

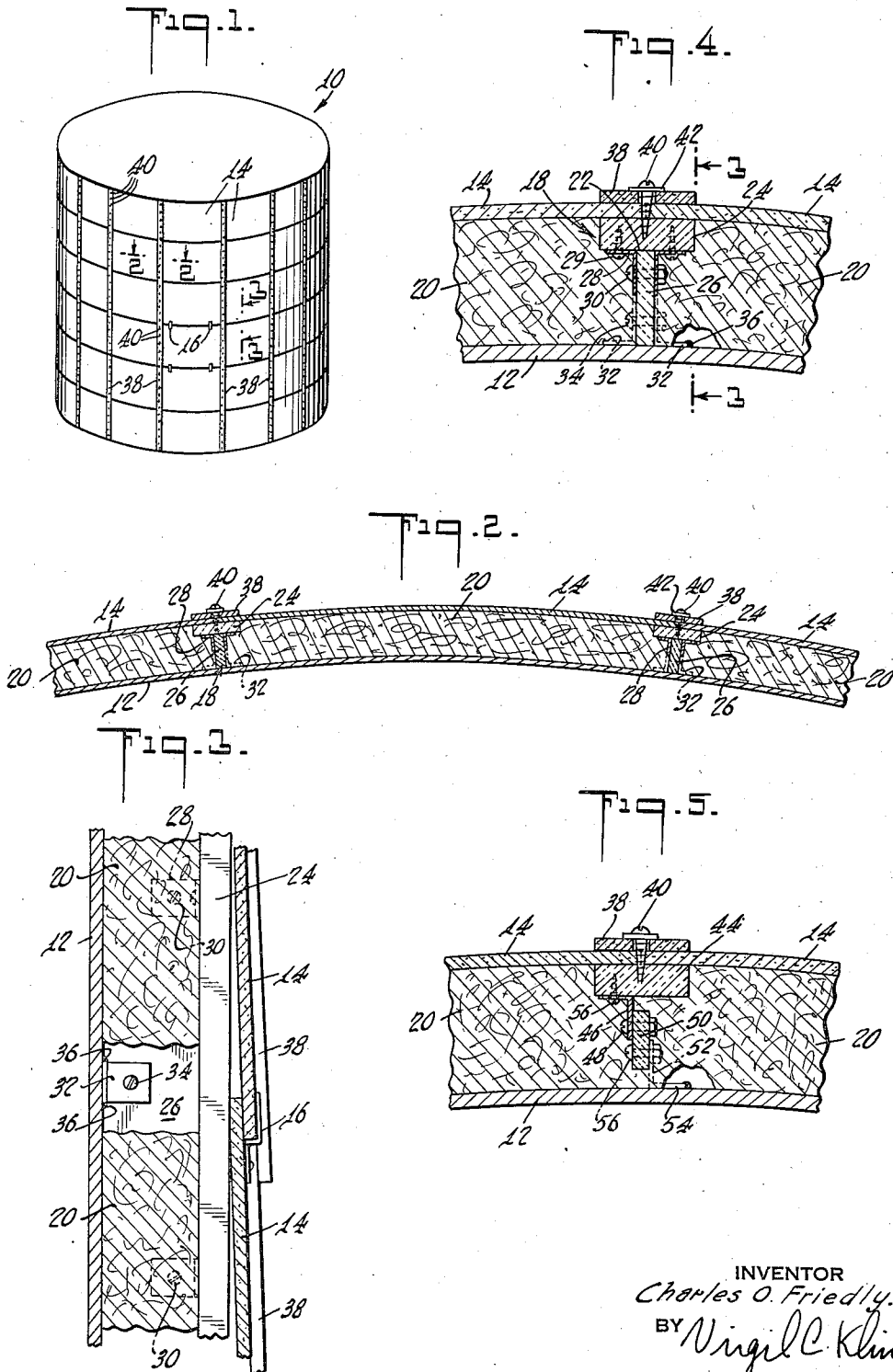
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INSULATED STRUCTURE

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INSULATED STRUCTURE

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The present invention relates to insulated structures, and more particularly, to improved insulating constructions for the side walls of tanks and the like.

Heretofore, it has been proposed to insulate the walls of tanks employed in the refining and storage of petroleum products and for other uses, such prior installations comprising insulating blankets or blocks applied to the walls and in some instances surrounded by sheathing which is supported by metal framing members or the like from the tank wall. The sheathing serves as a weather-resistant, protective exterior cover for the insulation, and hence, has been preferred. However, the metal framework heretofore required to support the sheathing conducts heat from the outer surface directly to the tank wall, or vice versa, in effect, by-passing the insulation and substantially reducing its overall efficiency. The principal object of the instant invention is to provide a construction for the insulation of tanks and the like in which such a sheathing is supported over the insulation in a manner to make unnecessary the use of conducting members extending through or substantially through the insulation which serve to provide channels for the flow of heat.

Another object of the invention is to provide an insulated structure, such as an insulated tank or the like, including an insulating layer and an outer weather-resistant sheathing, the latter being supported from the tank wall by structural members including thermal-insulating material.

A further object of the invention is to provide a structure of the type referred to above, in which the supporting members for the sheathing comprise strips of a structural insulating material secured to the sheathing and tank wall.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description thereof which is to follow and to the accompanying drawing, in which:

Fig. 1 is a perspective view showing a tank or the like insulated in accordance with the instant invention;

Fig. 2 is a sectional view on an enlarged scale taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on an enlarged scale taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged detail view depicting the sheathing supporting means of the invention; and

Fig. 5 is a view similar to Fig. 4, illustrating a modification of the supporting means.

Referring now to the drawing, and particularly to Fig. 1, my invention is illustrated as embodied in an insulating structure for tanks as employed in the refining and storage of petroleum products and the like. However, it will be understood that a construction embodying the invention may be employed with tanks of any type and for any use and for various other structures where similar problems are presented.

The tank 10 includes wall 12 (see Figs. 2, 3, and 4), suitably composed of steel sheets riveted or otherwise secured together in any conventional manner. Supported in spaced relationship to the wall is a sheathing 14 which comprises sheets of a weather-resistant, moisture-proof material, preferably sheets of a hardened, compressed, asbestos-cement composition inasmuch as this material has been found to be especially suitable for this purpose. Due to limitations in size, a plurality of sheets 14 are necessary, both vertically and circumferentially of the tank. Vertically of the tank wall the sheets are preferably overlapped or shingled, as illustrated in Figs. 1 and 3, Z-clips 16 secured adjacent the upper edge of each lower sheet supporting the overlapping edge of the sheet thereabove. The edges of the sheets forming vertical joints are suitably butted (see Figs. 2 and 4) and supporting means 18, in accordance with the invention, are employed to secure the sheets to the tank wall adjacent the joints. The space between the sheathing and the tank wall is filled with a suitable insulating material 20. The insulating material may comprise a granulated insulation such as nodulated rock wool, blanket insulation such as a mineral wool blanket, or block insulation of any suitable type, it being understood that the invention is in no way limited to the use of any particular insulating material, the above being named merely as examples.

In accordance with the preferred form of the invention, the supporting means 18 comprises a member 22 of T-shaped cross section formed of strips 24 and 26 of a strong, thermal-insulating, board-like material. Suitably for this purpose, a board insulating material is employed comprising a highly compressed, densified asbestos, lime, silica material. However, other board-like insulating materials of known type exhibiting a relatively high modulus of rupture may be employed.

Strips 24 and 26, making up each T-member 22, may suitably be secured together by short angle irons 28 fastened at spaced intervals to strips 24 and 26 as by screws 29 and bolts 30, respec-

tively (see Fig. 3). T-members 22 extend preferably the full height of the tank wall.

T-members 22 are secured to the tank wall 12 by means of spaced angle irons 32 fastened to opposite sides of the strip 26, forming the leg of the T, by bolts or the like 34 passing through one of the flanges and the strip. The other flanges are preferably welded, as indicated at 36, to the metal plates forming the tank wall 12. As illustrated in Fig. 3, angle members 28 and 32 are staggered along the length of the T-member 22 so that they will not be in contact with each other.

Sheathing 14, comprising a plurality of plates, preferably of asbestos-cement material as previously referred to, are secured to T-members 22, as shown in Fig. 4. The butt joint between the plates preferably overlies T-member 22, and secured thereover is a batten 38 which may suitably comprise a strip of the hardened, compressed, asbestos-cement material employed for the plates 14. Screws or other fastening means 40 penetrate batten strip 38 and the joint and enter strip 24, forming the head of T-member 22. A washer 42 may be placed beneath the head of the screw 40 if desired. Although supporting members 22 have been shown only at the joints, it will be understood that in the event relatively large sheets are employed for the sheathing, one or more intermediate supporting members may also be provided. In this instance, the construction will be the same, except that batten strips are, of course, unnecessary and screws or fastening means 40 are employed to secure the plates directly to the strip 24.

Referring now to Fig. 5, a slightly modified form of the invention is shown in which the sheathing supporting means comprises strip 44, preferably of the same or similar material as that employed for the strips 24 and 26 of the construction of Fig. 4. Strip 44 extends the full height of the sheathing and underlies the joint between the plates forming the sheathing 14. Fastening means 40 and batten strip 38 are employed to secure the sheathing to strip 44 in a similar manner to that previously described. Secured to the rear side of strip 44 is an extending angle iron 46, including a flange 48 fastened to a second insulating strip 50. Insulating strip 50, preferably of a similar material to the strip 44, is secured to a second extending angle iron 52, including a flange 54 welded or otherwise secured to the tank wall 12. The securing means 56 between the angle members 54 and 46 and the strips 44 and 50, respectively, may suitably be screws and bolts or the like, as illustrated.

It will be noted that by the instant invention, the sheathing members forming the exterior surface of the insulating covering are completely divorced from the tank wall. That is, no through metal members are provided at any point, with the result that paths of heat conduction are avoided and the maximum efficiency of the insulation 20 is obtained.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to, but that various changes and modifications will suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. An insulated structure comprising a tank wall, weather-resistant sheathing spaced therefrom, means supporting the sheathing compris-

ing strips of insulating material extending substantially vertically of said wall and combined to have a T-shaped cross section with the head of the T resting against the sheathing, means securing the leg of the T to the wall and means securing the sheathing to the head of the T, and insulating material disposed between said sheathing and wall.

2. An insulated structure comprising a tank wall, weather-resistant sheathing comprising asbestos-cement sheets spaced therefrom, means supporting said sheathing comprising strips of insulating material running substantially vertically of said wall and combined to have a T-shaped cross section with the head of the T resting against the sheathing, angle members secured to the shank of the T including flanges secured to the tank wall, and means penetrating the sheathing and entering the head of the T to secure the sheathing thereto.

3. An insulated structure comprising a tank wall, weather-resistant sheathing spaced therefrom, means supporting said sheathing comprising strips of insulating material extending substantially vertically of said wall and combined by angle members to form a member T-shaped in cross section, means comprising angle members securing the shank of the T to the wall, said last-named angle members being in staggered relationship with respect to the angle members securing the strips forming the T-member, and means for securing the sheathing to the strip constituting the head of the T.

4. An insulated structure comprising a tank wall, weather-resistant sheathing spaced therefrom, means supporting said sheathing comprising strips of insulating material extending substantially vertically of said wall and combined by angle members to form a member T-shaped in cross section, means comprising angle members securing the shank of the T to the wall, said last-named angle members being in staggered relationship with respect to the angle members securing the strips forming the T-member, means for securing the sheathing to the strip constituting the head of the T-member, and insulating material filling the space between said sheathing and wall.

5. An insulated structure comprising a wall, sheets of weather-resistant sheathing spaced therefrom and including edges in substantially abutting relationship to form a vertical joint, a T-shaped member composed of insulating material supporting said sheathing from said wall at said joint, with the head of the T bridging the joint, means securing the shank of the T to the wall, a batten strip overlying the joint, and means penetrating said batten strip and sheathing and entering the head of the T to secure the sheathing to said T-shaped member.

6. An insulated structure comprising a wall, sheets of sheathing comprising an asbestos-cement material spaced therefrom and including edges in substantially abutting relationship to form a vertical joint, a T-shaped member composed of insulating material supporting said sheathing from said wall at said joint, with the head of the T bridging the joint, means securing the shank of the T to the wall, a batten strip overlying the joint, means penetrating said batten strip and sheathing and entering the head of the T to secure the sheathing to said T-shaped member, and insulating material disposed in the space between said wall and sheathing.

7. An insulated structure comprising a tank

wall, weather-resistant sheathing spaced therefrom, means supporting the sheathing and maintaining it in fixed relationship to the wall, said means comprising a strip of insulating material spaced from said wall and sheathing and including angle irons secured at opposite faces of said strip and having flanges fastened to said wall and sheathing, respectively, and insulating material disposed between the wall and sheathing.

8. An insulated structure comprising a tank 10 wall, weather-resistant sheathing spaced therefrom, means supporting the sheathing and main-

taining it in fixed relationship to the wall, said means comprising a strip of insulating material disposed against said sheathing, a second strip of insulating material spaced from said first-mentioned strip and wall, angle irons secured at opposite faces of said second strip, said angle irons including flanges secured to said wall and said first-mentioned strip, respectively, and insulating material disposed between the wall and sheathing.

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