Nov. 7, 1950 T. A. CARLSON 2,529,136

MUFFLER WITH PLURAL PERFORATED INNER ELEMENTS

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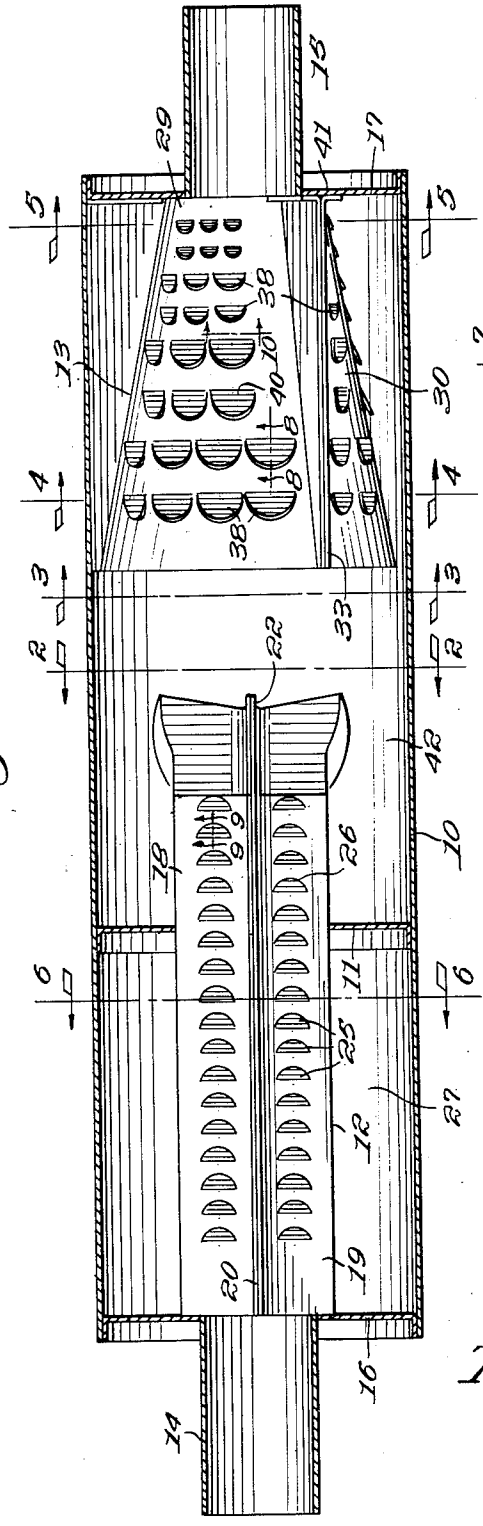


Fig. 1.

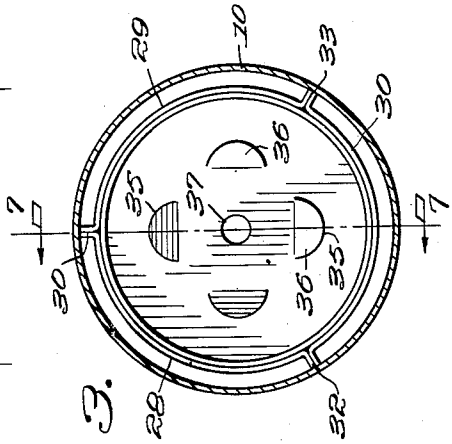


Fig. 3.

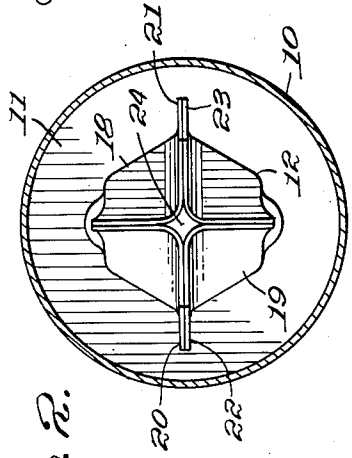


Fig. 2.

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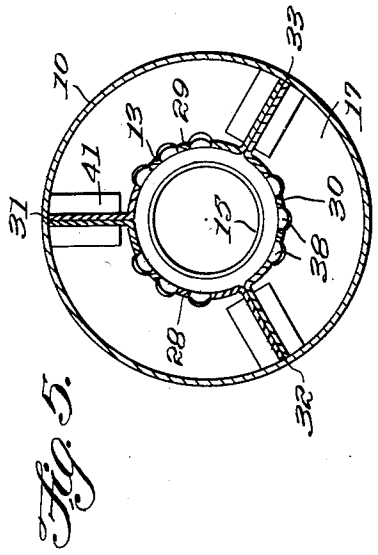


Fig. 5.



Fig. 8.

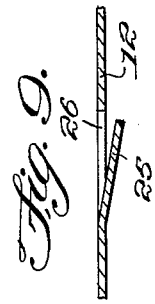


Fig. 9.



Fig. 10.

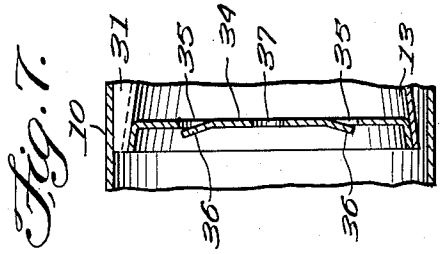


Fig. 7.

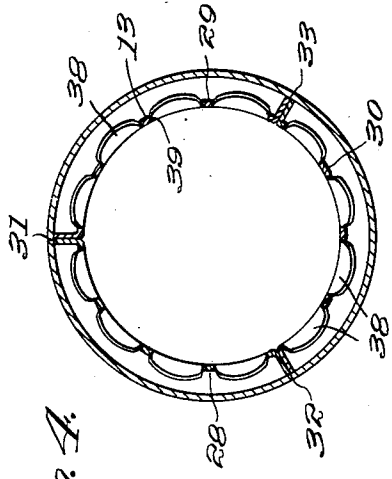


Fig. 4.

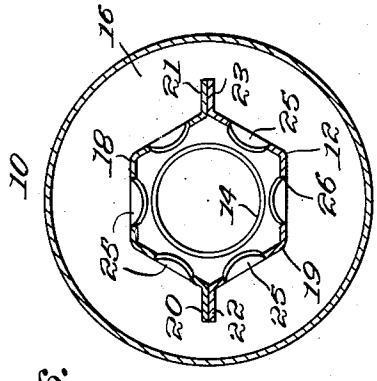


Fig. 6.

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UNITED STATES PATENT OFFICE

2,529,136

MUFFLER WITH PLURAL PERFORATED INNER ELEMENTS

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Application August 3, 1949, Serial No. 108,317

3 Claims. (Cl. 181—48)

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This invention relates to improvements in mufflers used in connection with exhaust manifolds of internal combustion engines particularly as used in motor vehicles, and in particular includes a muffler formed with a cylindrical housing having an enclosed area in the receiving end with a breather type tube extended through the said enclosed area and into which the exhaust gases from the exhaust manifold of the engine are passed and in the outlet or discharge end of the housing a funnel-like element is provided which is also formed with breather like elements in the walls.

The purpose of this invention is to improve the construction of mufflers for the exhaust gases of motor vehicle engines by providing a cushioning compartment through which the gases pass which substantially eliminates sound vibrations without increasing back pressure in the exhaust manifold.

Various types of mufflers for internal combustion engines have been provided in which numerous combinations of baffles and other sound arresting elements have been formed but where the elements are arranged to arrest and absorb sound excessive back pressure is built up in the exhaust manifold.

With this thought in mind this invention contemplates an improved type of muffler in which the sound arresting elements are of the breather type in which sound vibrations are substantially eliminated without increasing back pressure in the manifold.

The object of this invention is, therefore, to improve the construction of the sound arresting elements in a muffler whereby the exhaust gases pass through a cushioning compartment and the sound vibrations thereof impinge gases confined in the compartment instead of impinging baffles and other rigid elements that transmit the vibrations to the vehicle.

Another object of the invention is to provide a sound eliminating muffler for the exhaust of internal combustion engines of motor vehicles in which the parts are sufficiently rugged to withstand extreme heat of the exhaust gases.

A further object of the invention is to provide an improved type of muffler for internal combustion engines of motor vehicles which is of a comparatively simple and economical construction.

With these and other objects in view the invention embodies a muffler having an elongated cylindrical housing with an enclosed compartment in the receiving end, a receiving tube

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formed with a plurality of sections with rows of breather openings in the sections and with the tube extended through the enclosed compartment, and a funnel like element also formed of a plurality of sections and having breather openings in the walls of the sections positioned in the discharge end of the housing.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

Figure 1 is a longitudinal section through the housing of the muffler with the receiving tube and funnel like elements shown in elevation.

Figure 2 is a cross section through the intermediate part of the housing taken on line 2—2 of Figure 1 and showing the end of the receiving tube in elevation.

Figure 3 is a similar section taken on line 3—3 of Figure 1 showing the open end of the funnel like element in the discharge end of the housing.

Figure 4 is a similar section taken on line 4—4 of Figure 1 showing the shape of the breather openings in the wall of the funnel like element.

Figure 5 is a similar section on line 5—5 of Figure 1 illustrating the connecting flanges of the sections of the said funnel like elements.

Figure 6 is a similar section taken on line 6—6 of Figure 1 illustrating the construction of the receiving tube.

Figure 7 is a detail showing a section through the end of the funnel like element taken on line 7—7 of Figure 3 and showing a transverse baffle in the end of the element.

Figure 8 is a detail showing a section taken on line 8—8 of Figure 1 illustrating the breather openings of the funnel like element.

Figure 9 is a similar section taken on line 9—9 of Figure 1 illustrating the breather openings of the receiving tube.

Figure 10 is a detail showing a section on line 10—10 of Figure 1 illustrating the arcuate formation of the material in the walls of the funnel like element immediately behind the said breather like openings.

Referring now to the drawings wherein like reference characters denote corresponding parts the improved muffler of this invention includes an elongated cylindrical housing 10 having a transverse partition 11 spaced from the receiving end with a receiving tube 12 extended from the receiving end through the partition 11 and a funnel like element 13 positioned in the opposite or discharge end of the housing, and the housing is provided with an inlet or receiving connection 14 and a discharge connection 15.

In the design shown the housing 10 is formed of a continuous cylindrical wall or tube with a flanged head 16 in the receiving end and a similar head 17 in the discharge end. The connections 14 and 15 are secured in the heads 16 and 17, respectively and the connection 14 opens into the receiving tube 12 and the connection 15 opens into the funnel like element 13.

The receiving tube 12, as illustrated in Figures 1, 2 and 6 is formed of two sections 18, 19 and the sections are secured together by flanges, the section 18 having flanges 20 and 21 and the section 19 flanges 22 and 23. The flanges are secured together by welding, soldering, or any other suitable means. The sides of the sections, at the outlet end of the tube, are crimped together as illustrated in Figures 1 and 2 providing a comparatively small opening 24 at the center and in the design shown each section is provided with three flat surfaces and each surface is provided with a row of breather openings formed as illustrated in Figure 9 by stamping semi-circular flaps 25 from correspondingly shaped openings 26 providing arcuate slits with the metal or material from the interior thereof extended inwardly toward the interior of the tube as shown in Figure 6.

With the flaps 25 of the breather openings 26 in the walls of the receiving tube 12 formed in this manner communication is provided through the slits between the interior of the tube and the confined chamber 27 in the receiving end of the housing of the muffler positioned between the head 16 and the partition 11 and with the pressure of the exhaust gases increasing and decreasing continuously the gases confined in the chamber 27 provide a cushion which absorbs sound vibrations from the gases passing through the receiving tube 12.

In the design shown the funnel like element 13 in the opposite end of the housing is formed in three sections 28, 29 and 30 and the sections are connected by flanges as illustrated at the points 31, 32, and 33. The large end of the element is provided with a transverse baffle 34 which is formed with breather openings 35 from which semi-circular tongues 36 are stamped. The baffle is also provided with a centrally disposed opening 37 and it will be understood that as many of the openings 35, as may be desired may be provided therein.

The breather openings in the walls of the funnel like element 13 are also substantially semi-circular in shape with tongues or flaps 38 stamped from openings 39 and immediately adjacent the base sections of the tongues the material of the element is formed with a bulge 40 as illustrated in Figure 10 whereby the tongues have a slightly arcuate formation. The tongues or flaps of the funnel like element extend outwardly as illustrated in Figures 4 and 8. The element 13 is supported in the housing by the flanges connecting the sections, the said flanges extending to the inner peripheral surface of the housing. The ends of the flanges are provided with laterally extending flanges 41 which are secured to the inner surface of the head 17.

With the parts arranged in this manner exhaust gases passing through the openings 26 of the receiving tube 12 enter the chamber 42 in the opposite end of the housing and these gases work through the openings 39 of the element 13 and pass from the discharge end of the housing through the connection 15.

By this means it is possible to construct a muffler with rugged elements and retard the progress of the exhaust gases to such an extent that substantially all sound vibrations are isolated.

It will be understood that modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. In a muffler for the exhaust of internal combustion engines, the combination which comprises an elongated cylindrical housing having receiving and discharge ends and provided with a transverse partition spaced from the said receiving end providing an enclosed chamber in said end, a receiving tube having a plurality of flat sides with rows of semi-circular openings in the sides and having semi-circular flaps struck from the openings extended inwardly from the said sides, said receiving tube extended from the receiving end of the housing through the transverse partition and into the intermediate part of the housing with openings positioned on both sides of the partition, and a funnel like element positioned in the opposite end of the housing with the small end thereof at the end of the housing and with the large end extended inwardly toward the intermediate part of the housing, said funnel like element also having semi-circular openings in the walls thereof with tongues struck from the openings extended outwardly from the said walls, and said funnel like element also having a transverse partition in the large end thereof with semi-circular openings in the partition and with the material struck from the openings of the partition extended outwardly of the element.

2. In a muffler for the exhaust of internal combustion engines, the combination which comprises an elongated cylindrical housing having receiving and discharge ends and provided with a transverse partition spaced from the said receiving end providing an enclosed chamber in said end, a receiving tube having a plurality of flat sides with rows of semi-circular openings in the sides and having semi-circular flaps struck from the openings extended inwardly from the said sides, said receiving tube extended from the receiving end of the housing through the transverse partition and into the intermediate part of the housing with openings positioned on both sides of the partition, and a funnel like element positioned in the opposite end of the housing with the small end thereof at the end of the housing and with the large end extended inwardly toward the intermediate part of the housing, said funnel like element also having semi-circular openings in the walls thereof with tongues struck from the openings extended outwardly from the said walls, and said funnel like element also having a transverse partition in the large end thereof with semi-circular openings in the partition and with the material struck from the openings of the partition extended outwardly of the element, said housing having receiving and discharge connections with the discharge connection communicating with the interior of the said funnel like elements and with the receiving connection communicating with the interior of the said receiving tube.

3. In a muffler for the exhaust of internal combustion engines, the combination which comprises an elongated cylindrical housing having receiving and discharge ends and provided with a transverse partition spaced from the said receiving end providing an enclosed chamber in said end, a receiving tube having a plurality of openings

in the wall and having flaps struck from the openings extended inwardly from the said walls, said receiving tube extended from the receiving end of the housing through the transverse partition and into the intermediate part of the housing with the openings of the walls positioned on both sides of the partition, and a funnel like element positioned in the opposite end of the housing with the small end thereof at the end of the housing and with the large end extended inwardly toward the intermediate part of the housing, said funnel like element also having openings in the walls thereof with tongues struck from the openings extended outwardly from the said walls, and said funnel like element also having a transverse partition in the large end thereof with openings in the partition and with the material struck from the openings of the partition extended outwardly of the element.

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