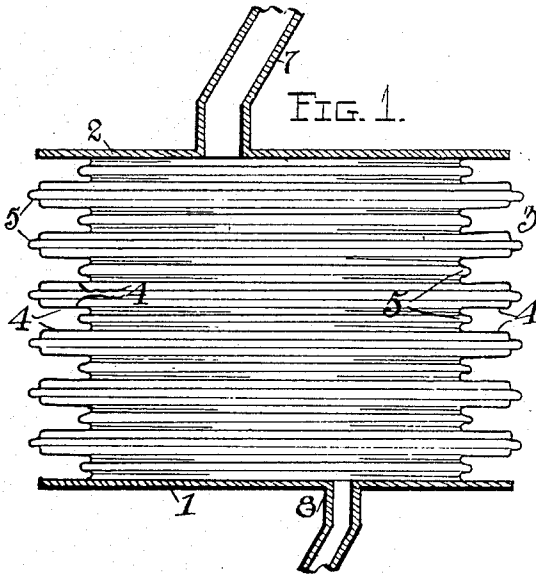
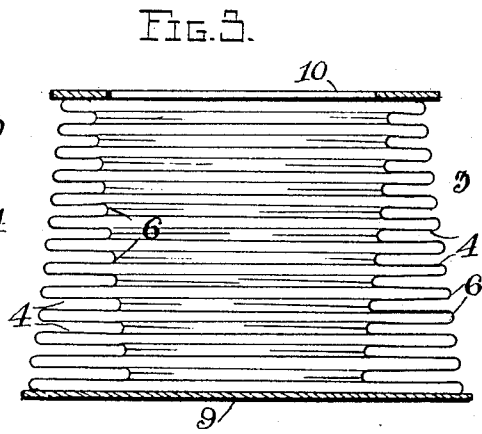
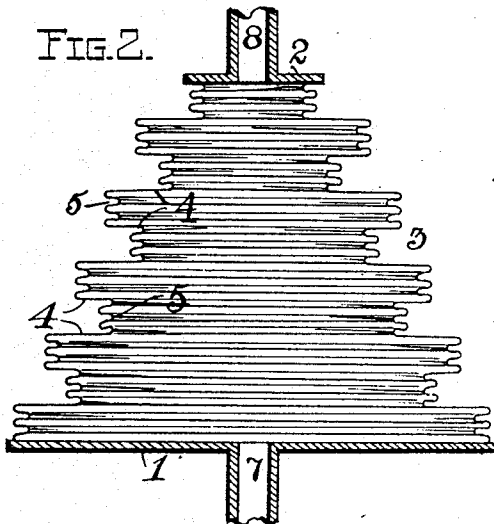
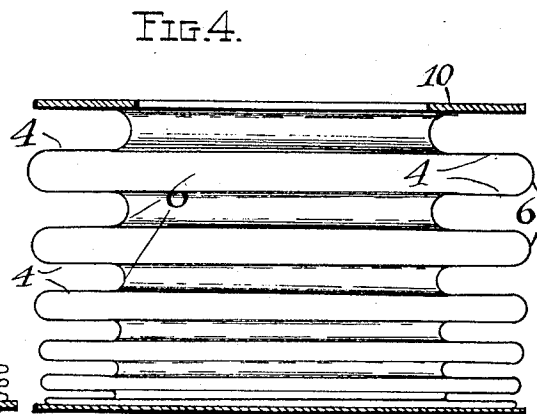


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No. 781,939.

PATENTED FEB. 7, 1905.

W. M. FULTON.
COLLAPSIBLE VESSEL.
APPLICATION FILED FEB. 26, 1903.



Witnesses

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UNITED STATES PATENT OFFICE.

WESTON M. FULTON, OF KNOXVILLE, TENNESSEE.

COLLAPSIBLE VESSEL.

SPECIFICATION forming part of Letters Patent No. 781,939, dated February 7, 1905.

Application filed February 26, 1903. Serial No. 145,193.

To all whom it may concern:

Be it known that I, WESTON M. FULTON, of Knoxville, Tennessee, have invented a new and useful Improvement in Collapsible Vessels, which invention is fully set forth in the following specification.

This invention relates to collapsible vessels, and has for its object to provide a vessel which is capable of being repeatedly collapsed and expanded without injury to the vessel caused by breaking of joints and straining of parts which destroy the vessel's usefulness.

Heretofore collapsible vessels after the form of a bellows or Japanese lantern have been constructed in which the walls of the vessel are corrugated, the opposite walls of any given corrugation lying in converging planes and being united at a sharp angle, which breaks after the vessel has been used for a short time. A substantially similar construction occurs in certain corrugated vessels formed of perforated metal disks united at their inner and outer peripheries to form the walls of the vessel.

In collapsible vessels formed as above described the very use for which the vessel is designed—viz., expansion and contraction—acts to rapidly destroy the same by breaking the angular joints.

According to the present invention a collapsible vessel is constructed with a rigid end wall or walls, to which is connected a flexible lateral wall composed of substantially parallel portions united or connected by portions struck or otherwise formed on a simple or compound curve, thereby entirely avoiding the angular construction which constitutes the great source of weakness in collapsible vessels as heretofore constructed. Preferably the collapsible walls of the vessel are made of sheet metal, such as tin, brass, or iron; but any suitable material may be employed without departing from the spirit of the invention, and in the accompanying drawings some of the forms which the inventive idea may assume are shown; but these are illustrative only and are not designed to define the limits of the invention.

Figure 1 shows a vertical section of a cylin-

drical collapsible vessel with perforated rigid end walls. Fig. 2 shows a modified form of Fig. 1. Fig. 3 shows a vessel open at the top and closed at the bottom and having collapsible walls according to this invention, but differing specifically from those shown in Figs. 1 and 2; and Fig. 4 shows still another modification.

Referring to Figs. 1 and 2, the reference-numerals 1 and 2 indicate rigid end walls, and 3 a collapsible wall connecting said walls 1 and 2. The collapsible wall is composed of substantially parallel portions 4, connected by curved portions 5, which in these two instances are made up of compound curves, though, if preferred, they might be simple curves, as at 6 in Figs. 3 and 4. In Figs. 1 and 2 the rigid end walls are provided with openings or conduits 7 and 8, which may be utilized for the entrance and exit of fluids.

In Fig. 3 is shown a vessel having a rigid imperforate bottom or end wall 9, the flexible side wall 3, composed of the parallel portions 4, connected by the curved portions 6, and a rim or rigid annular top piece 10. In this figure the parallel portions 4 of the collapsible wall are of greater external and less internal diameter as we proceed from the top downward, and the curved portions 6 connecting them are of simple as distinguished from compound curves 5 of Figs. 1 and 2.

In Figs. 1, 2, and 3 the curved portions connecting the parallel surfaces 4 are substantially uniform in character and dimensions; but this is not necessary, as they may gradually increase from one end to the other, as shown in Fig. 4.

From the foregoing it will be perceived that a variety of forms may be employed in giving mechanical expression to the broad inventive idea involved, which is that of connecting substantially parallel portions of a flexible wall by curved or non-angular portions. These parallel portions may or may not be of equal area and may or may not be positioned vertically one above the other. Thus in Figs. 1 and 4 they are of equal area and are placed vertically one above the other, while in Figs. 2 and 3 they are of unequal

area, and in Fig. 3 they are placed vertically one above the other, while in Fig. 2 they are not so placed. It is equally apparent that the curved portions connecting the parallel portions may vary in character so long as the essential feature of a collapsible wall composed of parallel planes connected by curved non-angular portions is present, whereby the angular form of collapsible wall with its attendant defects is avoided.

It is not necessary to enumerate the great variety of uses to which a collapsible vessel of the character herein described can be put, but a few may be mentioned. For example, those forms shown in Figs. 1 and 2 are peculiarly adapted for use as mufflers for the exhaust of locomobile and other similar motors, one of the conduits, as 7, being connected to the exhaust and the other, as 8, leading to the open air. In this case the intermittent exhaust into the vessel will serve to expand the vessel and the continuous exhaust from the vessel due to the elasticity of the vessel's flexible wall will tend to collapse it, the escape from the vessel being more gradual and hence accompanied by little, if any, objectionable noise. The forms shown in Figs. 3 and 4 are also extremely useful in laboratory and physical experiments for determining the heat-radiating powers of various liquids by reason of the opportunity afforded for maintaining a constant radiating surface with varying volumes. Numerous other uses could readily be given, but the foregoing are sufficient to indicate the wide range of uses of which the collapsible vessel is capable.

What I claim is—

1. A collapsible vessel having a flexible elastic wall with corrugations of different depths,

the parallel portions of the wall being connected by curved portions.

2. A collapsible vessel having a flexible elastic wall with corrugations of different depths, the parallel portions of the wall being connected by curved portions, and rigid end walls united to said flexible wall.

3. A collapsible vessel having a flexible elastic metallic wall with corrugations of different depths, the parallel portions of the wall being connected by curved portions, and rigid end walls united to said flexible wall.

4. A collapsible vessel having a flexible elastic metallic wall with corrugations of different depths, the parallel portions of the wall being connected by curved portions, and rigid end walls united to said flexible wall, one of said rigid walls being provided with an opening therethrough.

5. A collapsible vessel having a flexible elastic wall with corrugations of different depths, the parallel portions of the wall being connected by curved portions, and rigid end walls each of which is provided with an opening therethrough.

6. A collapsible vessel varying in cross-sectional area from end to end and having a flexible elastic wall with corrugations of different depths, the parallel portions of the wall being connected by curved portions, and rigid end walls each of which is provided with an opening.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WESTON M. FULTON.

Witnesses:

H. B. HICKS,
SAM BOEKER.