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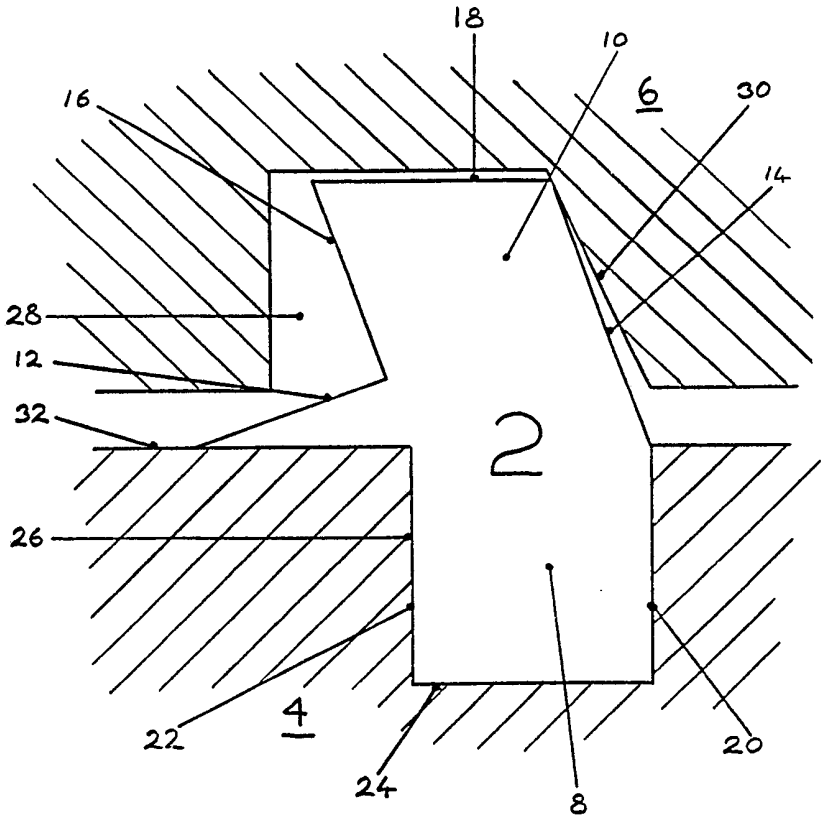
EP 0001385 A1 US 4709933 A

(58) Field of search
UK CL (Edition J) **F2B**
INT CL⁴ **F16J**

(54) Pressure seal

(57) A pressure seal, 2 for effecting a pressure seal between a first part 4 and a second part 6 comprises a first portion 8 for locating in the first part 4, a second portion 10 for locating in the second part 6 and a lip 12 which extends away from the first and the second portions 8, 10 and which is for positioning between the first and the second parts 4, 6 and the second portion 10 being such that it has first and second sides 14, 16 which are opposite each other and which slope.

FIG 1



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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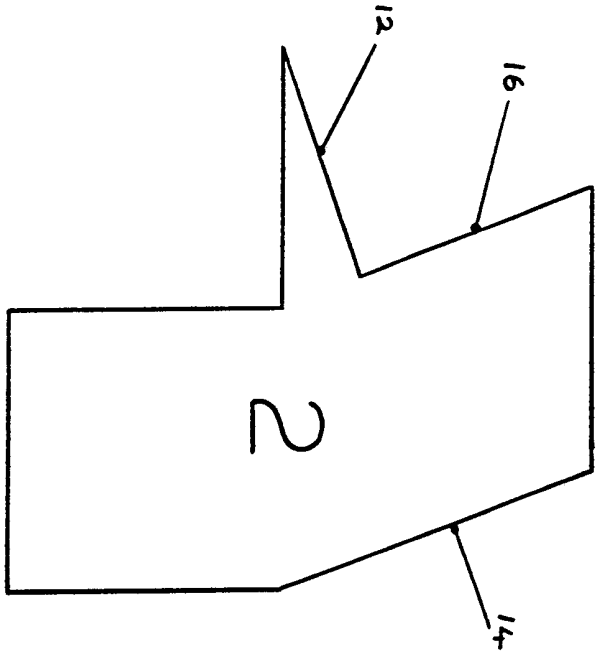

FIG 2

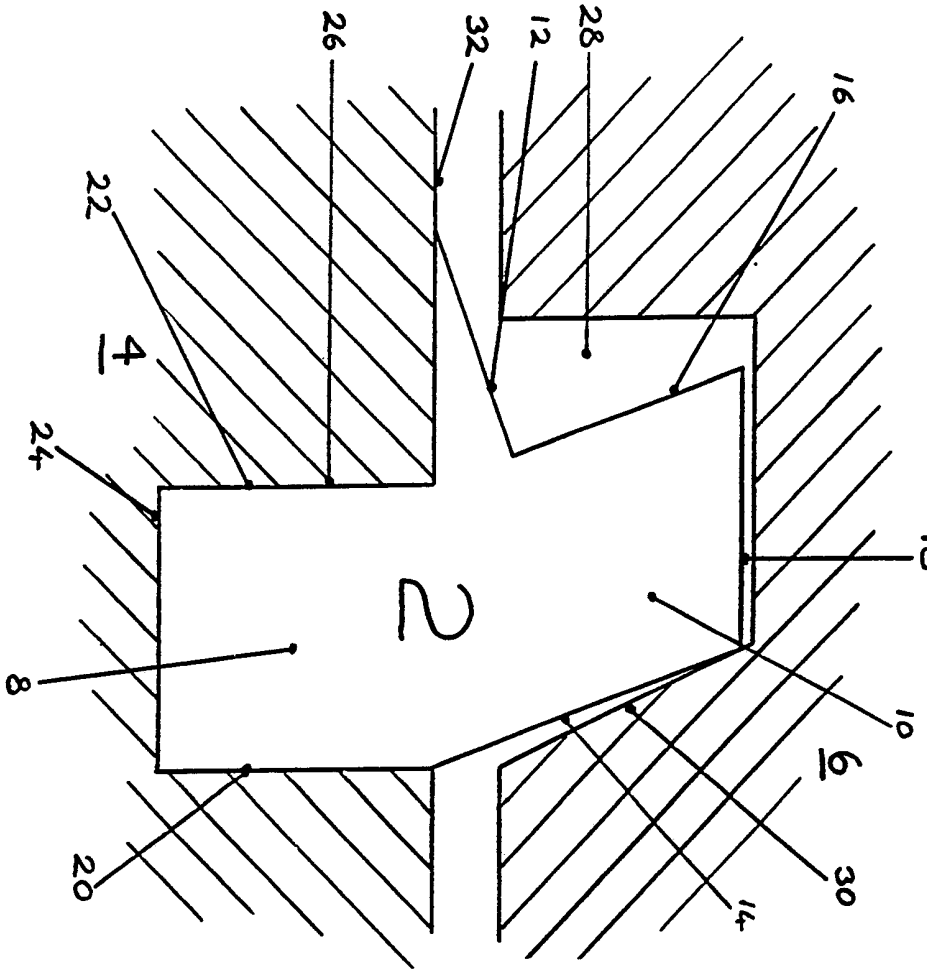

FIG 1

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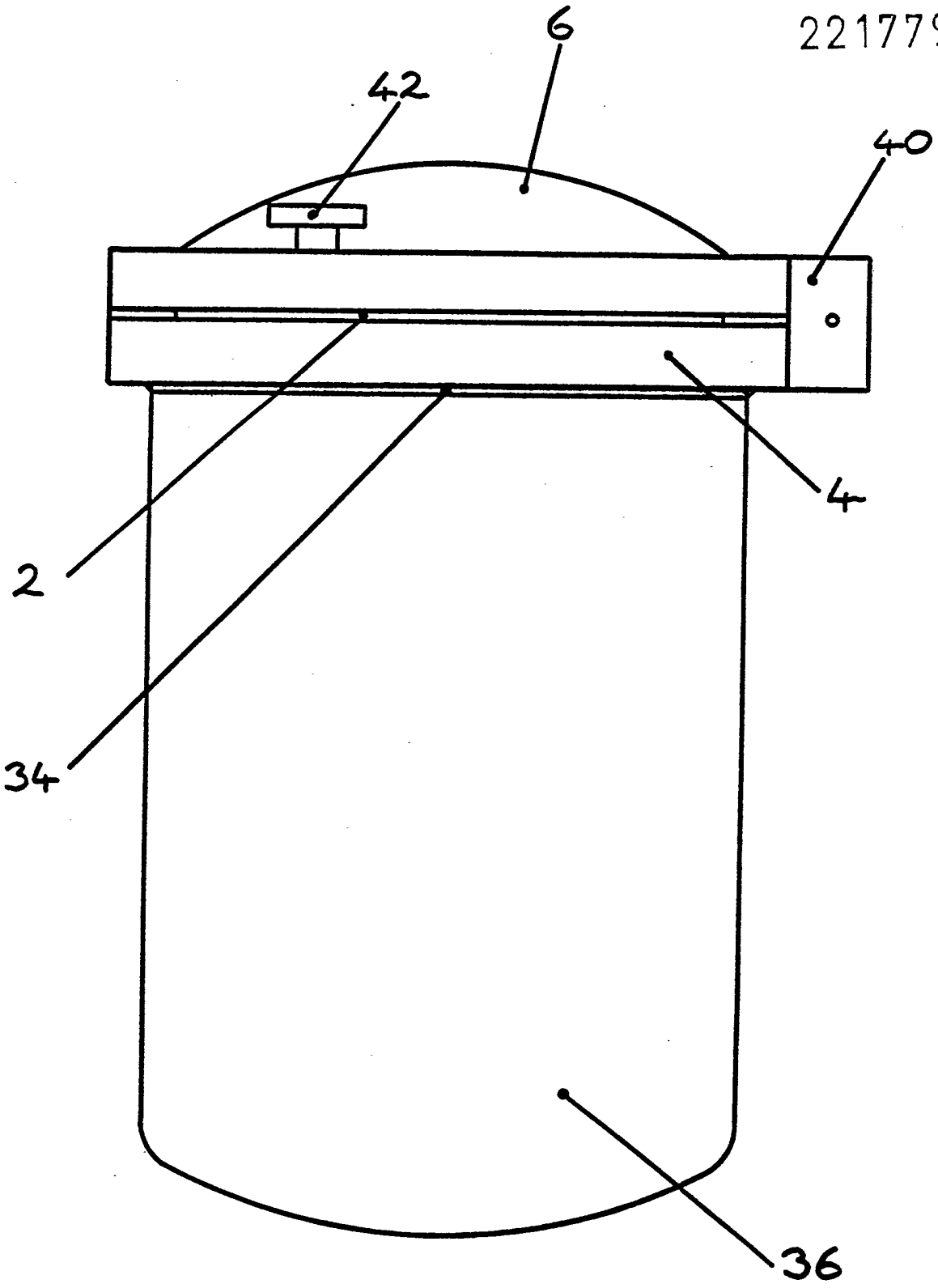

FiG 3

A PRESSURE SEAL

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This invention relates to a pressure seal and, more especially, this invention relates to a pressure seal for effecting a pressure seal between a first part and a second part.

It is well known to employ seals such for example as O-ring seals for effecting a seal between first and second parts. Where a join between the first and the second parts is to be subjected to high pressures, it is also known to employ a special type of seal known as a pressure seal. Pressure seals are seals which are designed such that pressure acting on them tends to force the seal harder against the first and/or the second parts, thereby providing an increased sealing effect.

Where the second part to be sealed is hinged to the first part, for example in the case of apparatus having a lid as the second part hinged to a body as the first part, it sometimes happens that the closing action of the hinged second part causes premature wearing of the pressure seals. The hinged closing action of the second part about the first part tends to prevent the second part squarely approaching the first part and the second part approaches the first part with an arcuate movement which can cause the second part to chop against the pressure seal and thus abrade or

cut the pressure seal, causing premature failure of the pressure seal.

It is an aim of the present invention to obviate or reduce the above mentioned problem.

Accordingly, this invention provides a pressure seal for effecting a pressure seal between a first part and a second part, which pressure seal comprises a first portion for locating in the first part, a second portion for locating in the second part, and a lip which extends away from the first and the second portions and which is for positioning between the first and the second parts, and the second portion being such that it has first and second sides which are opposite each other and which slope.

The pressure seal of the present invention can be employed to provide a pressure seal between first and second parts which are separable from each other or which are hinged to each other. When the first and the second parts are hinged to each other, the sloping first and second sides of the second portion of the pressure seal help to avoid the hinged second part chopping or abrading the pressure seal and thus causing it prematurely to fail.

Preferably, the pressure seal is one in which the second portion has a third side which connects the first and the second sides such that the third side connects to the

first side with an angle greater than 90°, and such that the third side connects to the second side with an angle which is less than 90°.

Preferably, the pressure seal is such that the first portion has first and second sides which are opposite each other and which are parallel to each other. The first portion may then have a third side which connects the first and the second sides such that the third side connects to the first side with a 90° angle, and such that the third side connects to the second side with a 90° angle.

Preferably the lip is positioned at the junction between the first and the second portions. Also preferably, the lip is triangular in cross section.

Usually, the seal will be in the form of a closed loop. Preferably the closed loop is in the form of a circular ring. With a circular ring pressure seal, the lip will extend inwardly. It is to be appreciated that the pressure seal can however be an elongate pressure seal if desired.

The seal will usually be made of a flexible material such for example as any of the flexible materials currently employed for making known pressure seals. Thus the pressure seal may be made of a rubber material or a plastics material.

The present invention also extends to apparatus when provided with the pressure seal, and in which the pressure seal is used for effecting a pressure seal between the first part and the second part.

Preferably, the apparatus is an autoclave, the first part then being an autoclave body, and the second part then being an autoclave lid.

When the apparatus is an autoclave, then the apparatus may be one in which the first portion of the pressure seal sits in a recess in a header ring or a header assembly which is secured to the autoclave body, and in which the second portion of the pressure seal sits in a recess in the autoclave lid. Advantageously, the recess in the autoclave lid has a first face which slopes at an angle which is steeper than the sloping angle of the first side of the second portion of the pressure seal.

An embodiment of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a cross section through a pressure seal and shows the pressure seal in use;

Figure 2 is the same cross section of the seal as shown in Figure 1 and is given for explanatary purposes of the sealing action of the pressure seal; and

Figure 3 shows the pressure seal of Figure 1 in use in an autoclave.

Referring to Figure 1, there is shown a pressure seal 2 for effecting a pressure seal between a first part 4 and a second part 6. The pressure seal 2 comprises a first portion 8

for locating in the first part 4, a second portion 10 for locating in the second part 6, and a lip 12. The lip 12 extends away from the first and the second portions 8, 10 as shown. The pressure seal 2 is a ring seal so that the lip 12 thus extends inwardly. Also as shown, the lip 12 is positioned between the first and the second parts 4, 6.

The second portion 10 of the pressure seal 2 is such that it has a first side 14 and a second side 16. The first and the second sides 14, 16 are opposite each other as shown and they slope. More specifically, the first and the second sides 14, 16 slope inwardly since the pressure seal 2 is a ring seal.

The second portion 10 has a third side 18 which connects the first and the second sides 14, 16 such that the third side 18 connects to the first side 14 with an angle which is greater than 90°, and such that the third side 18 connects to the second side 16 with an angle which is less than 90°.

The first portion 8 of the pressure seal 2 has a first side 20 and a second side 22. The first and the second sides 20, 22 are opposite each other and they extend parallel to each other. The first portion 8 also has a third side 24 which connects the first and the second sides 20,22 such that the third side 24 connects to the first side 20 with a 90° angle, and such that the third side 24 connects to the second side 22

with a 90° angle.

As can be seen from Figure 1, the lip 12 is positioned at the junction between the first and the second portions 8, 10. As can also be seen from Figure 1, the lip 12 is triangular in cross section. The lip 12 thus gets thinner towards its free edge.

The pressure seal 2 is made of a flexible material which may be a rubber material or a plastics material.

In use of the pressure seal 2 as shown in Figure 1, it will be seen that the first portion 8 is located in a recess 26 in the first part 4. The second portion 10 is located in a recess 28 in the second part 6. The recess 28 has a first face 30 which slopes at an angle which is steeper than the sloping angle of the first side 14 of the second part 10 of the pressure seal 2. For example, the first face 30 may slope at an angle which is steeper by 5° than the sloping angle of the first side 14.

The action of the pressure seal 2 will now be described with reference to Figure 2. During use of the pressure seal 2, pressure on the second side 16 drives the first side 14 into engagement with the first face 30. The greater the pressure on the second side 16, then the greater is the sealing effect with the first face 30. Pressure on the top of the lip 12 makes the lip seal more and more effectively with the surface 32 of the first part 4. Also, pressure on

the third side 18 and the first side 14 force the lip 12 into greater sealing contact with the surface 32.

Referring back to Figure 1, if the second part 6 were to be a hinged lid hinged on the right side of Figure 1, then it will be apparent that the lid 6 would close with an arcuate closing action towards the first part 4. The sloping first and second sides 14, 16 are able to accomodate this arcuate closing action and the second part 6 does not tend to abruptly chop into the second portion 10 of the pressure seal 2 and thus cause premature wear and failure.

Referring now to Figure 3, the pressure seal 2 is shown in use in apparatus in the form of an autoclave 34. The autoclave 34 has a body part 36 which is preferably in the form of a copper or stainless steel cylinder. A header ring 4 is connected to the body part 6 by a brazed joint 38 and part of the header ring 4 is shown as the first part 4 in Figure 1. The autoclave 34 has a lid 6 and part of the lid 6 is shown as the second part 6 in Figure 1. The lid 6 is hinged to the header ring 4 by a hinge mechanism 40. The lid 6 can be clamped to the body part 36 by a closure mechanism in the form of a plurality of hand screw locking devices 42, only one of which is shown in Figure 3.

The pressure seal 2 enables the autoclave to work with very high pressures of super heated steam, with the pressure

seal 2 having a good working life.

It is to be appreciated that the embodiment of the invention described above with reference to the accompanying drawings has been given by way of example only and that modifications may be effected. Thus, for example, the pressure seal 2 can be used with apparatus other than the autoclave 34. Also, instead of using the pressure seal 2 in known autoclave contructions, the pressure seal 2 may be used in the autoclave described and claimed in our co-pending patent application which has the same filing date as the present patent application and which has a special header assembly which replaces the header ring 4 shown in Figure 3. The disclosure in our said co-pending patent application is incorporated herein by reference.

CLAIMS

1. A pressure seal for effecting a pressure seal between a first part and a second part, which pressure seal comprises a first portion for locating in the first part, a second portion for locating in the second part, and a lip which extends away from the first and the second portions and which is for positioning between the first and the second parts, and the second portion being such that it has first and second sides which are opposite each other and which slope.

2. A pressure seal according to claim 1 in which the second portion has a third side which connects the first and the second sides such that the third side connects to the first side with an angle greater than 90°, and in which the third side connects to the second side with an angle which is less than 90°.

3. A pressure seal according to claim 1 or claim 2 in which the first portion has first and second sides which are opposite each and which are parallel to each other.

4. A pressure seal according to claim 3 in which the first portion has a third side which connects the first and the second sides such that the third side connects to the first side with a 90^{o} angle, and such that the third side connects to the second side with a 90^{o} angle.

5. A pressure seal according to any one of the preceding claims in which the lip is positioned at the junction between the first and the second portions.

6. A pressure seal according to any one of the preceding claims in which the lip is triangular in cross section.

7. A pressure seal according to any one of the preceding claims and which is in the form of a closed loop.

8. A pressure seal according to claim 7 in which the closed loop is in the form of a circular ring.

9. A pressure seal substantially as herein described with reference to the accompanying drawings.

10. Apparatus when provided with a pressure seal as claimed in any one of the preceding claims, and in which the pressure seal is used for effecting a pressure seal between the first part and the second part.

11. Apparatus according to claim 10 and which is an autoclave, the first part then being an autoclave body, and the second part then being an autoclave lid.

12. Apparatus according to claim 11 in which the first portion of the pressure seal sits in a recess in a header ring or a header assembly which is secured to the autoclave body, and in which the second portion of the pressure seal sits in a recess in the autoclave lid.

13. Apparatus according to claim 12 in which the recess in the autoclave lid has a first face which slopes at an angle which is steeper than the sloping angle of the first side of the second portion of the pressure seal.

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