May 11 , 1926. 1,583,908

H. H. WILLIAMS

MUFFLER AND THE LIKE

Filed Feb. 12, 1925 2 Sheets-Sheet 1

Fig. 1.

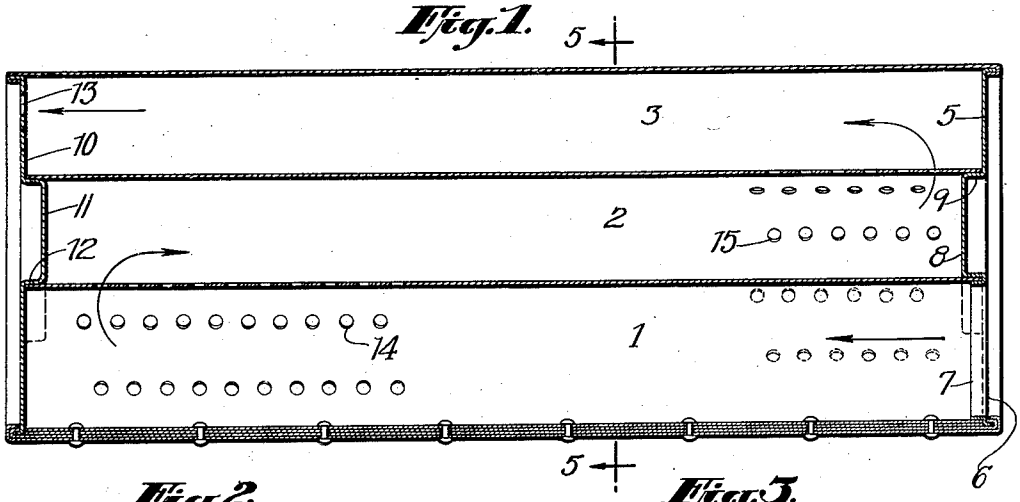



Fig. 2.

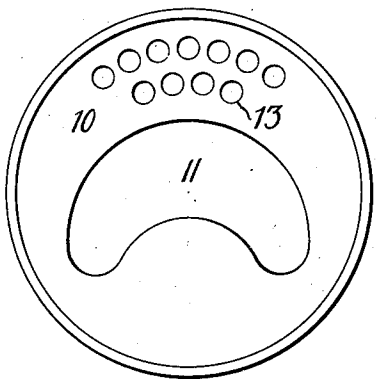



Fig. 3.

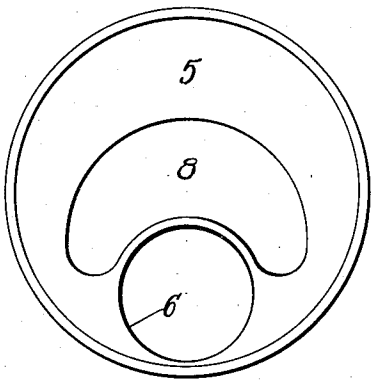



Fig. 4.

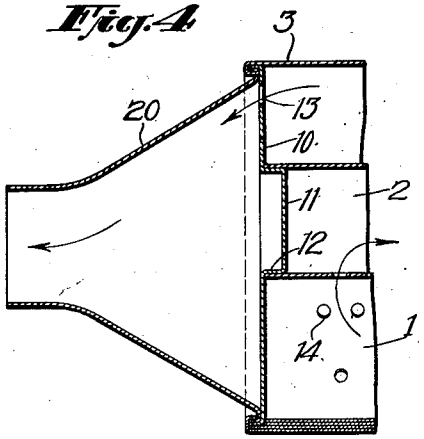
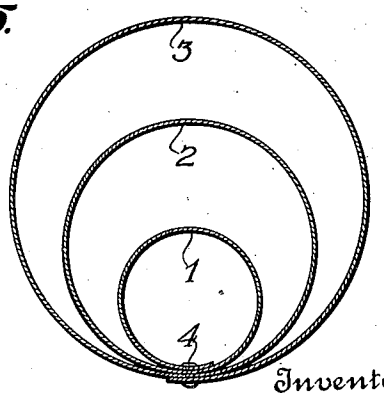



Fig. 5.




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Filed Feb. 12, 1925 2 Sheets-Sheet 2

Fig. 6.

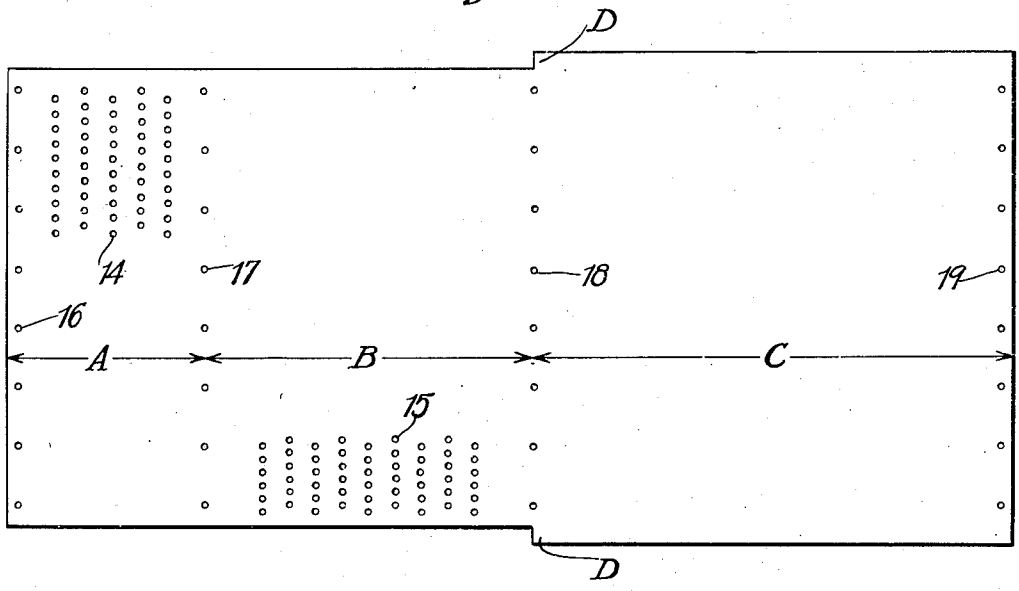
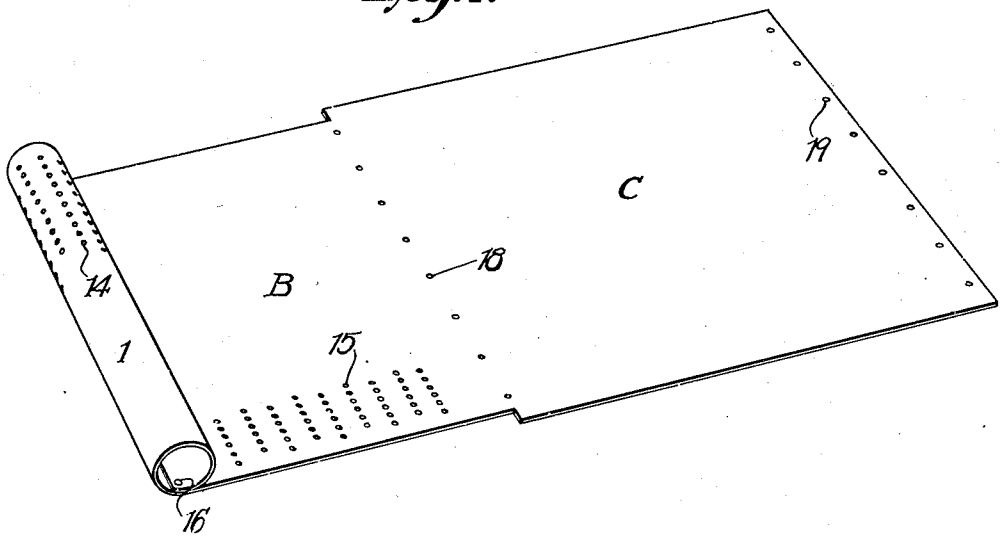



Fig. 7.




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Patented May 11, 1926. 1,583,908

# UNITED STATES PATENT OFFICE.

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## MUFFLER AND THE LIKE.

Application filed February 12, 1925. Serial No. 8,626.

A common form of muffler for internal combustion engines comprises a number of tubes of different diameters assembled concentrically and provided with heads and openings by which the exhaust gases pass forward and backward and are broken up and expanded gradually and finally emerge into the atmosphere.

My invention provides a method of manufacturing a muffler or similar apparatus with a considerable reduction in weight and cost compared with previous constructions.

The acompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a longitudinal vertical section;

Figs. 2 and 3 are opposite end elevations;

Fig. 4 is a separate section of one of the heads showing a modification;

Fig. 5 is a cross-section on the line 5—5 of Fig. 1;

Fig. 6 is a plan of the blank from which the muffler is formed;

Fig. 7 is a perspective view of the same illustrating an intermediate stage in the operation.

Referring to the embodiment of the invention illustrated, the muffler is formed in the succession of tubes 1, 2 and 3 of successively increased diameter, tangent to one another along a common line as shown in Fig. 5. These tubes are integral continuations of one another formed of a single sheet bent spirally and fastened together along the tangent line as by means of rivets 4 (or it may be by welding or otherwise). At the inlet end a head 5 is mounted on the tubes with an opening 6 surrounded by a flange 7 fitting within the end of the tube 1; and with an offset portion 8 of approximately crescent shape the flanged edge 9 of which fills the greater part of the end of the tube 2 so as to hold it properly spaced from the tube 1. The end 5 is surrounded by a flange over which the edge of the outermost tube is crimped as shown in Fig. 1.

The opposite head 10, Fig. 2, is flanged and similarly held by the crimped edge of the outer tube and is provided with a crescent shaped portion 11, the flange 12 of which serves to space the first and second tubes and is provided with a number of apertures 13 which serve to break up the currents of gas and lead them to the atmosphere.

The inner tube is provided at its rear end with lateral perforations 14 serving to break up the current of gases and to pass them into the rear end of the second tube; whence they travel back to the forward end of the second tube and through perforations 15 into the third tube which conducts them finally to the atmosphere through the perforations 13.

Such a muffler can be made from a single sheet such as is shown in Fig. 6 with the addition of the heads illustrated or heads of any other suitable design. The blank has a portion A designed to be rolled up as in Fig. 7 to form the tube 1; a longer portion B which as the rolling continues will form the next tube 2; and finally a portion C which as the rolling is continued will form the outermost tube; this portion C having margins D which are crimped over the outer flanged edges of the heads. Before being rolled into tubular shape, the blank is punched to form the perforations 14 and 15 and also to form lines of rivet holes 16, 17, 18 and 19 along the lines which are tangent in the finished structure.

Thus the body of the muffler is made of a single sheet, and I combine the separate blanking, punching, rolling and seaming operations of the several tubes into one set of operations for all; thus reducing materially the labor cost of manufacture. This invention makes it possible also to reduce the thickness of metal compared with that previously used because the stiffness of the body is increased in my design by reason of its being all in one piece and by reason of the reinforcement secured through fastening all the tubes together along one line.

The invention may be applied to a muffler comprising any number of tubes and to tubes of various shapes and of various arrangements and capacities of the chambers and passages.

The bending of the sheet may be affected by rolling it around a mandrel the requisite number of times. After removing the mandrel, the spring of the metal will be allowed to expand the outer convolutions, and finally the heads will hold them in the desired diameters. Various other methods may be used of forming the blank into the series of tubes. The holes indicated at 16 to 19 may be rivet holes as a stated, or they may be pilot holes serving to indicate the line of con-

tact and to hold the different tubes in proper position while they are being fastened together.

Fig. 4 shows the provision of a separate chamber for securing a central discharge. This is a conical shell 20, the base of which is crimped within the edge of the shell 3 forming the outer tube. Or such an additional chamber may be provided by a lateral extension on the larger portion of the blank which forms the outer shell.

Though I have described with great particularity of detail certain embodiments of my invention, yet it is not to be understood therefrom that the invention is restricted to the particular embodiments illustrated. Various modifications may be made by those skilled in the art without departure from the invention as defined in the following claims.

What I claim is:

1. A muffler or the like comprising a plurality of tubes of different diameters one within another and tangent to one another along a common line and fastened to each other along said line, and a head 5 mounted on said tubes with an opening 6 surrounded by an internal flange 7 fitting within the end of one of said tubes, an offset portion 8 of crescent shape fitting within the end of another of said tubes and a flange fastened to the edge of the outermost tube.

2. The muffler of claim 1 having its opposite head 10 flanged and fastened to the outer tube and having a crescent shaped portion 11 entering an intermediate tube so as to space the adjacent tubes apart, said head 10 being provided with a number of apertures 13 to break up the currents of gas and lead them to the atmosphere.

3. The muffler of claim 1 having its opposite head 10 flanged and fastened to the outer tube and having a crescent shaped portion 11 entering an intermediate tube so as to space the adjacent tubes apart, said head 10 being provided with a number of apertures 13 to break up the currents of gas and lead them to the atmosphere, and having in addition a conical shell 20 the edge of which is fastened to the edges of the head 10 and the outer tube.

In testimony whereof, I have hereunto signed my name.

HERBERT H. WILLIAMS.