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GB 2187431 A GB 1502978 A DE 3425978 A

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(54) Stackable storage container

(57) A metal container for long term storage of material e.g. radioactive waste includes a cover 12 arranged to close an open end of the container, the cover 12 having a rigid annular member 19 located around the periphery thereof. The thin sheet metal of the cover 12 extends under and partly envelopes the substantially annular rigid member 19 so as to secure it thereto. The sheet metal of the casing wall of the container 11 extends around and partially envelops a substantially annular rigid flange member 21 so as to secure it thereto. The substantially annular rigid flange member 21 is releasably secured adjacent the substantially annular member 19 by way of nuts and bolts 17 with a substantially annular sealing member 25 therebetween. An angle ring having a vertical 15 and a horizontal 14 wall is secured to the substantially annular member 19 and extends upwardly from the cover 12 of the container 11. The horizontal wall 14 of the angle ring supports a lite stacked container 13 such that a substantially annular support member 16 which depends from the underside of the container 13 is maintained clear of the upper region of the container 11.

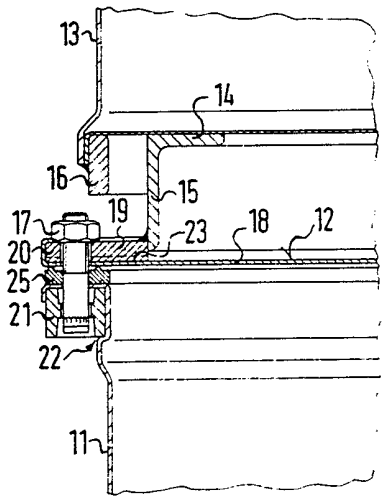

FIG. 2

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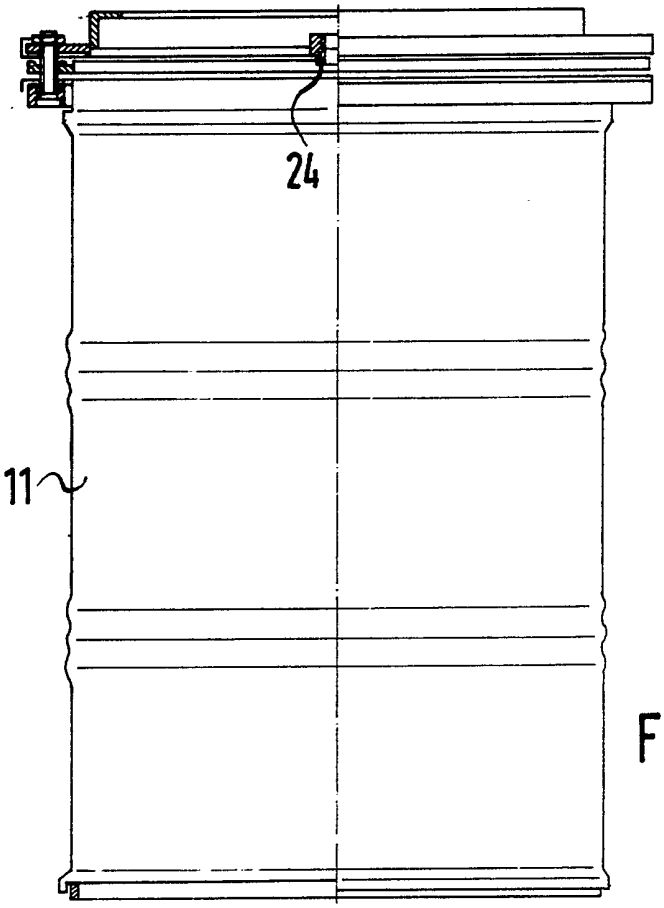

FIG. 1

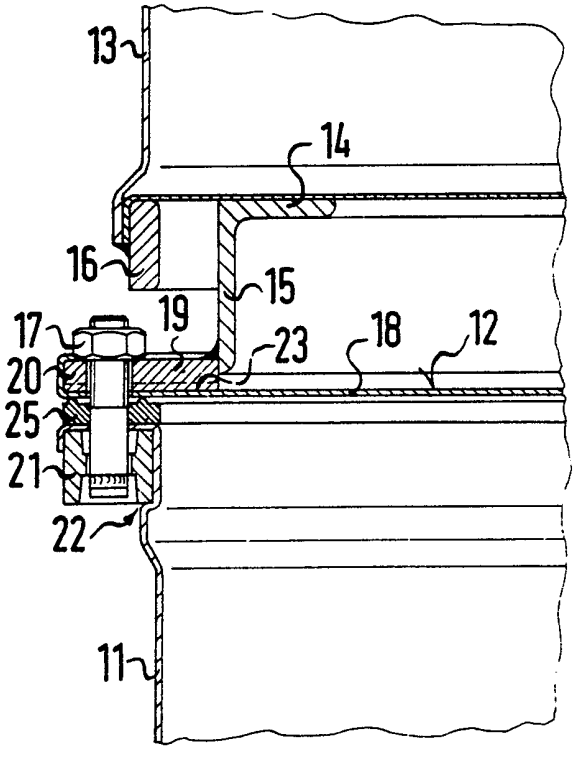

FIG. 2

STACKABLE STORAGE CONTAINER

The present invention relates to a stackable storage container made from metal and in particular, but not exclusively, to a stackable storage container for providing long term storage.

Such containers are commonly used for the storage of radioactive waste. Further, a container of this type is known from published German Patent Application 34 25 978.

The upper periphery of the casing of such known containers comprises a rigid annular member, as does the periphery of the cover of the container. When the cover closes the container, these annular members together provide an extremely stable flange type seal.

It is a particular disadvantage that the cover, and the casing of the container, are formed of a thin metal material and as such, have to be welded onto the flange type rigid annual members. The necessity for welded seams results in considerably high production costs. Furthermore, the metal material of the casing and cover subsequently tends to corrode more easily at the welded seams and also in the regions surrounding the seams, than the remaining material which is not subjected to heating. The weakened material of the cover and casing can be disadvantageously readily damaged during stacking when one container is deposited onto another container with too much force. Such damage should particularly be avoided when radioactive waste material is being stored.

It would therefore be advantageous if a container could be provided which does not exhibit such disadvantages.

The present invention seeks to provide a stackable container which provides for enhanced safety against corrosion and which can therefore withstand greater impacts without denting when being stacked and in which the sealing between the cover and casing can be provided cost-efficiently.

According to the present invention there is provided a stackable storage container formed of metal and comprising a casing extending between an underside upon which the container stands when upright and an open end region arranged to be closed by a cover member, the underside including a substantially annular rigid support member, the open end region including a substantially annular rigid flange member, the cover member including a substantially annular rigid member disposed around the outer region thereof, means being provided for releasably securing the substantially annular rigid flange member adjacent the substantially annular rigid member with a sealing member located therebetween, and the cover having centring means extending therefrom which has an outer dimension less than the inner dimension of the substantially annular rigid support member, wherein the cover extends around and at least partly envelops the substantially annular rigid member and is secured thereto and the casing extends around and at least partly envelops the substantially annular rigid flange member and is secured thereto.

The invention is described further hereinafter, by way of example only, with reference to the accompanying drawing in which:

Fig 1 is a part sectional side elevation of one embodiment of a stackable container according to the present invention; and

Fig 2 is a sectioned view of a peripheral region of the casing of the container of Fig 1 with a

similar container stacked thereon.

Fig 1 shows an upstanding substantially cylindrical container 11 having a cover 12 (see Fig 2) secured in a closing position thereon. An annular seal member 25 (see Fig 2) is positioned to provide a seal between the cover 12 and upper periphery of the casing wall. Fig 1 also shows a pipe 24, the function of which will be described below.

Fig 2 shows the region of the sectional view of the container of Fig 1 in greater detail. Further, the container 11 has a like container 13 stacked thereon.

The cover 12 includes a rigid annular member 19 which forms the outer periphery thereof, and also an upstanding angle ring having a vertical wall 15 and a horizontal lip 14. The vertical wall 15 of the angle ring is welded to the rigid annular member 19. The upper periphery of the casing of the container 11 includes a rigid annular flange member 21. The flange member 21 is positioned such that when the cover 12 closes the container 11, the flange member 21 and the rigid annular member 19 of the cover 12 are adjacent each other. However, in this position the flange member 21 does not contact the annular member 19 since an annular sealing member 25 is located therebetween.

The cover 12 is secured to the container by nuts and bolts 17 which can be tightened so as to compress the sealing member 25 and thereby provide an effective seal.

As shown in Fig 2, the base of the container 13 includes a rigid annular support member 16 upon which the container 11, 13 stands when on level ground.

The container 13 is supported on the container 11 by way of the upper surface of the horizontal lip 14 of the angle ring. A region of the base of the container 13 lies directly on the angle ring. The rigid annular

support 16 of the container 13 when stacked on the container 12 extends downwardly around the angle ring but terminates above the nuts and bolts 17. Thus neither the support 16, the base of the container 13 nor the nuts and bolts of the container 11 will be damaged when the container 13 is stacked on the container 11. Also, the container 13 is prevented from sliding off the container 11, since the vertical wall 15 of the angle ring engages behind the annular support 16.

The cover 12 comprises a thin sheet 18 of metal material which envelops the outer region 20 of the annular member 19 of the cover 12.

The above means of securing the sheet 18 to the member 19 is particularly simple to achieve and is considerably less susceptible to corrosion than are welded seams.

The casing of the container 11 comprises thin sheet metal which partially envelops the outer region of the annular flange 21 in a similar manner as described above. The flange member 21 is also retained in position by a reinforcing rib 22 formed in the casing and provding an abutting surface for the flange member 21.

Automatically operated lifting equipment for lifting and transporting the containers can easily engage under the horizontal lip 14 of the angle ring of the cover 12.

A drainage hole 23 opens from the inner region of the surface of the cover 12 and allows for the drainage of water from the surface of the cover 12, so that it will not be possible for any water to collect in the inner section of the cover 12. The pipe 24 (Fig 1) is provided for gas discharge, and further a valve or a gas discharge filter can if necessary be built into the

cover.

The annular seal 25 is formed to provide a hollow chamber or cavity in the inner section in order to achieve a better spring loading effect.

Also, the annular flange 21 of the container has a double-T cross-section in order to achieve a greater bending strength.

The construction of the cover 12 will also make it possible for it to be used as a double cover system, as has been described in principle in published German Patent Application 34 25 979.

As described above the containers 11, 13 can be stacked on like containers without the need to take special care not to damage the thin walls thereof. Further, the absence of welded seams reduces the likelihood of mechanical or chemical damage occurring.

CLAIMS

1. A stackable storage container formed of metal and comprising a casing extending between an underside upon which the container stands when upright and an open end region arranged to be closed by a cover member, the underside including a substantially annular rigid support member, the open end region including a substantially annular rigid flange member, the cover member including a substantially annular rigid member disposed around the outer region thereof, means being provided for releasably securing the substantially annular rigid flange member adjacent the substantially annular rigid member with a sealing member located therebetween, and the cover having centring means extending therefrom which has an outer dimension less than the inner dimension of the substantially annular rigid support member, wherein the cover extends around and at least partly envelops the substantially annular rigid member and is secured thereto and the casing extends around and at least partly envelops the substantially annular rigid flange member and is secured thereto.

2. A container as claimed in claim 1, wherein the casing includes a rib having a surface abutting the substantially annular rigid flange.

3. A container as claimed in claim 1 or 2, wherein the centring means is secured to the substantially annular rigid member of the cover member and comprises an angle ring.

4. A container as claimed in claim 3, wherein the angle ring extends from the cover further than the substantially annular rigid support member extends from the underside of the container such that the substantially annular rigid supporting member is held

clear of the upper region of a like container when the container is stacked thereon.

5. A container as claimed in any preceding claim, wherein the substantially annular rigid flange member has an H-shaped cross-section, of which the web is horizontal when the container stands upright.

6. A stackable storage container formed of metal substantially as hereinbefore described with reference to the drawing.

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