Oct. 12, 1954 R. T. DINWIDDIE 2,691,458

REMOVABLE INSULATION

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Fig. 1.

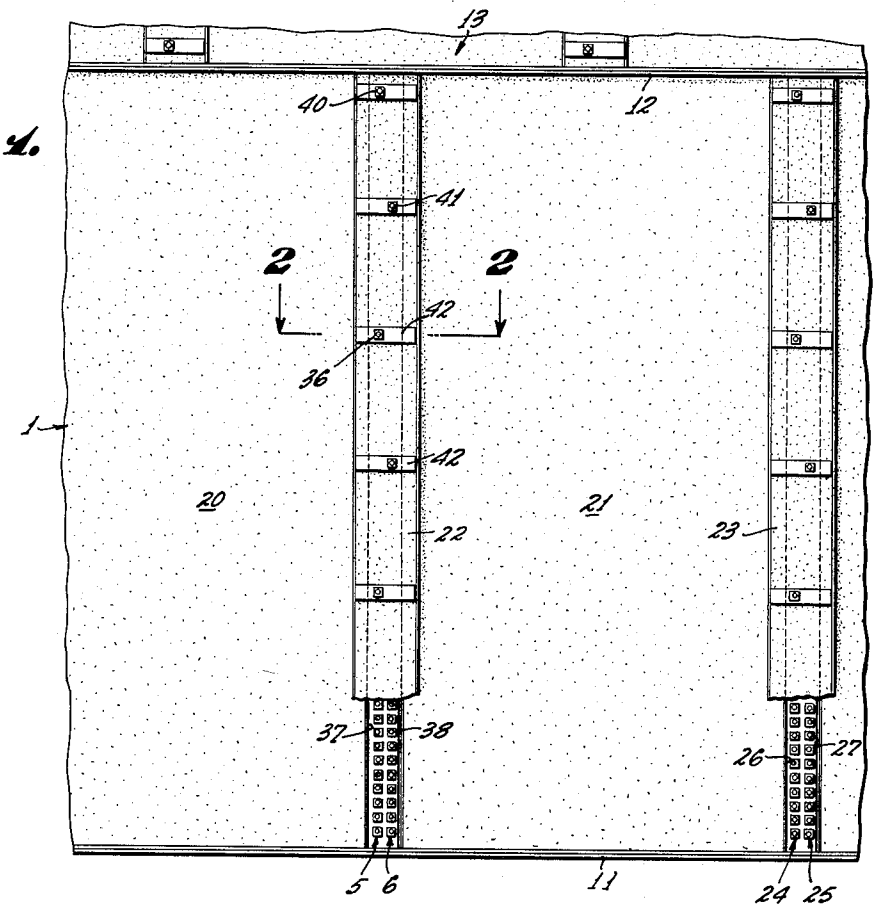
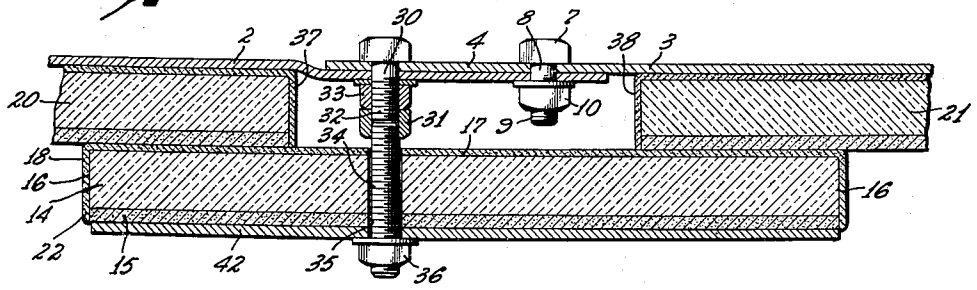


Fig. 2.



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REMOVABLE INSULATION

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2 Claims. (Cl. 220—9)

1

The invention relates to removable insulation and more particularly to removable insulation for an oil tank. Such tanks are made of iron sheets having edges connected by a lap joint held by a double row of bolts. These tanks are used to store oil as it is pumped from the ground. It is usual to provide a heater pipe in the bottom of the tank to prevent the oil from chilling and becoming too viscous. It is desirable to insulate the tank. This has been done heretofore by using sheets of asbestos or of fiber glass held in position by binding wires which encircle the tank. The disadvantage of this arrangement is that the above named insulations are rather expensive and, more particularly, once in a while the sulphuric acid content of the oil produces a leak at one of the bolts in the side of the tank or corrodes the heater pipe, necessitating access both to the interior and to the exterior of the tank. If the sheets of insulation are held in place by binding wires, it is necessary to cut these wires which loosens the insulation all the way around the tank, although the leakage may only be at one spot.

An object of the present invention is to provide an insulation cheaper than that indicated above and, more particularly, to provide such insulation in removable form so that one or more sections of the insulation may be removed without removing the remainder.

A further object of the invention is to provide an improved fastening means which can be secured to the existing bolts on the tank, to removably hold the insulating sections in place on the tank.

For further details of the invention reference may be made to the drawings wherein:

Fig. 1 is a side view in elevation of a tank having removable insulation according to the present invention, with part of the tank broken away and a part of the fillet strips of insulation broken away.

Fig. 2 is an enlarged sectional view on line 2—2 of Fig. 1.

Referring in detail to the drawings, the side of a conventional oil tank is indicated at 1. Such tanks may be about 20 feet or more in diameter and are made of iron sheets such as indicated at 2 and 3, having a lap joint 4 connected by a double vertical row of bolts 5 and 6. As indicated in Fig. 2, each bolt in rows 5 and 6 has a head 7 inside of the tank, and a shank 8 which projects through the sheets like 2 and 3 a sufficient distance so that the outer threaded end 9 thereof projects beyond its nut 10.

2

The sheets like 2 and 3 of which the tank is made are usually about 8 feet high and 4 feet wide. The base ring 11 rests on the ground and the next higher ring is indicated at 12. The tank may have one or more upper sections, of which an upper section is indicated at 13 above the ring 12.

The invention makes use of an existing form of insulation available in sheets. These sheets are substantially flat when unstressed. Such insulation as shown in Fig. 2 comprises a Celotex fiber board 14 about 5/8 inch thick having cemented to the outer front surface thereof so-called "50 lb." roofing paper indicated at 15 and usually having an outer slate surface not shown. The edges like 16 and the rear face 17 of the fiber board is coated with a waterproof asphalt coating indicated at 18. The fiber board 14 is thus entirely enclosed in a waterproof coating. The insulation just described is employed for the sheets 20, 21 and for the fillet strips like 22 and 23.

As shown in Fig. 1, the dimension for the sheets like 20 and 21 is so chosen that its long dimension will fit between the lower and upper rings 11 and 12 of a section, while its width is such that it will extend between one double row of bolts indicated at 5, 6 and an adjoining double row of bolts indicated at 24, 25, with a gap of about 4 inches between the edge 26 of one sheet such as 21, and the adjoining edge 27 of the next sheet. This also applies to edges 37, 38. While the sheets like 20, 21 have a substantial amount of rigidity and are ordinarily flat, it has been found that these sheets are sufficiently flexible so that they can be bent face-to-face with the tank to conform to the curvature of a large tank such as 20 feet in diameter. This is accomplished by holding one sheet against the tank along its middle vertical line and then by pressing the opposite sides of the sheet inwardly against the tank. To hold the sheets like 20, 21 in their curved position against the face of the tank, I provide fillet strips like 22, 23 preferably of insulating material as above described, these fillet strips being about 12 inches wide and, therefore, overlapping the edges 26 and 27 of adjoining sheets about 4 inches on each sheet. The strips 22, 23 have a length of substantially 8 feet or the distance between adjoining rings like 11 and 12.

To hold the fillet strips 22 and 23 in place, I make use of the existing tank bolts in the rows like 5, 6 and 24, 25. For this purpose I thread a nut like 31, on the existing protruding outer end 32 of the existing tank bolt 30. The bolt end 32 projects beyond the existing nut 33 about one-half the thickness of the nut 31. I then thread

into the nut **31** a threaded bolt or stud **34** of a length sufficient to extend beyond the large insulating sheets like **20** and **21** and extend through an aperture like **35** in the fillet strip like **22**. The outer end of the stud **34** is provided with a nut **36** and between the nut and the fillet strip **22** is provided a horizontally extending sheet metal strip **42** which may be slightly curved to conform to the curvature of the tank and cause the fillet strips like **22** to more effectively bear against the adjoining edges like **37** and **38** of the large sheets **20** and **21**. The strips like **42** may be 2 feet apart although other spacings may be used.

The bolts in the rows **5**, **6** and **24**, **25** exist in definite spaced relation and the fillet strips **22**, **23** can be drilled so that the holes like **35** in the fillet strips will fit their studs like **34**. Preferably the studs like **34** are mounted in staggered relation as shown in Fig. 1 wherein the upper stud indicated at **40** is mounted on one of the bolts in the row **5**, while the next lower stud **41** is mounted on one of the bolts in the row **6**.

If the tank should leak at the bolts in the rows **5** or **6**, by removing the fillet strip **22** it is possible that sufficient access could be had to the leaking bolts to repair them, or if not, one or both of the adjoining fillet strips like **23** could be loosened enough to remove one or both of the main insulation sheets like **20** and **21**. Also the removal of one of the main insulation sheets like **20** and **21** would give access to a door or manhole cover not shown which is bolted on the side of the tank, for access to its interior. This would make it possible to inspect or repair the heater pipe not shown, employed to heat the oil. By removing one or more of the fillet strips like **22** and **23**, one or more of the main sheets like **20** and **21** can be removed without removing the remainder.

Various modifications may be made in the invention without departing from the spirit of the following claims.

I claim:

1. In a tank, plates forming the body of said tank and connected by lap joints, lap joint securing means comprising cooperating bolts and nuts, the threaded ends of said bolts extending outwardly beyond said nuts, sheets of insulation overlying the exterior of said plates and having parallel edges extended along opposite sides of said joints but terminating short of said securing means, strips of insulation overlying both said joints and the parallel edges of said sheets of insulation, and means securing said overlying strips of insulation in place comprising middle nuts partially threaded onto the outer ends of said bolts, studs extended through said strips of insulation and seated threadedly at their inner ends in said middle nuts, and outer nuts threaded upon said studs exteriorly of said strips of insulation forcing the latter against the edges of said sheets.

2. In a tank, plates forming the body of said tank and connected by lap joints, lap joint securing means comprising cooperating bolts and nuts, the threaded ends of said bolts extending outwardly beyond said nuts, sheets of insulation overlying the exterior of said plates and having parallel edges extended along opposite sides of said joints but terminating short of said lap joint securing means, strips of insulation overlying both said joints and the parallel edges of said sheets of insulation, and means securing said overlying strips of insulation in place comprising middle nuts partially threaded onto the outer ends of said bolts, studs extended through said overlying strips of insulation and seated threadedly at their inner ends in said middle nuts, transverse rigid straps extended across said joint and formed with an opening seating said studs and outer nuts threaded on said studs exteriorly of said strips of insulation and straps forcing the latter against said strips and said strips against the edges of said sheets.

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