May 22, 1956 R. BLOMELEY 2,746,578

INSULATING STRUCTURE

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Fig. 1

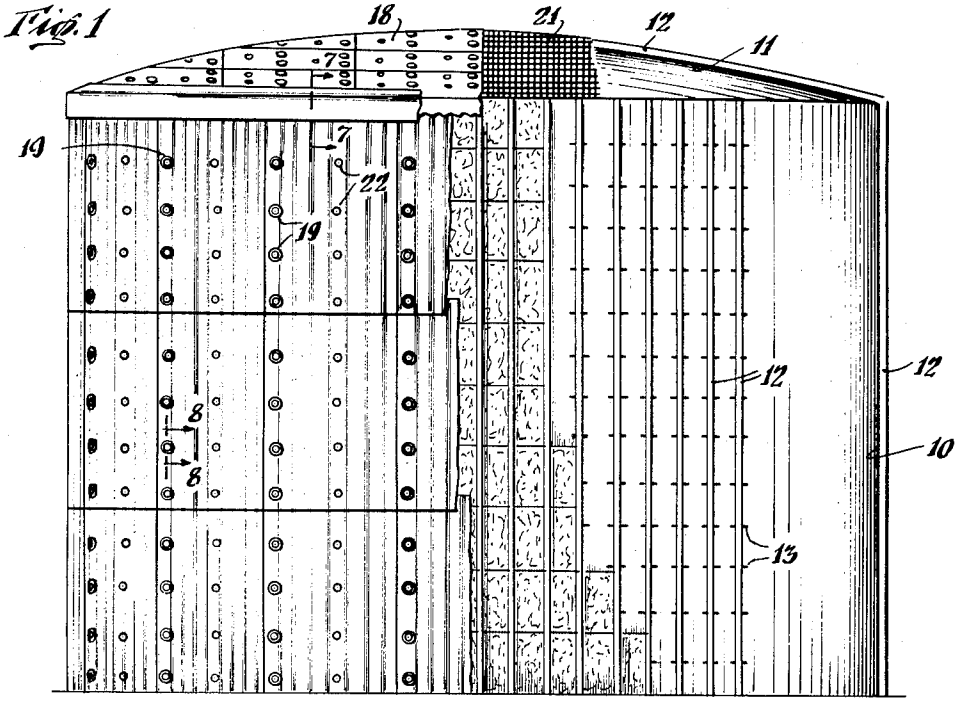

Fig. 2

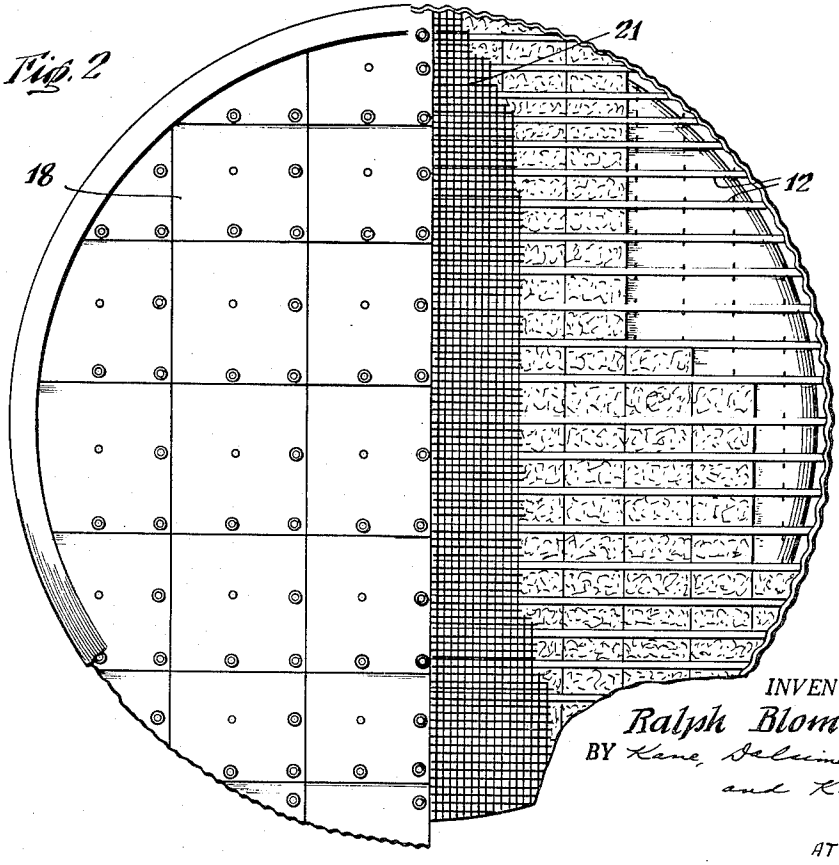

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Fig. 3

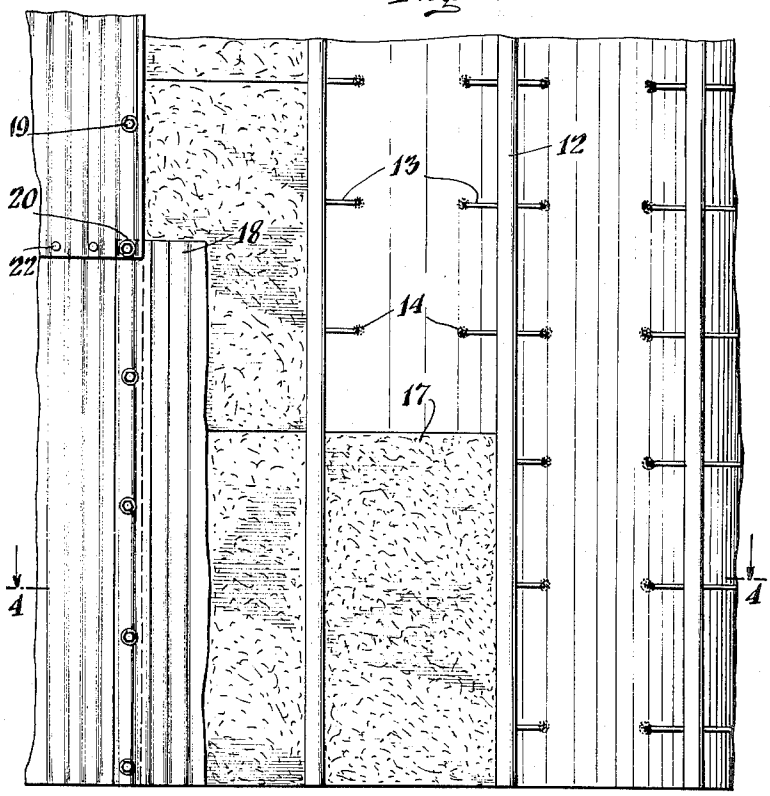


Fig. 7

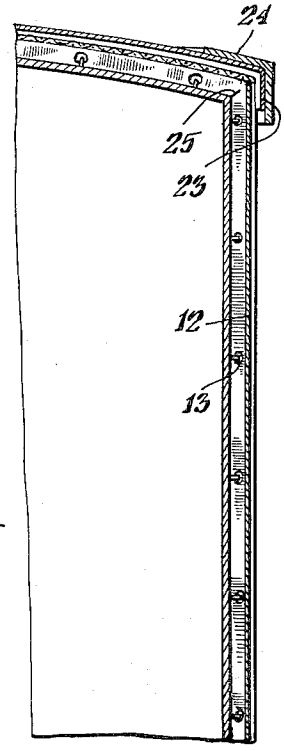


Fig. 4

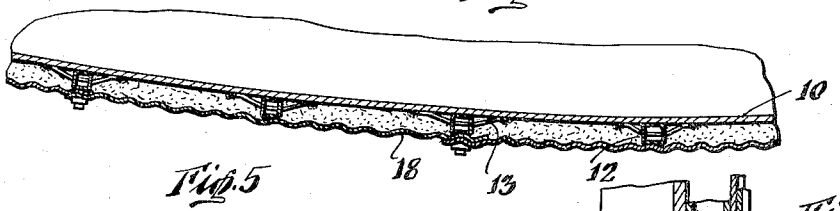


Fig. 5

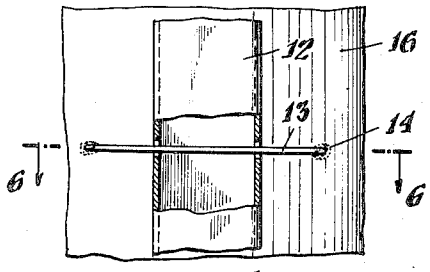


Fig. 6

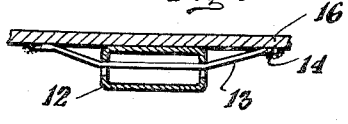
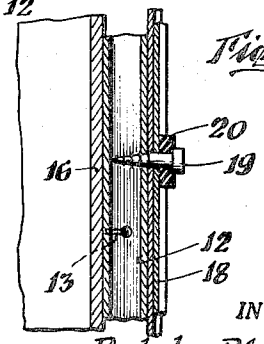


Fig. 8



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INSULATING STRUCTURE

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3 Claims. (Cl. 189—34)

This invention relates to an insulating structure capable of use in numerous different associations but primarily intended for the protection of tanks used for storage of gasoline, oil and other liquids. It is to be understood, however, that the present teachings while of particular utility, when employed in connection with tanks and similar structures, may also be used to advantage in connection with the surfaces of other enclosures which are to be insulated.

By means of the present teachings a structure is furnished which may readily be applied to an enclosure such as a tank. So applied, it will protect the tank from both the escape of heat as well as the entrance of heat into its interior. Moreover, it will remain operative for substantially the life of the tank, despite the action of wind and the elements and the expansion and contraction of the tank incident to temperature changes.

Additionally, the present invention teaches a technique or procedure which may readily be followed by relatively unskilled labor and which will include the use of inexpensive materials such that a desired and substantially permanent insulating structure will be economically provided.

With these and other objects in mind reference is had to the attached sheets of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a side elevation of a tank with portions of the insulating and structures incidental thereto removed;

Fig. 2 is a similar plan view of the same;

Fig. 3 is an enlarged fragmentary view of a side portion of the tank;

Fig. 4 is a sectional plan view taken along the line 4—4 in the direction of the arrows as indicated in Fig. 3;

Fig. 5 is a fragmentary sectional view of a part of the assembly as illustrated in the preceding views;

Fig. 6 is a transverse sectional view taken along the line 6—6 in the direction of the arrows as indicated in Fig. 5; and

Figs. 7 and 8 are sectional views in enlarged scale taken respectively along the lines 7—7 and 8—8 and in the direction of the arrows as indicated in Fig. 1.

In these views the numeral 10 indicates the side wall of a tank having a top or roof 11. Enclosures of this nature are well known and are usually employed to store liquids of diverse character. Both the tank body and its roof are usually formed of sheet metal sections riveted, welded or otherwise secured to each other to provide a structure which will efficiently retain desired materials. Where erected the tanks range in diameter from very small size to in excess of 300 feet. Various heights are also incorporated. It is frequently necessary—especially in the case of liquids—that the material within the tank be maintained with a certain temperature range. For this reason heat exchange apparatus is often disposed within the tank.

As will be apparent, it is highly desirable to also insulate the tank so that winter temperatures or rays of a

summer sun will not unduly affect fluids and liquids stored in its interior. Much difficulty has been experienced in employing insulation because structures of this nature are usually provided in exposed locations such that they bear the full brunt of the weather and particularly rain, snow, ice, etc. With the temperature range present between summer and winter conditions the factors of expansion and contraction must additionally be taken into consideration especially if a large enclosure is to be insulated. Also, the action of wind acting on the large exposed surfaces is a factor, in that the covering material will, under those conditions, tend to strip from the structure which has been insulated.

With the foregoing in mind there is applied to the wall 10 a series of anchoring posts 12. These may be galvanized and in the form of preferably non-circular piping. As shown especially in Figs. 1 and 2, these posts may in certain instances extend up the sides of the tank and across the top of the same. In other instances they will terminate adjacent the upper edge of the side walls. They are suitably spaced from each other so that they may receive between them bats or units of insulating material. Also, their interiors are preferably filled with proper insulating material so that heat losses will be limited to the greatest possible extent.

To secure these posts in position at points adjacent the outer surfaces of the enclosures, pins are employed. These pins are formed of relatively heavy wire lengths 13 which have their ends secured to the face of the enclosure as at 14 by spot welding or otherwise. The length of these pins is such that their points of attachment to the tank are relatively spaced from the posts on pipes 12. As shown, especially in Figs. 5 and 6, the lengths of wire may pass through the posts at points intermediate the inner and outer faces of the latter; the secured ends of the wire being angularly offset. So disposed, the posts are firmly mounted in face to face contact with the enclosure. At the same time, however, they may shift laterally within limits. Also, within similar limits they may shift radially. Additionally, being secured to the enclosure wall they may move with the latter as it shifts incident to wind pressure or conditions of heat and cold.

Between these posts bats of insulating material 17 are disposed. That insulating material may be of any desired character and include, for example, a body of fiber glass. The edges of the insulating bats are disposed in face to face contact with the side edges of the posts. Where pins 13 are present the bodies of the bats will be locally compressed. The thickness of these insulating bodies will depend upon the characteristics of the insulating material employed and degree of insulation which is to be incorporated. Under ordinary circumstances their outer faces should not extend beyond the outer faces of the posts.

The technique employed in connection with the side walls will involve the placing of bats of insulating material from the bottom supporting surface (the base flange or footing of the tank) up to a desired height. This may be around 4 feet. Thereupon, cladding strips or panels 18 are applied to the outer faces of the insulating bodies and the posts to approximately the same height. This operation is repeated throughout the entire surface to be insulated. If desired, additional thicknesses of material could, of course, be employed in the side walls. However, it has been found that ordinarily this is not necessary. The panels are lapped and are conveniently formed of aluminum. The overlapping should be at least one corrugation, and if desired, a suitable material such as mastic could be employed in the zone of this overlap. Sheet metal screws 19 are employed and pass through the

panels **18** to extend into the posts **12**. If desired, washers **20** may be interposed between the heads of the screws and the outer surfaces of panels **18** to prevent the entrance of any air or moisture at the points at which the screws penetrate the panels.

A similar arrangement is resorted to in covering the top or roof of the tank. In other words, bats of insulating material are disposed between the posts. Those posts are secured to the tank or enclosure roof by means of pins, as in Figs. 5 and 6, so that these posts likewise in effect "float" in their support with reference to the enclosure structure. Also, the aluminum cladding panels being secured to these posts or studs are free to move with the latter. Accordingly, the danger of these sheets tearing loose under severe conditions is avoided. Pins **13** act as supports for the insulation. Especially within the area of the side walls, they prevent the blanket sections or bats from slumping.

These sheets **18** are again overlapped within the area of the roof. Such overlapping should, of course, occur in the direction of the downward slope or incline. Mastic or similar sealing material may be provided in the zone of the overlap. In addition, it is preferred to apply over the roof a layer of hardware cloth or mesh **21**. This mesh is retained in position by the superposed panels **18**, the screws **19** which secure them to the posts and also the further screws **22** which are preferably employed to attach overlapped portions of the panels to each other. While additional layers may, of course, be used, it has been found, in the case of the roof assembly, that such procedure is not necessary. Therefore, it is preferred to merely incorporate the structure as I have outlined.

In any event it will be seen that by the present teachings relatively light weight, inexpensive insulation blankets may be readily employed in any desired thickness. They will be supported within the frames or spaces defined by the anchor posts and remain intact without any tendency towards slumping. The side wall and roof structures are integrated as a single unit. In effect the posts and bats, together with the covering panels or cladding, form a structure completely enclosing and protecting the tank not alone from extremes of temperature range, but also from the elements.

In order to protect the structure from the entrance of moisture or other deteriorating factors, adjacent the edge of the roof, the panels of the latter are simply bent over the flashing edge, as indicated at **23**, and extended downwardly over the side wall panels for an appropriate distance. In this manner is apparent that no water may enter at the edge zone of the roof. A counterflashing strip **24**, also preferably formed of aluminum, overlies the flashing portion **23**. In addition to affording protection it serves to accord a neat appearance to the structure. Throughout this zone, as well as within the structure generally, the insulating bats or panels conveniently extend into the corrugations which are preferably embodied in the surface of the panels. This will serve to enhance

the self sustaining properties of the structure. Where any post or pipe extends in other than a straight line it may be notched as indicated at **25** in Fig. 7. Thereupon, by suitably bending the same and if desired welding the adjacent edges of the notch together, the posts will in effect present a single unitary structure.

Thus, among others the several objects of the invention as specifically aforenoted are achieved. Obviously numerous changes in construction and re-arrangements of the parts may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. An insulating structure including in combination a side wall, posts movably disposed adjacent the outer face of said wall to slidably bear against the same throughout substantially its entire height, a number of separate wires extending transversely of and individual to each post with their ends anchored to the wall face at points short of adjacent posts to limit movement of the thus secured post across the face of said side wall, insulating material disposed in contact with the outer wall face and being locally supported by portions of the wire ends extending beyond said post, said posts being hollow and substantially square in section, the sides of said posts being formed with aligned pairs of openings whereby the wires slidably pass therethrough, the inner post surface—throughout its entire height—movably bearing against the outer face of said wall, panels overlying said posts and securing means extending through said panels and posts into the interior of the latter.

2. In an insulating structure as specified in claim 1, the addition of a roof mounted by said side wall, posts slidably extending in contact throughout their entire lengths with the outer surface of said roof, said posts embodying a configuration corresponding to the first-named posts and being secured to said roof by wires in the same manner as the wires secured to said first-named posts and panels also overlying the posts disposed in contact with said roof and being secured thereto.

3. In an insulating structure as specified in claim 2, certain of the posts disposed adjacent the side wall being coextensive with those disposed adjacent the roof and being bent to provide an angularly extending portion furnishing a post in contact with the surface of said roof; said bend including a transversely notched part on the inner face of a given post.

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