Feb. 28, 1933. D. NETTENSTROM 1,899,520

GROUND ANCHOR

Filed Aug. 19, 1929

Fig. 1.

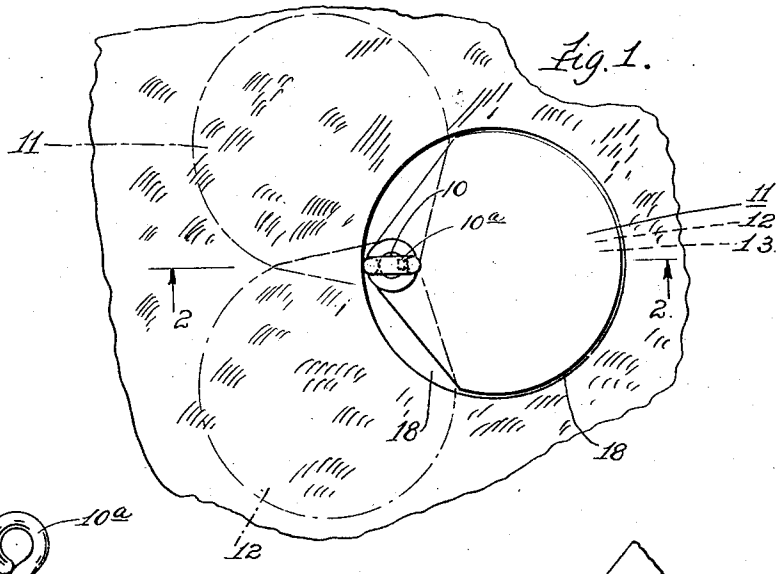


Fig. 2.

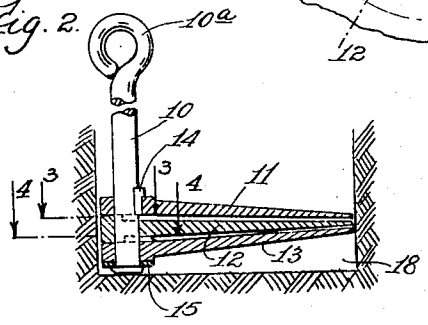


Fig 3.

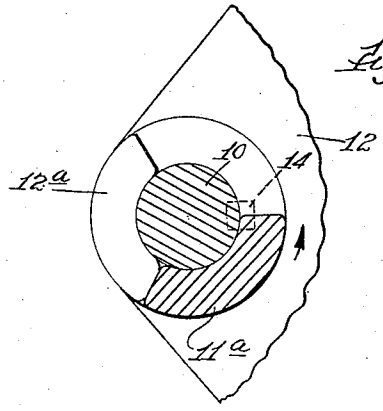


Fig. 5.

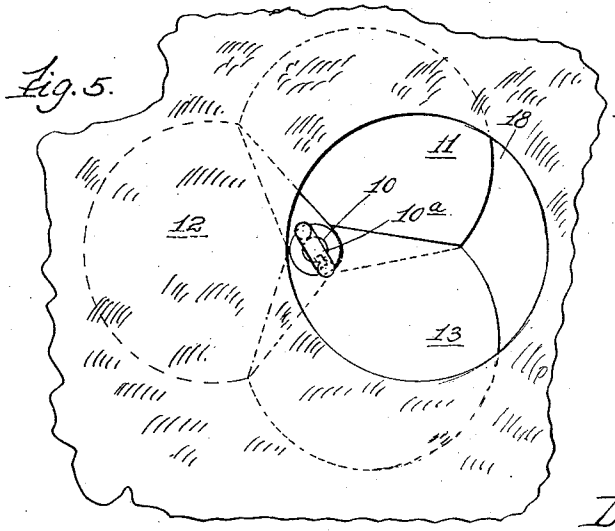
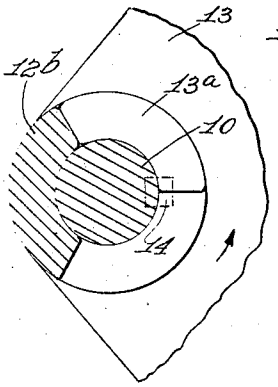


Fig. 4.



Witness
H. McKnight.

Inventor.
David Nettenstrom.
by Dunn & Dunn
his Attorneys.

Patented Feb. 28, 1933 1,899,520

UNITED STATES PATENT OFFICE

DAVID NETTENSTROM, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO HARRY C. WANNER, OF CHICAGO, ILLINOIS

GROUND ANCHOR

Application filed August 19, 1929. Serial No. 386,850.

This invention relates to ground anchors for connection to tension members such as guy ropes or cables, and the like, and has for an object to produce an anchoring device of improved and simplified construction which is capable of being economically manufactured. A further object resides in the provision of novel retaining means of relatively few working parts adapted to be inserted in a hole in the ground and arranged to be actuated upon rotation of the anchor rod for producing a ground engaging retaining flange having an area several times greater than the cross sectional area of the hole. It consists in certain features and elements of construction herein shown and described, as indicated by the claims.

In the drawing:

Figure 1 is top plan view of an anchoring device embodying the present invention, shown with the retaining flanges collapsed and inserted in a hole in the ground, and indicating diagrammatically the position that two of the retaining flanges may be caused to assume when the device has been actuated.

Figure 2 is a vertical cross section of the device in collapsed position taken substantially as indicated at line 2—2 on Figure 1.

Figures 3 and 4 are fragmentary transverse sectional views of the inter-engaging driving connections of the respective retaining flanges taken substantially as indicated at lines 3—3 and 4—4 respectively.

Figure 5 is a top plan view of the anchoring device showing a preferred arrangement of the retaining flanges in operative position.

The anchoring device embodying the present invention includes an anchoring rod, 10, provided adjacent its lower end with collapsible retaining means comprising three axially spaced laterally projecting flanges, 11, 12 and 13 sometimes hereinafter called blades. The upper flange, 11, which may be termed the "driver", is rigidly secured to the anchor rod by means of a key, 14, while the two lower flanges are free to rotate on said rod and are retained in positioned thereon by a washer, 15, held in place by the riveted or peened-over lower end of the anchor rod. These retaining flanges are each dimensioned to substantially occupy the cross sectional area of the hole, and are designed for engagement with the anchor rod at an eccentric point adjacent their outer periphery so that when the two lower retaining flanges are rotated about the rod for registration in vertical alignment with the upper flange, 11, in collapsed position, the device may be inserted in the hole, as indicated at 18, with the rod eccentrically disposed therein and adjacent the side wall of the hole. The anchoring rod is dimension so that its upper end extends a substantial distance above the surface of the ground and is formed with an eye, 10^a, for connection with a tension member such as a guy rope or a cable.

The retaining flanges are provided with lost motion inter-engaging driving connections by means of which motion is imparted from one to the next adjacent flange of the series, commencing with the driver, 11. These driving connections include a downwardly projecting boss or stop, 11^a, on the under side of the upper flange, 11, positioned to co-operate with an upwardly projecting boss, 12^a, on the upper side of the intermediate flange, 12, and said intermediate flange is also provided with a downwardly projecting boss, 12^b, directly opposite the boss, 12^a, and adapted to register for co-operative engagement with an upwardly projecting boss, 13^a, of the bottom retaining flange, 13. These stop bosses are of sectoral arcuate formation and since there are but three flanges in the series, the bosses are of 120° angular extent, and it will be understood that for a different number of retaining flanges, the angular extent of these bosses will be varied proportionally to the number of flanges in the series; however, it has been found that three flanges serve the purpose satisfactorily. It will be apparent that when the driver of upper flange, 11, is rotated in one direction, herein shown as counter-clockwise as indicated by the arrow in Figure 3, said flange and its driving boss is permitted to be rotated one-third of a complete revolution before boss, 11^a, encounters boss, 12^a, for imparting motion to

the intermediate flange, 12, in which position the upper flange is angularly spaced by one-third rotation, or 180°, with respect to the other flanges, 12 and 13. And, likewise, when the driver or upper flange is rotated another third revolution, the intermediate flange by means of bosses, 11^a, 12^a, is rotated therewith, the lower flange remaining in its original or initial position because of the lost motion driving connection between bosses, 12^a, and 13^a; in this position the bosses, 12^b, and 13^a, are abutting, so that upon continued rotation, motion would be imparted to the lower flange, 13. However, after two thirds rotation of the driver or upper flange, the three flanges are equally angularly spaced, forming together a retaining flange having an area several times the cross sectional area of the hole.

Any suitable cross rod, wrench or tool may be applied to the upper end of the anchor rod for imparting rotary motion to the driver or upper flange, 11, by means of which the flanges, commencing with said driver or upper retaining flange, are swung laterally and caused to operate as blades and cut their way into the solid ground adjacent the hole, 18, in angularly spaced relation.

Thus in the arrangement illustrated in Figure 1, two of the flanges are almost totally disposed beneath solid ground, giving a relatively firm anchorage. And of course, the loose earth is again replaced and tamped in the hole on top of the flange in registration with the hole to provide anchorage therefor. But preferably the device is rotated slightly less or slightly more than one complete revolution, (to be more definite, approximately one-sixth of a revolution) so that the retaining flanges will be caused to assume a position substantially as illustrated in Figure 5, wherein each of the retaining flanges is at least partially embedded under solid earth for firmly anchoring the device therein.

My improved anchoring device is relatively simple, having but few parts, and is capable of quick and easy installation or removal. As may be noted in the drawings, the particular arrangement and design of the retaining flanges is such that both the upper and lower flanges, 11 and 13, are identical, and are employed in reverse arrangement, thus reducing pattern costs and especially the costs of maintaining separate records, storage, etc.

Although I have shown and described one embodiment of my invention, it will be understood that the construction and arrangement of parts may vary without departing from the spirit and scope of my invention. I do not therefore wish to be construed as limiting myself to the specific construction illustrated herein, excepting as specifically limited in the appended claims.

I claim:

1. A ground anchoring device comprising an anchor rod having a transversely extended portion at the upper end and retaining means at the lower end consisting of a plurality of super-imposed flange members similar in outline and eccentrically mounted on the rod, the rod being fixed to one of said members and the other members mounted to rotate on the rod, said flange members having sectorally extending bosses projecting from their adjacent faces, the angular extent of said sectoral bosses aggregating 360 degrees, and in the collapsed position of the flange members occupying circumferentially successive positions about the axis of the rod, and extending axially past each other for mutual engagement to transmit rotative movement successively from the member which is fixed to the rod.

2. A ground anchoring device in accordance with claim 1, in which each of the said bosses extends angularly about the axis of the rod by the amount by which each of the flange members is displaced angularly with respect to the adjacent flange member in the fully expanded position of the anchor.

3. In a ground anchor as defined in claim 1, said flange members being three in number and each of the segmental bosses extending angularly with respect to the axis of the rod by substantially 120°.

4. A ground anchoring device comprising an anchor rod having a transversely extending portion at the upper end and retaining means at the lower end consisting of a plurality of superimposed flange members similar in outline and eccentrically mounted on the rod, said flange members having sectorally extending bosses thereon extending axially past each other, said bosses having mutually engaging faces to transmit rotative movement successively from one member to another, said faces being positioned so that in the collapsed position of the members they are angularly spaced around the axis of the rod at angular intervals equal to the angular displacement of adjacent flange members in the fully expanded position.

DAVID NETTENSTROM.