

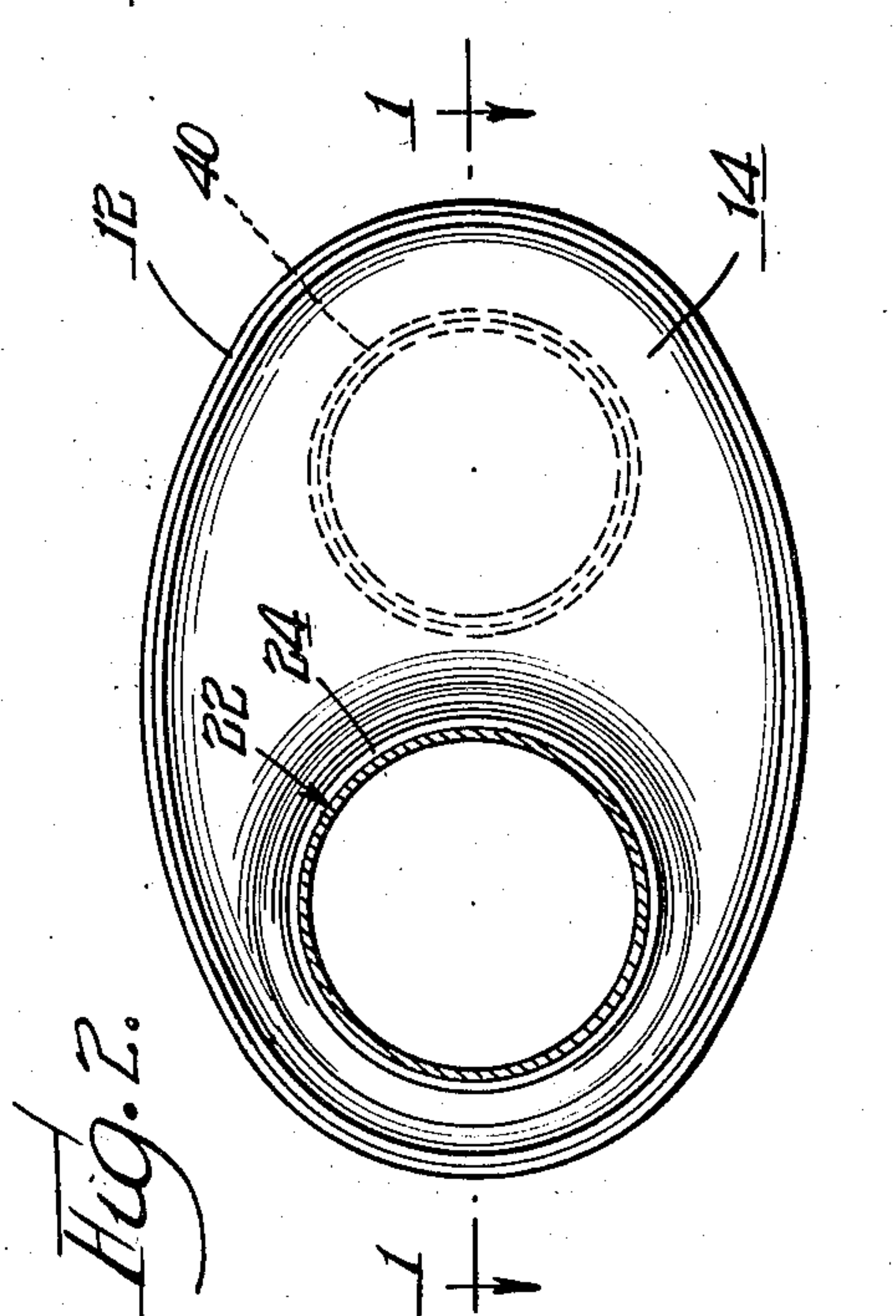
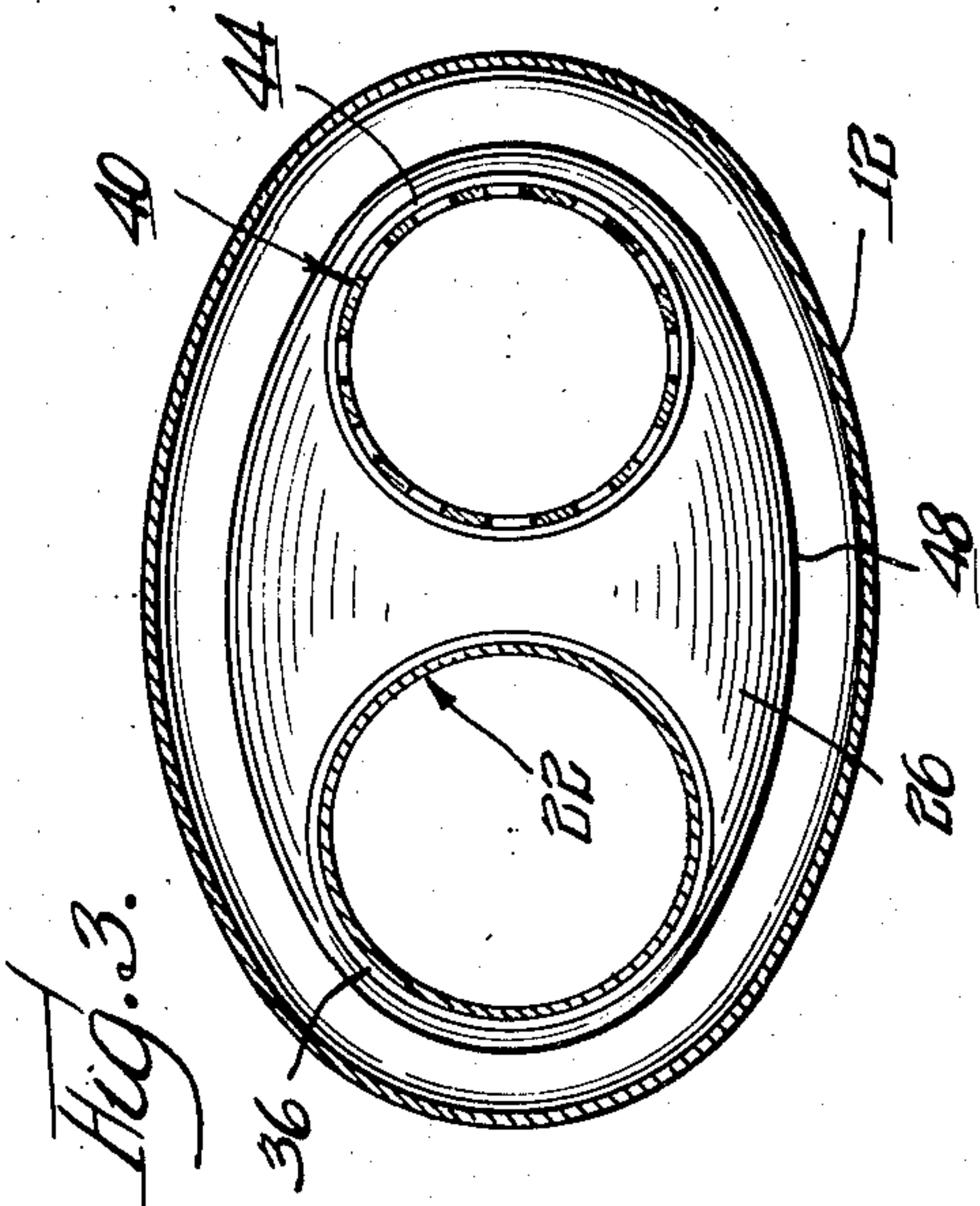
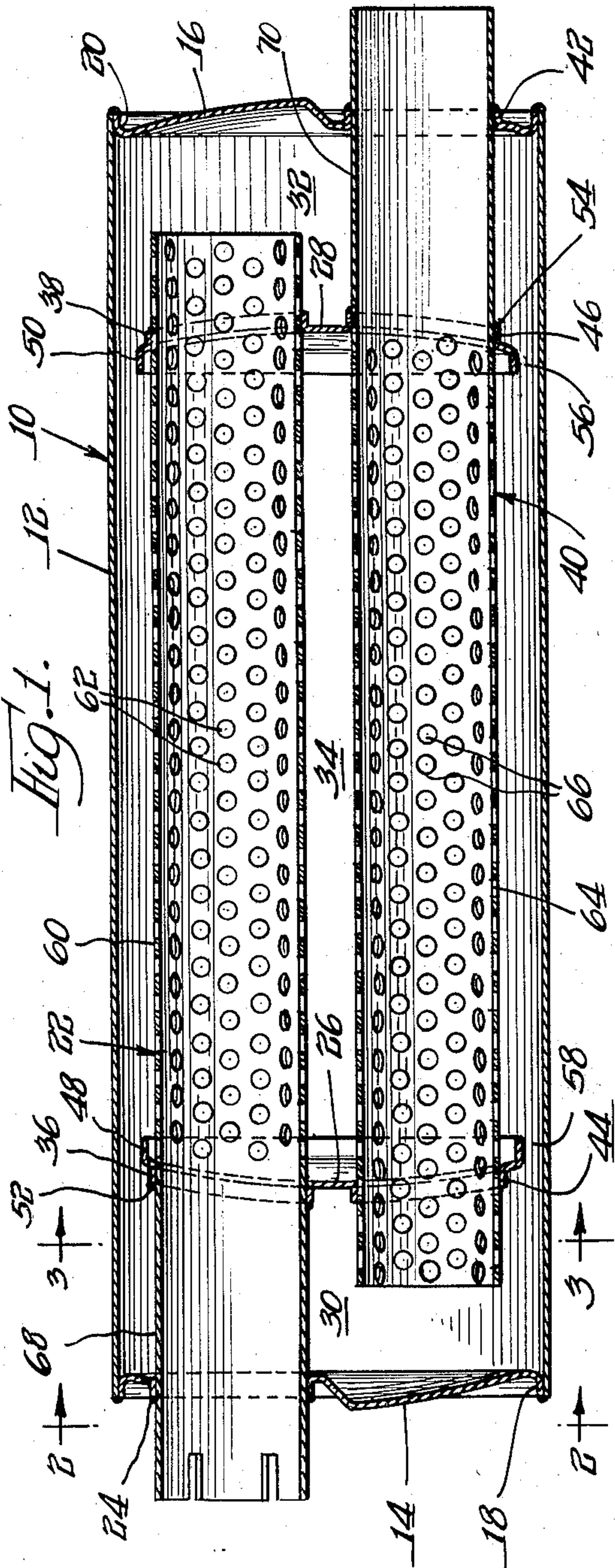
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EXHAUST MUFFLER

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## EXHAUST MUFFLER

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4 Claims. (Cl. 181—53)

The present invention relates to a novel muffler structure of the type adapted to be used in connection with internal combustion engines.

An important object of the present invention is to provide a novel muffler structure which may be relatively easily and economically assembled and which has improved functional characteristics.

A more specific object of the present invention is to provide a novel muffler structure including a plurality of tubes and partitions or baffles disposed within a body member, which tubes and baffles are constructed and arranged so as mutually to support each other within and out of contact with the body member so as to facilitate assembly thereof within the body member.

Another more specific object of the present invention is to provide a novel exhaust muffler of the above described type which is constructed so as to promote the flow of substantial portions of the exhaust gases along and against the outer body member for more effective cooling of the gases.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings, wherein:

Fig. 1 is an enlarged sectional view taken along line 1—1 in Fig. 2 and showing the novel muffler structure of the present invention;

Fig. 2 is a cross-sectional view taken along line 2—2 in Fig. 1; and

Fig. 3 is a cross-sectional view taken along line 3—3 in Fig. 1.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, a muffler structure 10 incorporating the features of the present invention comprises an elongated outer tubular body or shell 12 which preferably has an oval transverse cross-sectional shape. End members 14 and 16 close opposite ends of the body member and are respectively provided with peripheral flanges 18 and 20 welded to the body member. An exhaust inlet tube 22 projects through an opening in the end member 14 defined by an axially extending flange 24 and is welded to this flange. The tube 22 also extends through baffles 26 and 28 spaced longitudinally within the body member and defining opposite end chambers 30 and 32 and a relatively long intermediate chamber 34. As shown in the drawings, openings in the baffle members for receiving the tube 22 are respectively defined by axially extending flanges 36 and 38 which closely encircle the tube. The inner end of the tube 22 opens into the chamber 32 adjacent the end member 16. The muffler structure is also provided with an outlet tube 40 which projects through an opening in the end member 16 and is welded to an axially extending flange 42 defining this opening. The tube 40 also extends through openings in the baffle members, which openings are respectively defined by flanges 44 and 46 closely encircling the tube.

In order to promote easier and more economical assembly of the tube and baffles, it should be noted that the

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baffles are provided with an oval configuration similar to the cross-sectional shape of the tubular body member and have their peripheries 48 and 50 spaced well within the inner surface of the tubular body member. Thus, there is no need for holding the dimensions of the baffles to close tolerances and they may be easily inserted within the tubular body. It should further be noted that the baffle 26 is rigidly connected to the tube 22 by welding the flange 36 to the tube as indicated at 52 while at the same time the tube 40 extends through the flange 44 with a slip fit and is not welded or otherwise secured thereto. Similarly the tube 40 is welded to the flange 46 of the baffle 28 as at 54 and the tube 22 extends through the flange 38 with a slip fit. This structure not only facilitates assemblies of the various parts but also substantially reduces or eliminates stresses which might be imposed on the muffler structure as a result of uneven heating and cooling of the body 12 and the tubes and resulting uneven expansion and contraction thereof during operation of the muffler.

It will be appreciated that with the structure thus far described, the exhaust gases entering the tube 22 will empty into the chamber 32 adjacent the outlet end of the muffler. The periphery 50 of the baffle 28 defines in combination with the tubular body member a generally annular or oval passageway 56 between the chambers 32 and 34 and the periphery of the baffle 26 defines a similar oval or generally annular passageway 58 between the chambers 30 and 34. Thus, the exhaust gases entering the chamber 32 are directed outwardly against the interior surface of the tubular body 12 and flow through the passageway 56 into the chamber 34 from which the gases flow through the passageway 58 into the chamber 30 and finally from the muffler structure through the outlet tube 40. The arrangement of the passageways 56 and 58 insures that a substantial portion of the gases will be directed along the tubular body 12, which being exposed to the surrounding atmosphere, is relatively cool and promotes cooling of the gases. Such cooling of the gases promotes expansion thereof as they pass from the relatively restricted tube 22 through the chambers and thus improves the attenuation of the sound impulses and the muffling characteristics of the structure.

A portion 60 of the inlet tube 22 which extends inwardly from the baffle 26 is provided with a plurality of perforations 62 throughout its length and similarly, a portion 64 of the tube 40 which extends inwardly from the baffle 28 is provided with a plurality of perforations 66. Thus portions of the gases may pass through perforations 62 into the chamber 34 and from the chamber 34 through the perforations 66 and out through the tube 40 so that more rapid expansion of at least portions of the gases may occur and thus reduce the back pressure created within the muffler structure. Furthermore, gas flow may occur between a number of the perforations in both tubes and in both forward and reverse directions as pressure pulsations from the internal combustion engine are transmitted to the muffler structure so that a plurality of paths of gas flow of different lengths and different directions are provided to promote out-of-phasing and deadening of gas and pressure pulsations and sound resonance. Preferably the chambers 30 and 32 are relatively short as compared with the intermediate chamber 34, and portions 68 and 70 of the tubes 22 and 40 respectively extending through these end chambers are imperforate. This arrangement prevents portions of the gases from passing directly from the inlet tube into the open end of the outlet tube and from the open end of the inlet tube directly into the outlet tube while at the same time major portions of the tube are perforated to promote expansion of the gases and out-of-phasing of the impulses in the manner described above.



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While the preferred embodiment of the present invention has been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. An exhaust muffler comprising an elongated tubular body, first and second end members respectively secured to and closing opposite ends of said body, first and second tubes respectively secured to and projecting through said first and second end members and respectively having inner end portions opening adjacent said second and first end members, and a plurality of axially spaced baffles substantially concentric with said body and defining a plurality of chambers within said body, each of said baffles having a peripheral configuration similar to and smaller than a transverse cross sectional configuration of said body and having a free unsupported peripheral edge entirely spaced from an interior surface of said body and defining therewith a generally annular gas passageway directly between adjacent chambers, said tubes extending through each of said baffles and being respectively secured to a baffle adjacent their associated end members, said baffles and said tubes mutually supporting each other away from the interior surface of said body, said tubes providing the only support for said baffles.

2. An exhaust muffler comprising an elongated tubular body, first and second end members respectively secured to and closing opposite ends of said body, first and second substantially parallel perforated tubes respectively secured to and projecting through said first and second end members and respectively having inner end portions opening adjacent said second and first end members, and first and second baffles substantially concentric with said body and respectively disposed adjacent to and spaced from said first and second end members and defining a plurality of chambers within said body, each of said baffles having a peripheral configuration smaller than a transverse cross sectional configuration of said body and a free peripheral edge entirely spaced from an interior surface of said body and defining therewith a generally annular gas passageway between adjacent chambers, said first tube extending through both of said baffles and being secured to said first baffle, said second tube extending through both of said baffles and being secured to said second baffle, said baffles and said tubes mutually supporting each other away from the interior surface of said body, said tubes providing the only support for said baffles.

3. An exhaust muffler comprising an elongated tubular body having a generally oval transverse cross section, first and second end members respectively secured to and clos-

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ing opposite ends of said body, first and second generally oval baffles substantially concentric with said body and respectively disposed adjacent to and spaced from said first and second end members and defining relatively short opposite end chambers and a relatively long intermediate chamber within said body, said baffles being substantially smaller than the oval cross section of said body and having free peripheral edges entirely spaced from an interior surface of said body and defining therewith generally oval passageways directly between adjacent chambers, a first tube having an imperforate portion secured to and extending through said first end member and extending to and secured to said first baffle and a perforated portion extending through said intermediate chamber and into said second baffle with a slip fit, and a second tube having an imperforate portion secured to and extending through said second end member and extending to and secured to said second baffle and a perforated portion extending through said intermediate chamber and into said first baffle with a slip fit, said baffles and said tubes mutually supporting each other away from the interior surface of said body, said tubes providing the only support for said baffles.

4. An exhaust muffler comprising an elongated tubular body, first and second end members respectively secured to and closing opposite ends of said body, first and second baffles substantially concentric with said body and respectively disposed adjacent to and spaced from said first and second end members and defining relatively short opposite end chambers and a relatively long intermediate chamber within said body, said baffles being substantially smaller than a transverse cross section of said body and having free peripheral edges spaced entirely from an inner surface of said body and defining therewith generally annular gas passageways directly between adjacent chambers, a first tube extending through said first end member and said baffles and secured to said first end member and said first baffle, a second tube extending through said second end member and said baffles and secured to said second end member and said second baffle, said tubes having perforated portions extending through said intermediate chamber, said baffles and said tubes mutually supporting each other away from the interior surface of said body, said tubes providing the only support for said baffles.

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