July 15, 1941. W. SAMANS 2,249,497

TANK CLOSURE

Filed July 19, 1939 2 Sheets-Sheet 1

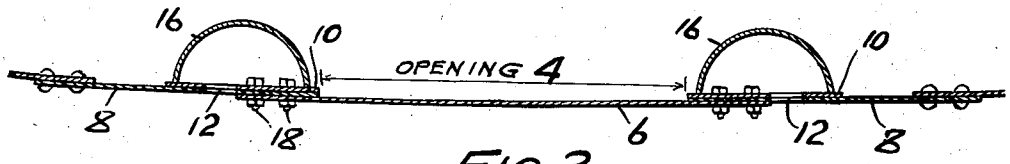


FIG. 2.

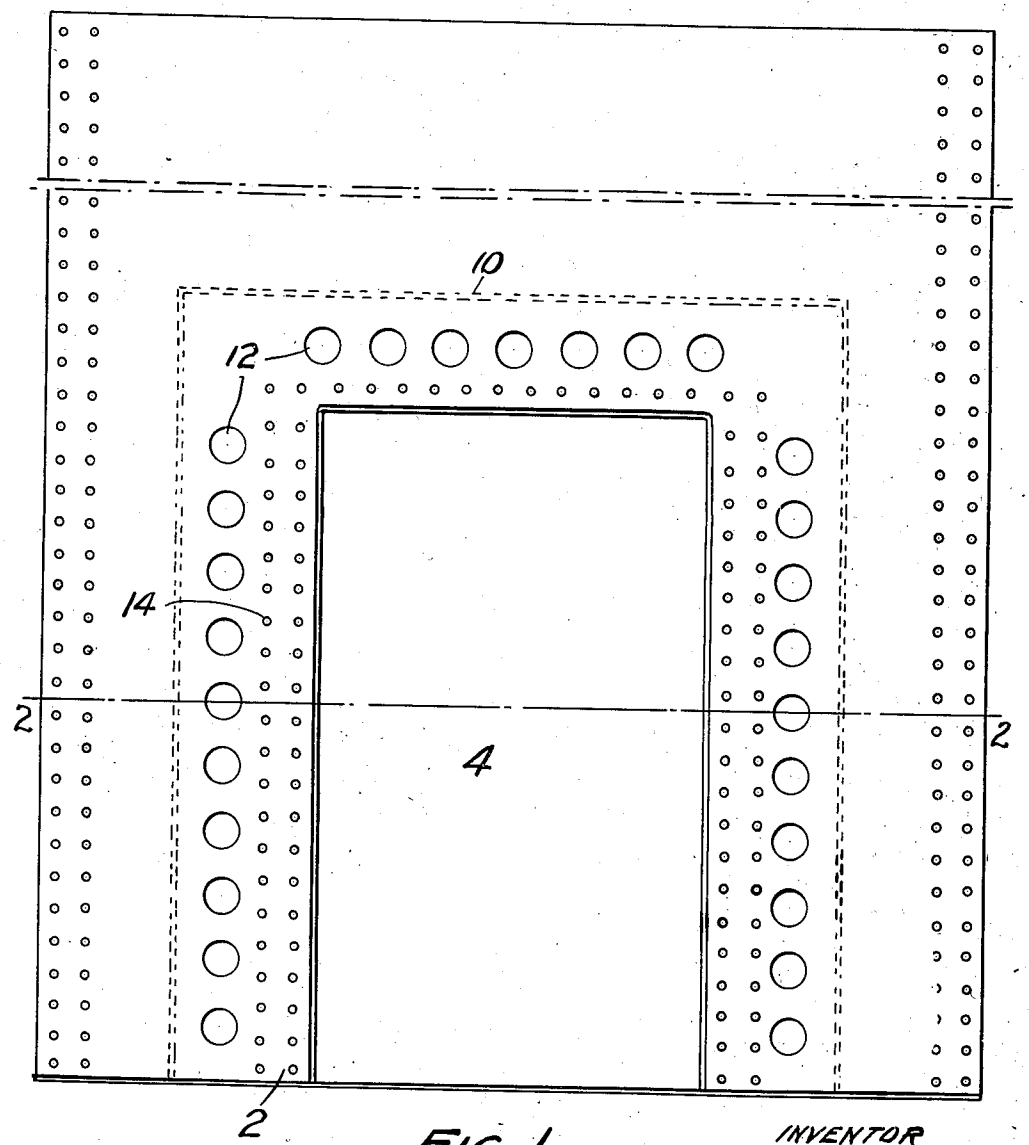


FIG. 1.

WITNESS:
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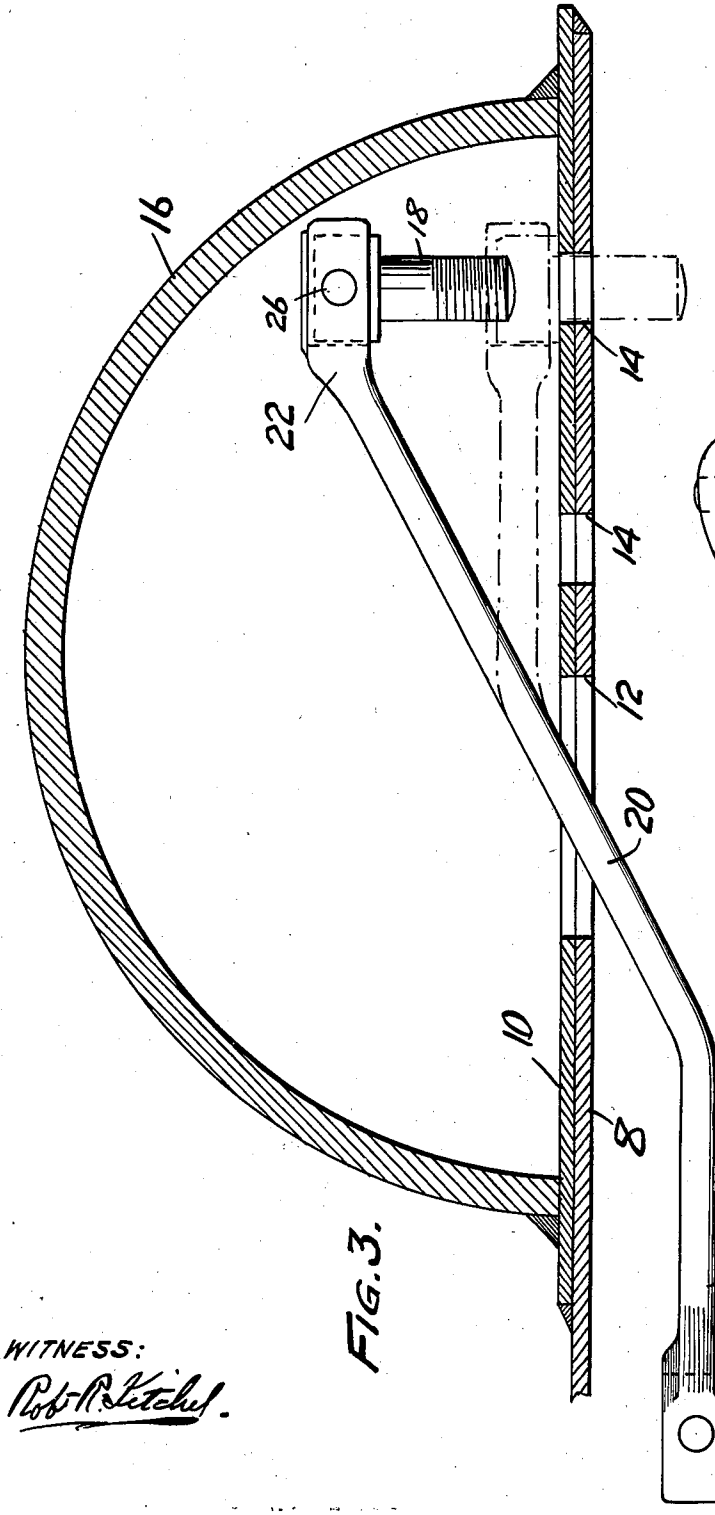


FIG. 3.

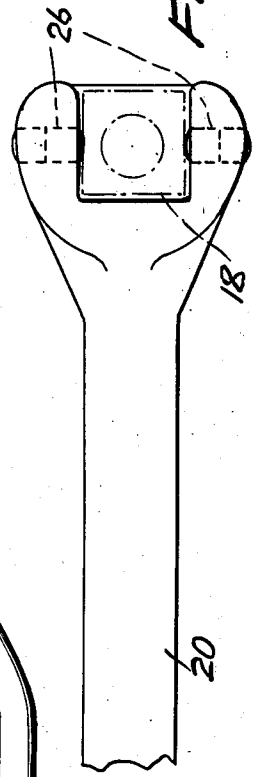


FIG. 4.

WITNESS:
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Patented July 15, 1941

2,249,497

UNITED STATES PATENT OFFICE

2,249,497

TANK CLOSURE

Walter Samans, Philadelphia, Pa., assignor to Sun Oil Company, Philadelphia, Pa., a corporation of New Jersey

Application July 19, 1939, Serial No. 285,343

3 Claims. (Cl. 220—55)

This invention relates to a closure arrangement for a large opening in a tank such, for example, as the production tank to which oil first flows from a well. Production tanks of this type must have clean-out openings to remove the muck which settles out therein. Such a tank is subjected to static pressures and any satisfactory clean-out opening must be provided with closure means which will not weaken the tank. It should preferably carry the tank shell plate stresses horizontally across the opening without serious distortion which would result in concentrated stresses and failure.

While various proposals have been made for the production of such closures, a flush type of closure is most satisfactory in that it insures the proper distribution of stresses to secure maximum strength. Any such closure arrangement, however, raises difficulties in the matter of placing and removing the cover plate, since it is difficult to prevent the bolt heads from turning unless two men are employed on the job. Difficulties are particularly encountered when multiple rows of bolts are used.

It is the object of the present invention to provide a closure of the type indicated which may be readily removed and replaced by one man.

This general object of the invention and more specific objects thereof, particularly relating to details will become apparent from the following description, read in conjunction with the accompanying drawings, in which:

Figure 1 is a fragmentary exterior elevation of a tank provided with the improved closure;

Figure 2 is a horizontal section taken on the plane indicated at 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary section of similar type showing details of construction and illustrating the manner in which bolting of the closure in place is effected; and

Figure 4 is a fragmentary detail showing the nature of the wrench used in connection with the invention.

The tank is indicated at 2 and may be of any usual type, for example, either bolted or welded type. An opening, indicated at 4, is located near the bottom of the tank for the removal of material settling from the oil. Such an opening is generally fairly large, for example, of the order of four feet high and two feet wide. The opening accordingly would represent a substantial weakening of the tank wall.

The opening 4 is adapted to be covered by a cover plate, indicated at 6, forming a substantial continuation of the walls of the tank, as indicated in Figure 2, so that uniform distribution of strains about the tank over the region of the opening will occur with resulting strength substantially equal to that of a tank without the opening.

The shell plate of the tank is indicated in Figure 3, at 8. Surrounding the opening 4 there is welded to this plate 8 a reenforcing plate 10. Through both of these plates are located as indicated large openings 12 and bolt holes 14, the openings 12 being located with respect to the bolt holes so that bolts may be placed by means of a wrench, as will be evident hereafter. On the interior of the tank and surrounding the opening there are welded sections of steel pipe or tubing 16 split lengthwise, providing a bolt receiving chamber interiorly of the holes 12 and 14 and closing off the interior of the tank from said holes.

Within this chamber the bolts 18 may be introduced through the large openings 12 by means of a wrench 20, which may be provided with suitably arranged ends 22 and 24 designed as indicated in Figure 3 for the insertion of bolts within holes 14 and the holding of the bolts while the nuts are tightened thereon respectively. The ends of the wrench are desirably shaped to hold the square or hexagonal bolt heads and frictional means may be provided in the form of resilient plugs 26 to hold the bolt heads within the wrench opening.

It will be evident from the above that one man may readily secure the cover plate over the opening, holding the bolt head by means of a wrench within the bolt chamber with one hand and manipulating the nut with the other.

The reenforcing plate 10 is provided to supply the metal necessary to replace the metal removed from the shell plate in making the access openings 12 for the bolts. Thus the strength of the tank is preserved in the vicinity of the opening.

The bottom of the cover plate is flanged so that it may be bolted through the usual flange provided on the stave of the tank to the bottom plates of the tank.

What I claim and desire to protect by Letters Patent is:

1. In combination, a tank having an opening therein, and having bolt holes surrounding said opening and having also a plurality of openings larger than said bolt holes arranged adjacent said bolt holes, means providing a chamber for receiving bolts inserted through said plurality of openings and for covering said bolt holes and

said plurality of openings interiorly of the tank, and a cover plate adapted to be bolted over the first mentioned opening by bolts passing through said bolt holes.

2. In combination, a tank having an opening therein, a reinforcing plate surrounding said opening, said tank and reinforcing plate having bolt holes surrounding said opening and having also a plurality of openings larger than said bolt holes arranged adjacent said bolt holes, means providing a chamber for receiving bolts inserted through said plurality of openings and for covering said bolt holes and said plurality of openings interiorly of the tank, and a cover plate adapted to be bolted over the first mentioned opening by bolts passing through said bolt holes.

3. In combination, a tank having an opening therein, and having bolt holes surrounding said opening and having also a plurality of openings larger than said bolt holes arranged adjacent said bolt holes, means comprising a cylindrical member welded to the tank providing a chamber for receiving bolts inserted through said plurality of openings and for covering said bolt holes and said plurality of openings interiorly of the tank, and a cover plate adapted to be bolted over the first mentioned opening by bolts passing through said bolt holes.

WALTER SAMANS.