March 24, 1925.

1,531,113

F. A. LOVEJOY

MANHOLE COVER

Filed July 26, 1924

Fig. 1

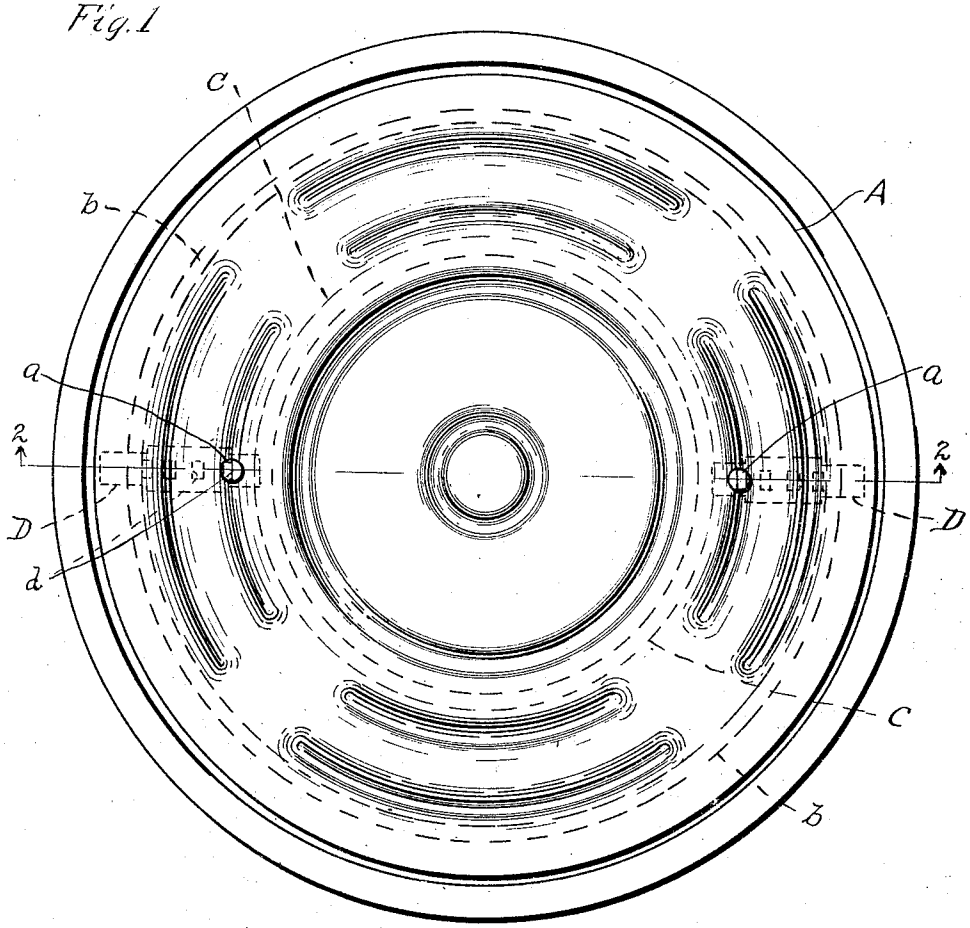


Fig. 2

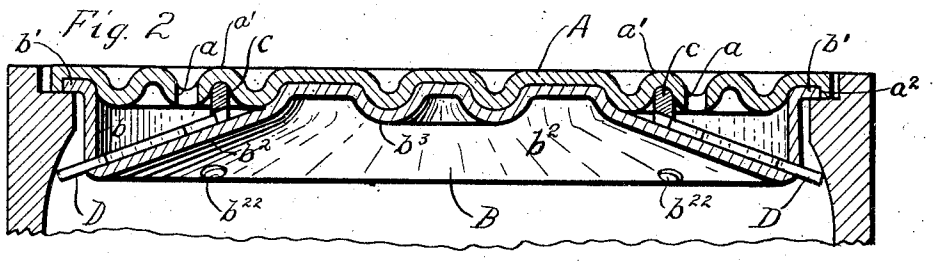
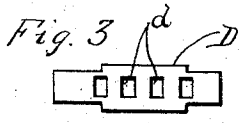


Fig. 3



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Patented Mar. 24, 1925. 1,531,113

UNITED STATES PATENT OFFICE.

FREDERICK ALDEN LOVEJOY, OF WEST ROXBURY, MASSACHUSETTS.

MANHOLE COVER.

Application filed July 26, 1924. Serial No. 728,421.

To all whom it may concern:

Be it known that I, FREDERICK ALDEN LOVEJOY, a citizen of the United States, residing at West Roxbury, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Manhole Covers, of which the following is a specification.

My invention is an improved street manhole cover for sewers and the like, of relatively light weight, great strength and perfect security in use.

In the drawings:

Figure 1 is a top plan view;

Figure 2 is a medial sectional elevation on line 2—2 of Figure 1;

Figure 3 is a detail of the bolt.

Street manhole covers as at present commonly made, are of cast iron, made of great thickness and solidity to meet the strain of heavy trucks and the like passing over them. Their weight is necessarily great. Apart from the weight which is a burden in use, it is necessary to form them substantially smaller than the rabbeted recess in the ring in which they fit, as, being cast, it is impracticable to fashion them closely or to make such a piece to a close dimension without machining.

In use the slipping and sliding of the cover under violent impacts tends to wear the opposed parts of the cover and receiving ring and when this occurs, from time to time the cover may be slid and tilted by the impact of a wheel and forced from its position, often with damage resulting.

In modern practice, the street manhole cover has become so heavy that it is no longer practicable to lift them out and it is necessary to pry up one side and then drag them out of position to one side.

It is an object of my invention to form a manhole cover of very light weight, in such a way that it is amply strong to resist all stresses to which it may be subjected in use; to form it accurately to a designed size in order that it may fit without undue movement within the rabbeted recess in the receiving ring and to reduce the cost of construction materially.

An additional object is to provide means to lock the manhole cover in place, so that it cannot be removed from place by accident nor without a suitable tool.

My improved manhole cover is made up out of three parts, which are united into one integral instrumentality, by riveting or otherwise, preferably by spot welding, namely, a surface plate, A, an arch member, B, and a ring stiffener member C.

The upper surface of the manhole cover, is formed of a pressed metal disk A, preferably with a series of corrugations, a', and having about its periphery a depending flange, a^2.

The arch member, B, is formed in dished shape, having an annular flange, b, around the rim of the portion, b^2 of the arch, and having a section b^3 at the center, preferably corrugated to combine with the corrugations of opposed portions of the plate A. Around the edge of the flange b, opposed to the under side of plate A, is a flange b'.

Intermediate between the point of contact between the central portions of A and B and the peripheral portions I preferably insert and secure a stiffener ring C.

In the lower portion of part b^2 a series of drain and ventilating apertures b^{22} are formed and the plate A is provided with apertures, a, into which an instrument may be inserted to lift the cover. Preferably also I provide locking bolts D working in apertures in the ring C and flange b, these bolts being positioned beneath one of the apertures, a, in plate A so that the bolts may be shifted by a tool inserted through an aperture, a, in plate A, the bolts being provided with recesses, d, to receive the end of the actuating tool.

In assembling the parts the stiffener ring C is secured to the arch member B, the bolts D being first placed in place in the designed apertures in flange b and ring C. The ring C is preferably spot-welded to the arch member B, thus permanently securing the bolts D to the member B, with capacity for limited longitudinal movement of the bolt. The bolt D is preferably slightly curved from end to end, so that a slight friction is developed between the bolt and opposed surfaces, in order that the bolt may be held by friction in its retracted position.

The part, B, carrying the ring C and bolts D is now assembled with plate A, the bolts D being positioned beneath an aperture, a, in plate A, in order that they may be actuated as required. The central corrugations of plate A and part B fit together and the flange b' rests against the under side of plate A. Parts A and B are spot welded together at the center and at the periphery

and parts A and C are also spot welded. I consider spot-welding to be the preferable method of securing the various parts together, but it is obvious that other means of securing may be employed, as by riveting or by bolts and nuts.

B is a feature of my invention as this interlocking brings to the direct support of the surface plate, A, the arch member B, in such a fashion that any possible deflection of the surface plate is resisted by the tensile strength of the flange, b, of the dished arch member, to which any pressure applied to the centre of the surface plate is transmitted through the part b^2.

The compound structure described above is preferably of pressed steel, with the exception of the stiffener ring C which is preferably cast metal. The utilization of tensile and compressive resistance to deflection of plate A, instead of the mere mass of the metal in a thick plate, reduces the weight of the cover by half. The use of pressed metal renders it possible to make the cover closely fit the aperture in which it rests, whereas it is not practicable to govern the size of cast covers closely, without machining, which is too costly. The provision of the deep flange b makes impossible any accidental tilting and sliding out of the cover. The provision of the bolts D prevents removal of the cover by unauthorized persons, usually children. The light weight of my manhole cover renders it easy of removal by one man, by merely inserting a pair of hooks in apertures, a, and lifting the plate out, after first retracting the bolts by inserting a rod through apertures, a, into a slot of the bolts D.

In the drawings, the thickness of the material of parts A and B is necessarily shown disproportionately great, for clearness.

I claim:

1. A compound cover, comprising an upper plate, a depending flange applied on the under peripheral part of the upper plate; an arch element abutting upon the lower part of the flange and supporting the center of the upper plate.

2. A compound cover, comprising an upper plate, a depending flange secured on the under peripheral part of the upper plate; an arch member secured at the center to the under side of the upper plate and at the outer edge of the arch member secured to the lower inside edge of the depending flange.

3. A compound cover, comprising an upper plate, corrugated at its center part; a depending flange applied on the under peripheral part of the upper plate; a truncated conical member having corrugations at its truncated surface coacting with the central corrugations on the upper plate and abutting upon the lower inside part of the depending flange and supporting the center of the upper plate.

4. A compound cover, comprising an upper plate, corrugated at its center part; a depending flange secured on the under peripheral part of the upper plate; a truncated conical member having corrugations at its center coacting with the central corrugations on the upper plate and secured at its edge to the lower part of the depending flange and supporting the center of the upper plate.

5. As in claim 1 and having also a stiffener ring secured to the upper plate and arch member, intermediate their centers and peripheries.

6. As in claim 1, and having also ventilating and draining perforations in the upper plate and the arch member.

7. As in claim 1 and having also a stiffener ring secured to the upper plate and arch member, intermediate their centres and peripheries and sliding bolts working in slots in the lower edge of the stiffener ring and the lower part of the depending flange of the arch element.

Signed at Boston, Massachusetts, this twenty fourth day of July 1924.

FREDERICK ALDEN LOVEJOY.