

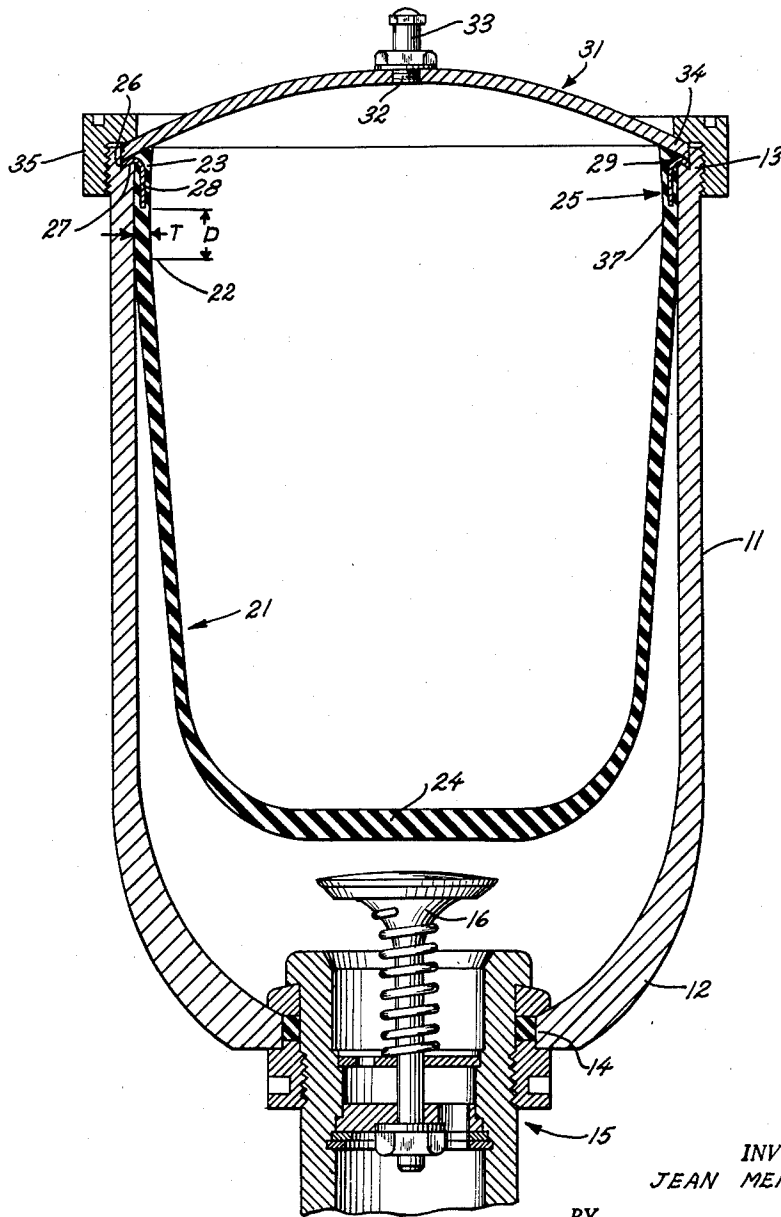
Nov. 5, 1963

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3,109,458

PRESSURE VESSELS

Filed Dec. 16, 1959



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3,109,458

PRESSURE VESSELS

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Filed Dec. 16, 1959, Ser. No. 859,972

1 Claim. (Cl. 138—30)

This invention relates to the art of pressure vessels, more particularly of the type known as pressure accumulators.

It is among the objects of the invention to provide a deformable partition for a pressure vessel, which partition may be securely retained in position at the rim thereof with substantially no sharp bending stress or strain imposed thereon which might cause weakening of the partition at such region, with resultant tearing of the partition, regardless of the number of times the partition is expanded and contracted due to charging and discharging of the pressure vessel with continuous use.

According to the invention, these objects are accomplished by the arrangement and combination of elements hereinafter described and particularly recited in the claim.

This application is a continuation-in-part of co-pending application Serial No. 582,535, filed May 3, 1956, now U.S. Patent 2,919,718.

In the accompanying drawing in which is shown one of various possible embodiments of the several features of the invention, the single FIGURE is a longitudinal sectional view of a pressure vessel.

Referring now to the drawing, the pressure vessel comprises a container 11 of strong rigid material, such as steel, capable of withstanding high pressures, said container being substantially spherical at one end as at 12 and open at its other end as at 13.

The end 12 of the container has an axial opening 14 in which is mounted a closure assembly 15 defining a port through which a fluid under pressure, such as oil, may flow into and out of the container.

As the valve 16 controlling the fluid port may be of any suitable type such as that shown in Patent No. 2,721,580 and per se forms no part of this invention, it will not be further described.

Positioned in the container 11 is a deformable partition 21, illustratively a collapsible and expansible bladder which desirably is of resilient material such as rubber or synthetic plastic of like physical characteristics.

The bladder 21 is desirably substantially conical in contour and its wall thickness progressively decreases from an annular region 22 spaced from the rim 23 thereof, at least some distance toward the free end 24 of the bladder.

The bladder 21 is supported at its rim 23 in such manner that regardless of the number of times it is expanded and contracted during charging and discharging of the pressure vessel, no sharp bending stresses will be imparted to the portion of the bladder wall adjacent such supported rim 23.

To this end, an annular supporting member 25 is desirably molded into the wall portion of the bladder adjacent the rim 23 thereof. The supporting member 25 desirably is of resilient sheet material such as metal or suitable plastic, and is substantially L-shaped in cross section.

One leg 26 of the supporting member 25 extends laterally outward and is seated on an internal annular shoulder 27 near the open end 13 of the container. The other leg 28 of the supporting member extends downwardly into the wall portion of the bladder 21 adjacent said rim 23. De-

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sirably, the junction between legs 26, 28 is rounded as at 29 to eliminate a sharp edge.

Means are provided to close the open end 13 of the container and to retain the bladder 21 and annular member 25 in position. To this end, a cover plate 31 is provided which has an axial opening 32 in which a suitable gas valve 33 may be positioned. The periphery 34 of the cover plate 31 is designed to be positioned on the rim 23 of the bladder over the leg 26 of the supporting member and by means of a threaded collar 35 coacting with complementary threads on the container the cover plate is urged downwardly to clamp the leg 26 against shoulder 27, the thus compressed rim 23 of the bladder forming a fluid-tight seal.

As shown in the drawing, to ensure that bending of the bladder will not occur at the region adjacent the lower edge 37 of the supporting member 25, the wall thickness of the bladder from near the rim 23 thereof to the annular region 22 is substantially constant, having a value of say T, and the annular region 22 from which the thickness of the bladder wall decreases is spaced from the lower edge 37 of the annular member 25 by a distance D.

The distance D must be such as to ensure that the bladder does not bend over the lower edge 37, yet must not be too great as to diminish the utilizable volume of the pressure vessel, and a value of D equal to at least twice, and preferably three times, the thickness T has been found to be suitable.

With the construction above described, as the thickness of the bladder wall at the zone where it leaves the container wall as at 22 is less than in the vicinity of the supporting member, the bladder will flex where the thickness is less, i.e., at the region 22, hence no sharp bends will occur at the lower edge 37 of the supporting member 25.

It is also to be noted that since the thicker portion T will press against the wall of the container, the resultant friction will reduce the stress on the bond of the bladder to the supporting member.

With the construction above described, a deformable partition is provided for a pressure vessel which will be restrained from any sharp bends regardless of the number of times the partition is expanded or contracted, and hence is capable of continuous use for long periods of time without likelihood of breakdown of the partition.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claim, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A pressure vessel comprising a rigid container having a mouth at one end with an internal annular shoulder and a port at the other end, a flexible partition in said container, the wall of said partition being extensible, said partition having a circular peripheral edge and a supporting member of flexible resilient substantially rigid sheet material having a portion thereof embedded in said partition wall adjacent the peripheral edge thereof, said portion extending substantially parallel to said partition wall, said portion having an inner edge positioned in said partition,

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said supporting member being an annulus substantially L-shaped in cross section forming a pair of legs, one of said legs extending substantially laterally outward and resting on said shoulder, the other leg defining the imbedded portion, said partition having a portion of the wall thereof of substantially constant thickness extending from at least near the peripheral edge thereof past the inner edge of said annular supporting member, the thickness of said partition wall being reduced along the length thereof from the constant thickness wall portion thereof toward the portion of said partition remote from its peripheral edge, the distance between the inner edge of said supporting member to the region at which said reduced wall thickness begins being at least twice as long as the thickness of the constant thickness wall portion, a cover plate extending over the mouth of said container, and means securely to clamp said cover plate against said outwardly extending leg to

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retain the latter on said shoulder and retain the peripheral edge of said partition in fixed position with respect to the mouth of said container with the constant thickness portion of said partition in engagement with the wall of the container adjacent the mouth thereof.

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