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PATENT SPECIFICATION

DRAWINGS ATTACHED

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Inventor: LEONARDUS ARNOLDUS NICOLAAS BIJVOET

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COMPLETE SPECIFICATION

Sheet Metal Shipping Container

We, VAN LEER'S VATENFABRIEKEN N.V., a Dutch Corporate Body, of 206, Amsterdamseweg, Amstelveen, Holland, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to sheet metal shipping containers, particularly sheet steel shipping drums of the type which are commonly used for the packaging, the storage and the transportation of various commodities.

It has already been proposed to provide sheet metal shipping containers comprising a side wall and at least one end which is permanently secured to said side wall and which has a circumferential upstanding flange engaging the inner surface of said side wall with a reinforcing ring for the seam by means of which the container side wall and the flange of the end are secured to one another. Such a reinforcing ring may be positioned at the outside of the seam and may have such a profile that the seam is partially or wholly enveloped by the reinforcing ring.

In a conventional shipping container design the reinforcing ring is provided with a portion engaging the inner surface of the upstanding flange of the container end and an annular portion extending inwardly from said first named portion. However, it has been found that this construction has certain disadvantages, and it is one object of the present invention to remove these disadvantages.

With this and other objects in view the invention provides a sheet metal shipping container comprising a side wall and at least one end wall permanently secured to said side wall, said end wall having a central substantially disc like portion surrounded by a circumferential upstanding flange engaging the inner surface of said side wall, said side wall and said flange of said end wall being secured

to one another by means of a seam which is at least partially enclosed in a reinforcing ring comprising a portion engaging the inner surface of said upstanding flange of said end wall, and an annular portion extending inwardly from said first named portion and having an inner marginal edge which is turned away from said central portion of said end wall.

The arrangement according to the invention has various advantages over prior art constructions, particularly those in which the reinforcing ring is provided with a radially inwardly extending annular portion which over its full radial width is in engagement with the container end. If the filled container is placed upright the bottom end has the tendency to sag under the load of the contents of the container. During transport by rail or road vibrations may be set up in the bottom end. On the other hand, the top end may also bulge outwardly, for instance by an increase in temperature or by the contents of the container being thrown upwards through shocks or vibrations. Also combinations of the various unfavourable conditions may occur. In all these cases the edge of a radially inwardly extending annular portion of the reinforcing ring may be caused to form a sharp crack or even to cut into the container end material which may lead to fractures or bursts in the container end, and thus to leakage. This is particularly applicable to containers made of thinner or lighter gauge sheet steel than is used for conventional drums, and the trade is confronted with a rising demand for such lighter drums. The phenomena described may form just the difference between a failure and a satisfactory container.

In the container construction according to the invention the annular portion of the reinforcing ring has an inner marginal edge portion which is turned away from the central disc-like portion of the end wall so that this edge portion will smoothly engage the end

[Price 4s. 6d.]

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proposed

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wall if it is bulged outwardly. This is particularly the case when, according to a preferred embodiment of the invention, said annular portion has a cross-section in the form of a circular arc, or a parabolic arc or a hyperbolic arc, or some similar smoothly curved shape.

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Moreover, shipping containers of the type concerned usually are painted, lacquered or sprayed after the container has been completed. In the container made in accordance with the present invention a circular crevice is left between the annular portion of the reinforcing ring and the adjacent container end. The paint, lacquer or similar coating also penetrates into this crevice so that even if the reinforcing ring or the end or both are slightly deformed no unpainted portions will be exposed as would be the case if the annular portion of the reinforcing ring were in close contact with the container end. This feature not only ensures a lasting better appearance but also has a rust preventing effect.

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The invention will now be described more in detail, reference being made to the accompanying drawings in which:

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Figure 1 is a cross-sectional view on an enlarged scale of the completed chime forming the connection between the side wall and the end of a container made in accordance with the invention, and

Figure 2 is an exploded cross-sectional view on the same scale of the parts constituting the chime before they are assembled.

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The container side wall 11 and the end 12 of the container according to the invention are to be connected to one another in a liquid tight manner by a seam which is reinforced so as to be capable of withstanding the rigors of transportation under unfavourable conditions; for this purpose a reinforcing ring 13 is provided which after completion of the connection of the side wall 11 to the container end 12 at least partially encloses the seam.

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In the embodiment shown in the drawings the connection between the side wall and the end is formed as a so-called double fold seam; thereto, the side wall 11 is provided with a radially extending flange 14, whereas the end 12 is formed with a circumferential upstanding flange 15 merging into a radially extending flange 16. The end is placed in the side wall so that the circumferential upstanding flange 15 engages the inner surface of the side wall 11, and the flange 14 of the side wall is folded into U-shape through an angle of 180°, whilst the radial flange 16 of the container end is folded through an angle of 360° into double U-shape; thereby the flange 16 encompasses the flange 14 of the side wall.

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However, before folding the flanges of side wall 11 and end 12 into interlocking engagement the reinforcing ring 13 is placed into

the recess formed by the end, said ring comprising a portion 17 engaging the inner surface of the circumferential upstanding flange 15 of the end, and a radially outwardly extending flange 18. The flange 18 is folded over together first with the flange 16 of the end 12 and then with this flange and the flange 14 of the side wall 11 so that the chime shown in Figure 1 results. This folding operation can be carried out by means of any conventional machine or tool.

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The reinforcing ring 13 also possesses an annular portion 19 extending inwardly from the portion 17 engaging the inner surface of the flange 15. The inner marginal edge of this annular portion 19 is bent upwards, that is away from the end 12, as indicated at 20.

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Even if the end 12 is rather seriously bulged outwards still the edge 20 of the reinforcing ring cannot "bite" into the end material which might lead to the formation of sharp cracks, cuts and leakages; on the contrary, the end will smoothly engage the curved underside of the reinforcing ring.

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Moreover, a crevice 21 is formed between the annular reinforcing ring portion 19 and the outer surface of the end. When the completed container is sprayed or covered with a coating of paint or lacquer in any other way the coating material will penetrate into this circular crevice thereby preventing the penetration of moisture and moreover, preventing exposure of unpainted parts when the reinforcing ring and/or the end might be locally deformed. Thus, a lasting neat appearance is ensured and the risk of the formation of rust is greatly reduced.

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Various additions, modifications and alterations may be made without departing from the scope of the invention as defined in the appended claims. For instance, in the embodiment shown and described the inwardly extending portion 19 of the reinforcing ring 13 has a cross-section in the form of a circular arc; it will be clear that this cross-section might also have a parabolic or a hyperbolic or another shape; however, preferably the cross-section has a smoothly curved shape as shown.

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Moreover, the seam forming the connection between the container side wall and the container end need not be a double fold seam or a single fold seam even; any other form of seam may meet the requirements.

WHAT WE CLAIM IS:—

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1. A sheet metal shipping container comprising a side wall and at least one end wall permanently secured to said side wall, said end wall having a central substantially disc like portion surrounded by a circumferential upstanding flange engaging the inner surface of said side wall, said side wall and said flange of said end wall being secured to one another by means of a seam which is at least partially enclosed in a reinforcing ring comprising a



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1. A sheet metal shipping container comprising a side wall and at least one end wall permanently secured to said side wall, said end wall having a central substantially disc like portion surrounded by a circumferential upstanding flange engaging the inner surface of said side wall, said side wall and said flange of said end wall being secured to one another by means of a seam which is at least partially enclosed in a reinforcing ring comprising a 130



portion engaging the inner surface of said upstanding flange of said end wall, and an annular portion extending inwardly from said first named portion and having an inner
5 marginal edge which is turned away from said central portion of said end wall.

2. A sheet metal shipping container as claimed in claim 1, in which said annular
10 portion has a cross-section in the form of a circular arc, or a parabolic arc, a hyperbolic

arc or some similar smoothly curved shape.

3. A sheet metal shipping container constructed substantially as herein described with reference to the accompanying drawings.

A. A. THORNTON & CO.,
Chartered Patent Agents,
Northumberland House,
303/306, High Holborn, London, W.C.1,
For the Applicants.

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