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(54) Exhaust system.

(57) A reverse type silencer (10) comprises a pair of cylindrical portions (12, 14) in which their meeting ends are pinched and overlapped. A resonance silencer (12) is located behind the silencer (10) and has a plurality of notches (24) arranged spirally. Shells (26, 30) are provided for the silencer. Sound waves entering into the silencer are reflected and attenuated resulting in dampening of noise before emission.

EP 0 150 899 A2

"Exhaust System"

FIELD OF THE INVENTION

This invention relates to an exhaust system and particularly to a reverse type silencer for an exhaust system.

BACKGROUND OF THE INVENTION

Reverse type silencers are so well known and in all these types of silencers there is a reversal of the flow of direction of gases to obtain dampening of noise.

It is an object of the present invention to provide a novel reverse type silencer which is more efficient than prior art silencers of the same type.

THE INVENTION

According to the invention a reverse type silencer includes a core in a shell, the core comprising a pair of cylindrical portions, the first portion having openings flanking the second portion and the second portion having openings facing rearwardly having regard to the flow of exhaust gas, and flanking the first portion.

In a preferred form of the invention the shell has a curved termination and the second portion extends through the termination. The curved termination may be convex or concave.

The ends of the two portions are preferably pinched (without losing any effective area), placed end to end, rotated through a right angle and the two pressed into each other by means of the provision of suitable slots.

As a result of this construction the centre of the core has a restriction substantially in the form of a cross, but other shapes may be formed depending on the degree of pinching.

Gases and sound waves entering the silencer of the invention have two routes - a first route through the centre of the core where they encounter the restriction, (which also causes a reduction in sound energy by altering the impedance of the system) and a second route through the flanking openings from where they impinge on the curved termination, the reflected gases and waves then moving reardwardly to impinge against the opposite wall of the silencer and the gases from there passing into the second portion of the core and then to atmosphere.

The reflected sound waves are reflected from a number of different points on the curved rear portion and therefore attenuate the oncoming waves both as to angle and as to phase. Some of the reflected waves are transmitted through the opposite wall which may separate the silencer of the invention from a primary silencer.

According further to the invention there is provided a primary silencer comprising a cylindrical body in a shell, the body having a plurality of open notches in its surface.

The space between the cylindrical body and the shell may be filled with sound absorbing material such as glass or ceramic fibres.

The notches may be of any shape, but are preferably cut transversely and a curved portion pressed into the surface to cnstitute a downwardly-depending lip, either forwardly or rearwardly.

In a preferred form of the invention the notches in a particular manner are grouped and are arranged in the form of a number of spirals longitudinally of the body. This arrangement ensures that portions of wavelengths or groups of wavelengths of sound are collected by at least one or a group of notches, whence the waves pass into the sound absorbing material to be absorbed in part and,

in some and often most cases, become out of phase when reflected back into the body, thereby attenuating or altering the wave pattern of incoming waves.

The spiral formation also causes a reduction in turbulence at high gas velocities.

EMBODIMENT OF THE INVENTION

An embodiment of the invention is described below with reference to the accompanying drawing which is an exploded perspective view of a silencer according to the invention.

In the drawing the reverse type silencer section of a combined resonance/reverse silencer is indicated by reference 10 and comprises a pair of cylindrical portions 12,14, the meeting ends of which are pinched as shown and overlap as shown, slots having been provided for this purpose.

Behind the reverse type silencer section is a resonance type silencer section indicated by reference 20 which has a core 22 including a plurality of open notches 24 arranged spirally. A shell 26 is provided for this section of the silencer.

The shell 30 of the reverse type silencer section has a curved termination 32, formed by crimping the end of the cylinder forming it. The end of portion 12 extending through the orifice 34 in the shell 30. The curve may be concave or convex.

The pinching of the portions 12,14 results in the formation of openings 16 in portion 12 and 18 on portion 14, these openings flanking the respective portions. As mentioned above the exhaust gases and sound waves entering this section of the combined silencer have two routes - a first route through the centre of the two portions where the pinching causes the formation of a restriction in the form of a cross or other shape and a second route through the flanking openings from where the gases and the sound waves impinge on the curved termination 32.

The reflected gases and sound waves then move rearwardly at a number of angles, some of the gases finding their way through the openings 18 and thence to atmosphere. The reflected sound waves attenuate some of the incoming sound waves, and others impinge on the diaphragm 40 between the two sections of the combined silencer, and are transmitted through the diaphragm to this section, where they are dampened.

In the section 20, the core is enclosed in a shell 26, the space between the core and shell being filled with a sound absorbing material such as glass or ceramic fibres or the like. The shell 26 may be integral with shell 30.

The features disclosed in the foregoing description, in the following claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

CLAIMS: -7-

1.

A reverse type silencer characterised in including a core in a shell, the core comprising a pair of cylindrical portions, the first portion having openings flanking the second portion and the second portion having openings facing rearwardly having regard to the flow of exhaust gas, and flanking the first portion.

2.

A reverse type silencer according to claim 1 characterised in that the shell has a curved termination and the second portion extends through the termination.

3.

A reverse type silencer according to claim 1 to claim 2 characterised in that the adjacent ends of the first and second portions are pinched, placed end to end, rotated through a right angle and pressed into each other to form a substantially cross configuration at the join between the first and second portions.

4.

A reverse type silencer according to claim 3 characterised in that the opening in the first portion is formed at its extremity and the openings in the second portion are arranged in the form of spirals distributed longitudinally of the body.

5.

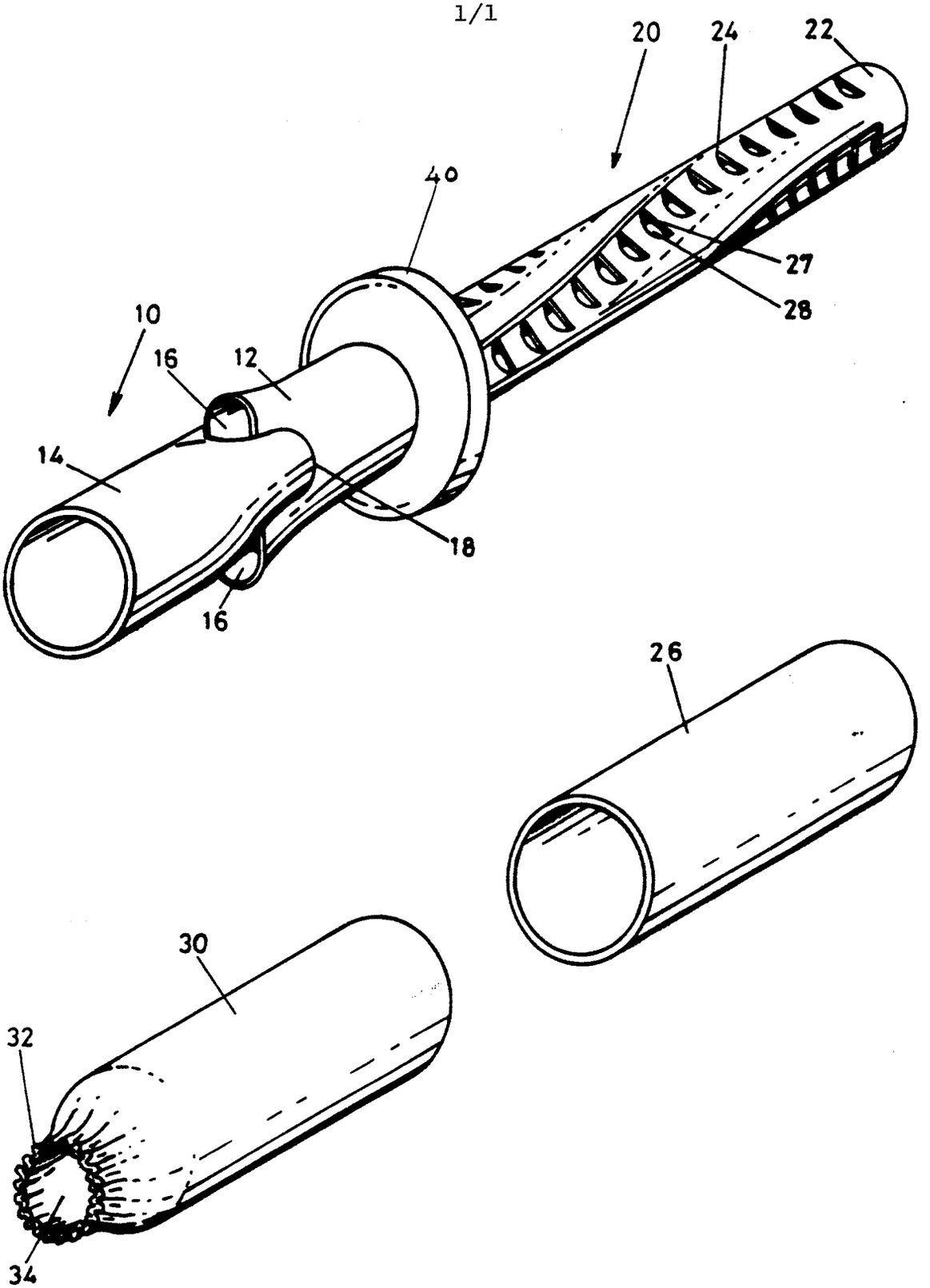
A reverse type silencer according to any one of claims 1 to 4 characterised in including a primary silencer comprising a cylindrical body in a shell, and the body having a plurality of open notches in its surface.

6.

A reverse type silencer according to claim 5 characterised in that the cylindrical body and the shell are filled with sound absorbing material such as glass or ceramic fibres.

7.

A reverse type silencer substantially as herein described with reference to the accompanying drawing.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