July 17, 1923. 1,462,353

G. G. MUSTED

MANHOLE DOOR

Filed June 2, 1920

FIG. 1.

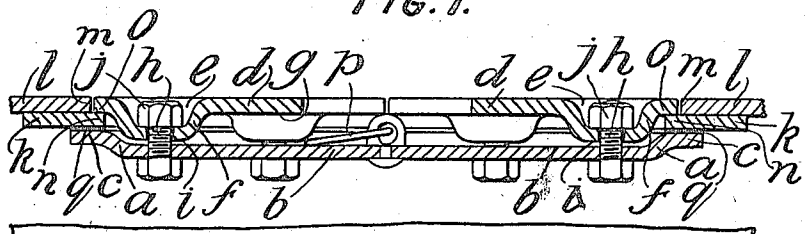


FIG. 2.

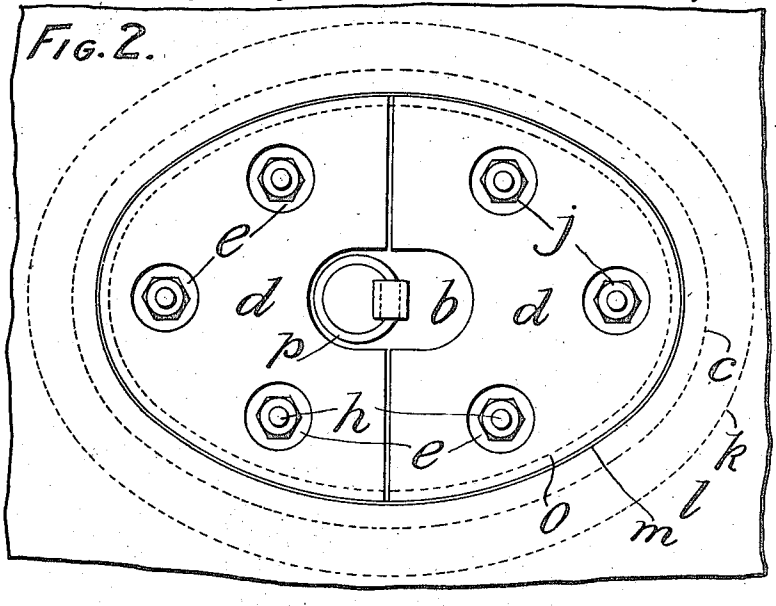
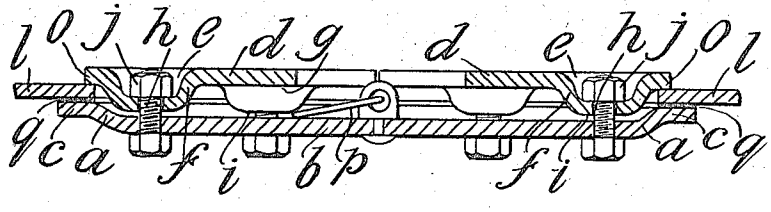


FIG. 3.



Inventor-
George Gordon Musted
by his Attorneys
Howson & Howson

Patented July 17, 1923. 1,462,353

# UNITED STATES PATENT OFFICE.

GEORGE GORDON MUSTED, OF PARTICK, GLASGOW, SCOTLAND.

## MANHOLE DOOR.

Application filed June 2, 1920. Serial No. 385,983.

*To all whom it may concern:*

Be it known that I, GEORGE GORDON MUSTED, a subject of the King of Great Britain and Ireland and the Isle of Man, and a resident of Partick, Glasgow, Scotland, have invented new and useful Improvements in Manhole Doors, of which the following is a specification.

This invention has reference to improvements in manhole and like doors for water ballast, oil and other tanks, and compartments, and for other purposes, such as gasometers, boilers, floating docks, dock gates, pump casings, suction and water pipes, ice breakers, tunnels of ships, hatch openings, shell openings, and cattle doors, and particularly relates to that type of manhole and like door in which the securing bolts secured to the door do not pass through the plating but pass through the door opening in the plating adjacent to the edge of same and also through holes formed in a securing ring and are tightened by nuts screwing on to the bolts and bearing against the ring.

According to this invention the door consists of a plate provided with a depressed and flat central portion and an elevated and flat rim portion formed by "joggling" the plate along a line concentric with the outer edge of same. The securing ring, consists of a flat sectional ring plate having a plurality of recesses in its outer surface each of which is formed by a circular pendent wall projecting from the other and inner surface of the ring plate towards the adjacent surface of the door plate. These recesses are provided with bottoms pierced for the passage of the securing bolts which are secured to the door plate. When fitted into place that portion of the plating round the door opening is sandwiched between the flat elevated rim part of the door plate and that part of the sectional ring plate outside or beyond the recesses. The length of the securing bolts is such that the ends of same do not project beyond the outer surface of the ring plate when the nuts are screwed on to the ends of same.

To facilitate the manipulation of the door a handle is secured to the central part of same and lies under the securing ring plate within the open central part of same.

The above door is "semi-flush" with the plating in which the door opening is formed, that is, all that projects beyond the plating is the edge of the securing ring. To make the door "dead-flush" with the plating a strengthening ring is secured under the plating and projects inwards all round the door opening. This strengthening ring is sandwiched between the door plate and the securing ring so that the upper surface of the securing ring is flush with the plating. The depth of the recesses in the securing ring and the depth or amount of the "joggle" on the door plate is such that when the door is bolted up there is a small clearance space between the bottom of the recesses and the surface of the door plate.

In order that others skilled in the art to which this invention relates may perfectly understand same I have hereunto appended one sheet of drawings in which:—

Figure 1 is a sectional elevation of a manhole door as constructed according to this invention and illustrates a "dead-flush" door.

Figure 2 is a plan view of same.

Figure 3 is a sectional elevation similar to Figure 1 but illustrates the "semi-flush" door.

Referring to these drawings:—

In carrying this invention into effect or practice a flat, oval-shaped door plate is formed with a "joggle" at the part *a* so that a flat depressed central surface *b* and a flat elevated rim surface *c* are provided. A securing ring *d* made in preferably two sections is formed with a plurality of recesses *e* which are each formed by a circular pendant wall *f* projecting from the inner surface *g* of the ring plate *d* towards the surface *b* of door plate.

Bolts *h* secured into the door plate pass freely through holes formed in the bottoms *i* of the recesses *e*. Nuts *j* screwing on to the bolts *h* are located in the recesses *e*. A strengthening or compensating ring *k* is secured to the plating *l* round the door opening *m* and projects inwards all round the opening. The inwardly projecting part *n* of this ring *k* is sandwiched between the part *c* of door plate and the part *o* of securing ring plate *d* beyond the recesses *e*.

An operating handle *p* fitted to the door plate lies under the ring *d* and within the central part of same. Suitable packing *q* is inserted to make the door water, oil or gas tight.

In the "semi-flush" door as illustrated by Figure 3 the construction is the same as that illustrated by Figures 1 and 2 with the exception that the ring *k* is dispensed with.

What I claim and desire to secure by Letters Patent is:—

1. Manhole and like doors comprising tank or other plating; a door opening therein; a door plate; a "joggle" formed in said door plate concentric with the outer edge of same; a flat elevated rim part and a flat depressed central part in said door plate; a ring plate; a plurality of recesses in the outer surface of said ring plate and near the edge thereof; circular pendant walls, forming said recesses, projecting from said ring plate towards said door plate; bolts secured in said door plate and passing through the pierced bottoms of said recesses; nuts on said bolts located in said recesses; and an operating handle located under said ring plate within the open center part of same.

2. Manhole and like doors comprising tank or other plating; a door opening therein; a door plate; a "joggle" formed in said door plate concentric with the outer edge of same; a flat elevated rim part and a flat depressed central part in said door plate; a ring plate; a plurality of recesses in the outer surface of said ring plate; circular pendant walls, forming said recesses; projecting from said ring plate towards said door plate; bolts secured in said door plate and passing through the pierced bottoms of said recesses; nuts on said bolts located in said recesses; a strengthening ring secured to the plating and projecting inwards all round the said door opening; and an operating handle located under said ring plate within the open center part of same.

3. Manhole and like doors comprising tank or other plating; a door opening therein; a door plate; a "joggle" formed in said door plate concentric with the outer edge of the same; a flat elevated rim part and a flat depressed central part in said door plate; a ring plate comprising a plurality of independent parts; a plurality of recesses in the outer surface of each of said independent parts; circular pendant walls, forming said recesses, projecting from said ring plate towards said door plate; bolts secured in said door plate and passing through the pierced bottoms of said recesses; nuts on said bolts located in said recesses; and an operating handle located under said ring plate within the open center part of same.

GEORGE GORDON MUSTED.