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- **GUT, Damian**  
**32 050 Skawina (PL)**
- **WIDZYK, Lukasz**  
**32 050 Skawina (PL)**
- **POTOK, Dariusz**  
**32 050 Skawina (PL)**
- **DUDEK, Grzegorz**  
**32 050 Skawina (PL)**

(71) Applicant: **VALEO SYSTEMES THERMIQUES**  
**78320 Le Mesnil Saint-Denis (FR)**

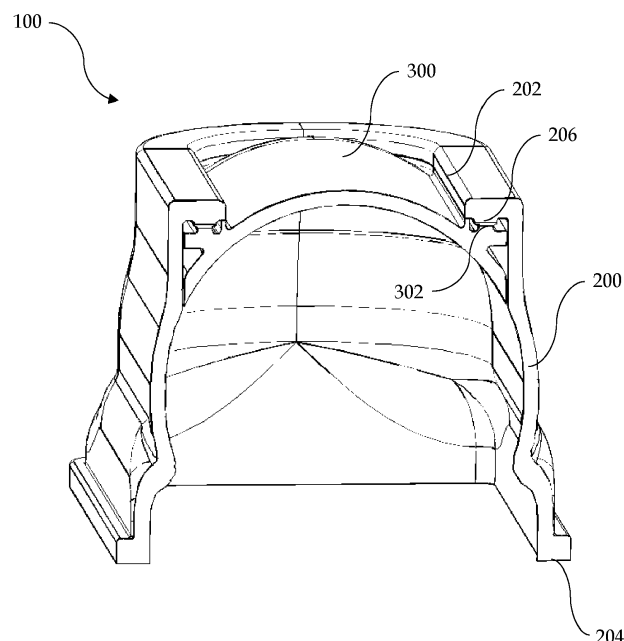
(74) Representative: **Valeo Systèmes Thermiques**  
**Service Propriété Intellectuelle**  
**8, rue Louis Lormand**  
**La Verrière**  
**78320 Le Mesnil Saint Denis (FR)**

(72) Inventors:  
• **LIPOWSKI, Mateusz**  
**32 050 Skawina (PL)**

(54) **A TANK FOR A HEAT EXCHANGER**

(57) A tank for a heat exchanger comprises a first part and a second part adapted to connect to the first part. The first part further defines an enclosure and comprises a first opening. The second part further is adapted to be arranged inside the first part and cover the first opening of the first part, wherein at least one portion of the second

part is adapted to abut against and connect to the first part. In particular, the at least one portion of the second part can be adapted to abut against and connect to at least one portion of the first part which forms an edge of the first opening.



**FIG. 3**

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## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to a tank for a heat exchanger. In particular, the present invention relates to a tank for a heat exchanger for a motor vehicle.

### BACKGROUND OF THE INVENTION

**[0002]** Generally, a tank for a heat exchanger comprises one part or multiple parts depending on the complexity of shape of the tank. In one example, the tank comprises a first part and a second part. The second part is adapted to connect to the first part by welding, wherein a welding seam is sandwiched between the first part and the second part. When the tank is used in the heat exchanger, the welding seam of the tank is subjected to high stress due to pressure inside the tank. Therefore, there is a possibility of failure in the welding seam of the tank, leading to disconnection of second part from the first part.

### SUMMARY OF THE INVENTION

**[0003]** An objective of the present invention is to provide a tank for a heat exchanger that alleviates the problems in the prior arts. To be more precise, an objective of the present invention is to provide a robust tank for a heat exchanger which would be able to withstand high pressure. This may be achieved, for example, by reducing stress in a welding seam of the tank comprising multiple parts.

**[0004]** To achieve the above objectives, the present invention herein provides a tank for a heat exchanger comprising: a first part defining an enclosure, wherein the first part comprises a first opening; a second part adapted to be arranged inside the first part and cover the first opening of the first part, wherein at least a portion of the second part adapted to abut against and connect to at least a portion of the first part which forms an edge of the first opening of the first part.

**[0005]** In one aspect, the first part comprises a base portion adapted to connect to a heat exchanger core of the heat exchanger.

**[0006]** In another aspect, the first part comprises a first connection portion adapted to connect to the second part.

**[0007]** In another aspect, the first connection portion is an inwardly extending leg portion.

**[0008]** In another aspect, the second part comprises a second connection portion adapted to connect to the first connection portion by welding.

**[0009]** In another aspect, the second connection portion is an outwardly extending leg portion.

**[0010]** In another aspect, the first connection portion and the second connection portion abut against one another with a welding seam sandwiched between the

first connection portion and the second connection portion.

**[0011]** In another aspect, the second connection portion is located between the first connection portion and the base portion.

**[0012]** In another aspect, the first connection portion covers at least a portion of the second connection portion when viewed from the first connection portion to the base portion.

**[0013]** In another aspect, the first connection portion and the second connection portion are significantly parallel to the base portion.

**[0014]** In another aspect, the first connection portion and the second connection portion are inclined to the base portion.

**[0015]** In another embodiment, the present invention herein provides a heat exchanger comprising: at least one tank according to any one of the above embodiments.

**[0016]** According to the above embodiments, the second part is arranged inside the first part and covers the opening of the first part. Further, the second part abuts against the first part, in particular the edge of the opening of the first part. Therefore, the stress in the welding seam sandwiched between the first connection portion and the second connection portion is reduced. Further, the second part is not pushed through the opening of the first part due to a pressure of a fluid in the tank and so a robust tank is achieved.

### BRIEF DESCRIPTION OF DRAWINGS

**[0017]** Other characteristics, details and advantages of the invention can be inferred from the description of the invention hereunder. A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained, as the same becomes better understood by reference to the following description when considered in connection with the accompanying figures, wherein:

FIG. 1 illustrates a tank for a heat exchanger, in accordance with an embodiment of the present invention;

FIG. 2 illustrates an exploded view of the tank of FIG. 1;

FIG. 3 illustrates a sectional view of the tank of FIG. 1, at the plane A-A'; and

FIG. 4 illustrates a sectional view of the tank, in accordance with another embodiment of the present invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0018]** It must be noted that the figures disclose the invention in a detailed enough way to be implemented, the figures helping to better define the invention, if need be. The invention should however not be limited to the embodiments disclosed in the description.

**[0019]** In the present description, some elements or parameters may be indexed, such as a first element and a second element. In this case, unless stated otherwise, this indexation is only meant to differentiate and name elements that are similar but not identical. No idea of priority should be inferred from such indexation, as these may be switched without betraying the invention. Additionally, this indexation does not imply any order in mounting or use of the elements of the invention.

**[0020]** FIG. 1 illustrates a tank 100 for a heat exchanger, in accordance with an embodiment of the present invention. FIG. 2 illustrates an exploded view of the tank 100 of FIG. 1. The tank 100 for the heat exchanger comprises a first part 200 and a second part 300 adapted to connect to the first part 200. In one embodiment, the tank 100 for the heat exchanger can comprise a first part 200 defining an enclosure and comprising a first opening 202. The tank 100 for the heat exchanger can comprise a second part 300 adapted to be arranged inside the first part 200 and cover the first opening 202 of the first part 200. In one aspect, at least one portion of the second part 300 can be adapted to abut against and connect to the first part 200. In one example, the at least one portion of the second part 300 can be adapted to abut against and connect to at least one portion of the first part 200 which forms an edge of the first opening 202.

**[0021]** FIG. 3 illustrates a sectional view of the tank 100 of FIG. 1, at the plane A-A'. In another aspect, the first part 200 can comprise a second opening adapted to connect to a heat exchanger core of the heat exchanger. The heat exchanger core can comprise a plurality of tubes and fins stacked together. The heat exchanger core can comprise a header plate connected to the plurality of tubes. In another aspect, the second opening can comprise a base portion 204 adapted to connect to the header plate of the heat exchanger core. The base portion 204 can be connected to the header plate of the heat exchanger core by crimping. In another aspect, the second part 300 can be inserted inside the first part 200 through the second opening of the first part 200.

**[0022]** In another aspect, the first part 200 can comprise a first connection portion 206 adapted to connect to the second part 300. The first connection 206 can be an inwardly extending leg portion extending inward of the first part 200 from the edge of the first opening 202 of the first part 200. In another aspect, the second part 300 can comprise a second connection portion 302 adapted to connect to the first part 200. The second connection portion 302 can be an outwardly extending leg portion extending outward of the second part 300 from a periph-

ery of the second part 300.

**[0023]** In another aspect, the second connection portion 302 can be connected to the first connection portion 206 by welding, wherein the second connection portion 302 and the first connection portion 206 abut against one another with a welding seam sandwiched between the second connection portion 302 and the first connection portion 206. The second connection portion 302 can be connected to the first connection portion 206 by any type of welding, such as but not limited to friction welding, hot plate welding, laser welding and so on.

**[0024]** In another aspect, the second connection portion 302 can be located between the first connection portion 206 and the base portion 204. The second connection portion 302 can be located adjacent to the first connection portion 206. The base portion 204 can be located at a distance from the second connection portion 302. In another aspect, the first connection portion 206 can cover at least one portion of the second connection portion 302 when viewed from the first connection portion 206 to the base portion 204. In another example, the first connection portion 206 can cover one portion of the second connection portion 302 when viewed from the first connection portion 206 to the base portion 204. In another example, the first connection portion 206 can cover the entire portion of the second connection portion 302 when viewed from the first connection portion 206 to the base portion 204.

**[0025]** In another aspect, the first connection portion 206 and the second connection portion 302 can be located at an angle with respect to the base portion 204. In another example, the first connection portion 206 and the second connection portion 302 can be located in parallel with respect to the base portion 204. FIG. 4 illustrates a sectional view of the tank 100, in accordance with another embodiment of the present invention. In another example, the first connection portion 206 and the second connection portion 302 can be located at an inclined angle with respect to the base portion 204.

**[0026]** According to the above-described embodiments, the second part 300 is arranged inside the first part 200 and covers the first opening 202 of the first part 200. Further, the second part 300 abuts against the first part 200, in particular the edge of the first opening 202 of the first part 200. Therefore, the stress in the welding seam sandwiched between the first part 200 and the second part 300 is reduced. Further, the second part 300 is not pushed through the first opening 202 of the first part 200 due to a pressure of a fluid in the tank 100 and so a robust tank 100 is achieved.

**[0027]** All the above-described embodiments are just to explain the present invention while more embodiments and combinations thereof might exist. Hence, the present invention should not be limited to the above-described embodiments alone.

**Claims****1.** A tank (100) for a heat exchanger comprising:

a first part (200) defining an enclosure, wherein the first part (200) comprises a first opening (202);  
 a second part (300) adapted to be arranged inside the first part (200) and cover the first opening (202) of the first part (200), wherein at least a portion (302) of the second part (300) adapted to abut against and connect to at least a portion (206) of the first part (200) which forms an edge of the first opening (202) of the first part (200).

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**2.** The tank (100) as claimed in preceding claim, wherein the first part (200) comprises a base portion (204) adapted to connect to a heat exchanger core of the heat exchanger.

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**3.** The tank (100) as claimed in preceding claim, wherein the first part (200) comprises a first connection portion (206) adapted to connect to the second part (300).

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**4.** The tank (100) as claimed in preceding claim, wherein the first connection portion (206) is an inwardly extending leg portion.

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**5.** The tank (100) as claimed in claim 3 or 4, wherein the second part (300) comprises a second connection portion (302) adapted to connect to the first connection portion (206) by welding.

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**6.** The tank (100) as claimed in preceding claim, wherein the second connection portion (302) is an outwardly extending leg portion.**7.** The tank (100) as claimed in claim 5 or 6, wherein the first connection portion (206) and the second connection portion (302) abut against one another with a welding seam sandwiched between the first connection portion (206) and the second connection portion (302).

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**8.** The tank (100) as claimed in preceding claim, wherein the second connection portion (302) is located between the first connection portion (206) and the base portion (204).

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**9.** The tank (100) as claimed in preceding claim, wherein the first connection portion (206) covers at least a portion of the second connection portion (302) when viewed from the first connection portion (206) to the base portion (204).

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**10.** The tank (100) as claimed in any one of preceding

claims, wherein the first connection portion (206) and the second connection portion (302) are significantly parallel to the base portion (204).

**11.** The tank (100) as claimed in any one of claims 1 to 9, wherein the first connection portion (206) and the second connection portion (302) are inclined to the base portion (204).**12.** A heat exchanger comprising:  
at least one tank (100) as claimed in any one of preceding claims.

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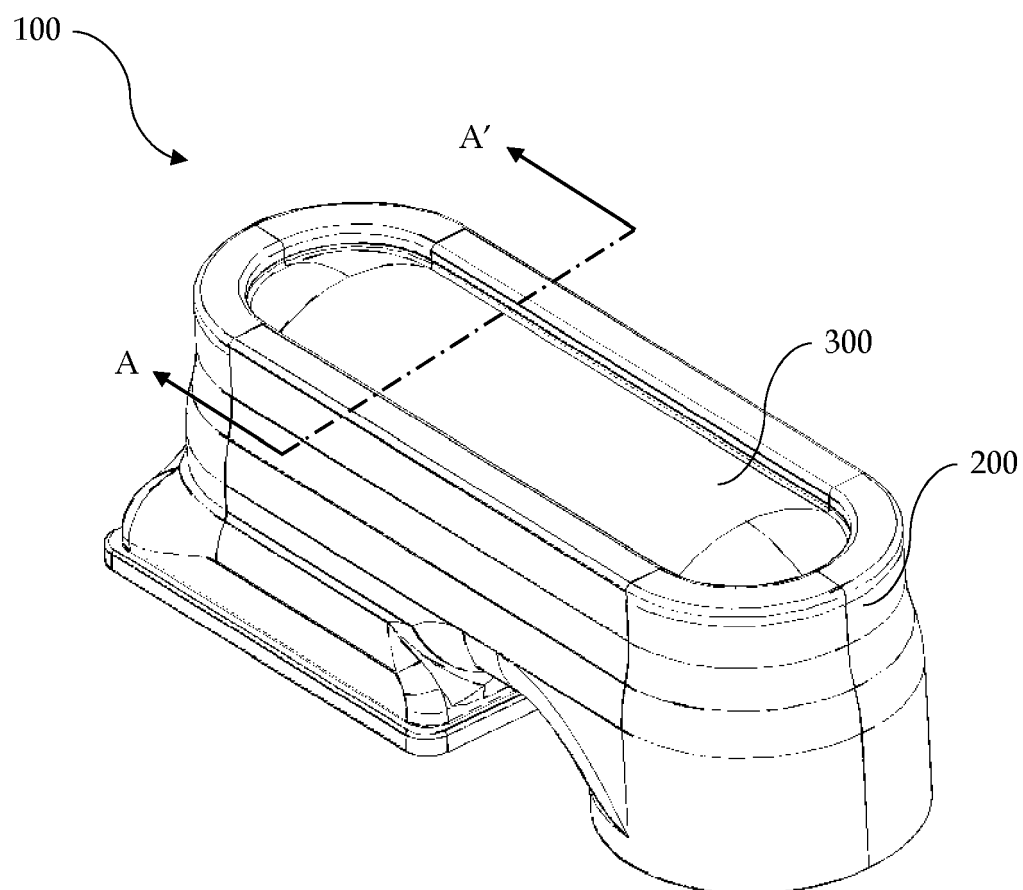


FIG. 1

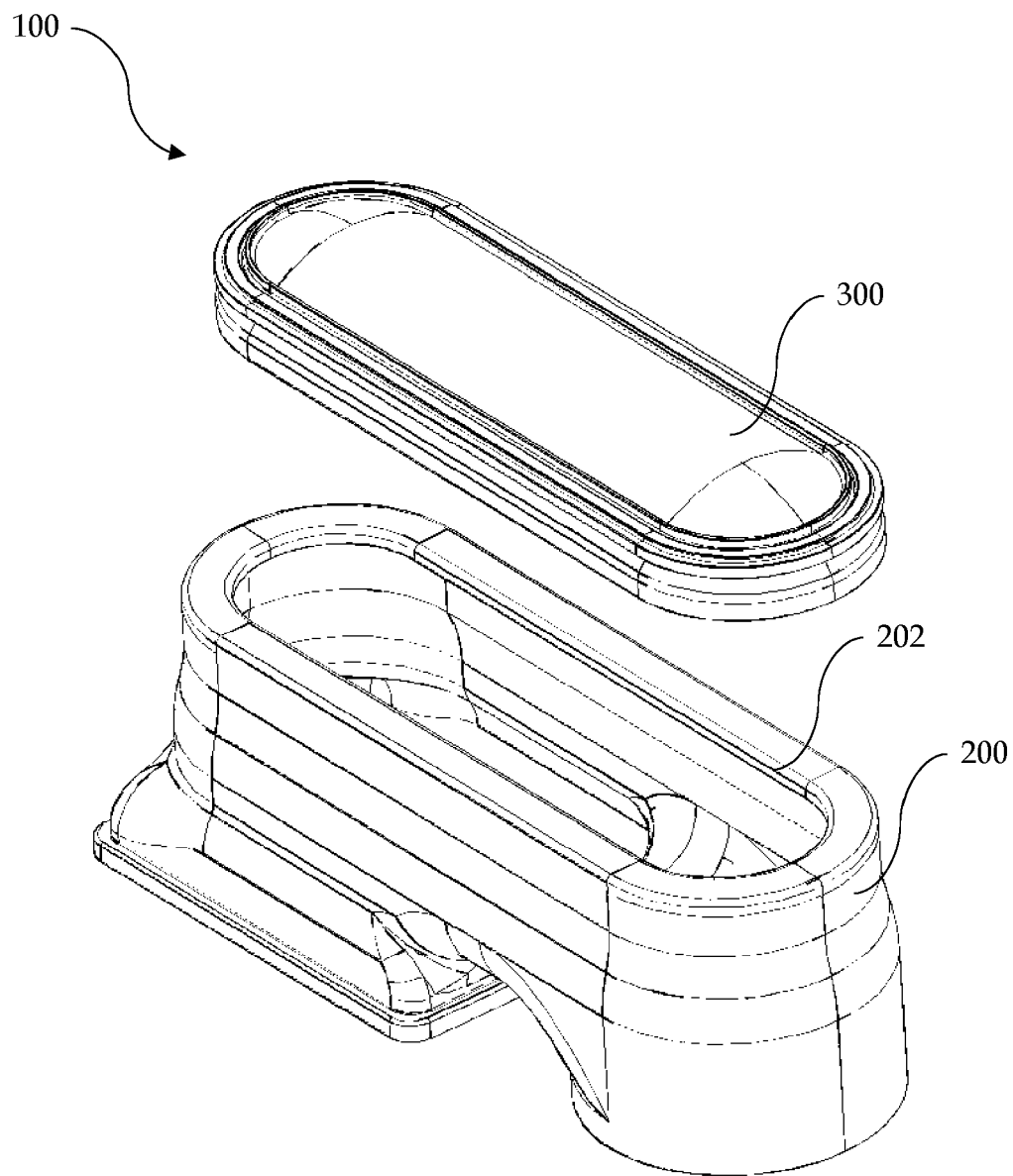


FIG. 2

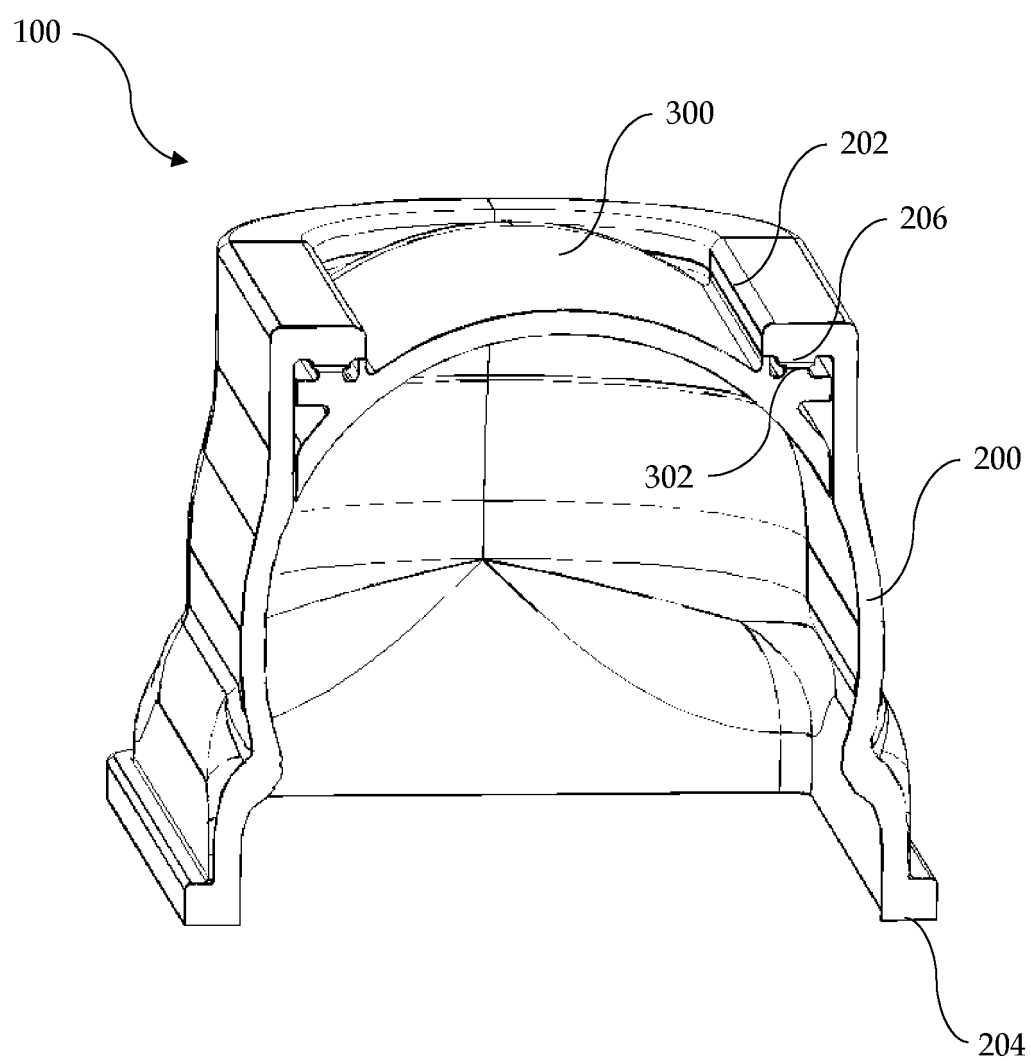


FIG. 3

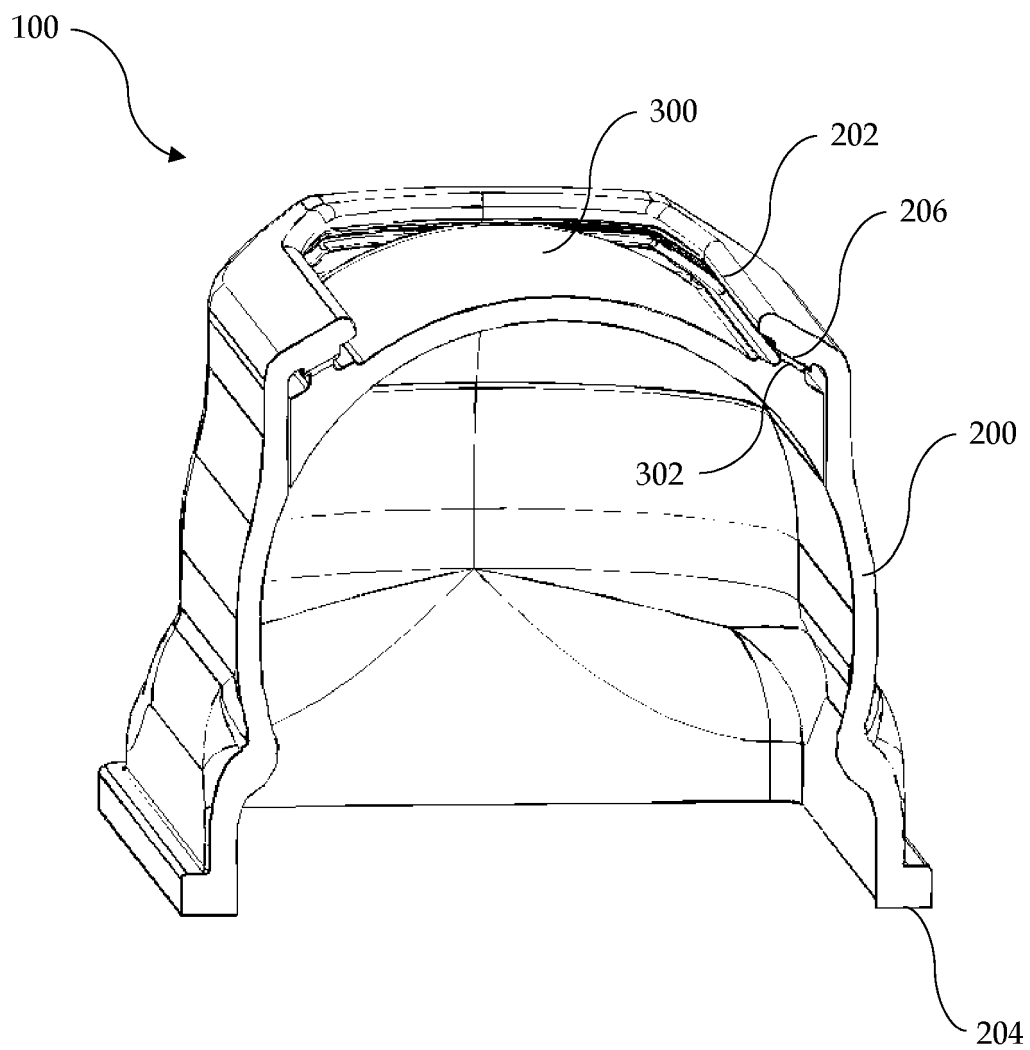


FIG. 4





## EUROPEAN SEARCH REPORT

Application Number

EP 23 20 8488

## DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		2 April 2024	Jessen, Flemming
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

# **ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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