1. This invention relates to improvements in manhole covers, an object being to provide a safety manhole cover largely to prevent accidents to children, whose curiosity, whetted perhaps by admonitions to the contrary, leads them to pry up and remove ordinary manhole covers to disclose the mysteries beneath, with the result that they are apt to fall in and be injured or drowned.

The unauthorized openings of such manholes is not confined to children, however. They are at times used for the surreptitious disposal of trash or articles, and sometimes for the concealment and disappearance of evidence of crime.

Accordingly, it is an object of the invention to provide a safety manhole cover which, when once satisfactorily secured in place, cannot be opened by commonplace tools or a plurality of holders or clamps provided on the underside of the cover which engage under the manhole rim and lock it in place.

Other objects are to provide such a safety manhole cover in which the key cannot be removed therefrom without placing the mechanism in locking position, which tends to prevent tampering, to simplify in construction and operation, and relatively inexpensive.

Further objects and advantages will appear from the description and claims to follow, in connection with the accompanying drawing which illustrates, by way of example but not of limitation, an embodiment of the invention, and in which:

Figure 1 is a vertical section through a typical manhole with the cover in place thereon, said section being taken on the line 1—1 of Fig. 2;

Fig. 2 is a view taken on the plane indicated by the line 2—2 in Fig. 1 and looking upwardly to show the bottom of the cover in relation to the manhole;

Fig. 3 is a vertical section on the line 3—3 of Fig. 2, through the cover-holding and locking mechanism, the parts being shown right side up;

Fig. 4 is a plan view of the locking keyhole in the cover taken on the line 4—4 of Fig. 3 and showing the position of the key in the unlock position of the cover-locating means;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 3 and showing the position of the key in the locked position of the cover-locating means;

Fig. 6 is a perspective view of the bracket on the underside of the cover plate for supporting the locking mechanism; and

Fig. 7 is a perspective view of one of the other locking brackets.

Referring to these views, particularly Figs. 1 and 2, the usual manhole for catch basins, drain pits and sewer connections comprises a relatively large circular opening 10 in a concrete slab 11 which is laid and secured on top of the wall 12 lining the hole in the ground 13 and leading to the catch basin 14, as the like below. The wall 12 is larger in diameter than the said opening and the inwardly-projecting portion of the slab around the opening forms the ledge of the manhole. The concrete slab may extend outwardly as far as desired, and its upper surface is usually substantially at the surrounding ground level.

The opening 10 is surrounded by a depression or recess 15 to receive the periphery of a circular cover plate 16, the upper surface of which, when the cover is in position to cover the opening, may be substantially flush with the top of the concrete slab. A metal ring 17 is sometimes embedded in the concrete to form the edge of the opening 10, but this cover is applicable thereto in the same manner as herein shown and described.

The cover 16 may be of the usual cast-metal type having preferably a ruggedly upper surface and such legs as may be desired thereon, and is of considerable weight. An annular raised rib 19 may be formed on the lower side to assist in centering the cover in the manhole opening. The edge of the cover lies freely into the annular depression 15 of the manhole ledge.

In order to prevent removal of the cover from its position when in place on the manhole by prying under its edge or the like, a plurality of holders or clamps 20 is provided on the underside of the cover which engage under the manhole rim and lock it in place.

Two, preferably, of these locking holders 20, 20, as seen in Fig. 2, are located on one side of the center of the cover and another, 21, on the other side of the center. The holders 20 are fixed, but the holder 21, or the manhole ledge gripping part thereof, may be withdrawn from its ledge-engaging position, as later explained, by a suitable key operated from the top side of the cover.

Each of the holders or clamps 20 comprises a metal bracket 22, the foot of which is secured, as by screw bolts 23, to the underside of the cover and an angle member 24 bolted to the bracket 22 by bolts extending through an adjusting slot 25 or slots, 25, thereof, and having a leg 26 extending under and engaging the lower edge of the manhole ledge. The object of the fixed adjustment in this bracket combination is to accommodate the holders to ledges having varying thicknesses.

The holders or clamps 20 are spaced apart circumferentially of the cover to give spaced locking points with the manhole ledge for greater strength and for greater resistance to prying-up efforts at the sides, and to assist in applying the cover to the manhole opening.

The combined angular or Z-bracket 22, 24, 26 is thus comparatively strong and rigid to impart to the cover at the edge, yet with sufficient resiliency to permit the arms or legs 26 with their slightly down-turned ends to give sufficiently to permit the cover to be slid or turned into its position in the manhole, and conversely, when withdrawing the cover, by the reverse movements the arms 26 will give sufficiently to enable the cover to be tipped up and withdrawn.

The clamp or holder 21 opposite the clamps 20, which may be withdrawn from engagement with the manhole ledge for the placement and removal of the cover and shown in an enlarged scale in Figs. 3 to 6, comprises a depending bracket 26, Fig. 6, bolted as shown or otherwise secured to the underside of the cover. A horizontal member 31 is punched and bent from the vertical portion of the bracket 26 and its lower end is bent into another suitably positioned horizontal supporting member 32. A horizontal slot 33 and vertical communicating slot or notch 34 are formed in bracket 26. All the holes are formed in the two members 31 and 32, which in turn vertically align with the circular portion of the keyhole 35 formed in the cover plate 16.

This locking clamp or holder 21 includes a vertically movable stem or shaft 36 passing up through the apertures in the members 32 and 31 of the bracket 26 and into the keyhole 35 in the cover, terminating at its upper end substantially flush with the edge of the cover 16 when in its uppermost position. At its lower end the stem 36 has rigidly secured thereon, as by riveting or otherwise, the horizontal locking, clamping or holding member 37, corresponding to members 26 of the clamps 20 in the same that it is adapted to engage under the manhole ledge to hold the cover in its closed position.

A coiled spring 38 surrounds stem 36 and rests on the lower member 32 of the bracket 30. Its upper end engages the lower side of the projecting ends of a cross pin 39 extending transversely through and affixed in
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Again, should the key be removed while the cover is not on the manhole, the cover cannot be again seated in its place on the manhole, because the key in removing it would be turned outwardly to its locking position and would prevent the seating of the cover. It is necessary in such case to reinsert the key in the cover and turn it to the unlocking position before the cover can be reset on the manhole.

Without further elaboration, the foregoing will so fully explain the gist of the invention that others may, by applying current knowledge, or under varying conditions of service, without eliminating certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be described and secured by the following claims.

I claim:

1. A safety manhole cover for peripherally seating on the thick-walled ledge of a manhole and having locking devices on the underside of the plate for engaging under the ledge to resiliency lock the cover in its seat, one of said devices having a vertically extendable or retractable key turned to an unlocked position, under such an adjacent edge or inwardly into unlocked position within the vertical limits of the ledge, the cover having a keyhole in such position in its inner edge for so turning said member into its locking or unlocking position, the key, hole and member being interrelated to prevent removal of the key from the cover and to prevent the key from being turned to the unlocking position, and a spring-locked means to prevent turning of the key in the final unlocked position of the parts.

2. A safety manhole cover comprising a cover plate adapted to be peripherally seated on the thick-walled ledge of a manhole, locking devices on the underside of said plate having laterally and outwardly extending key elements for engaging under the ledge to resiliently lock the cover in its seat, one of said devices having a vertically extendable or retractable key turned to an unlocked position, under such an edge or inwardly into unlocked position the key being turned to the unlocking position, and a spring-locked means to prevent turning of the key in the final unlocked position of the parts.

3. A safety manhole cover for thick-walled manholes including a locking device mounted on the underside of the cover, said device including a bracket, a vertically extendable or retractable key member attached to said bracket having a keyhole formed in the cover and a laterally extendable clamping member at its lower end and engaging the inside edge of the manhole, the clamping member being secured in place by means of a key, the key operable to depress and rotate said key to engage and unclamp the same.

4. A safety manhole cover for thick-walled manholes including a locking device mounted on the underside of the cover, said device including a vertical stem having its upper end projecting into a keyhole formed in the cover and a laterally extending clamping member at its lower end to engage under the manhole ledge for clamping the cover in place on the manhole, locking means for said stem and member in both clamping and unclamping positions, a spring tensioned to lift said stem and member into clamping position, a projecting stop on said stem, and a key having a hollow shank adapted to be inserted in said hole over said stem and having engaging recesses in its end for said stem stop, the key operable to depress and rotate said key to clamp and unclamp the same.
5. A removable safety cover for a manhole in a thick-walled top slab of a subterranean catch basin or the like comprising a cover plate having peripheral support on the top of the circumferential ledge of the manhole in the top slab, vertical brackets secured to the bottom of said plate and extending substantially below the same, and clamping arms mounted at the lower ends of said brackets being resiliently spaced from said plate, said arms extending horizontally outward to resiliently engage under and hold to the lower side of said manhole ledge to clamp and hold the cover in place on the top of the slab and manhole, one of said brackets having a vertical portion corresponding to the thickness of said ledge and with horizontally projecting bottom and intermediate portions having vertically aligned apertures therein, the cover having a keyhole in line with said apertures, a vertically movable and rotatable stem mounted in said apertures, the clamping arm of said bracket being secured to the lower end of said stem beneath said plate, a coiled spring on said stem urging it upwardly, interengaging parts on the arm and the said bottom portion in the clamping position of the arm and locking same against rotation, and a separable key insertable through said keyhole to grip said stem to depress and unlock the arm and to rotate it.

7. Removable safety cover for a manhole in a thick-walled top slab of a subterranean catch basin or the like comprising a cover plate having peripheral support on the top of the circumferential ledge of the manhole in the top slab, vertical brackets secured to the bottom of said plate and extending substantially below the same, and clamping arms mounted at the lower ends of said brackets being resiliently spaced from said plate, said arms extending horizontally outward to resiliently engage under and hold to the lower side of said manhole ledge to clamp and hold the cover in place on the top of the slab and manhole, one of said brackets having a vertical portion corresponding to the thickness of said ledge and with horizontally projecting bottom and intermediate portions having vertically aligned apertures therein, the cover having a keyhole in line with said apertures, a vertically movable and rotatable stem mounted in said apertures, the clamping arm of said bracket being secured to the lower end of said stem beneath said plate, a coiled spring on said stem urging it upwardly, interengaging parts on the arm and the said bottom portion in the clamping position of the arm and locking same against rotation, and a separable key insertable through said keyhole to grip said stem to depress and unlock the arm and to rotate it.

8. A removable safety cover for a manhole in a thick-walled top slab of a subterranean catch basin or the like comprising a cover plate having peripheral support on the top of the circumferential ledge of the manhole in the top slab, vertical brackets secured to the bottom of said plate and extending substantially below the same, and clamping arms mounted at the lower ends of said brackets being resiliently spaced from said plate, said arms extending horizontally outward to resiliently engage under and hold to the lower side of said manhole ledge to clamp and hold the cover in place on the top of the slab and manhole, one of said brackets having a vertical portion corresponding to the thickness of said ledge and with horizontally projecting bottom and intermediate portions having vertically aligned apertures therein, the cover having a keyhole in line with said apertures, a vertically movable and rotatable stem mounted in said apertures, the clamping arm of said bracket being secured to the lower end of said stem beneath said plate, a coiled spring on said stem urging it upwardly, interengaging parts on the arm and the said bottom portion in the clamping position of the arm and locking same against rotation, and a separable key insertable through said keyhole to grip said stem to depress and unlock the arm and to rotate it.

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