Jan. 9, 1968 F. P. DAVENPORT 3,362,684

MANHOLE COVER LIFTING APPARATUS

Filed May 16, 1966

FIG. 1.

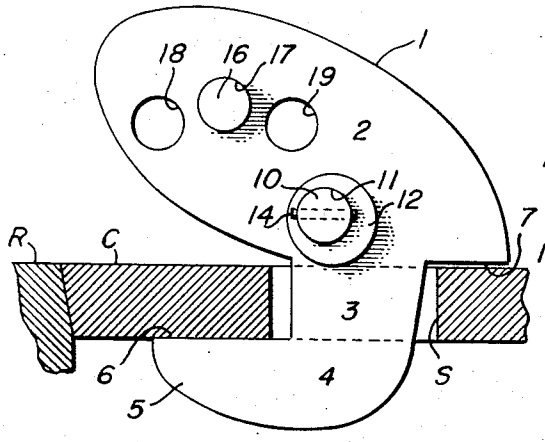


FIG. 2.

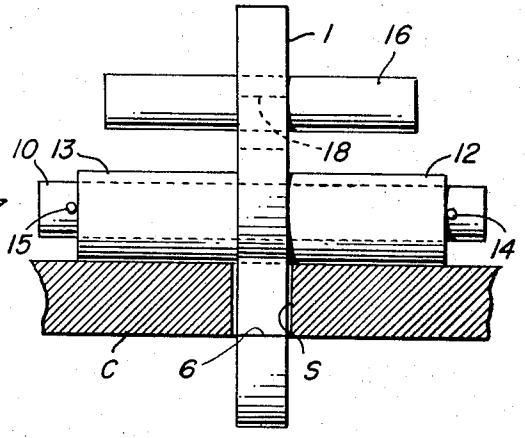


FIG. 4.

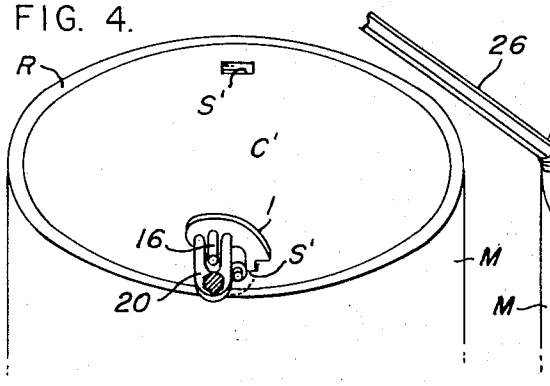
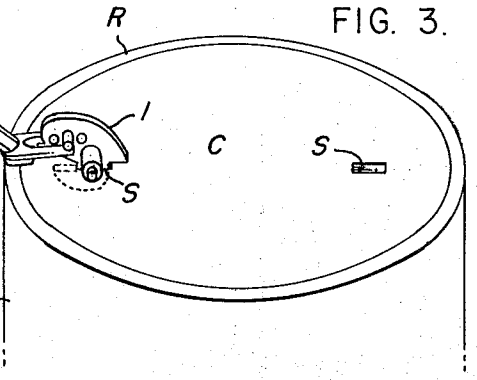


FIG. 3.



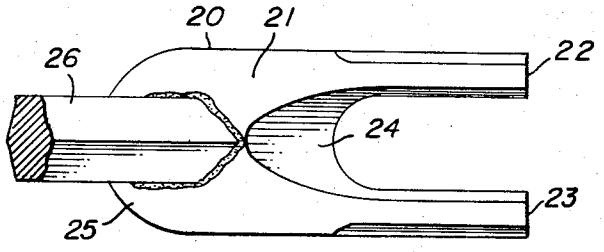


FIG. 5.

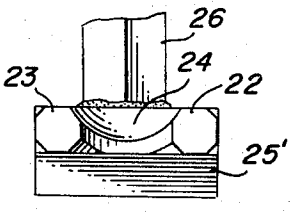


FIG. 7.

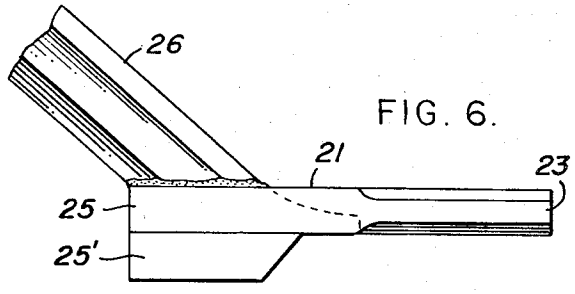


FIG. 6.

INVENTOR.
FRANK P. DAVENPORT
BY
ATTORNEY.

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MANHOLE COVER LIFTING APPARATUS

Frank P. Davenport, 659 Church Lane, Yeadon, Pa. 19050

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ABSTRACT OF THE DISCLOSURE

Means for lifting the covers of manholes and the like comprising a key insertable through an opening in the cover and engageable with the under side thereof and leverage means cooperative with the key whereby the cover may be dislodged from its seat.

This invention has to do with a specialized implement useful primarily in dislodging, removing and replacing the, usually cast iron, covers of manholes of the type employed for affording access to subterranean conduits, pipes, mains and the like and with a combination apparatus including such implement and a forked lever operating bar adapted for engaging the implement after the latter has been releasably secured to a manhole cover whereby the latter may be dislodged from its seat and independently moved about at will.

Manhole covers are often left undisturbed for long periods on the metallic seats or rims of manhole structures and through the corroding action of natural elements or the pressure of traffic passing over them or a combination of both, sometimes become so firmly attached to their seats they can be dislodged only with considerable difficulty. Moreover, even when dislodged the covers are relatively heavy and cumbersome to handle yet as far as I am aware no convenient tool or combination of tools has thus far been provided to facilitate either of these operations, which because of field conditions must necessarily often be manual as distinguished from power tool ones.

It is therefore a principal object of the invention to provide an implement hereinafter generally designated a key designed for association with a manhole cover of any of a number of specific types to facilitate removal of the cover from its seat to afford access to the interior of the manhole, its movement to an out of the way location and finally replacement on its seat after the manhole has been serviced.

A further object is to provide a key of the above character adapted for association and combination with a forked operating bar of novel construction with the aid of which the key, whether disposed parallel or normal to a diameter of the cover, is conveniently manipulated first to dislodge the cover from its seat, then to translate it to an out of the way point while the manhole is being serviced and finally to return it to its seat.

Another object is to facilitate the handling of manhole covers by the provision of specially designed apparatus having novel characteristics which render it eminently suitable for this purpose.

Other objects, purposes and advantages of the invention will hereinafter more fully appear or will be understood from the following description of a preferred embodiment of it illustrated in operative relation to a manhole and its cover in the accompanying drawing in which:

FIG. 1 is a side elevation of said embodiment in which a typical manhole cover is fragmentarily represented in section;

FIG. 2 is an end elevation thereof;

FIG. 3 is a perspective view of the apparatus in operative relation to a manhole cover of a usual type and including a specially designed operating bar fragmentarily represented in association and combination therewith;

FIG. 4 is a similar view of the apparatus but in relation with a cover of another specific type;

FIG. 5 is a fragmentary top plan view of the operating bar to which reference has just been made;

FIG. 6 is a fragmentary side elevation thereof, and

FIG. 7 is a fragmentary front view of the bar.

Referring now more particularly to the construction and operation of the apparatus as shown in the drawing it will be understood that the manholes to which reference has been made are generally permanent subterranean structures having as access ports circular vertically directed openings defined by rigid metallic rims into which the covers are seated to form closures for the manhole. These covers are normally made of cast iron or steel, but sometimes are composite disks including ferrous metal forms with fillings of Portland cement or the like. In most instances, however, whatever be the specific structure of the manhole cover, which of course constitutes no part of the present invention, openings through the cover are provided to enable a tool to be inserted therethrough for lifting the cover from its seat in the manhole rim when access to the manhole is desired.

These openings are often rectilinear slots respectively located near the peripheral edge of the cover, a pair of slots usually being provided, and while sometimes the slots have their longer axis coincident with a diameter of the cover in other instances they are disposed at right angles to such diameter while certain manufacturers prefer to provide intersecting slots of both descriptions producing in effect apertures in the form of small open crosses in the covers. It is here immaterial, however, which of these several different forms of openings be encountered in a specific instance as the apparatus illustrated and now to be more fully described is adapted for utilization interchangeably with any of them.

Said apparatus comprises a key generally designated **1** having a body **2** made from heavy ferrous metal, preferably one-half inch steel plate or the like, in which transverse bores are formed as will hereinafter more fully appear. Considering the key as fronting toward the left when in the position shown in FIG. 1, from body **2** depends a leg **3** having at its lower extremity a foot **4** terminating in a toe **5**, the upper surface **6** of which preferably is flat or substantially so and normal to the front edge of the legs, these parts being of such dimensions they can be entered in the slot S in a manhole cover C with the toe extending toward the manhole rim R and beneath and in contact or approximate contact with the underface of the cover substantially as shown in said figure. Above the upper extremity of the front edge of the leg the periphery of the body extends forwardly, upwardly and thence rearwardly preferably in a smooth curve and is finally carried forwardly to meet the rear face of the leg, thus forming a shoulder **7** substantially parallel to the upper face **6** of the toe and in a plane spaced above the latter a distance sufficient when the leg is in the slot to overlie the cover adjacent the proximate end of the slot, desirably with a slight clearance between the cover and the key.

To maintain the key in a position substantially normal to the cover when the key leg is extended through the slot suitable means are provided preferably comprising a stub shaft **10** extending through a bore **11** in the body and carrying eccentrically bored sleeves or cams **12, 13** adapted to rest on the cover on each side of the key, the cover normally having a corrugated or other ornamentalized pattern (not shown) on its upper face; thus by rotation of the sleeves they can be brought into engagement with the upper surface of the cover whatever be its configuration for the justmentioned purpose. Of course the sleeves are

suitably held on the stub shaft in any convenient way as by pins **14, 15** extending transversely through the shaft beyond the extremities of the sleeves.

The key further embodies means adapted for cooperation with an operating bar of suitable conformation, said means being selectively employable either when the key is disposed with its body coincident with a diameter of the cover or at right angles thereto as when the slots therein are normal to such diameter. More particularly therefore a stub shaft **16** is extended through a bore **17** in the body of the key and firmly fixed therein as by a press fit and/or by welding to the body and, on each side of and a little below this shaft, the body may be provided with bores **18, 19** adapted for reception of the tines of a forked operating bar as hereinafter more fully explained.

When it is desired to raise through the medium of my invention a manhole cover C having a slot S therethrough, the leg of the key is projected through the slot and manipulated so that its toe **5** and shoulder **7** engage or at least are approximately parallel respectively to the lower and upper faces of the cover and to maintain the key upright cams **12, 13** are then manually rotated if necessary into contact with the upper surface of the cover; the key thereafter remains substantially generally normal to the cover surface.

After the key has been thus releasably associated with the cover C lifting means may be applied to the key first to dislodge the cover from its seat in the rim R of the manhole M, then to move it to a position apart where it cannot interfere with manhole servicing operations and finally to return the cover to its original position. For this purpose I prefer to employ a special tool or bar generally designated **20**, having a sole plate **21** from one end of which project spaced parallel tines **22, 23** between which the plate is dished to provide a hollow trough **24** and, from adjacent the heel portion **25** of the plate, desirably carrying a downwardly projecting boss **25'** to serve as a fulcrum, a handle **26** welded to the plate projecting rearwardly and upwardly at an angle of about 40° to the plane thereof. Tines **22, 23** are spaced to embrace key **1** edgewise and to engage beneath stub shaft **16** or, when employed in association with a cover C' having slots S' normal to the cover diameter on which they lie, to enter and extend through bores **18, 19** in the key, the end of shaft **16** adjacent the plate then resting in trough **24**. In either instance boss **25'** of the sole plate can initially fulcrum on rim R of the manhole or any other suitable support whereby manipulation of the bar enables the cover to be dislodged to free it from wedged or "frozen" adherence to its seat, thereafter to be moved to a remote place and finally returned to its original seat over the manhole, the cover, key and bar remaining in interlocked relation through these several operations.

While it is usually most convenient to dispose the key in respect to the manhole cover to be removed in such relation that tool **20** can engage under stub shaft **16**, or have its tines entered in holes **18, 19** with the heel of the tool or its boss seating on the manhole rim R, it will be apparent that in certain instances some other bar supporting means may be preferred while first dislodging the cover from the rim; in others that it may be unnecessary to utilize a leverage action for first dislodging the cover which may therefore be raised more or less directly from the manhole and moved away by a simple lifting effort on the part of the operator.

Moreover while I have herein disclosed a manhole cover lifting key of specific character as illustrated in the drawing and have described it as operatively associated and

combined with a bar also more or less specifically described and illustrated, it will be understood the said key does not always require for its useful employment utilization of said bar, as other means may in many instances be advantageously employed for lifting it and a cover to which it may be attached; further that numerous changes and modifications in the form, construction, arrangement and relationship of the parts and components of my apparatus will readily occur to those skilled in the art and may be utilized if desired without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. An implement for association with a manhole cover having a slot extending therethrough, said implement comprising a body and a leg terminating in a foot having a toe adapted to engage beneath the cover when the leg is projected through the slot, a shoulder on the body oppositely directed from the toe with respect to the leg disposed to overlie the cover when the leg is so projected, means extending transversely of the body for engagement by an operating bar when the implement is so associated with the cover, and means for maintaining the implement substantially upright when so associated comprising a shaft extending oppositely from the body and eccentrically bored sleeves rotatable thereon.

2. An implement as defined in claim **1** in which the means for engagement by the bar define spaced bores extending through the body for reception of tines on the extremity of an operating bar.

3. The combination of an implement for association with a manhole cover having a slot extending therethrough, said implement comprising a body and a leg integral therewith terminating in a foot having a toe adapted to engage beneath the cover when the leg is projected through the slot, a shoulder on the body oppositely directed from the toe with respect to the leg disposed to overlie the cover when the leg is so projected, and means extending transversely of the body receiving an operating bar when the implement is so associated with the cover, said bar including a sole plate having parallel spaced projecting tines engaging said means, a heel portion adapted to seat on the rim of the manhole on which the cover is disposed and a handle projecting angularly rearwardly and upwardly from the heel portion with respect to said tines for manipulation by an operator to tilt the cover relatively to said rim by a pivotal movement of the bar about the region of engagement of said heel portion with said manhole rim.

4. The combination defined in claim **3** in which the operating bar receiving means comprise a stub shaft projecting outwardly from opposite sides of the body.

5. The combination defined in claim **3** in which the operating bar receiving means define the interior surface of a bore extending through the body.

6. The combination defined in claim **3** in which the operating bar receiving means define spaced bores extending through the body for reception of said tines.

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OTHELL M. SIMPSON, *Primary Examiner.*