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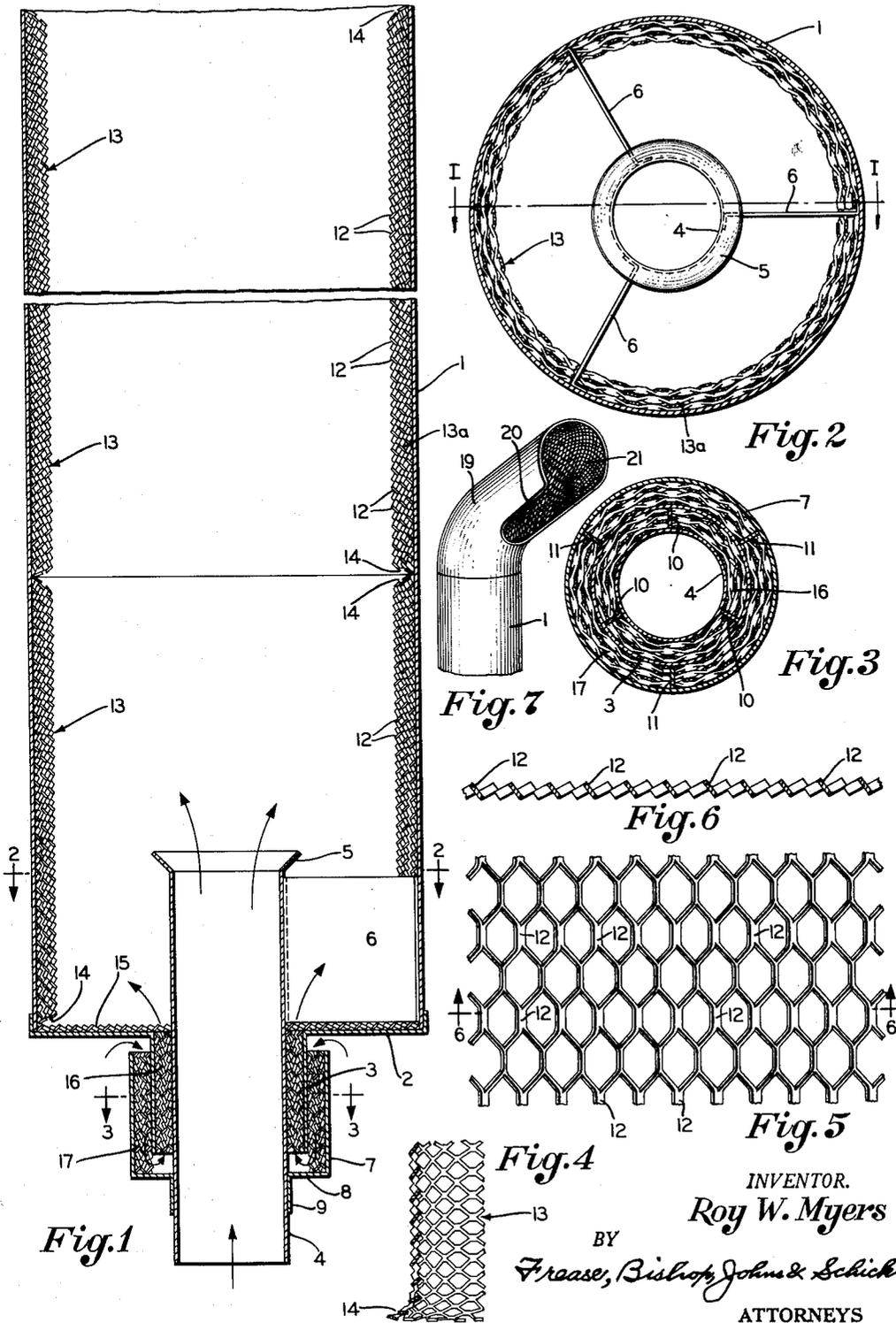


Fig. 1

Fig. 2

Fig. 3

Fig. 6

Fig. 5

Fig. 4

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The invention relates to mufflers for internal combustion engines and more particularly to a muffler especially adapted for use upon trucks and the like.

It is an object of the invention to provide a muffler of this character having an expansion barrel lined with expanded sheet metal for the purpose of breaking up the sound.

Another object of the invention is to provide such a muffler in which the expansion barrel is lined with tubes formed of expanded sheet metal, opposite ends of each tube being flared outwardly forming annular flanges for contact with the interior of the expansion barrel.

A further object of the invention is to provide such a muffler in which alternate sections of the expanded metal are so arranged that the angular web portions of the expanded metal are alternately located in opposite directions.

A still further object of the invention is to provide a muffler of the character referred to in which a plurality of concentric tubes of expanded sheet metal are located one within the other, within the expansion barrel of the muffler.

Also, it is an object of the invention to provide a muffler of this type in which a smaller diameter inlet pipe, connected to the exhaust pipe of the motor, enters the inlet end of the expansion barrel.

A further object is to provide such a muffler in which means is provided at the inlet end of the expansion barrel for releasing back pressure within the expansion barrel and for drawing atmospheric air therein.

The above objects together with others, which will be apparent from the drawing and following description, or which may be later referred to, may be attained by constructing the improved muffler in the manner hereinafter described in detail and illustrated in the accompanying drawing.

In general terms, the invention may be briefly described as comprising a muffler having an expansion barrel open at its discharge end and closed at its inlet end, excepting for a smaller diameter inlet pipe adapted to be connected to the exhaust side of the motor.

Means is provided at the inlet to the expansion barrel of the muffler, and surrounding the inlet pipe thereto, providing for the release of back pressure within the expansion barrel and for drawing atmospheric air into the same.

For the purpose of breaking up sound, the interior of the expansion barrel is lined with expanded sheet metal. This expanded sheet metal lining is preferably formed in a plurality of sections so arranged that the angular web portions of the expanded metal are alternately located in opposite directions.

The expanded metal is preferably formed into tubes, the ends of which are flared outwardly to form annular flanges for contact with the interior of the expansion barrel of the muffler. In order to increase the effectiveness of the muffler, two or more tubes of expanded sheet metal may be inserted, one within the other, to provide a lining for the expansion barrel.

The means for releasing back pressure and admitting atmospheric air at the inlet end of the expansion barrel, may be formed by providing a rearwardly or downwardly disposed tubular neck at the inlet end of the expansion barrel, surrounding and of greater diameter than the inlet pipe.

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This tube is surrounded by a second tube, of larger diameter, closed at its rear or lower end and connected to the inlet pipe and open at its upper or forward end. This provides a tortuous path through which back pressure may be discharged or released and through which atmospheric air may be drawn into the inlet end of the expansion barrel. The tubular members forming this inlet portion of the muffler may be lined with expanded sheet metal.

A rearwardly disposed elbow is provided at the upper end of the expansion barrel, said elbow having a longitudinally disposed slot in its underside to relieve back pressure in this end of the barrel. One or more layers of expanded sheet metal may be located around the interior of the elbow.

Having thus briefly described the invention, reference is now made to the accompanying drawing, showing a preferred embodiment of the invention, in which;

FIG. 1 is a longitudinal sectional view through a muffler embodying the invention, taken on the line 1-1, of FIG. 2;

FIG. 2 is a transverse sectional view through the expansion barrel of the muffler, taken as on the line 2-2, in FIG. 1;

FIG. 3 is a transverse sectional view through the inlet portion of the muffler, taken as on the line 3-3, FIG. 1;

FIG. 4 is a fragmentary section of one end portion of one of the tubular sections of expanded sheet metal with which the barrel of the muffler is lined;

FIG. 5 is an enlarged, fragmentary elevation of a portion of a sheet of expanded sheet metal such as is used for lining the muffler;

FIG. 6 is a transverse section thereof, taken as on the line 6-6, FIG. 5; and

FIG. 7 is a small scale perspective view of the upper end portion of the expansion barrel, showing the elbow with slotted underside.

Referring now more particularly to the embodiment of the invention illustrated in the drawing, in which similar numerals refer to similar parts throughout, the muffler comprises generally the expansion barrel 1 formed of sheet metal of cylindrical shape and of any desired or necessary length.

The muffler to which the invention pertains is especially adapted for use upon trucks and the like, and for this purpose the expansion barrel 1 is preferably located vertically on one side of the vehicle and extends to a point above the top of the cab thereof.

The lower end of the expansion barrel is closed by the wall 2 having a central opening from which the cylindrical neck 3 extends downward. The inlet pipe 4, of smaller diameter than the tubular neck 3, extends centrally therethrough and into the lower end of the expansion barrel 1, the upper end of the inlet pipe being preferably outwardly flared, as indicated at 5.

This inlet pipe may be connected to the lower end portion of the expansion barrel as by the spiders 6. A tube 7, of larger diameter than the neck 3, surrounds said neck and is closed at its lower end as at 8, and connected to the inlet pipe 4 as at 9. The upper end of the tube 7 is spaced downwardly from the bottom wall 2 of the expansion barrel, and the closed end 8 of the tube 7 is spaced downwardly from the lower end of the neck 3, as best shown in FIG. 1.

This provides a tortuous passage through which atmospheric air may enter the inlet end of the expansion chamber in the direction of the arrows shown in FIG. 1, or in like manner back pressure within the expansion barrel may be released and passed outwardly from the expansion barrel in a direction opposite to said arrows.

The inlet pipe 4 may be connected to the neck 3 by spiders, as indicated at 10 in FIG. 3, and in like manner

the tube 7 may be connected to the neck 3 as by spiders 11, shown in said figure.

A principal feature of the invention is the provision of expanded sheet metal lining within the expansion barrel of the muffler. For this purpose, a common and well known type of expanded sheet metal is used, of the type commonly used for metal lath and the like.

A fragmentary elevation of such expanded sheet metal, shown substantially full size, is illustrated in FIG. 5 and a transverse section therethrough is shown in FIG. 6. In these views it will be seen that the web portions 12 of this expanded sheet metal are located at acute angles to the normal plane of the expanded metal sheet.

Applicant takes advantage of this angular arrangement of the web portions in the expanded sheet metal to assist in breaking up sound within the muffler. In forming the lining for the expansion barrel, the expanded sheet metal as shown in FIGS. 5 and 6 is preferably formed into tubular sections of such lengths that a plurality of such sections located longitudinally end to end extend from one end of the expansion barrel to the other.

Each of these tubular sections, as indicated at 13 and best shown in FIG. 4, has its opposite ends flared outwardly as at 14 forming annular flanges for contact with the inner walls of the expansion barrel 1.

As best shown in FIG. 1, these tubular sections of expanded sheet metal are preferably oppositely arranged so that the angular web portions 12 of alternate tubular sections are oppositely disposed. In actual practice, this has been found to assist in breaking up the sound of the exhaust gases within the expansion barrel.

As the exhaust gases are admitted to the lower end portion of the expansion barrel from the inlet pipe 4, they will expand outwardly and upon contact with the lowermost section of expanded sheet metal, in which the web portions 12 are angled upwardly and forwardly, will easily pass therethrough.

Upon contact with the next upper section of expanded sheet metal, in which the web portions 12 are rearwardly and downwardly angled, the exhaust gases upon contact therewith will be reflected back into the central portion of the expansion barrel, and so on throughout the length of the expansion barrel, thus tending to break up the sound.

Instead of providing only a single layer of expanded sheet metal lining within the expansion barrel, one or more additional tubular sections of expanded metal may surround each section 13, between the same and the inner wall of the barrel, as indicated at 13a in FIGS. 1 and 2, thus increasing the effectiveness of the lining in breaking up the sound.

If desired, a lining 15 of expanded metal may be placed upon the bottom wall 2 of the expansion barrel. Also, if desired, one or more layers of expanded metal may be located between the inlet pipe 4 and the neck 3, as indicated at 16 in FIGS. 1 and 3, and between the neck 3 and the tube 7, as indicated at 17 in said figures.

For the purpose of directing the exhaust gases away from the cab of the truck, or other vehicle upon which the muffler is located, an elbow 19 may be attached to the upper end of the expansion barrel 1, as best shown in FIG. 7.

This elbow is preferably a 45° elbow, disposed rearwardly so as to direct exhaust gases away from the cab. A longitudinally disposed slot or opening 20 is formed in the underside of the elbow to release back pressure at the upper end of the muffler. One or more layers of expanded sheet metal may line the interior of the elbow as indicated at 21.

From the above it will be obvious that a simple, inexpensive and effective muffler is provided for trucks and the like, wherein the sound from the exhaust gases may be broken up and absorbed by contact of exhaust gases with the expanded sheet metal lining arranged in sections with the angular web portions thereof alternately disposed

in opposite directions, and in which back pressure may be quickly and easily released from the expansion barrel.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. A muffler comprising a tubular expansion barrel, an inlet pipe of less diameter than the expansion barrel and located in the inlet end of the barrel, and a lining upon the inner walls of the expansion chamber comprising expanded sheet metal having angularly disposed web portions, said expanded sheet metal lining being formed of alternate tubular sections having the web portions oppositely disposed.

2. A muffler comprising a tubular expansion barrel, an inlet pipe of less diameter than the expansion barrel and located in the inlet end of the barrel, and a lining upon the inner walls of the expansion chamber comprising expanded sheet metal having angularly disposed web portions, said expanded sheet metal lining being formed of alternate tubular sections having the web portions oppositely disposed, each tubular section of expanded sheet metal having outwardly flared ends contacting the inner walls of the barrel.

3. A muffler comprising a tubular expansion barrel, an inlet pipe of less diameter than the expansion barrel and located in the inlet end of the barrel, and a lining upon the inner walls of the expansion chamber comprising concentric layers of expanded sheet metal having angularly disposed web portions, said expanded sheet metal lining being formed of alternate tubular sections having the web portions oppositely disposed.

4. A muffler comprising a tubular expansion barrel open at its discharge end and having an end wall at its inlet end, there being a central opening in said end wall, a tubular neck extending outwardly from said opening, an inlet pipe of less diameter than said tubular neck and located therethrough and into the expansion barrel, a tube of larger diameter than said tubular neck and surrounding the same, and closure means for said tube spaced from the end of said tubular neck, forming a tortuous path through which back pressure from the expansion barrel may pass between the inlet pipe and said tubular neck and between said tubular neck and said tube.

5. A muffler comprising a tubular expansion barrel open at its discharge end and having an end wall at its inlet end, there being a central opening in said end wall, a tubular neck extending outwardly from said opening, an inlet pipe of less diameter than said tubular neck and located therethrough and into the expansion barrel, a tube of larger diameter than said tubular neck and surrounding the same, and closure means for said tube spaced from the end of said tubular neck, forming a tortuous path through which back pressure from the expansion barrel may pass between the inlet pipe and said tubular neck and between said tubular neck and said tube and expanded sheet metal linings upon the interiors of said tubular neck and said tube.

6. A muffler comprising a tubular expansion barrel open at its discharge end and having an end wall at its inlet end, there being a central opening in said end wall,

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a tubular neck extending outwardly from said opening, an inlet pipe of less diameter than said tubular neck and located therethrough and into the expansion barrel, a tube of larger diameter than said tubular neck and surrounding the same, and closure means for said tube spaced from the end of said tubular neck, forming a tortuous path through which back pressure from the expansion barrel may pass between the inlet pipe and said tubular neck and between said tubular neck and said tube, and linings upon the interiors of said tubular neck and said tube, said linings comprising multiple layers of expanded sheet metal having angularly disposed web portions alternately disposed in opposite directions.

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