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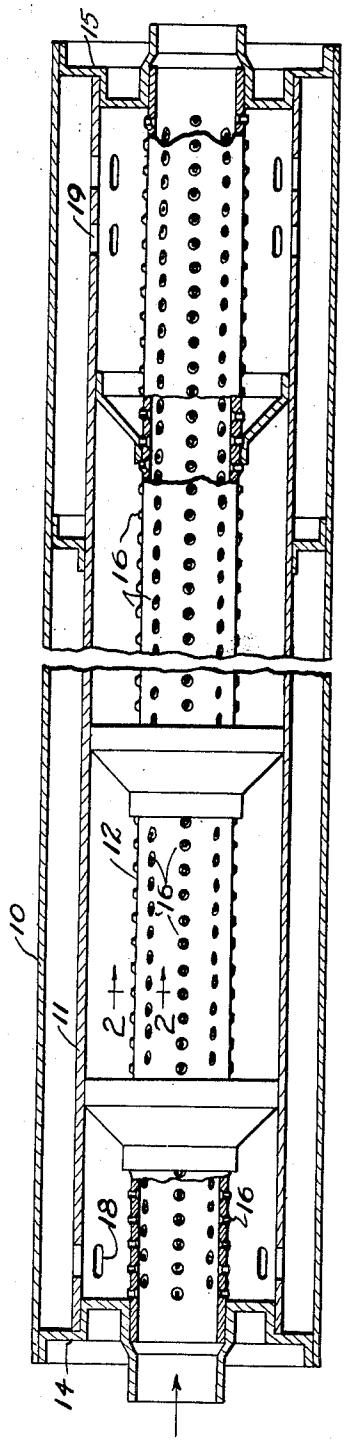


FIG. 1.



FIG. 3.



FIG. 2.

INVENTOR.
Virgil Oldberg
BY Daniel G. Cullen.
ATTORNEY.

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Virgil Oldberg, Detroit, Mich.

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4 Claims. (Cl. 137—160)

This invention relates to silencers and more particularly to silencers of the recently developed sound wave attenuating type.

There has recently appeared and been marketed a line of silencers having a plurality of relatively telescoped shells, the inner one of which provides, at least in part, a thru passage for the escape of exhaust gases from internal combustion engines. Between the inner shell and the next adjacent shell, is provided means for attenuating sound waves. In one construction such means comprises a mass of steel wool or the like, whereas in another construction, developed by applicant, the means comprises a series of annular frusto-conical diaphragms.

In both of these constructions, the inner shell is provided with a large area covered with a plurality of closely spaced minute perforations thru which sound waves pass from the inner shell to to the space, therearound, in which is disposed the wave attenuating means.

It has been discovered that the presence of these minute perforations, for some reason not at present known to applicant, creates an extremely objectionable "whistling" noise, and the principal object of the invention is to provide means for eliminating such "whistling" noise entirely, or at least, to a large degree.

Other objects of the invention will be readily understood and appreciated upon reference to the following detailed description of an embodiment of the invention and upon reference to the appended drawing, whose

Fig. 1 shows an embodiment in longitudinal section, and whose

Fig. 2 is a section on line 2—2 of Fig. 1, and whose

Fig. 3 is a diagrammatic view.

Referring to the drawing, it will be seen that there is shown a silencer including a plurality of relatively telescoped shells 10, 11, and 12, having open ends closed by end headers 14 and 15.

The inner shell is open from header to header to provide a thru passage for exhaust gases from the inlet header 14 to the outlet header 15 and for a large area is covered with a plurality of minute, closely spaced perforations 16. These create a communication between the interior of the inner shell 12 and the space between the shells 11 and 12, which space contains sound wave attenuating means, such as the series of frusto-conical resonator plates 17.

The intermediate shell 11 is provided with large openings 18 and 19 which creates communication between the interior of the intermediate shell and the space between it and the outer shell.

If the perforations 16 are formed simply by stamping or cutting them out of the inner shell, then, for some unknown reason, there is created an objectionable "whistling" noise, caused by the passage of sound waves thru the perforations. In order to eliminate such noises, the perforations are formed in the crowns of frusto-conical bosses 21 formed from the shell 12. This has been found to eliminate the objectionable "whistling" noises mentioned above and has been found to be extremely desirable in silencer construction.

It will be observed that while the perforations 16 are shown as being round and small holes, they might perhaps be in the nature of slots, oblong, oval, etc., or might also be in the form of squared or polygonal holes.

Further, it will be observed that the deflections around the perforations should be great enough so as to prevent any sharp edges, on their under surface, being presented to the gases rushing thru the inner shell past the perforations, in paths at right angles to the axes of these perforations. It is believed that the sharp edges, on the inner surface of the inner shell, at the perforations, as provided in prior art constructions, causes the sound waves passing thru the perforations, to be split, as illustrated diagrammatically in Fig. 3, with the attendant "whistling" noises. In the construction disclosed, the edges of the perforations are rounded, as shown, to prevent such splitting of sound waves.

It will also be observed that the deflected edges at the perforations are far more rigid than prior art, undeflected edges, and that consequently, they will not vibrate or become distorted, temporarily or permanently. This freedom from vibration and distortion is believed to be an important factor in making the silencer more free from noises than prior art silencers.

Now having described the invention and a preferred embodiment of the same, reference will be had to the following claims which determine the scope of the invention, it being understood that the same is not to be limited to the specific embodiment shown.

I claim:—

1. A silencer of the class specified including two relatively telescoped shells, the inner one of which is provided with a plurality of closely spaced, minute, outwardly extruded perforations, having their sound wave entrance edges smoothened, and means disposed in the annular

space between the two shells for aiding in sound wave attenuation, the extrusions engaging the means and cooperating to retain them in place.

2. A silencer of the class specified including two relatlvely telescoped shells, the inner one of which is provided with a plurality of closely spaced, minute, outwardly extruded perforations having their sound wave entrance edges smoothened, and diaphragms disposed in the annular space between the shells, the extrusions engaging the diaphragms and cooperating to retain them in place.

3. A silencer of the class specified including two relatively telescoped shells, the inner one of which is provided with a plurality of closely spaced, minute, outwardly extruded perforations having their sound wave entrance edges smoothened, and means disposed in the annular space between the two shells for aiding in sound wave attenuation, the extrusions engaging the means and cooperating to retain them in place and also preventing the gathering of soot or the like in the perforations.

4. A silencer of the class specified including two relatively telescoped shells, the inner one of which is provided with a plurality of closely spaced, minute, outwardly extruded perforations having their sound wave entrance edges smoothened, and diaphragms disposed in the annular space between the shells, the extrusions engaging the diaphragms and cooperating to retain them in place, also preventing the gathering of soot or the like in the perforations.

VIRGIL OLDBERG.