No. 606,949. Patented July 5, 1898.

# H. L. WILSON.

## MANHOLE AND COVER THEREFOR.

(Application filed Feb. 11, 1898.)

(No Model.)

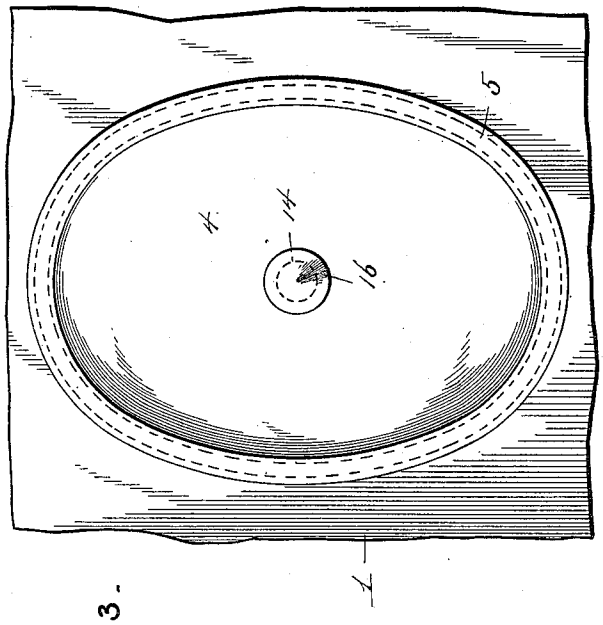



FIG. 3.

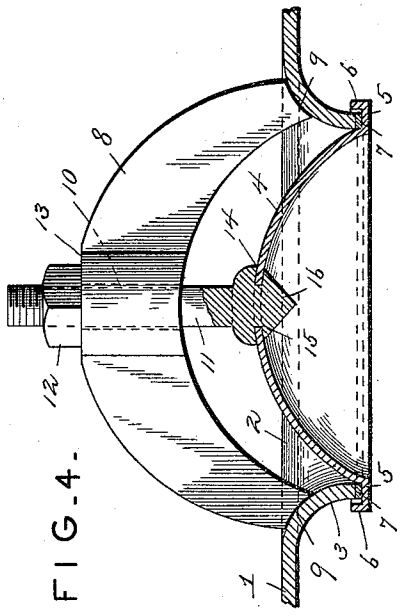



FIG. 4.

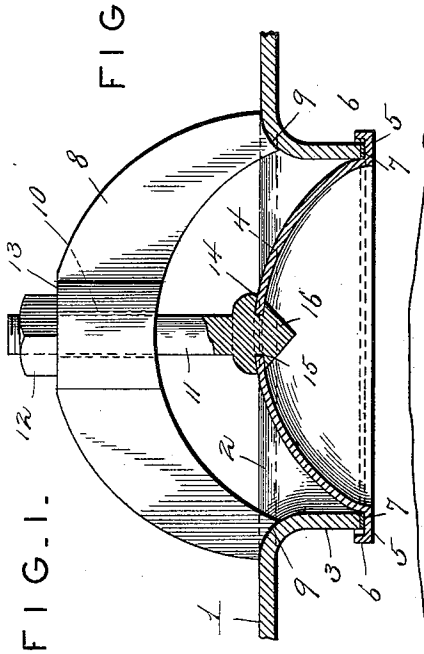



FIG. 1.

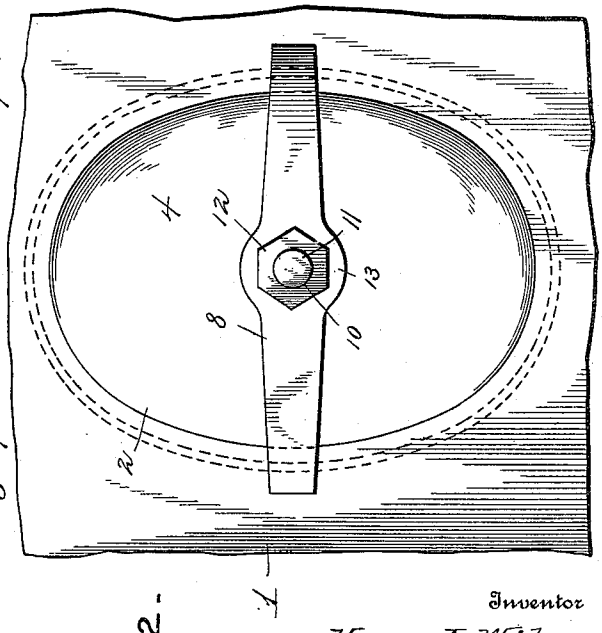



FIG. 2.

Witnesses

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

HARRY L. WILSON, OF ERIE, PENNSYLVANIA.

## MANHOLE AND COVER THEREFOR.

SPECIFICATION forming part of Letters Patent No. 606,949, dated July 5, 1898.

Application filed February 11, 1898. Serial No. 669,980. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY L. WILSON, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Manholes and Covers Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to a novel manhole-cover and securing mechanism therefor, my object being to produce a device of this character of simple and inexpensive construction, which will insure a steam-tight joint between the cover and the boiler-sheet, and which will be of maximum durability.

To these and other ends subordinate thereto my invention consists in providing a curved or arched internal annular flange struck from the boiler-sheet and defining the manhole and in stamping, spinning, or otherwise forming a dished or concave cover provided with a horizontal annular flange extending under the arched flange and designed to make a close joint therewith by the interposition of a gasket, the cover-bail being so constructed and located that the stress of the bail under the pressure derived from the tightening of the cover-bolt will be exerted upon the arched flange substantially in a radial direction for the purpose of utilizing the resiliency of the arched flange and of the annular flange around the cover to insure an absolutely steam-tight joint between the cover and the boiler-sheet.

The invention consists, further, in the particular manner of securing the cover-bolt or stem to the cover and in certain other peculiarities of construction and arrangement, which will be hereinafter made apparent.

Referring to the drawings, Figure 1 is a central vertical section through the manhole-cover, the cover-bolt, and the contiguous portion of the boiler-sheet, the cover-bail being shown in elevation. Fig. 2 is a top plan view of the subject-matter of Fig. 1. Fig. 3 is a bottom plan view thereof, and Fig. 4 is a detail sectional view illustrating an exaggeration of the relative positions or forms of the arched flange upon the boiler-sheet and the horizontal annular flange around the cover when the device is used in connection with high-pressure boilers and it is necessary to screw up the cover-bolt in a sufficient degree to exert great stress upon the parts through the bail.

Referring to the numerals on the drawings, 1 indicates the ordinary boiler-sheet, and 2 the manhole defined by an inwardly-extending arched or curved annular flange 3, the edge of which is normally located in a plane a slight distance inside the plane of the sheet.

4 indicates a sheet-metal manhole-cover, which is of circular, elliptical, or other desired form and dished or of dome shape, as indicated. Around the edge of the cover is a flange 5, surrounded by an outwardly-extending peripheral flange 6.

7 indicates a rubber or other suitable packing gasket seated upon the flange 5 between the dome of the cover and the peripheral flange 6 and designed to be compressed between the flange 5 and the edge of the arched flange 3 on the boiler-sheet.

8 indicates the bail, preferably made in the yoke shape illustrated and having its opposite extremities bearing upon the arch of the flange 3 at a point which will bring the pressure or stress of the yoke in a radial direction with respect to the curvature of the arched flange. The extremities of the bail are shaped, as indicated at 9, to conform to the curvature of the flange, and a smooth bore 10 is formed at the center of the yoke for the reception of the cover stem or bolt 11, provided with screw-threads at its upper end above the bail for the reception of a compression-nut 12, designed to lie against a flattened face 13 at the upper side of the bail. The bolt 11 is provided adjacent to its lower end with an annular flange or shoulder 14, designed to bear against the upper surface of the dome, and has its extremity passed through an aperture 15 at the top of the dome and upset in a suitable die to form a head 16 upon the inside of the cover. This particular manner of securing the cover-bolt to the cover is particularly efficacious where, as in my device, the cover proper is formed from sheet metal stamped or spun into the form shown.

The upsetting of the head 16 in a die will

in an obvious manner firmly clamp the material of the cover between said head and the shoulder or flange 14. It will now be observed that by screwing the compression-nut 11 in one direction or the other the manhole-cover may be lowered slightly for the purpose of inserting a new gasket, or the bolt may be entirely withdrawn from the bail to permit the cover to be lowered into the boiler for the purpose of permitting the workman to enter through the manhole, or that the cover may be drawn up with considerable force to effect a tight joint between the flanges 3 and 5. As has been premised, however, this usual and ordinary clamping action is insufficient to make a sufficiently-tight connection for high-pressure boilers, for the reason that although a steam-tight joint can be made sufficient pressure is not ordinarily brought to bear to prevent the gasket from blowing out under very high pressures. It is for this reason that I have located the ends of the bail upon the arch of the flange 3 and have provided the peripheral flange 6, surrounding the supporting-flange 5.

By reference to Fig. 4 of the drawings it will be seen that when the compression-nut 12 is screwed down with considerable force the pressure exerted upon the arch by the bail and opposed by a corresponding pressure in the opposite direction of the cover will cause the curved or arched flange 3 to yield slightly, throwing its edge toward the dome of the cover and producing a slight creeping and consequent condensation of the gasket at its inner edge. The tendency of the flange to spring back into place will therefore always be exerted to maintain the tight connection and will compensate for any slight contraction, expansion, or lost motion between the parts. If now the pressure is sufficiently great, a new resistive element is brought into operation by the yielding of the flange 5, which under this excess pressure will spring slightly, as shown in Fig. 4, and will establish a substantially parallel direction of said flange 5 and of the edge of the arched flange 3. Thus not only is a great direction-pressure exerted to bind the parts—as, for instance, that of the bolt-and-nut connection ordinarily employed—but the resistance of the flanges 3 and 5, owing, first, to their comparative inflexibility, and, second, to the annular form, will, when they are sprung under the pressure directed, exert a constantly-active force, tending to retain the steam-tight joint and to cause the lower edge of the arched flange to move inward toward the dome, thereby not only compressing the gasket, but serving to condense it adjacent to its inner edge, where it is reinforced by the rising of the dome.

From the foregoing it will appear that I have invented a most durable and efficient manhole-cover and securing mechanism therefor which will insure at all times an absolutely steam-tight connection between the cover and boiler-sheet and which may be readily attached or detached or may be adjusted with facility to accommodate the various contingencies of its application; but while the present embodiment of the invention appears to be most preferable I do not desire to limit myself to the structural details set out, but reserve the right to change, modify, or vary them at will within the scope of the protection prayed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A manhole-cover made of resilient sheet metal having a dome-shaped center and a surrounding laterally-projecting flange adapted to seat on the inturned flange defining the manhole, said cover-flange terminating in an outwardly-turned peripheral flange adapted to surround the inturned boiler-flange, said dome-shaped center being provided with a central perforation, in combination with a sustaining-bolt penetrating and riveted to said cover, substantially as described.

2. The combination with an arched and incurved flange defining a manhole, of a dome-shaped cover formed from resilient sheet metal and provided with a surrounding lateral flange engaging the edge of the manhole-flange and terminating in an outwardly-turned peripheral flange surrounding said manhole-flange, a bail having its ends seated upon the arch of said curved manhole-flange, and a cover-bolt extending through and secured to the cover and bail, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY L. WILSON.

Witnesses:
F. P. RUSSELL,
WM. H. SMITH.