

(No Model.)

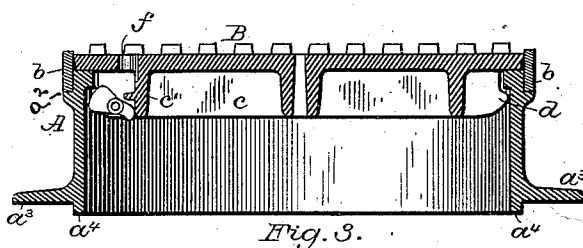
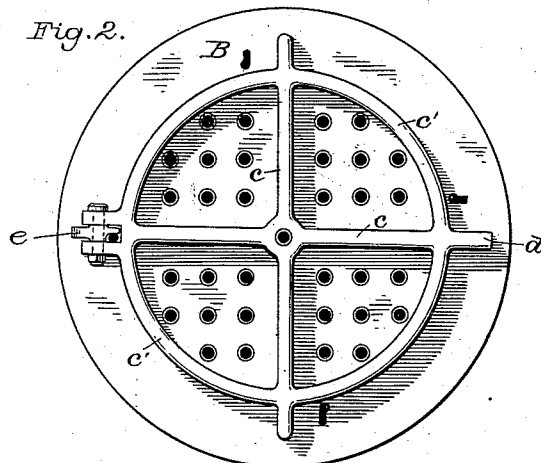
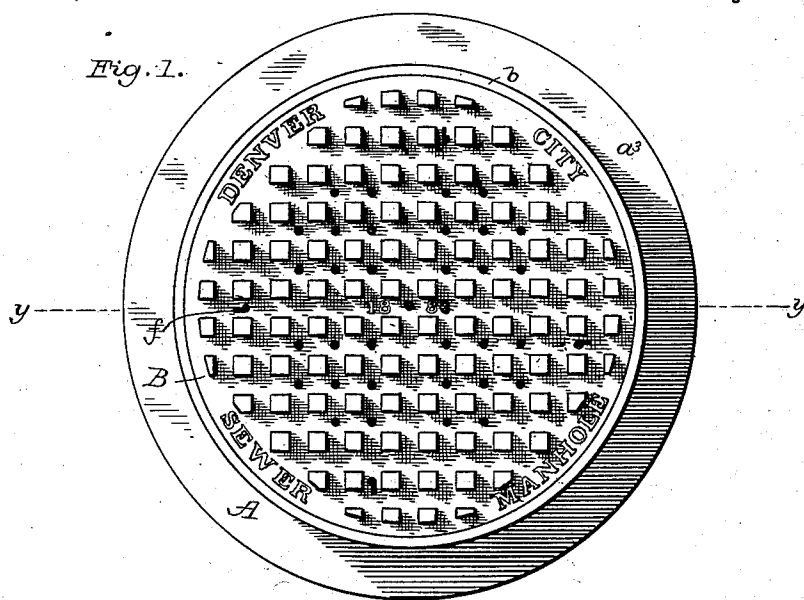
2 Sheets—Sheet 1.

H. C. LOWRIE.

SELF LOCKING MAN HOLE COVER FOR SEWERS, STREET VAULTS, &c.

No. 317,153.

Patented May 5, 1885.



Attest:
Philip F. Larner.
Novell Battle.

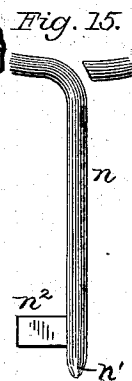
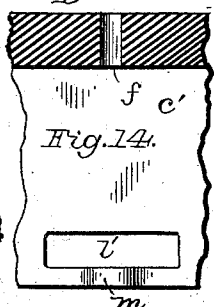
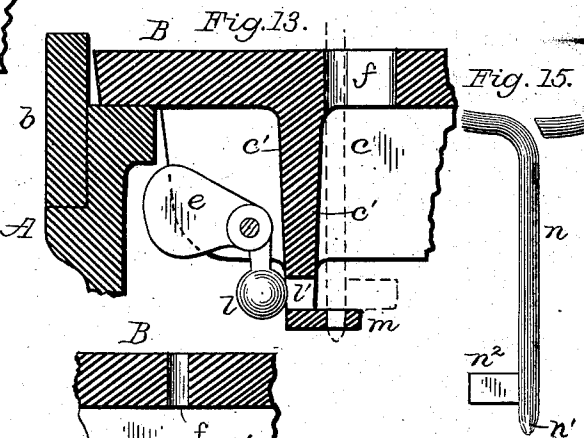
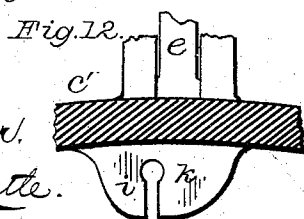
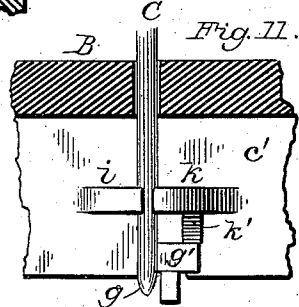
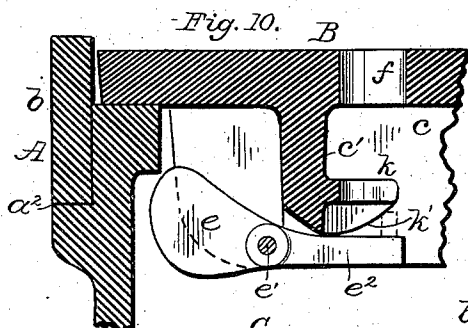
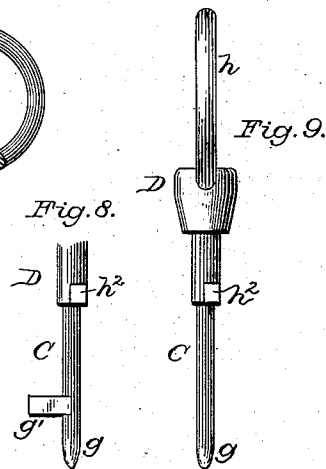
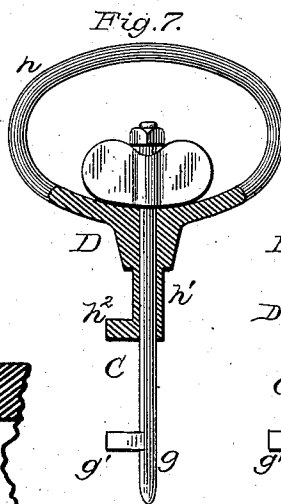
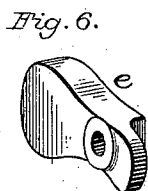
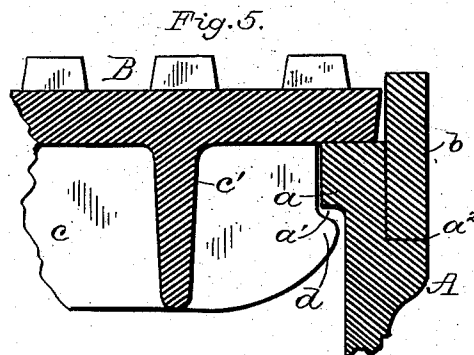
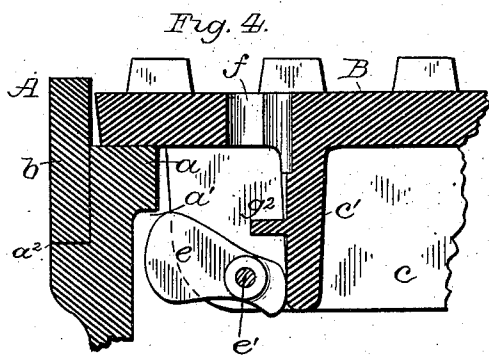
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SELF LOCKING MAN HOLE COVER FOR SEWERS, STREET VAULTS, &c.

No. 317,153.

Patented May 5, 1885.



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UNITED STATES PATENT OFFICE.

HARVEY C. LOWRIE, OF DENVER, COLORADO.

SELF-LOCKING MAN-HOLE COVER FOR SEWERS, STREET-VAULTS, &c.

SPECIFICATION forming part of Letters Patent No. 317,153, dated May 5, 1885.

Application filed March 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, HARVEY C. LOWRIE, of Denver, in the county of Arapahoe and State of Colorado, have invented a certain new and useful Self-Locking Man-Hole Cover for Sewers, Street-Vaults, &c.; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

To render such sewer-openings as are provided with man-hole covers practically inaccessible to unauthorized persons is the prime object of my invention; and I have provided, therefore, a simple and effective locking mechanism, and although the same has been devised by me with special reference to sewer-service, my improvements are equally applicable for use in connection with covers to coal-holes and other similar outside entrances to vaults located beneath sidewalks or streets.

Under certain portions of my invention the man-hole curb is of necessity provided with such an annular abutting surface as will enable the locking devices attached to the under side of the cover to engage therewith regardless of the particular rotative adjustment of the cover; but it is obvious that said abutting surface may be in the form of a series of projecting lugs or a series of recesses, so as to substantially constitute a continuous annular abutting surface, with which, at all points, a locking-bolt may engage; but under certain other portions of my invention the particular character of the said abutting surface may be widely varied.

A man-hole cover embodying my invention in its best form has no handle, and is self-locking, when dropped into its seat in the curb, regardless of rotative adjustment, and the key devised by me by which it is unlocked is novel and complex in its character, and serves not only as key, but also as a "lifter" or detachable handle for the cover; but if my key be employed in a simpler form, a permanent handle for the cover can be used, if desired, and in the case of covers accessible for unlocking from below—as with coal-holes, for instance—the key may be dispensed with, if desired, because, although in that case the cover can only be unlocked by manipulation beneath the cover, it can be se-

curely locked from the outside by merely dropping the cover into position.

I am aware that self-locking vault-covers have heretofore been provided with a pendent T-shaped catch, arranged to engage with one of its arms beneath the edge of a curb; but for preventing the free releasing vibration of said catch, should the cover be lifted, a second pendent catch or "keeper" is necessarily employed, which is provided with a notch for the reception of the second arm of the T-shaped catch, and opposite said double-catch radially-projecting lugs have been provided on the under side of the cover for occupying holes specially provided therefor in the curb. While said prior vault-covers can in accordance with certain portions of my invention be provided with key-holes, so as to render their catches accessible to keys, and thereby for the first time render such covers more suitable for sewers, it is to be understood that certain other portions of my invention enable a cover to be promptly dropped into place and be self-locked regardless of any such particular rotative adjustment as is necessary in the use of said prior vault-covers, because their projecting lugs must be carefully entered into their respective holes, which are formed in the curb. So, also, without departure from portions of my invention can my key-holes and keys be employed with such prior weighted or gravity latch-bolts as are attached to a curb, so as to co-operate with a cover having a pendent keeper for engaging with said latch-bolt, said cover also having a lug for engaging with the curb at the side opposite the latch, and therefore requiring the exact or special adjustment of the cover to its seat, which is wholly obviated under the main features of my invention, because my bolt is attached to the cover, and all portions of the annular abutting surface of the curb are available for service as a keeper for the bolt.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figure 1 is a top view of a man-hole cover and curb embodying my invention in one of its best forms. Fig. 2 is a bottom view of the cover. Fig. 3 is a diametrical vertical section of the cover and curb on line y, Fig. 1.

Fig. 4 is an enlarged sectional view of a portion of the cover and curb with the locking device. Fig. 5 is an enlarged sectional view of the cover and curb at a point diametrically opposite the portion shown in Fig. 4. Fig. 6 is a perspective view of the locking device detached. Figs. 7, 8, and 9 are views of the key in various positions. Figs. 10 to 15, inclusive, illustrate modifications of my improvement.

The man-hole curb A may be variably constructed, according to the particular service intended. If to be used upon a sidewalk or other place not traversed by heavy teams, the curb may be made wholly of cast-iron, or it may be a large flat stone, but it has the inwardly-projecting flange *a*, or its equivalent—as, for instance, a series of projecting lugs or recesses—so as to afford a proper abutting surface substantially like that at *a'* on the under side of the flange *a*, said surface, however it may be formed or shaped, operating as a substantially annular keeper for the securing devices. As here shown, the curb is specially designed for streets or roadways, and is composite in its construction, in that it is constructed in two parts, the base being composed of cast-iron, and having near its top an annular exterior flange, *a*², and at its bottom a wide annular exterior flange, *a*³, to afford a good bearing upon the usual masonry, and also an annular depending flange, *a*⁴, at the inner edge, which serves to brace the top of the masonry as against inward displacement. The cap *b* of the curb is an annular band of wrought-iron, shrunk upon or otherwise secured to the base and seated upon the flange *a*², thus protecting the cast-iron against injury, as from the wheels of passing teams, &c. The upper surface of the interior flange, *a*, is preferably provided with crosswise grooves or depressions at frequent intervals to facilitate the discharge of water liable to enter between the curb and cover, and thereby prevent undue adhesion of the cover by ice in cold weather. As usual, the top of the cover B is provided with spurs or studs, and also with perforations when used for sewers, or with bull's-eye glasses when used for sidewalk-vaults. The usual strengthening-webs are also employed, both radial, as at *c*, and annular, as at *c'*, the radial webs extending beyond the circular web, as shown, and one of the radial webs at its outer end is provided with a projection, *d*, which serves as an engaging-lug, which passes beneath the abutting surface *a'* of the flange *a* on the curb, when the cover is in its seat. Diametrically opposite said engaging-lug *d* is a pivoted locking bolt or lug, *e*, which, as here shown, is in the form of a horizontal lever, freely pivoted upon a horizontal axis or pin, *e'*, and having its outer end heavier than the inner end, and mounted between two short radial webs outside of the annular web *c'*, so as to be practically parallel with the surface of the cover.

When my locking bolt or lug *e* and engaging-lug *d* are to be applied to covers already made for use with ordinary curbs, a small cast-

ing, with the engaging-lug *d* thereon, is bolted flatwise to the radial web, and the locking bolt or lug is mounted alongside a radial web by means of a shaft or pin inserted laterally through said web. The inner end of the locking bolt or lug so engages with the outer surface of the annular web *c'* as to normally maintain said bolt in a slightly-inclined position, and the length of said locking bolt or lug is such that when in its lowest inclined position it projects its outer end beneath the keeper or flange *a* of the curb; but it will be seen that as the cover is dropped into its seat the outer end of said locking-bolt rides freely over said flange and then drops beneath the keeper, so that the cover cannot be again lifted without first lifting the outer end of the lug, which thus serves as a gravity latch-bolt.

As thus far described, the cover is only suitable for use where access can be had to the lower side of the cover—as by way of a coal-vault, for instance—to enable the locking-lug to be first lifted by hand, and the cover then lifted and moved from its seat, thus obviating the pendent chains or links and the cross-sticks usually employed for locking such man-hole covers, although these latter may be also employed, if desired, for affording still greater security when the locking-bolt is under the control of a key to be applied from above.

It will be seen that the annular keeper on the curb, taken in connection with the oppositely-located engaging-lug and locking-bolt, enable the cover to be dropped to its seat at random, as distinguished from the special adjustment of the cover to the curb, as with the prior vault-covers hereinbefore referred to. It will also be seen that my pivoted locking-bolt operates with a cam-like action in resisting the upward movement of the cover, and hence no second catch or keeper is necessary, as with said prior pendent T-shaped catch, and it is obvious that if the outer end of my locking-bolt be merely in contact with the curb when the cover is in place, the latter cannot be lifted, because of the cam-like action before referred to, and as said bolt is practically housed by the adjacent web, it is not exposed to injury during the handling of the cover.

Although but one key-hole *f* is actually needed, I prefer to have several of them, as shown, to mislead unauthorized persons, the location of the true key-hole being known to a custodian of a key by any predetermined mark—as, for instance, in this case the true key-hole may be between the words "Denver" and "Sewer," here shown to be cast on the cover.

It will be seen that in order to place the locking bolt or lug out of its locking position its inner end must be deflected in order to raise its outer end, and therefore the key C is relied upon to effect that movement. The vertical plane of the key-hole *f* is mainly at one side of the rear end of the locking-bolt; but the latter is cut away at its side in line

with the hole to prevent lodgment of dirt and to admit of the downward passage of the shaft or stem *g* of the key, which has a laterally-projecting arm or bit, *g'*, near its lower end, so that, when inserted into the key-hole to the proper depth and then turned a quarter of a revolution, said arm will overlie the rear end of the locking-bolt, whereupon, by forcing the key downward, the outer end of said bolt will be raised.

In order that the top of the rear end of the lug may not be accessible to a straight rod or pin inserted through the key-hole, an overlying fixed stud or guard, *g''*, projects from the annular web *c'*, so that the bit-arm *g'* on the key-shaft must first be carried below said stud before it can be swung over the rear end of the locking-lug. The key, as thus far described, is simply an unlocking device to be used when the cover is provided with a handle by which it can be lifted while the lug is under the control of the key.

As here shown, the key C has a thumb-piece which may be integral with the shaft when said key is not combined with a cover-lifting device, as here shown. The cover-lifter D is connected with the key C and used therewith, and serves only as a vertical guide for the shaft or stem thereof; but so far as relates to the unlocking function it constitutes no portion of the key. Said lifter comprises a handle, *h*, of suitable form, a hollow cylindrical shank, *h'*, and at its lower end a laterally-projecting arm, *h''*. When the combined key and lifter is to be inserted, the lateral bit *g'* and arm *h''* occupy the same vertical plane, as seen in Fig. 7, and are readily entered into a key-hole, whereupon the lifter is turned a quarter of a revolution, so as to throw its arm beneath the cover, as seen in Fig. 8, and then the key is also turned to throw its arm over the rear end of the locking-lug, as seen in Fig. 9, after which to open the cover the key is pressed downwardly with one hand, and so held, while with the other hand the cover is lifted upon its edge, the key being then removed. This combined man-hole key and lifter having the separately-rotative arms or bits constitutes one of the novel features of my invention; although I am aware that a combined key and lifter need have but one projecting arm or bit, which will serve not only for controlling the locking-bolt, but also to engage with the cover for lifting it—as, for instance, as shown in Figs. 10, 11, and 12. Here the annular web *c'* is (shown in section) to be vertically slotted to receive a tail-piece, *e''*, projecting from the inner end of the locking-bolt *e*, and the key-hole is located inside of said web, instead of outside, as before described. On said web, near said vertical slot, there are two projecting studs, *i k*, which afford a key-slot between them. The tail-piece *e''* is below the stud *k*, which has an inclined face at *k'*, so that when the bit of the key is

turned toward said stud it will be placed over the tail-piece, and by a further turning of the key the tail-piece will be depressed and the bit of the key will pass beneath the stud, and thus enable the cover to be lifted by the key, the bit of which will meantime maintain the tail-piece in a depressed position and the outer end of the locking-lug in its elevated position.

While I prefer the lifting-key constructed in parts to be separately operated, and make special claims thereto, it is to be understood that I also claim, broadly, the combination of the cover and its locking-lug, organized substantially as described, whereby a key for controlling said lug may serve solely as an unlocking device, or also serve as a lifter or detachable handle for the cover.

The locking-lug, if made in the form of a weighted bell-crank lever, can be controlled by a key without requiring that the latter be forced downward, as described, for lifting the abutting end of the locking-lug—as, for instance, as illustrated in Figs. 13 to 15, inclusive.

The locking-bolt *e* is here shown in the form of a bell-crank lever, with a pendent arm and ball *l* at its lower end, said ball bearing normally at one side against the outer surface of the depending flange or annular web *c'*. The web *c'* is horizontally slotted, as at *l'*, opposite the ball *l*, and on the inner surface of said web, below the slot, there is a lug, *m*, perforated vertically to receive the tip *n'* of a key, *n*, when the latter is inserted as shown, so that on turning the key its arm or bit *n''* will swing into the slot *l'* and will strike the ball, and by moving the latter outwardly the bolt will be disengaged from the abutting surface or keeper on the curb, and the key while in this position will serve as a lifter for the cover, the arm or bit of the key being strong enough to serve that purpose.

To prevent the pivots from undue corrosion, brass or bronze may be employed, if desired, and the coincident surfaces of movable parts and stationary parts can either or both be made of suitable metal other than iron or steel without materially adding to the cost, and thus render undue adhesion of the lug with the adjacent portions of the cover practically impossible so far as the effects of rust are concerned.

While I deem a locking-bolt which operates by gravity in locking the cover to its seat as preferable to all others, and lay special claims thereto, it is obvious that other well-known forms of self-operating bolts may be employed without departure from the main feature of my invention, particularly in connection with covers to be employed in vaults and coal-holes, where the air is comparatively dry, or in particularly well ventilated sewers, where horizontally-moving spring-bolts and the like may be employed without undue corrosion.

To lessen facilities for forcing the lock, the

necessary perforations in cover should be small, there should be no ring, and the cover should rather closely fit the curb at top.

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

1. The combination, substantially as here-
inbefore described, of the man-hole curb hav-
ing an annular abutting surface to serve as a
keeper, and the man-hole cover provided with
10 a self-locking bolt, and an engaging-lug di-
ametrically opposite said bolt, whereby on
dropping the cover into its seat in the curb,
and without special adjustment therein, it will
be securely locked therein by the engagement
15 of said lug and bolt with oppositely-located
portions of the annular keeper, as set forth.

2. The combination of the man-hole cover,

having an engaging-lug and the horizontal piv-
oted lever weighted at its outer end to operate
as a gravity-bolt, and a man-hole curb having 20
an abutting surface to operate as a keeper for
said bolt and also for the engaging-lug, sub-
stantially as described.

3. The combination, with a man-hole cover
provided with a key-hole, of a self-locking piv- 25
oted bolt accessible for unlocking by means
of a key, substantially as described.

4. The combined man-hole key and lifter
embodying the separately-rotative arms or
bits, substantially as described.

HARVEY C. LOWRIE.

Witnesses:

EDMUND P. MARTIN,
ANDREW RYAN.