Feb. 11, 1947. A. H. HEINEMAN 2,415,425

VACUUM CHAMBER

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Fig. 1.

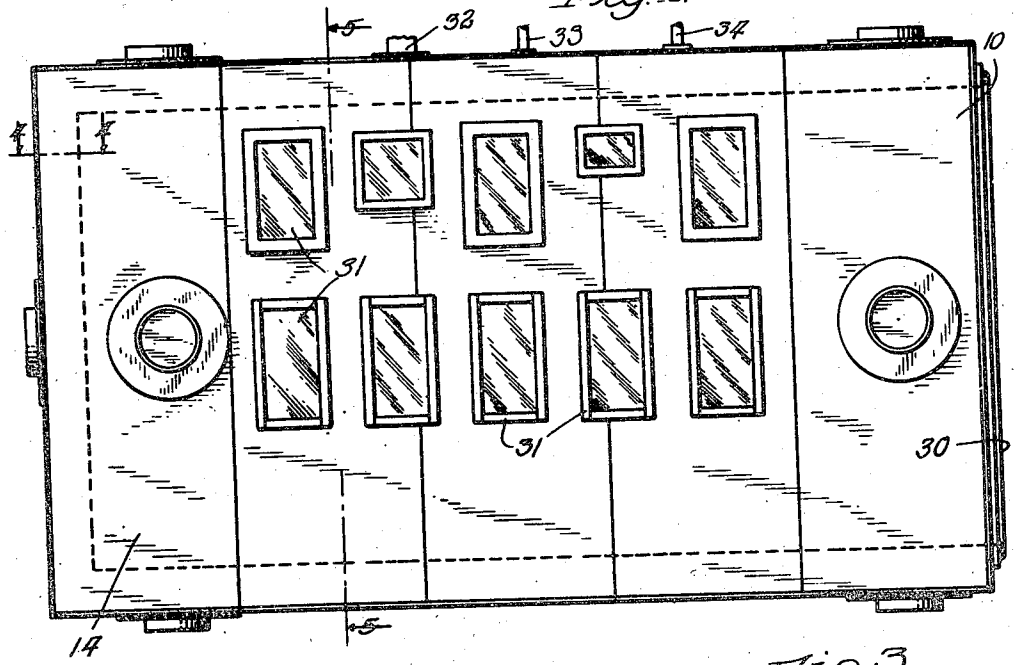


Fig. 2.

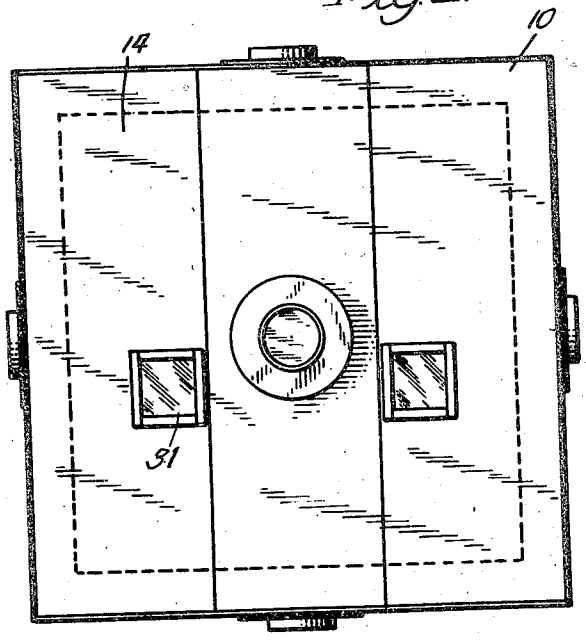
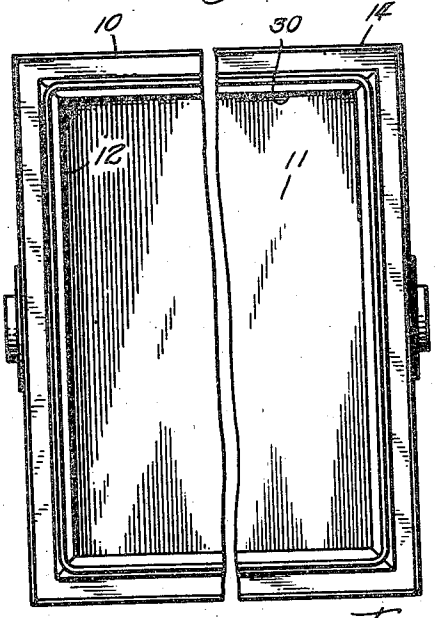


Fig. 3.



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Fig. 4.

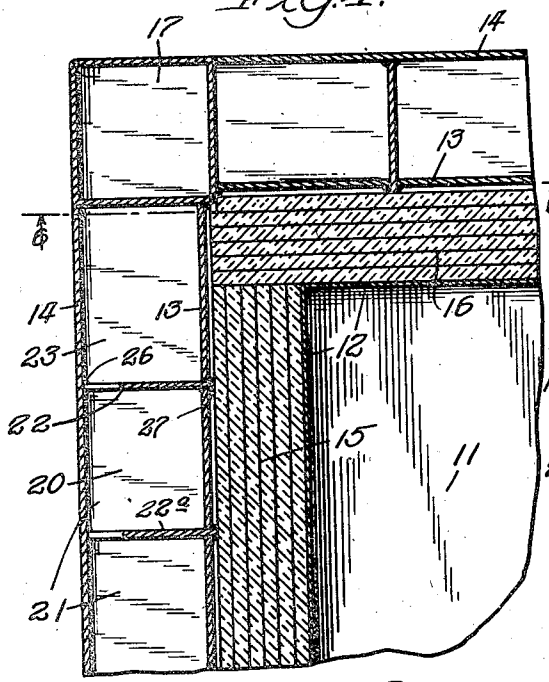


Fig. 5.

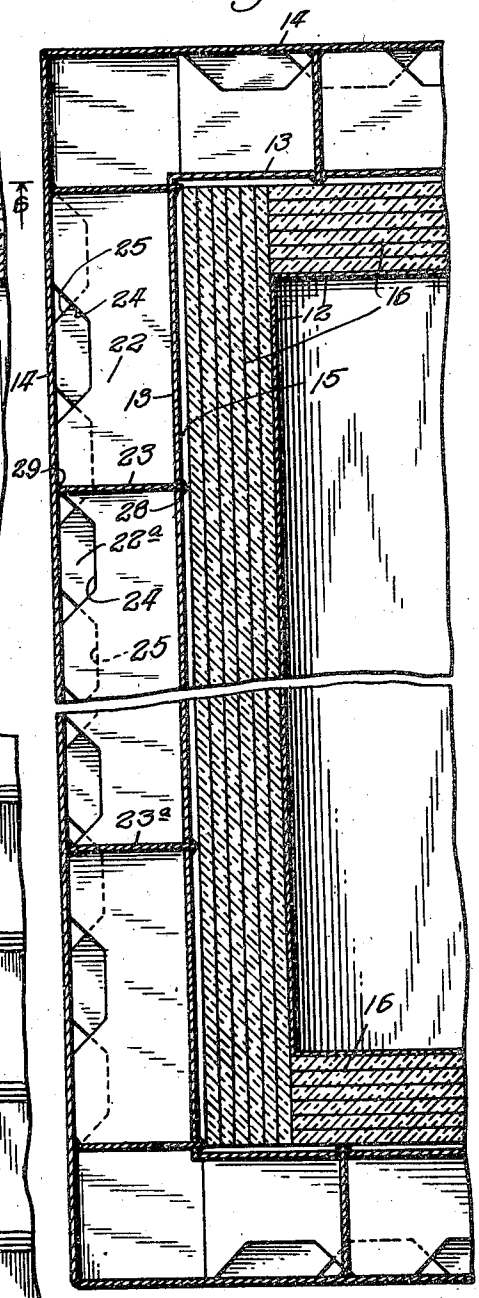
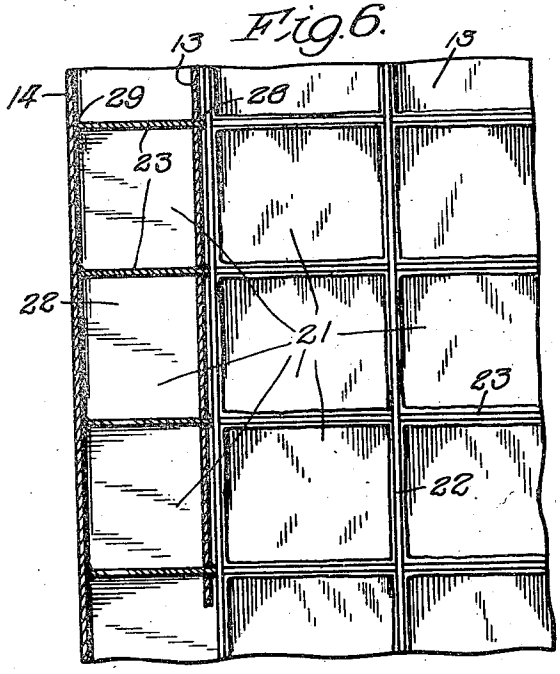


Fig. 6.



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Patented Feb. 11, 1947

2,415,425

UNITED STATES PATENT OFFICE

2,415,425

VACUUM CHAMBER

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Application June 11, 1945, Serial No. 598,879

6 Claims. (Cl. 98—29)

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This invention relates to a vacuum chamber and more particularly to a test chamber within which wide variations in pressure and temperature may be rapidly and frequently made.

The invention is illustrated in the drawings, in which Figure 1 is a side elevation of one form of the structure; Figure 2 is an end elevation of one end; Figure 3 is a fragmentary end elevation of the door end; Figure 4 is a horizontal section along the line 4—4 of Figure 1; Figure 5 is a vertical section along the line 5—5 in Figure 1; and Figure 6 is a vertical section along the line 6—6 in Figure 4.

The vessel 10 comprises an inner vacuum chamber 11 which is bounded by three substantially parallel spaced walls 12, 13 and 14. The inner wall 12 is preferably a diaphragm incapable of supporting the pressure of the atmosphere, and made of a metal which is not affected by cold, such as nickel or high nickel alloys. Between it and the second wall 13 is an insulating space 15 which is filled with a solid insulating material 16 such as cork. The wall 13 is a pressure-sustaining wall, and any pressure on the wall 12 is transmitted through the insulation to the wall 13.

Between the walls 13 and 14 is a second insulation chamber 20 which is subdivided into intercommunicating insulating chambers 21, best shown in Figure 6. These chambers are defined by the walls 13 and 14, by the vertical webs 22 and 22a, and the horizontal webs 23 and 23a.

As best shown in Figure 5, the webs are serrated at their outer portions to form cut-away portions 24 and 25. These serrations are staggered to prevent collapse of the structure. These portions serve to lighten the chamber but primarily serve to cut down heat transfer. The cut-away portions may be placed adjacent the inner edge of the partitions. The positioning depends upon stress conditions in the outer and central shells; that is, depends upon whether tension or compression is present.

As shown in Figures 4, 5 and 6 the various webs are welded to the wall 14, as indicated at 26, and extend through the wall 13 and are welded on the inside thereof, as indicated at 27. Similarly the webs 23, as shown in Figure 5, are carried through the wall 13, and are welded at 28, these webs being welded as at 29 to the wall 14.

A door 30 is provided at the end of the chamber opening the full width thereof. Various windows 31 are provided for inspection or for various attachments. Means are provided for evacuating the chamber, as for example, a line 32 leading to suitable evacuating equipment. Means 33 are

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also provided for evacuating the chamber 17 formed between the walls 13 and 14; and means 34 are provided for evacuating the insulating chamber 15. The absolute pressure within insulating chamber 15 is preferably kept below pressure within the test chamber 11, so that pressure is always maintained outwardly upon the wall 12. Pressures within the series of chambers 20 and 21 which go to make up the outer insulating chamber 17 are likewise kept low for insulating value.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom.

What I claim as new, and desire to secure by Letters Patent, is:

1. A vacuum chamber having walls defining an inner shell, a central shell, and an outer shell, which shells define respectively the vacuum chamber, an inner insulating chamber, and an outer insulating chamber, the inner shell being a flexible diaphragm, a solid insulating material in the inner insulating chamber transmitting compressive stresses from the flexible diaphragm to the central shell, means in the outer insulating chamber carrying stresses from the outer to the central shell, means for evacuating the vacuum chamber, and means for evacuating the insulating chambers, said last-mentioned means being adapted to produce an absolute pressure in the inner insulating chamber below the absolute pressure in the vacuum chamber.

2. A vacuum chamber as set forth in claim 1, in which the means for evacuating the outer insulating chamber is independent of the means for evacuating the inner insulating chamber.

3. A vacuum chamber as set forth in claim 1, in which the outer shell and central shell are supported in spaced relationship by intersecting transverse webs.

4. A vacuum chamber as set forth in claim 1, in which the outer shell and central shell are supported in spaced relationship by intersecting transverse webs, said webs having staggered cut-away portions adjacent the outer shell.

5. A vacuum chamber as set forth in claim 1, in which the outer shell and central shell are supported in spaced relationship by a plurality of intersecting sheet metal partitions welded to the outer and central shells at their respective junctions, each one of said partitions having a substantial portion of its edge adjacent the outer shell cut away, said cut-away portions being staggered in adjacent partitions.

6. A vacuum chamber as set forth in claim 1, in which the outer shell and central shell are supported in spaced relationship by a plurality of intersecting sheet metal partitions, said partitions being welded to the inner surface of the outer shell and having portions extending through the central shell and welded to the inner surface thereof.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,637,871	Nosan	Aug. 2, 1927
522,105	Canda	June 26, 1894
962,710	Levin	June 28, 1910
1,518,668	Mitchell	Dec. 9, 1924
1,787,101	Bramwell	Dec. 30, 1930
1,269,197	Mendenhall	June 11, 1918
1,984,007	Babbitt	Dec. 11, 1934
2,119,438	O'Leary	May 31, 1938

FOREIGN PATENTS

Number	Country	Date
17,802	Australian	May 31, 1934