Sept. 15, 1936. R. NEUHAUS 2,054,587

ACIDPROOF TANK

Filed June 6, 1935

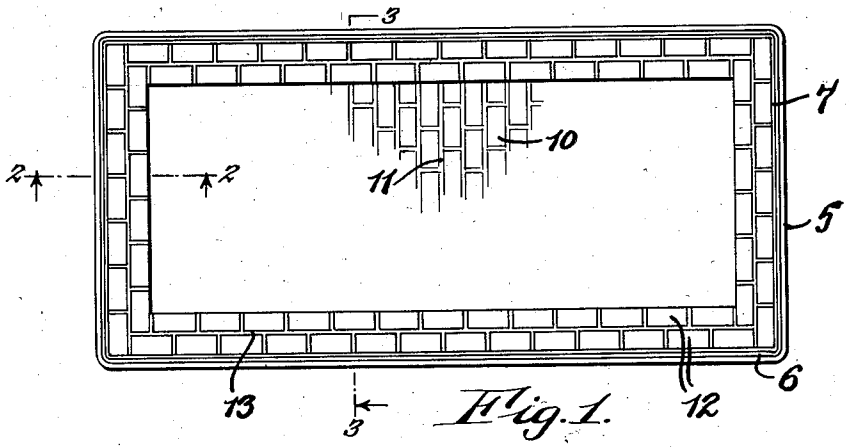


Fig. 1.

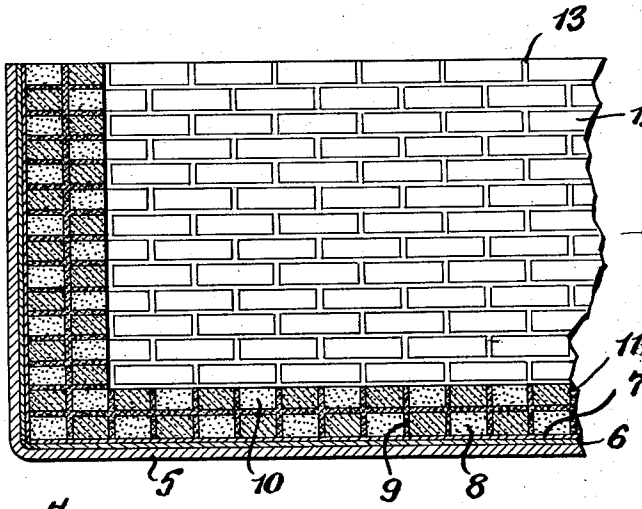


Fig. 2.

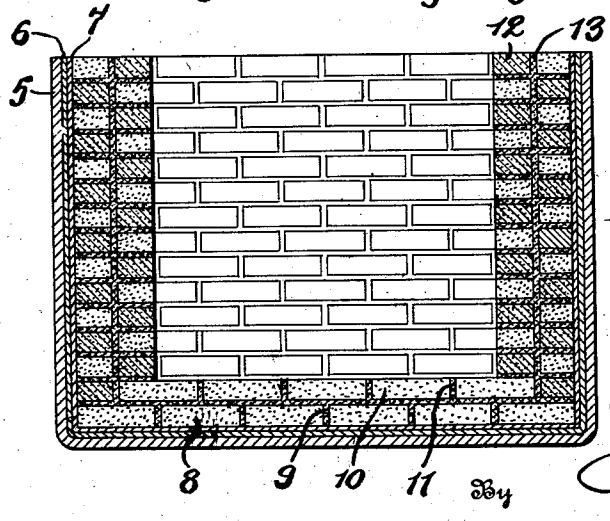


Fig. 3.

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ACIDPROOF TANK

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1 Claim. (Cl. 72—14)

This invention relates to an acid-proof tank designed for pickling metal bars and parts and more particularly to tanks of this character which are of substantial size, being very often several hundred feet in length.

In such tanks as heretofore constructed the tanks have generally consisted of an outer shell made of concrete and a lining of an acid-proof material, such as the lining of acid-proof brick and sulfur cement shown in my Patent 1,847,192 dated March 1, 1932. The provision of such a concrete shell not only makes the tank expensive but also delays the construction of the tank inasmuch as it is necessary to construct forms, prepare and pour the concrete and then wait until the shell is hardened before the tank can be lined. Further, concrete is not, of course, acid-proof and in the event of slight leakage to the outside shell the shell will in time disintegrate.

It is the object of the present invention to provide a pickling tank of large size in which the outer shell is made of lead lined sheet steel and in which this shell is further lined with brick and sulfur cement erected in accordance with my said Patent No. 1,847,192 and in which a cushioning and sealing layer of asphalt is interposed between the outer shell and the inner lining of brick and sulfur cement. A tank so constructed has a number of advantages. In the first place the brick and sulfur cement is rugged and will withstand blows whereas such blows would injure the lead lining if not protected and therefore the brick and sulfur cement lining protects the relatively delicate lead lining against injury. Further, the brick and sulfur cement lining protects the lead lining of the steel shell against sudden temperature changes and resulting crystallization of the lead since if hot acids are suddenly introduced into the tank this heat is not conducted to the lead lining for a substantial time and the rise in temperature of the lead lining is relatively slow. Further, by providing the sulfur cement and brick lining the outer lead lined steel shell is not subject to such wide variations in temperature. Thus, while the temperature of the acids inside the tank may be relatively high the temperature of the outer shell will be very much lower. This heat insulation effect provided by the brick and sulfur cement lining, of course, protects the steel and lead from separating due to their different coefficients of expansion. Another advantage of this construction is that the lead lining is protected against acids, such as hydrochloric, which attack lead since the lining and especially in combination with the asphalt sealing layer, is itself acid-proof. Since the lead is not attacked by the acids most generally used it, of course, furnishes a further barrier against the penetration of the acids to the outer steel shell.

In the accompanying drawing:

Fig. 1 is a top plan view of a tank made in accordance with my invention.

Fig. 2 is a fragmentary longitudinal section, taken on line 2—2, Fig. 1.

Fig. 3 is a transverse section, taken on line 3—3, Fig. 1.

In constructing a tank in accordance with my invention an outer steel shell 5 is first erected in any suitable manner and this steel shell is provided with a lead lining 6. The lead lined steel outer shell so formed is then coated with a layer of asphalt 7 and the lining of brick and sulfur cement is laid against this lining. The floor is first built up by laying a layer of bricks 8 in break-joint relation and pouring sulfur cement 9 in the joints between the bricks. The floor is then preferably completed by providing another layer of bricks 10, the joints between which are filled with sulfur cement 11. The walls of the inner lining are preferably laid up by laying layer after layer of bricks 12 in break-joint relation and by pouring sulfur cement 13 in the joints between the bricks of each layer as each layer is set up. The sulfur cement which is applied in a molten condition is prevented from running out past the inner face of the brick lining by erecting forms to retain the sulfur cement until it has hardened or by pasting strips of paper along the brick courses, as disclosed in my said Patent No. 1,847,192.

When the tank is completed the inner lining of brick and sulfur cement is built against the cushioning and sealing layer of asphalt 7. If any hairline cracks should develop which would permit a slow seepage of the acid through the lining, this acid strikes the asphalt which is not affected by the acid and which, being in a plastic state, seals the crack so as to prevent the escape of acid. In the event that both the brick and sulfur cement lining and the asphalt sealing layer fail to prevent the escape of acid the acid will encounter the lead lining which itself is, of course, commonly used as an acid-proof liner for tanks. The present invention therefore provides a method of lining steel tanks which provides a positive protection against the acid attacking the steel shell and destroying it. Further, the lead lining is protected against sudden temperature changes and resulting crystallization; is protected

against direct blows; is protected against acids, such as hydrochloric, which attack lead; and is protected against such wide variations in temperature as would be the case if the brick and sulfur cement lining were not provided inasmuch as this lining acts as an insulator, this last being particularly important in view of the difference in the coefficient of expansion of lead and steel.

I claim as my invention:

An acid-proof tank of the character described, comprising a shell of sheet steel lined throughout with an unbroken lining of lead, a further self-supporting lining for said shell composed of acid-proof bricks set up with sulfur cement and said brick and sulfur cement lining being sufficiently thick to protect the lead against injuries and sudden temperature changes as well as to be self-supporting and a layer of asphalt interposed between said linings.

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