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LOCKING CLOSURE.

APPLICATION FILED JAN. 18, 1916.

1,239,704. Patented Sept. 11, 1917.

Fig. 2.

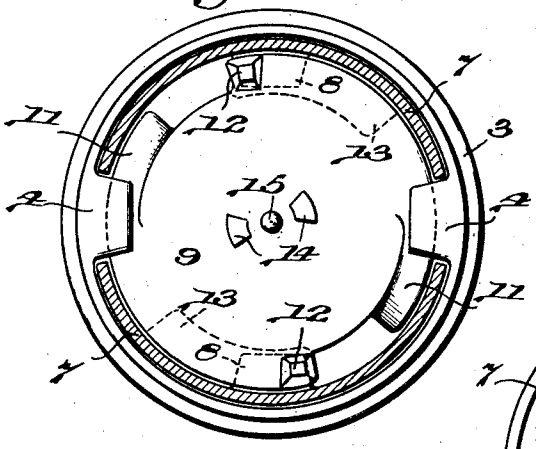


Fig. 7.



Fig. 3.

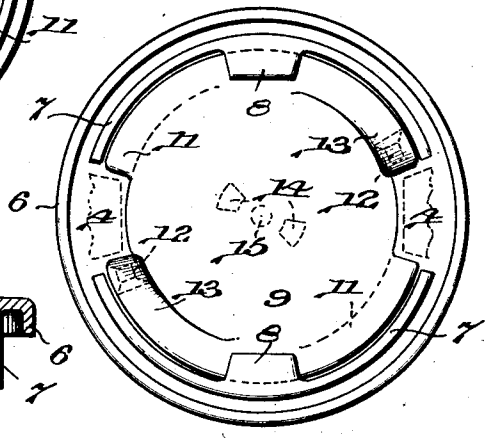
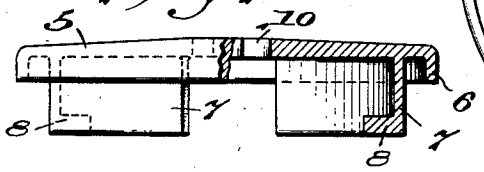


Fig. 4.



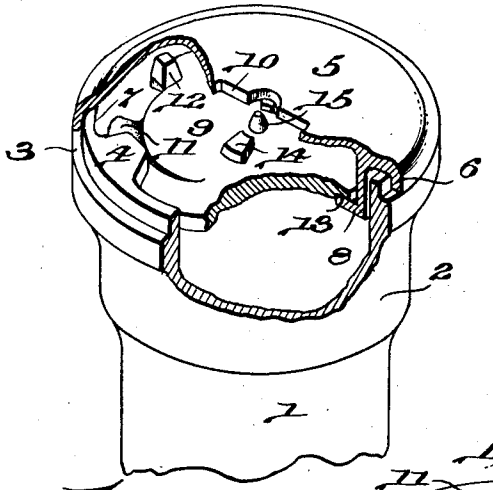


Fig. 1.

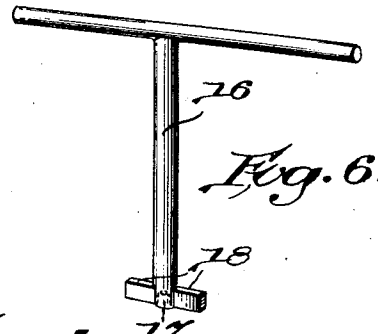
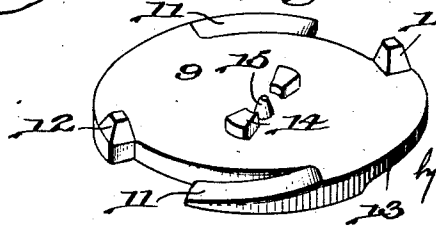


Fig. 6.

Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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LOCKING-CLOSURE.

1,239,704. Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed January 18, 1916. Serial No. 72,722.

To all whom it may concern:

Be it known that we, HARRY W. LEE, THOMAS J. LEE, and CHARLES M. SIMS, all citizens of the United States, residing at Anniston, in the county of Calhoun and State of Alabama, have invented certain new and useful Improvements in Locking-Closures, of which the following is a specification.

Our invention relates to improvements in closures for pipes, curb boxes, valve boxes, soil pipes and the like, and has for its object the production of a device whereby the opening of the pipe or similar element may be closed by means of a closure which may be locked and held in locked position, until it is desired to remove it.

A further object is the production of a device which shall have a minimum of parts, be simple, and rugged in construction and cheap to manufacture. A further object is the production of a closure which can only be locked and unlocked by means of a specially constructed key which is inserted through an opening in the cover so that only authorized persons can have access to the opening which is to be covered.

A further object of our invention is the production of a device which has a removable revoluble locking cam disk carried by lugs on a skirt depending from the cover into the opening to be covered, and adapted to engage the under surfaces of projections on the element, so that when the locking cam disk is revolved, in a certain direction, it coöperates with the projections on the pipe or other element having the opening and the lugs on the skirt of the cover to lock the cover to the pipe.

A further object is the production of a device having a cover which can not be rotated on the pipe, either when the closure is locked or when it is unlocked.

A further object is the production of a device in which the locking cam disk can not fall into the pipe whether the cover is in unlocked or locked position, with a further provision that the locking cam disk can not be rotated in the unlocking direction beyond the point at which the cover can be removed from the pipe.

These and other objects as may hereinafter appear are attained by the device illustrated in the accompanying drawing which shows one embodiment of our invention and in which:

Figure 1 shows a perspective broken away view of the element having the opening, in this case, a soil pipe, with the cover and the removable rotatable locking cam disk in their relative positions when the cover is locked to the pipe; Fig. 2 is a plan view of the top of the pipe with the locking cam disk in the locking position, and for the sake of clearness, all of the cover removed except the lower part of the depending skirt which is shown in cross section; Fig. 3 is a plan view of the cover with the locking cam disk inside the depending skirt and held in position by the lugs on the depending skirt. The cover and locking cam disk are in the proper relative positions to be placed over the end of the pipe, the radial projections of which are shown in dotted lines; Fig. 4 is a broken away side view of the cover; Fig. 5 is a perspective view of the removable rotatable locking cam disk; Fig. 6 is a perspective view of the key which may be inserted through the key hole of the cover for rotating the locking cam disk to lock or unlock the closure; Fig. 7 is a cross sectional view of a key hole cover which may be used to keep all foreign matter out of the interior of the pipe and closure.

Referring now to Fig. 1 of the drawings, 1 designates the element having an opening to be covered, in this case, a soil pipe having a bell 2 which has a ledge 3 on which the bearing rim of the cover rests. At 4 is shown one of the radial projections on the pipe which extends into the opening for a purpose hereinafter to be described. The cover 5 has a bearing rim 6 which rests on the ledge 3. Concentric with this bearing rim 6 but of smaller diameter is a depending portion or skirt 7. The numeral 8 designates one of the radial lugs on the depending skirt 7 which extends into the opening and is concentric with the radial projection 4 on the pipe. Carried by the lugs 8 and disposed between the projections 4 and the lugs 8 is the removable rotatable locking cam disk 9 which will be more specifically described hereinafter.

Referring now to Fig. 2, the lower part of the depending skirt 7 of the cover 5 is shown in cross section with the rest of the cover removed for the sake of clearly showing the position which the locking cam disk 9 assumes with relation to the lugs 8 on the depending skirt 7 and the radial projections 4 on the pipe 1 when the cover is locked to the pipe. As shown in this figure, there are two diametrically opposite projections 4 on the pipe which extend radially inward into the opening. The two diametrically opposite lugs 8 on the depending skirt 7 are shown in dotted lines because covered by parts of the locking cam disk 9. These lugs 8 are disposed at an angle of 90° from the projections 4 on the pipe and concentric with these projections 4 but on a lower plane. The locking cam disk 9 which rests on the lugs 8 is disposed between the lugs 8 and the projections 4 and by coöperating with the under surfaces of the projections 4 and the upper surface of the lugs 8, locks the cover to the pipe. As shown in this figure, the depending skirt 7 has diametrically opposite cut-away portions which register with and interlock with the projections 4 to prevent the cover 5 from being rotated, or otherwise moved when placed on the pipe.

In Fig. 3, a plan view of the under side of the cover 5 is shown with the locking cam disk 9 in the unlocked position, and the cover 5 with the locking cam disk 9 ready to be placed over the pipe. The depending skirt 7 with the lugs 8 are shown in this figure. The under surface of the locking cam disk 9 is also shown. The projections 4 on the pipe 1 are shown in dotted lines in order to show the manner in which the cut-away portions of the depending skirt 7 register with and interlock with these projections 4 when the cover 5 is placed in position ready to be locked on the pipe 1.

In Fig. 4, the cover 5 is shown in side view with a portion of the bearing rim 6, the top of the cover, the depending skirt 7, and the lug 8 in section in order to show more clearly the design of this cover with its parts, and to show clearly the diametrically opposite cut-away portions of the depending skirt 7 which have been referred to above. The key hole in the cover 5 is designated by the numeral 10.

In Fig. 5, the removable locking cam disk 9 is shown in perspective. This cam disk has diametrically opposite cut-away portions on its periphery which are slightly larger than the projections 4 on the pipe 1 and the lugs 8 on the depending skirt 7 of the cover 5. At one edge of each of the cut-away portions is shown a cam surface 11 on the periphery of the disk which inclines from the bottom to the top surface of the disk. At the opposite edge of each cut-away portion is a stop lug 12 on the periphery of the disk, projecting upward from the upper surface of the disk. On the lower surface of the disk are two diametrically opposite cam surfaces 13 on the periphery of the disk terminating at the opposite edge of the cut-away portions from the cam surfaces 11. Both these cam surfaces 13 are more clearly shown in Fig. 3 which shows the under surface of the locking cam disk 9. The lugs 14 with the centering teat 15 provide the means by which the plate may be rotated when in position.

Fig. 6 shows the locking key 16 having an opening 17 in the end which is adapted to register with the centering teat 15 on the locking cam disk 9, and oppositely disposed arms 18 which engage the lugs 14 to rotate the locking cam disk.

Fig. 7 shows in section a keyhole cover having a suitable cap 19 with depending spring members 20 to keep the cap in position. Any suitable key hole cover may be used, the one shown is merely for the purpose of illustration.

The operation of the device shown is as follows:

The locking cam disk 9 with the surface having the lugs 12 uppermost is placed inside the depending skirt 7 of the cover 5 by first turning the disk until the cut-away portions on the periphery of the disk register with the lugs 8 on the skirt. The disk is then turned until it rests on the lugs 8 and the cut-away portions of the disk register with the cut-away portions of the depending skirt 7, as shown in Fig. 3. The cover 5 with the locking cam disk 9 may then be placed over the opening of the pipe 1, the cut-away portions of the depending skirt 7 and the locking cam disk 9 registering with the radial projections 4, as shown in Fig. 3. The locking cam disk 9 is then carried by the lugs 8 and is disposed below the under surfaces of the projections 4. The key 16 is then inserted in the key hole 10 of the cover 5, the opening 17 then registering with the centering teat 15 and the oppositely disposed arms 18 engaging the lugs 14 on the locking cam disk 9. By means of the key, the locking cam disk 9 is then turned in a clockwise direction, when the cam surfaces 11 engage the under surfaces of the projections 4 and the cam surfaces 13 engage the upper surfaces of the lugs 8, causing a wedge action which retains the cover 5 in position and prevents its removal by reason of the coöperation of the radial projections 4, the locking cam disk 9 and the lugs 8. The relative position of the parts when the locking cam disk 9 is in the

locked position is shown in Figs. 1 and 2. The closure can then only be removed by means of a key 16 in the hands of an authorized person. Neither can the cover be rotated because of the interlocking of the cut-away portions of the depending skirt 7 with the radial projections 4 on the pipe 1. When it is desired to remove the cover, the locking cam plate 9 is rotated in a counter-clockwise direction by means of the key 16 until the stop lugs 12 engage the radial projections 4 and arrest any further rotation in this direction. The cut-away portions of the locking cam disk 9 are then registering with the radial projections 4, and the cover 5 with the locking cam disk 9 may then be removed. It is to be noticed that the locking cam disk 9 can not fall into the pipe because at all times during use it is carried by the lugs 8 on the depending skirt 7 of the cover 5.

Having now described specifically one embodiment of our invention, what we claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a closure, an element having an opening, a plurality of angularly disposed projections on the element, a cover having a depending skirt interlocking with the projections on the element, a plurality of lugs on the skirt, and a locking disk carried by said lugs adapted to engage the projections on the element to lock the cover to the element.

2. In a closure, an element having an opening, a projection on the element extending into the opening, a cover having a depending portion interlocking with the projection on the element, a lug on the depending portion of the cover, and a rotatable locking disk having cam surfaces coöperating with the projection on the element and the lug on the depending portion of the cover.

3. In a closure, an element having an opening, a plurality of projections on the element extending into the opening, a cover having a plurality of lugs extending into the opening angularly disposed to the projections on the element, and a locking means engaging the projections on the element and the lugs on the cover to lock the cover to the element.

4. In a closure, an element having an opening, a plurality of projections on the element extending into the opening, a cover having a plurality of lugs extending into the opening angularly disposed to the projections on the element in a plane below said projections, and a rotatable locking means engaging said projections and said lugs to lock the cover to the element.

5. In a closure, an element having an opening, a projection on the element, a cover with a depending skirt having a cut-away portion interlocking with the projection on the element, a removable locking cam adapted to be carried by the cover and adapted to engage the projection on the element, and lugs on the cover for carrying the removable locking cam.

6. In a closure, an element having an opening, a projection on the element extending into the opening, a cover having a depending portion, a lug on the depending portion extending into the opening, and a locking means adapted to be inserted in the depending portion and carried by the lug, said locking means engaging the lower surface of the projection on the element.

7. In a closure, an element having an opening, a projection on the element, a cover having a depending portion interlocking with the projection on the element, a lug on the depending portion, and locking means carried by the lug on the depending portion for engaging the lower surface of the projection on the element to lock the cover to the element, the said locking means having a cut-away portion adapted to register with the projection on the element to permit removal of the cover and locking means from the element.

8. In a closure for a soil pipe, a cover with a depending skirt having a plurality of cut-away portions and having a plurality of lugs projecting inwardly, a removable rotatable locking cam disk adapted to be carried by said cover and having cut-away portions adapted to register with said lugs, and projections on said soil pipe extending inwardly and registering with the cut-away portions of the depending skirt and the removable rotatable locking cam disk.

9. In a closure for a soil pipe, a cover with a depending skirt having a plurality of cut-away portions and having a plurality of lugs projecting inwardly, a removable rotatable locking cam disk adapted to be carried by said cover and having cut-away portions adapted to register with said lugs, projections on said soil pipe extending inwardly and registering with the cut-away portions of the depending skirt and the removable rotatable locking cam disk, and a stop lug on the removable rotatable locking cam disk engaging a projection on said soil pipe.

10. In a closure, an element having an opening, a projection on the element, a cover, a lug on the cover disposed in a plane below the projection on the element, a removable locking cam disk having a cut-away portion larger than the projection on the element and the lug on the cover, said locking disk having one surface engaging the lower sur-

face of the projection on the element and another surface engaging the upper surface of the lug carried by the cover.

11. In a closure, an element having an opening, a radial projection on the element extending into the opening, a cover having a depending portion interlocking with the radial projection on the element, a lug on the depending portion of the cover extending into the opening, and a rotatable locking disk adapted to be inserted in the depending portion of the cover, said locking disk having cam surfaces coöperating with the projection on the element and the lug on the depending portion of the cover.

12. In a closure, a soil pipe having diametrically opposite radial projections extending into the opening of the pipe, a cover having a bearing rim resting on the end of the soil pipe, a depending skirt on the cover having cut-away portions registering with the radial projections, diametrically opposite lugs on the skirt in a plane below the radial projections, a removable revoluble locking cam disk having cut-away portions larger than the radial projections and the lugs, said cam disk adapted to be disposed within the depending skirt and adapted to be carried by the lugs, and means on the cam disk for rotating the cam disk to cause surfaces on the cam disk to engage the under surfaces of the projections.

13. In a closure, an element having an opening, a projection on the element, a cover having a lug, a revoluble locking cam disk resting on the lug and adapted to engage the projection on the element to lock the cover to the element, and a stop on the revoluble locking cam disk engaging the projection on the element for arresting the rotation of the disk at the proper position for removing the cover from the element.

14. In a closure, an element having an opening, a plurality of projections on the element, a cover having a plurality of lugs angularly disposed to the projections on the element, a rotatable locking means carried by the said lugs adapted when rotated to engage the said projections and lock the cover to the element, the said rotatable locking means having cut-away portions larger than the said projections, and means for arresting the rotation of the said locking means at the position where the said cut-away portions register with the said projections to permit removal of the cover from the element.

15. In a closure, an element having an opening, a plurality of projections on the element, a cover having a depending skirt interlocking with the projections on the element, a plurality of lugs on the depending skirt angularly disposed to the projections on the element, a rotatable locking disk carried by the said lugs and adapted when rotated to engage the said projections and lock the cover to the element, the said disk having cut-away portions larger than the said projections and the said lugs, and means for arresting the said disk at the position where the cut-away portions register with the said projections to permit removal of the cover from the element.

16. In a closure, a soil pipe, radial projections on the soil pipe extending into the opening, a cover having a depending skirt interlocking with the radial projections on the soil pipe, radial lugs on the depending skirt disposed in a plane below the radial projections on the soil pipe, a removable revoluble locking cam disk carried by the radial lugs on the depending skirt and having cut-away portions larger than the radial projections on the soil pipe and the radial lugs on the depending skirt, and stop lugs on the revoluble locking cam disk for engaging the radial projections on the soil pipe to cause the cut-away portions of the cam disk to register with the radial projections on the soil pipe to permit the removal of the cover.

17. In a closure, an element having an opening, a projection on the element, a cover having a depending skirt, lugs on the depending skirt angularly displaced from the projections on the element and in a plane below the projections on the element, a removable rotatable locking cam disk carried by the lugs on the depending skirt, and a key adapted to be inserted through an opening in the cover for rotating the locking disk to cause said disk to engage the lower surfaces of the projections on the element and lock the cover to the element.

18. As an element of a closure, a removable revoluble locking cam disk having a cut-away portion on the periphery, a cam surface on the periphery terminating at one edge of the cut-away portion, a stop lug on one surface of the disk, and means for rotating the disk.

19. As an element of a closure, a removable revoluble locking cam disk having diametrically opposite cut-away portions on the periphery, a cam surface on the periphery at one edge of each cut-away portion, a stop lug on the periphery at the opposite edge of each cut-away portion, and means for rotating the locking cam disk.

20. As an element of a closure, a removable revoluble locking cam disk having a cut-away portion on the periphery, a cam surface on the periphery on the upper surface of the disk terminating at one edge of the cut-away portion, a cam surface on the periphery on the lower surface of the

disk terminating at the other edge of the cut-away portion, a stop lug on the disk, and means for rotating the disk.

21. As an element of a closure, a removable revoluble locking cam disk having diametrically opposite cut-away portions on the periphery, a cam surface on the periphery on the upper surface of the disk terminating at one edge of each cut-away portion, a stop lug on the upper surface of the disk and a cam surface on the periphery on the lower surface of the disk at the opposite edge of each cut-away portion, and means for rotating the disk.

In testimony whereof we affix our signatures in the presence of two witnesses.

HARRY W. LEE.
THOMAS J. LEE.
CHARLES M. SIMS.

Witnesses:
C. M. HIGH,
E. L. RIVERS.