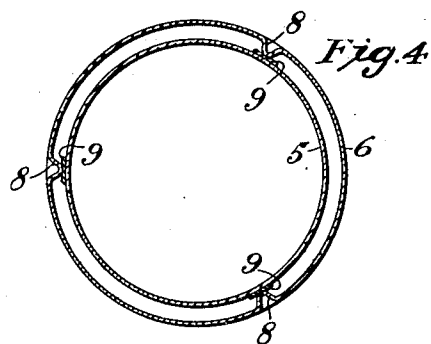
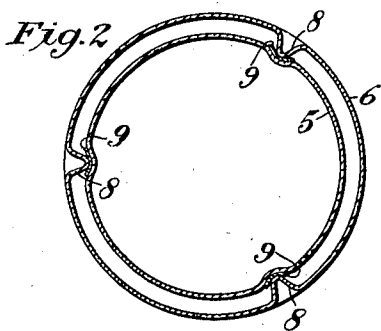
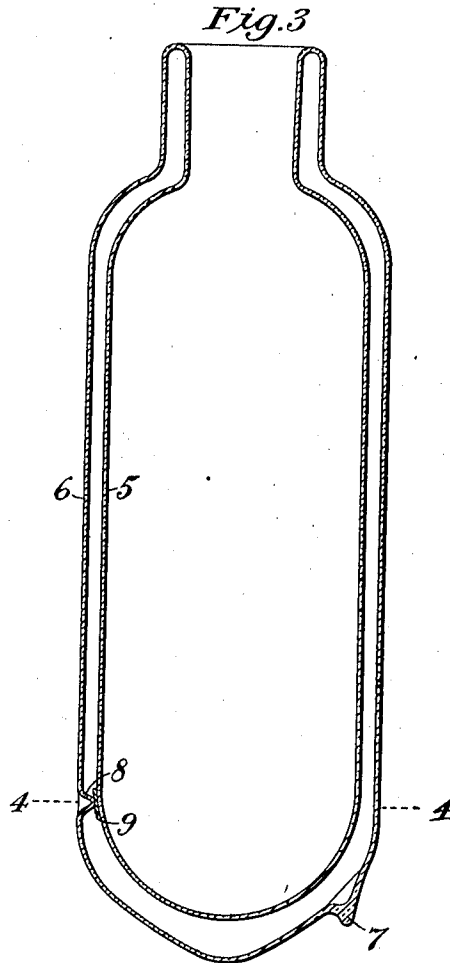
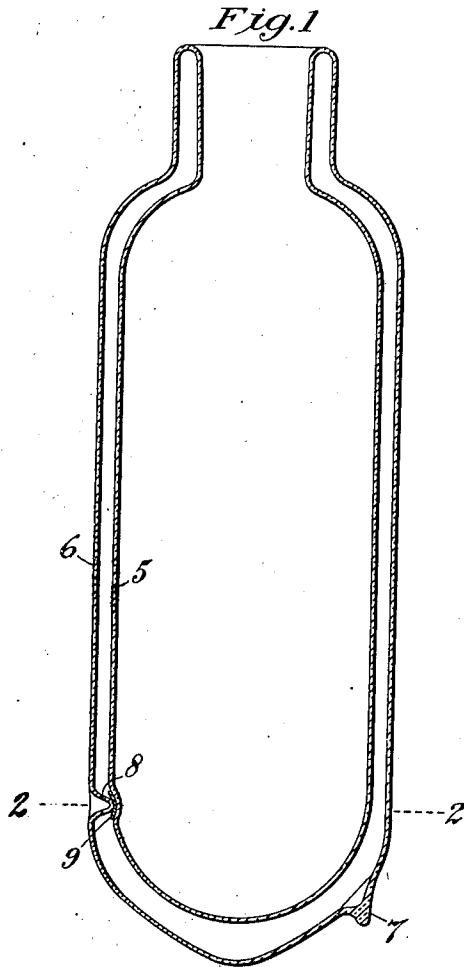


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HEAT INSULATING VESSEL.
APPLICATION FILED MAY 4, 1909.

1,021,058.

Patented Mar. 26, 1912.



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HEAT-INSULATING VESSEL.

1,021,058.

Specification of Letters Patent.

Patented Mar. 26, 1912.

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To all whom it may concern:

Be it known that I, ROBERT MACHLETT, a citizen of the United States, residing in the borough of the Bronx, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Heat-Insulating Vessels, of which the following is a specification, reference being had therein to the accompanying drawings, forming part thereof.

My invention relates generally to heat insulating vessels and particularly to double walled vessels inclosing a vacuum space between them as the insulating medium. It is advisable in vessels of this type to support the two walls relative to each other to prevent the breaking of their connection at the neck; and inasmuch as it is the primary purpose of such vessels to prevent the transfer of heat to or from the contents of the flask, it is important that physical contact between the inner and outer walls be avoided as far as possible. It is also necessary to provide for considerable expansion and contraction of one wall relative to the other. As a means for thus spacing or supporting the two walls relative to each other, spacing or stiffening bodies of soft, non-heat-conductive material, such as asbestos, are commonly employed, and these stiffening bodies are held in place in various ways, as by wire holders, by friction, or by the shape of the walls. Such bodies, however, are yielding in character, and furnish a large physical contact between the two walls.

One object of my invention is to provide a support which combines maximum rigidity and minimum physical contact, thus providing a highly effective support with negligible conductivity of heat.

Other objects and advantages of my invention will appear from the following description.

I shall now describe my invention with reference to the accompanying drawings and shall thereafter point out my invention in claims.

Figure 1 is a central sectional elevation of a vessel embodying my invention. Fig. 2 is a horizontal section of the same on the line 2—2 of Fig. 1. Fig. 3 is a view similar to Fig. 1 of a modification of my invention. Fig. 4 is a horizontal section on line 4—4 of the vessel shown in Fig. 3.

In the illustrated embodiments of my invention I employ a double-walled vessel of

vitreous material, having an inner wall 5 and an outer wall 6, cylindrical in form and of contracted upper portion or neck and joined at their mouth as shown. The air is exhausted from the space between the two walls in the usual way through the sealing tip 7 formed in the outer wall, thus providing the vacuum insulating medium. To minimize the radiation of heat the outer surface of the inner wall 5 and the inner surface of the outer wall 6 may be coated with silver, as is well known in the art. As the inner wall is joined to the outer wall only at the neck, it is advisable, as previously stated, to provide a support between the walls to prevent breakage at the point of connection, and it is to the means affording this support that my invention particularly relates.

In place of the supports or soft stiffening bodies usually employed, I provide rigid columns 8 in one wall spanning the distance between the walls. In the illustrated embodiments of my invention these rigid columns are of the same material as the outer wall and are formed by the application of a highly heated implement to the outer wall and the forcing in of the material of the wall at the desired points to form tapering hollow columns of glass, as shown. These tapering hollow columns of glass, by reason of their diminishing cross-section as they approach the inner wall, and of the fact that they terminate in rounded points, afford little conducting surface from wall to wall. They are not brought into actual contact with the inner wall, but to prevent this actual contact of glass on glass and to afford a slight cushion between the point of the glass column and the inner wall of the vessel, I employ thin pads or cushions 9 of asbestos paper or other elastic and low heat-conductive material between the tips of the columns 8 and the inner wall 5. These pads may be seated in shallow pockets formed in the inner wall for this purpose, as shown in Figs. 1 and 2, or the pockets may be omitted, as in Figs. 3 and 4. In either case, the pads are first placed against the inner wall in proper positions, being preferably moistened to cause sufficient adherence to hold them in place for a sufficient time, and then the material of the outer wall is forced in as previously described substantially in the radial line of the center of each pad. During this forcing in of the glass-support,

ing column, the extreme tip thereof cools sufficiently so that when it comes in contact with the pad, it will not injuriously affect it, and the glass quickly hardens, forming
 5 a rigid connecting and supporting column between the two walls. The number and location of these supports may be variously changed, but in practice I have found three to be a satisfactory number, spaced about
 10 equidistantly on a circumferential line, preferably well toward the bottom of the walls. In this construction, the tips of the rigid columns impinge against the pads and hold them in place. It is apparent, there-
 15 fore, that a very small physical contact is furnished between the inner and outer walls and that the efficiency of the heat insulation is impaired to a negligible extent, compared with the construction in which the
 20 full faces of elastic supports are in contact with both walls. Thus the two walls are connected together, but at the connection or each connection the physical contact is reduced to a minimum, and yet the supports
 25 are rigid glass, with just enough yielding character by reason of the thin pads to provide for expansion and contraction of the two walls relatively to each other.

It is obvious that various modifications
 30 may be made in the constructions shown and above particularly described within the principle and scope of my invention.

I claim:—

1. A heat insulating vessel comprising
 35 spaced walls joined at the mouth of the vessel and inclosing a vacuum space between them, and a rigid supporting column integral with one wall and extending substantially across the distance between the walls
 40 and terminating in a tip in close proximity to the other wall.

2. A heat insulating vessel comprising spaced walls joined at the mouth of the vessel and inclosing a vacuum space between
 45 them, a rigid supporting column integral with one wall and extending substantially across the distance between the walls and terminating in a tip in close proximity to the other wall, and a thin pad of soft material interposed between the tip of the
 50 column and the last mentioned wall.

3. A heat insulating vessel comprising spaced walls joined at the mouth of the vessel and inclosing a vacuum space between them, and a rigid supporting column integral
 55 with the outer wall and extending substantially across the distance between the walls and terminating in a tip in close proximity to the inner wall.

4. A heat insulating vessel comprising
 60 spaced walls joined at the mouth of the vessel and inclosing a vacuum space between them, a rigid supporting column integral with the outer wall and extending substantially across the distance between the
 65 walls and terminating in a tip in close proximity to the inner wall, and a thin pad of soft material interposed between the tip of the column and the last mentioned wall.

5. A heat insulating vessel comprising
 70 spaced walls joined at the mouth of the vessel and inclosing a vacuum space between them, a rigid supporting column integral with the outer wall and extending substantially across the distance between the walls
 75 and terminating in a tip in close proximity to the inner wall, the inner wall being provided with a pocket, and a thin pad of soft material in the pocket and interposed between the tip of the column and the inner
 80 wall.

6. In a vacuum insulated vessel of the type set forth, comprising an inner and an outer wall united at the mouth of the vessel, a plurality of spacing blocks formed integrally with one of said walls and extending
 85 across the vacuum space between said walls: the said blocks being constructed of a length to support the inner wall against displacement sufficient to cause rupture at the
 90 joint at said mouth.

7. In a vacuum insulated vessel of the type set forth, a plurality of spacing blocks between the walls thereof, formed integrally with one of said walls and separate from
 95 the other wall and entering recesses therein.

In testimony whereof I have affixed my signature in presence of two witnesses.

ROBERT MACHLETT.

Witnesses:

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 FRANCIS J. FARRELLY.