTIONS
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EXHAUST PIPE SILENCER WITH SIDE BRANCH CHAMBERS AND BAFFLED ELBOW SECTIONS

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3 Claims. (Cl. 181-59)

This invention relates generally to exhaust systems for internal combustion engines, and more particularly, to an exhaust gas conduit for an automotive engine.

It is an object of the present invention to provide an exhaust gas pipe construction that is formed with a plurality of creases or indentations to enhance the exhaust sound attenuating characteristics of the pipe construction.

It is another object of the present invention to provide an exhaust gas pipe construction having deviating and restricting means formed in certain bent sections thereof to increase the turbulence of the exhaust gases flowing through the pipe construction, thereby attenuating exhaust gas noise.

Other objects and advantages of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a longitudinal cross-sectional view of an exhaust gas pipe construction embodying the present invention;

FIGURE 2 is an enlarged transverse cross-sectional view taken along the line 2-2 of FIGURE 1; and

FIGURE 3 is an enlarged bottom elevational view of the structure illustrated in FIGURE 1, taken in the direction of the arrow 3 thereof.

Referring now to FIGURE 1 of the drawing, an exhaust gas pipe construction 10 is shown as comprising a hollow elongated tube or shell 12 which is formed with a plurality of longitudinally spaced necked-down sections, generally designated 14. The opposite ends of the shell 12 are also necked down into inlet and outlet sections or bushings 16 and 18, the former of which is adapted to be connected to a suitable conduit (not shown) communicating the pipe construction 10 with the exhaust manifold of a conventional automotive engine (not shown).

The bushing sections 16 and 18, together with the plurality of necked-down sections 14, form a series of axially adjacent chambers, generally designated 20. As seen in FIGURE 1, a plurality of louvered cylindrical gas flow tubes 22, 24, 26 and 28 are disposed within four of the chambers 20 and are supported coaxially therewithin by being spotwelded or similarly secured at least at one end to the inner peripheries of the necked-down sections 14 and/or the bushing sections 16 and 18. The tubes and the bushings 16 and 18 are of substantially the same inside diameters and this corresponds to the size of conventional exhaust and tailpipes. Thus, the shell 12 is somewhat larger in diameter than the diameter of the normal gas flow path through the pipe construction 10.

In general, the plurality of chambers 20 function to attenuate different exhaust sound frequencies in a manner such that the entire frequency range or spectrum of undesirable exhaust sound is attenuated by the time the exhaust gases reach the terminal end of the pipe construction 10. For example, the chambers 20 circumjacent the tubes 22, 24 and 26 act as spit chambers to attenuate high frequencies and the tube 28 functions with a nonperforate shell 30 to provide a tuned chamber to attenuate lower frequencies. Additional silencing sections may be provided as needed.

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In order that the pipe construction 10 conform with the shape or configuration of the frame and chassis of the automotive vehicle with which it is to be operatively associated, it is necessary that bends be formed in it at series of longitudinally spaced locations, as seen at 32, 34 and 36 in FIGURE 1. These bends cannot be readily formed in sections containing internal pipe sections (i.e., silencing sections) but it has been found that sound attenuation can be obtained by bending the enlarged empty sections, such as 32, 34 and 36. Such bending is preferably done on a vertical bending machine whereby a plurality of creases or radially inwardly extend indentations are formed on the concave side of the shell 12 in each of the bend sections 32, 34 and 36. In particular, the creases or indentations which are formed at the sections 32, 34 and 36 are arranged in two groups or triads, generally designated 38, of three indentations each. As best seen in FIGURE 2, each of the triads 38 comprises three separate indentations 38a, 38b and 38c, the former of which is slightly curved and extends transversely of the shell 12, and the latter two of which are somewhat more arcuate in shape than the indentation 38a and curve about the opposite ends thereof. It may be noted that the relative lengths and depths of each of the indentations 38a, 38b and 38c comprising the triads 38, will vary in accordance with the angle of bending or the relative angularity between the longitudinal axis of the shell 12 and the axis of inclination of the bent portion of the shell 12, with both the lengths and depths of the indentations increasing as the angle of bending increases.

The indentations 38a, 38b and 38c comprising the groups or triads 38, in combination with the enlarged diameter of the gas passage through the bent sections 32, 34 or 36 as compared with the normal gas passage diameter of sections 16, 18, 22, 24, 26, or 28, have a desirable exhaust sound attenuating effect on exhaust gases as they are transmitted through the pipe construction 10. More specifically, the indentations have a slight restrictive and baffle effect which changes the velocity and increases the turbulence of the exhaust gases as they pass through each bend sections 32, 34 and 36 of the shell 12, thereby reducing the sound energy of the exhaust gases. Also the indentations 38a, 38b and 38c comprising the triads 38 tend to make the bend sections 32, 34 and 36 somewhat more rigid and thereby reduced pipe noise.

While it will be apparent that the herein illustrated embodiment of the exhaust pipe construction 10 of the present invention is well calculated to fulfill the objects above stated, it will be appreciated that this construction is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In an exhaust gas pipe for transmitting exhaust gases from an automotive engine, a hollow elongated shell, said shell having a plurality of longitudinally spaced necked-down sections defining a series of chambers, said tube having at least one bent section providing a chamber, a triad of arcuately configured and inwardly extending projections formed on the concave of said bent section, said triad comprising one projections that extends transversely of said shell and a pair of projections which extend arcuately about the opposite ends of said transversely extending projection,

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said projections being adapted to restrict the flow of exhaust gases being transmitted through said chamber and thereby increase the turbulence of said exhaust gases to remove exhaust sound energy from said gases and improve the sound attenuating properties of said exhaust pipe.

2. In an exhaust conduit for conducting exhaust gases from an automotive engine, a hollow tube providing a passage for exhaust gas, said tube having a bent section providing a gas passage section that is not straight, said bent section having a concave side and a convex side, the concave side of said tube bent section having a triad of inwardly extending projections one of which extends crosswise of the tube and a pair of which extend lengthwise of the tube and are located respectively at opposite ends of said crosswise projection, said projections being adapted to restrict the flow of exhaust gases through the tube and increase the turbulence of the gases to remove sound energy from the gases and improve the sound attention of the tube.

3. A conduit as set forth in claim 2 wherein said bent section extends through an arc and has two of said triads formed therein, one of said triads being located adjacent each end of said arc.

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