ABSTRACT OF THE DISCLOSURE

The invention described in this application relates to an upright, multi-layer container comprising a steel plate wound around the external circumference of the upper end of an end plate, this combination being welded to the lower-end surface of a multi-layer cylinder, the steel plate being welded to the end plate, and a metal member in support of the body of the container and secured to said steel plate.

BRIEF SUMMARY OF THE INVENTION

This invention relates to an upright multi-layer container. In the case of such a container of a large size consisting of a multi-layer cylinder and a semi-spherical end plate welded to the cylinder, it is difficult to secure a support metal member to the multi-layer cylinder, since it is made up of many layers of thin steel or band steel. Therefore, the end plate is composed of a single-layer of steel and a deposited steel member is padded on the upper end portion thereof to form a flange portion or the upper end portion may be formed by a spherical-surface ring of forged steel provided with a flange so that a support metal member may be secured to said flange portion, for example, a skirt portion may be welded to said flange portion, which procedure has already been well known. However, in the case of a container of this well known art wherein a stress taxed on said flange portion in support of the container may be distributed widely on the end plate so as to avoid any excessive concentrated stress thereon, it is necessary to form the base portion of said flange portion into a small gradient thus requiring too much paid of a deposited iron member or a thick ring of forged steel of a large size, thus making the manufacture of the container very expensive as an unavoidable drawback.

An object of the present invention is to provide an upright, multi-layer container free of such drawbacks as those mentioned above.

Another object of the invention is to provide an upright, multi-layer container wherein a steel plate is wound around the external circumference of the upper-end portion of an end plate welded to the lower end of a multi-layer cylinder, the steel plate being welded by means of deposited iron members to the cylinder and to the end plate and a support metal member in support of the body of the container, for example, a steel skirt member is welded to said steel plate. According to the present invention, it is rendered sufficient to weld only the external circumference of the upper-end portion of the end plate and the narrow beveling portion of said steel plate thereby saving on the amount of deposited iron members. Therefore, this manufacturing procedure is very easy to carry out without using a large-size material of forged steel, as compared with the formation of a flange with the padding of deposited iron members on the external circumference of the end plate as specified or required in the case of containers of the prior art.

Still another object of the invention is to provide an upright, multi-layer container wherein an end plate of a smaller thickness is employed than that of a multi-layer cylinder and said end plate is welded to the multi-layer cylinder, together with a steel plate wound on the external circumference of the end portion of the end plate and welded thereto. According to the present invention, therefore, it is possible that the greater part of weight of the multi-layer container be supported by the steel plate directly welded to the end portion of the end plate without giving any excessive stress on the end plate thereby permitting the manufacture of highly dependable containers.

Still another object of the present invention is to provide an upright, multi-layer container wherein at least either a steel plate or deposited steel members for welding said steel to the end plate is made of ductile steel with a yield point lower than the end plate. This arrangement will certainly make the welding operation very easy and be effective in preventing any excessive concentrated stress on the end plate.

Other objects, characteristics and effect of the present invention will become more apparent from the following description, with reference to the embodiment shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of an upright large-size multi-layer container, with a part thereof exposed in vertical cross section. FIG. 2 is an enlarged view of the junction portion between the multi-layer cylinder, end plate and support metal member of FIG. 1.

DETAILED DESCRIPTION

In accordance with FIG. 1, there are indicated the multi-layer container for high-pressure purposes generally at numeral 1, its end plate at 2 welded to the end portion of the multi-layer cylinder 2 and the skirt member at 10 in vertical support of the container.

In carrying out the manufacturing operation, the steel plate 5 is wound around the external circumference of the upper end portion 4 of the lower end plate 3 and then welded thereto by means of a deposited iron member 6 for integral combination. Subsequently, the end plate 2 is caused to confront the lower-end surface of the cylinder 2 and both members are welded together by means of deposited steel members 7 and 8 to complete the formation of the multi-layer container 1. Again subsequently, the skirt member 10 for supporting the container is welded to the external circumference of the steel plate 5 by means of a deposited steel member 9.

For example, said steel plate 5, and deposited steel members 6, 8, 9, have tensile strength of about 35-45 kg./mm.2. And said cylinder 2, said end plate 3, and deposited steel member 7 have tensile strength of more than about 60 kg./mm.2.

The upright multi-layer container thus formed is such that the yield point and yield ratio of the steel plate 5 and deposited iron members 6, 8 and 9 are made lower than those of the cylinder 2 and end plate 3 and moreover, the lower end of the deposited iron member 6 is formed into a small gradient so that the iron plate 5 gives no excessive concentrated stress on the end plate 3 and the greater part of weight of the container 1 can be transmitted to the skirt member 10 whereas only one part thereof is transmitted to the end plate 3 thus presenting the manufacturing procedure to be all the more safe in practical use.

According to the present invention, after the deposited steel members 6, 7 and 8 have been welded in place, the welded portions can be subjected to some heat treatment to remove residual stress or improve the quality of the material thereof and thus it is possible to confirm the satisfactory completion of the container by testing and then...
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the skirt member 10 can be welded to the steel plate by means of the deposited steel member 9, thus making the manufacturing operation very simple.

What is claimed is:

1. An upright container comprising an end plate (3) having an upper end portion (4), a multi-layer cylinder (2) having a lower-end surface, the end plate being of a smaller thickness than that of the multi-layer cylinder, a steel plate wound around the external circumference of the upper end portion of said end plate, the steel plate being welded to the end plate, the upper end portion and the steel plate confronting the lower-end surface of the cylinder and being welded thereto, and a metal member in support of the body of the container and being secured to said steel plate.

2. An upright container comprising an end plate (3) having an upper end portion (4), a steel plate (5) wound around the external circumference of said upper end portion and welded thereto, a multi-layer cylinder (2) having a lower-end surface, the end plate having its upper end portion with the steel plate confronting the lower end surface of the cylinder and welded thereto, and a metal support means (10) welded to the steel plate.

3. An upright container as claimed in claim 2, said steel plate being made of ductile steel with a yield point lower than that of said end plate.

4. An upright container as claimed in claim 2, the steel plate being welded to the upper end portion by a deposited steel member (6) of ductile steel with a yield point lower than that of said end plate.

5. An upright container as claimed in claim 2, the end plate being of a smaller thickness than the multi-layer cylinder.

6. An upright container as claimed in claim 5, the steel plate (5) being welded to the upper end portion by a deposited steel member (6) and to the lower-end surface of the cylinder (2) by a deposited steel member (8), the metal support means (10) being welded to the steel plate by a deposited steel member (9), the upper end portion being welded to the lower-end surface by a deposited steel member (7).

7. An upright container as claimed in claim 6, deposited steel members (6), (8), (9), and steel plate (5) being ductile and having a yield point lower than those of the cylinder and the end plate.

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