Oct. 1, 1929. H. B. LINDSAY 1,730,153

INSULATED TANK

Filed Dec. 16, 1927 2 Sheets-Sheet 1

Fig. 1.

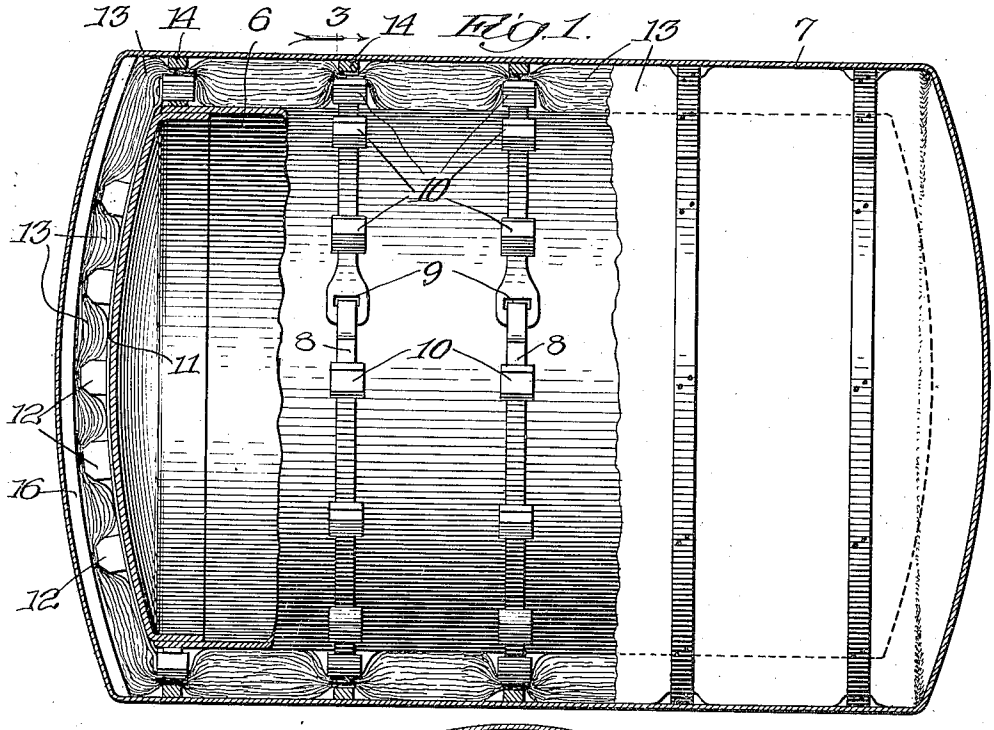
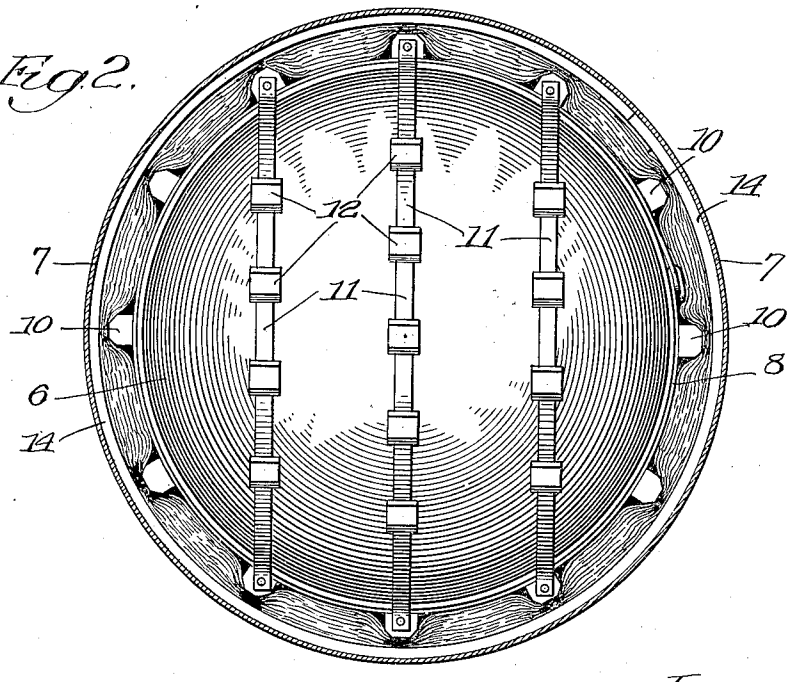


Fig 2.



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Fig. 3.

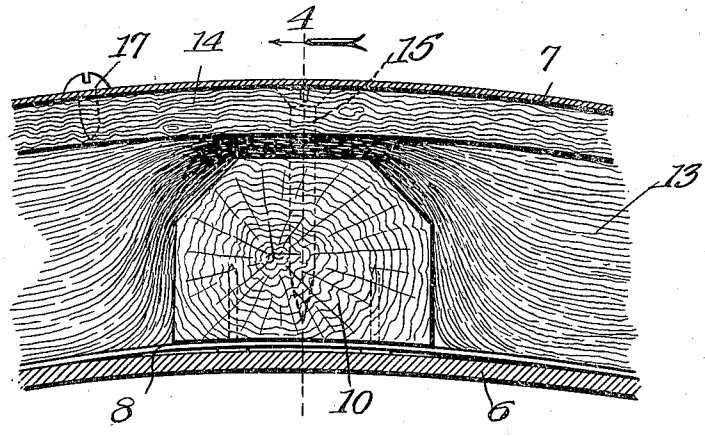


Fig. 4.

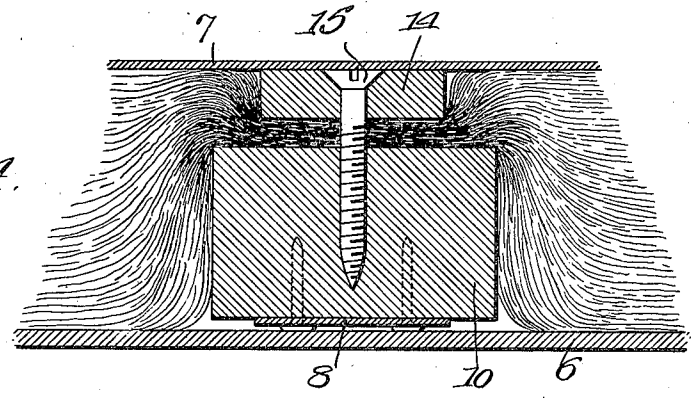
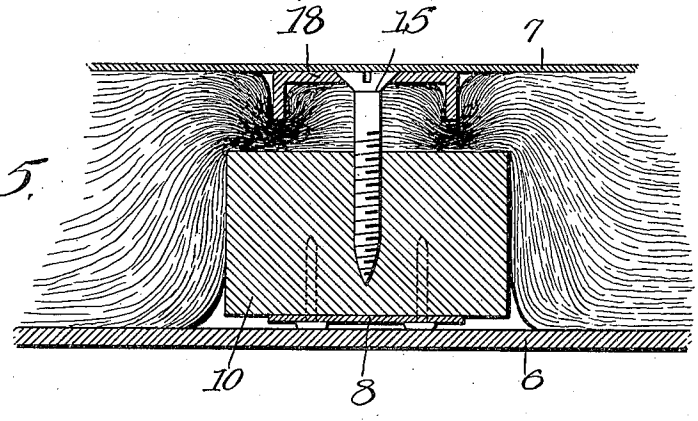


Fig. 5.



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UNITED STATES PATENT OFFICE

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INSULATED TANK

Application filed December 16, 1927. Serial No. 240,451.

My invention relates, more particularly, to tanks comprising a tank proper surrounded by a shell spaced therefrom, with insulating material interposed between these parts.

One of my objects is to provide supporting means for the shell whereby the passage of heat from the shell to the tank, or vice versa, as the case may be, by conduction, will be reduced to the minimum.

Another object is to provide a highly efficient construction of shell-supporting means.

Another object is to provide for the proper supporting of the shell where relatively soft yielding insulating material is used and to provide, in this connection, for the maximum insulating effect by such insulating material.

Another object is to provide simple and economical means for effectively insulating the tank, especially where soft insulating material is used and requiring the minimum of labor for assembly of the parts of the structure; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:—

Figure 1 is a view in elevation, with certain parts thereof shown in section and others in side elevation of a tank structure constructed in accordance with my invention, certain portions of the structure being broken away at different points along the tank structure. Figure 2 is an end view of the tank structure, the end dome plate of the shell being shown in section and the insulating material for the end of the shell omitted. Figure 3 is an enlarged broken section taken at the line 3 on Fig. 1 and viewed in the direction of the arrow. Figure 4 is a similar view taken at the line 4 on Fig. 3 and viewed in the direction of the arrow; and Figure 5, a view like Fig. 4, of a modification of the means shown therein.

In the particular construction shown the tank proper is represented at 6 and may be of any desirable construction, and the shell for surrounding the tank in spaced relation thereto is represented at 7, the space between the tank proper and the shell being provided to receive the material for insulating the tank proper 6.

In the arrangement shown the tank proper 6 is encircled, at intervals along its length, by bands 8 each of which is shown as containing at one end a transversely disposed slot 9 into which its opposite end is inserted and turned back to buckle the band 8 to the tank proper. Each band 8 is equipped with a series of blocks 10 which may be, and preferably are, of wood. Extending across each end of the tank proper 6 at its outer surface are a plurality of strips 11 shown as fastened at their opposite ends to adjacent ones of the tank encircling blocks 10, the strips 11 being equipped with blocks 12 arranged in spaced relation and similar to the blocks 10.

The material for insulating the tank proper 6 and which is located in the space between the tank proper and the shell 7 is represented at 13, and is shown as entirely surrounding and enclosing the block-equipped tank proper 6. The insulating material 13, as shown, and by preference, is of relatively soft character, as for example and preferably, kapok fiber with the fibers preferably extending in substantially parallel relation to each other.

Encircling the series of blocks 10, according to the showing in Figs. 1, 2, 3 and 4, are bands 14 which may be, and preferably are, of wood between which and the blocks the interposed portions of the insulating material 13 are compressed, these bands being secured to the blocks as by screws 15 as represented in Figs. 3 and 4. Extending across the series of blocks 12, with the insulating material interposed therebetween, is a series of strips 16 like the bands 14 and secured to the blocks 12 as described of the bands 14.

The shell 7 is shown as secured at intervals to the bands 14 and strips 16, as by means of screws 17 passing through the shell and screwing into these bands and strips.

The construction shown in Fig. 5 is the same as that of the preceding figures except that the band members between which and the blocks, the insulating material extends are of channel form as shown at 18 instead of the form shown in the preceding figures which is especially desirable where it is desired that

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these band members be of metal, in which case the shell 7 may be secured to the members 18 in any suitable way, as for example by welding.

In assembling the parts of the structure it is preferred that they be assembled as follows: The block-equipped bands 8 are first applied to the tank 6 as shown to extend the desired distance apart, the free ends of the bands 8 being inserted through the slots 9 in their other ends and upon drawing these bands into tight engagement with the tank the free ends are bent back upon themselves to the position shown. The insulating material 13 preferably in the form of a blanket, is then applied to the exterior of the tank to cover the blocks 10. The bands 14 are then applied to a position in which they encircle the blocks 10, with the insulation therebetween and then secured to these blocks as in the manner above described, the insulating material between these opposing members becoming compressed. The shell 7 is then applied to the bands 14, and secured to these bands as above described. Where the shell 7 is to be welded to the structure which it surrounds, the bands 14 would be positioned so that the joints between the sections forming the shell 7 would register with these bands, and in the welding of the joints the metal at these joints would be welded to the bands.

The block-equipped strips 11 are applied to the ends of the tank as shown, the insulating material is then applied to cover the ends of the tank and the block-equipped strips, whereupon the members 16 are applied to the position shown and secured to the blocks 12, the insulating material between these opposing parts becoming compacted. The heads of the shell 7 are then applied to the position shown and secured to the circumferential side wall of the shell.

It will be understood from the foregoing that by providing the series of blocks spaced apart, as distinguished from providing band structures of uniform thickness throughout their extent, the transmission of heat through the structure is minimized.

Furthermore, by constructing the insulated tank in accordance with my invention, the shell therefor and between which and the tank the insulating material is interposed, is rigidly supported, even though the insulating material be relatively soft and fluffy as in the case of the material suggested above, and the maximum insulating effect produced.

Further, the nature of my invention is such that the insulating material can be applied in large blankets or sheets as described (although not necessarily so) thereby reducing the cost of application of insulation and at the same time breaking the heat conductivity even through the blocks to the outer shell.

The structure provided also lends itself to fulfilling the different conditions to be met in the providing of an adequate support for the shell, inasmuch as the space between the bands and the space between adjacent blocks on each band may be varied as desired, thereby affording to the shell a degree of support to exactly suit the particular requirement for the support.

While I have illustrated and described certain particular embodiments of my invention, I do not wish to be understood as intending to limit it thereto as various alterations and modifications may be made in the structure shown and the invention embodied in other forms, without departing from the spirit of my invention.

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

1. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing members between said tank and shell and secured to said tank and each presenting a series of outwardly extending shell-supporting spaced apart portions, means for securing said members to said shell to prevent displacement of said shell and members relative to each other longitudinally of said tank structure, and insulating material in the space between said tank and shell.

2. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing members between said tank and shell and secured to said tank and each presenting a series of outwardly extending shell-supporting spaced apart portions, means for securing said members to said shell to prevent displacement of said shell and members relative to each other longitudinally of said tank structure, and insulating material in the space between said tank and shell extending over said spacing members.

3. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing means between said tank and shell and secured to said tank and presenting interrupted outwardly projecting shell-supporting portions and strip-members extending across and secured to said shell-supporting portions and to said shell, and insulating material in the space between said tank and shell.

4. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing members between said tank and shell and secured to said tank and each presenting a series of outwardly-extending shell-supporting spaced-apart portions, strip-members extending across said series of shell-supporting portions and secured to the latter and to said shell, and insulating material in the space between said tank and shell.

5. In an insulated tank structure, the com-

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bination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing means between said tank and shell presenting interrupted outwardly projecting shell-supporting portions and members opposing, and secured to, said shell-supporting portions, and insulating material located in the space between said tank and shell and between said shell-supporting portions and said members.

6. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing means between said tank and shell presenting interrupted outwardly projecting shell-supporting portions and strip-members extending across and secured to said shell-supporting portions, and insulating material in the space between said tank and shell and interposed between said shell-supporting portions and said strip-members.

7. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation to said tank, spacing members between said tank and shell comprising bands surrounding said tank and provided with blocks projecting radially outward therefrom, insulating material surrounding said tank and extending over said blocks, and bands extending around said tank and over said blocks and the insulation thereon and secured to said blocks.

8. In an insulated tank structure, the combination of a tank to be insulated, an outer shell for said tank in spaced relation thereto, bands surrounding said tank and carrying circumferentially separate radially projecting supporting members, said bands having means for adjusting them tightly around said tank, insulating material surrounding said tank and extending over said blocks, and bands extending around said tank and over said blocks and the insulation thereon and secured to said blocks.

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