

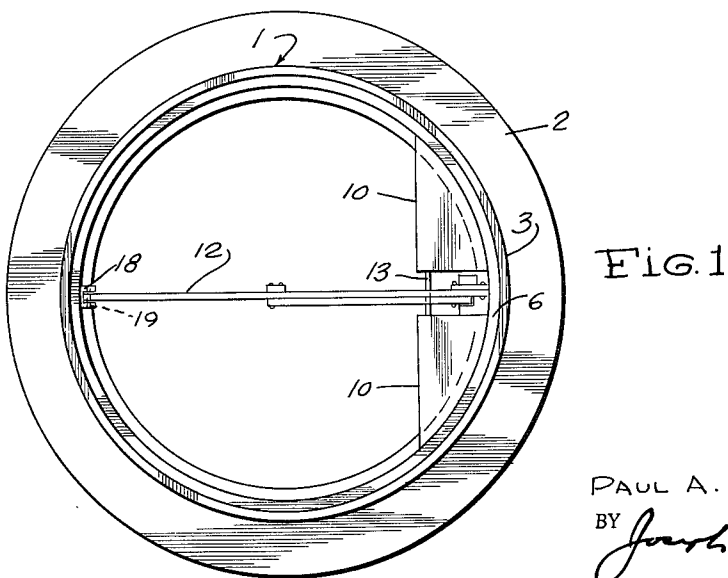
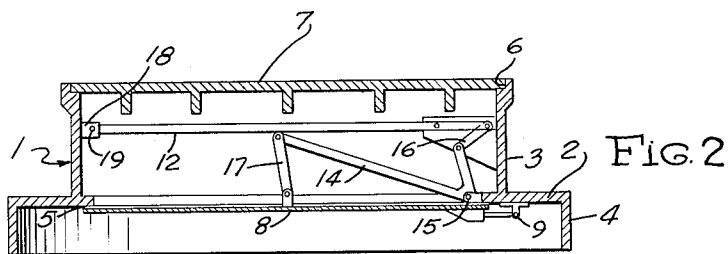
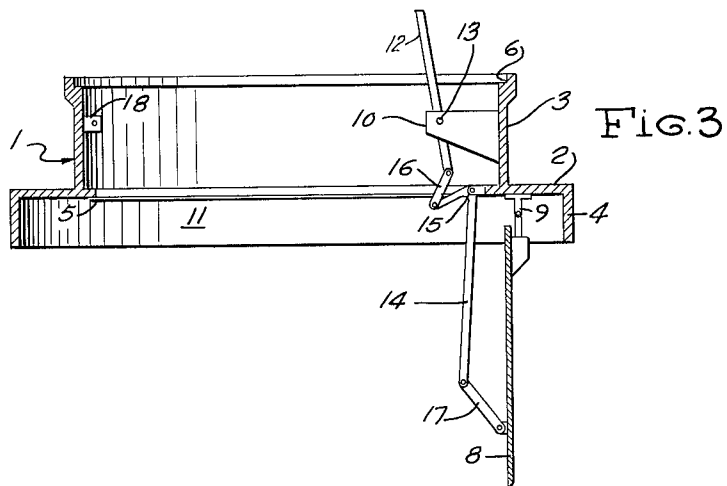
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3,198,094

SAFETY MANHOLE FRAME AND COVER

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SAFETY MANHOLE FRAME AND COVER

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(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to the field of manhole frames and covers, more particularly to a manhole frame and cover intended for use in a drainage system in which the fluid may exert a positive pressure against the manhole cover.

Drainage systems are often constructed to carry fluid under pressure. The manholes through which access to such systems is gained usually include an inner cover and an outer or "ripper" cover. Various means are provided for holding the inner cover in tight sealing engagement with the frame of the manhole. When maintenance work is done on such a pressure type drainage system, the workmen may neglect to replace or to secure one or more inner manhole covers. With the outer manhole covers in place there is no external indication that the drainage system is no longer pressure tight and capable of functioning properly during a storm. The same hazardous condition may be created by children or vandals tampering with the manhole covers. Furthermore, the closing of conventional pressure type manhole covers is generally a time consuming operation because of the weight of the covers and the complexity of the bolts, clamps and other means used to lock and seal the covers. If a storm occurs while a substantial number of conventional pressure manhole covers are open it may be impossible to close all the open manholes before flooding occurs.

Accordingly, an object of this invention is to provide a manhole frame and an inner manhole cover for a pressure drainage system which can be quickly opened and closed by a single workman.

Another object of this invention is to provide a manhole frame and cover of the character described which is sealed by the hydrostatic uplift of fluid in the system.

Another object of this invention is to provide a manhole frame and cover of the character described wherein the outer manhole cover cannot be replaced until the inner manhole cover is closed.

Another object of this invention is to provide a manhole frame and cover of the character described so constructed that a quick visual inspection of the exterior of the manhole will reveal whether the inner manhole cover is closed.

The exact nature of the invention and its other objects and advantages will be developed in the following description and in the drawings in which:

FIG. 1 is a plan view of the safety manhole frame and cover in its preferred form showing the device with its inner cover closed and outer cover removed;

FIG. 2 is a side elevation partly in section of the safety manhole frame and cover showing the device with its inner cover closed and its outer cover in place; and

FIG. 3 is a side elevation partly in section showing the device with its inner cover open and outer cover removed.

Referring to the drawings, the frame 1 of the safety manhole frame and cover includes a circular flange portion 2 formed with an upstanding cylindrical portion 3 intermediate its inner and outer peripheries and a depending cylindrical portion 4 formed at its outer periphery. The manhole frame 1 is installed in a well of the drainage system in a conventional manner. The bottom face

of circular flange 2 is finished adjacent its inner periphery to form a seat 5 for the inner cover. A concentric shelf 6 is formed at the top of upstanding cylindrical portion 3 of the frame. The outer manhole cover 7, a conventional circular manhole cover, is supported by shelf 6 when in place.

The circular inner manhole cover 8 is attached to frame 1 by hinge 9 and pivots on hinge 9 between its closed position adjacent seat 5 shown in FIG. 2 and its open position depending into the well shown in FIG. 3. A pair of supporting shelves 10 are joined to the inner wall of the upstanding cylindrical portion 3 generally above hinge 9, one shelf being on each side of hinge 9.

The operating mechanism by which the inner manhole cover 8 is raised and lowered comprises an operating lever 12 pivotally mounted on pin 13 at a point near its proximal end. The ends of pin 13 are supported by shelves 10. Immediately beneath operating lever 12 bell crank 14 is pivotally attached by pin 15 to projections formed on circular flange 2. Tension link 16 flexibly connects the proximal end of operating lever 12 to the shorter arm of bell crank 14. Tension link 17 flexibly connects the longer arm of the bell crank to the center of inner cover 8.

The dimensions of the safety manhole frame and cover and the materials from which its various components are made will vary according to the size of the access opening required and anticipated uplift pressure. The inner cover may be constructed of suitable aluminum alloys cut from flat sheets and reinforced or may be made of cast metal having sufficient strength to serve its purpose. The inner cover must be light enough so that it may be closed easily by a workman using the operating mechanism or by pressure from below. The manhole frame 1, the outer cover 7, and the supporting shelves 10 may be made of cast iron. The linkage may be made of castings or may be cut from bar stock. The operating mechanism need not consist of the particular linkage shown; any suitable linkage by which the inner cover may be conveniently closed may be used.

A locking means may be provided to lock the distal end of operating lever 12 in place when the inner cover is closed. The locking means shown includes a bifurcated member 18 affixed to the interior wall of upstanding cylindrical portion 3 of the frame and locking pin 19 which may be passed through aligned circular holes in the arms of bifurcated member 18 and the distal end of operating lever 12.

When it is desired to open the manhole cover the outer manhole cover 7 must first be removed. Locking pin 19 is withdrawn from engagement with bifurcated member 18 and operating lever 12. The inner manhole cover will then swing open of its own weight. The operation is reversed in closing the manhole cover, operating lever 12 being pushed down to raise the inner cover. During a storm when the drainage system is running full, the uplift pressure of the water in the system will cause inner cover 8 to be forced into tight sealing engagement with seat 5.

The safety feature of the present invention resides in the fact that the outer manhole cover cannot be put in place unless the operating lever is in the down position shown in FIG. 2. When the operating lever is down the inner manhole cover 8 must be closed or nearly closed regardless of whether the operating lever is locked in place by pin 19. When the drainage system is full the inner manhole cover 8 will seat itself. From the presence or absence of the outer manhole cover and the visibility of level 12, a workman can quickly determine by casual inspection whether the inner manhole cover is open or closed.

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I claim:

1. A manhole frame and cover for installation in a well of a pressure drainage system comprising:

- (a) a manhole frame having an upwardly facing seat for an outer manhole cover and a downwardly facing seat for an inner manhole cover;
- (b) an inner manhole cover hingedly attached to said manhole frame and movable between a closed position adjacent said downwardly facing seat and an open position depending into the well;
- (c) operating means connected to said inner manhole cover adapted to selectively open and close said inner cover, said operating means including an operating lever connected to said manhole frame below said upward facing seat and above said downward facing seat, said lever projecting above said manhole frame when said inner cover is open and lying within said manhole frame when said inner cover is closed; and
- (d) an outer manhole cover receivable on the upwardly facing seat of said manhole frame when said operating lever lies within said manhole frame.

2. A manhole frame and cover as described in claim 1 wherein the operating means comprises:

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- (a) an operating lever pivotally mounted on a pin spaced from the interior wall of said manhole frame;
 - (b) a bell crank pivotally mounted beneath said operating lever on a pin spaced from the interior wall of said manhole frame;
 - (c) a tension link interconnecting a first arm of the bell crank to the operating lever; and
 - (d) a tension link interconnecting the second arm of the bell crank to the top of the inner manhole cover.
3. A manhole frame and cover as described in claim 2 having locking means attached to the interior wall of said manhole frame for securing said operating lever in place when said inner manhole cover is closed.

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