Dec. 8, 1936. W. L. ROBINS 2,063,052

SELF SECURING AND PROPELLING ANCHOR

Filed Nov. 1, 1933

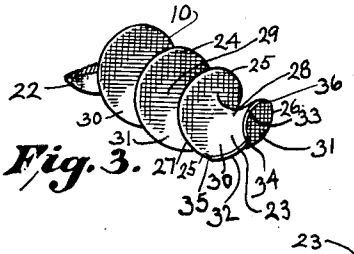


Fig. 3.

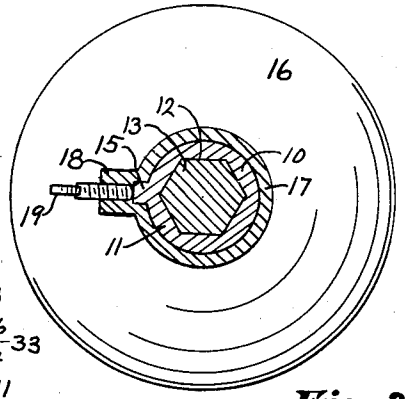


Fig. 2.

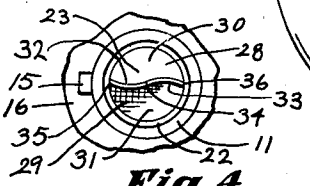


Fig. 4.

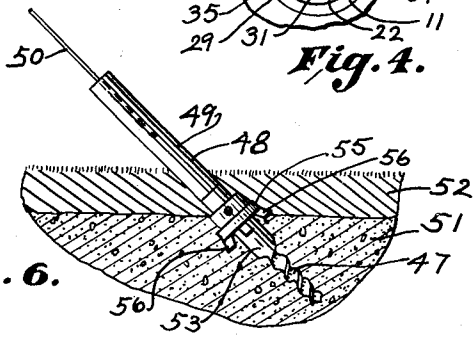


Fig. 6.

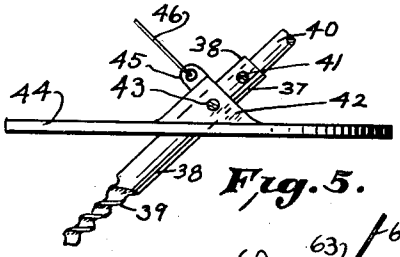


Fig. 5.

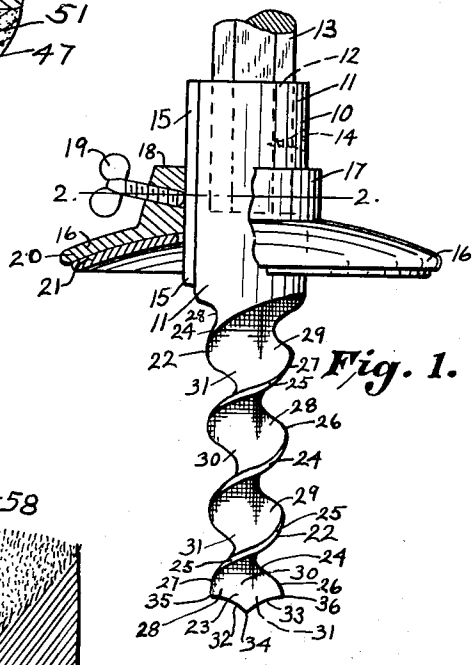


Fig. 1.

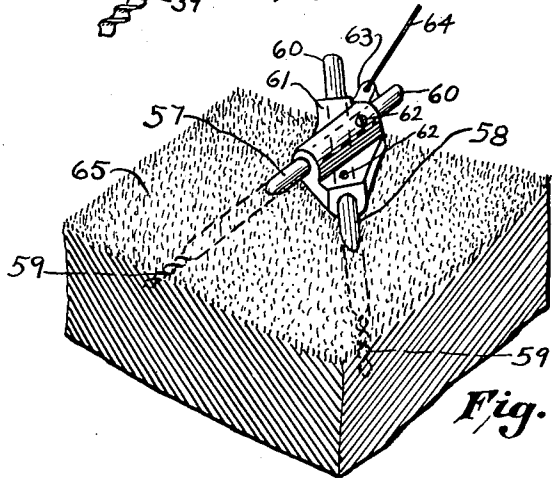


Fig. 7.

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SELF-SECURING AND PROPELLING ANCHOR

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Application November 1, 1933, Serial No. 696,252

8 Claims. (Cl. 189—91)

This invention relates to self-securing and propelling anchors, particularly to that class thereof which is adapted to be screwed into ground or other foundation, to serve as a rigid support for poles of flags, tents, umbrellas, etc., and for posts, for fences, for tent pegs, and other uses including guy wire anchors.

Various anchor devices, adapted to be planted in the ground, have been devised for supporting poles of flags, umbrellas, etc. Some of these devices have been designed to screw into the ground, but seemingly were designed with little regard to providing a rigid resistance to the swaying leverage action of the attached pole, and with no consideration for the different holding powers required, when put into various kinds of earth, including sand, and comparatively loose earth.

One of the objects of my invention is to provide a threaded anchor, so constructed, as to be readily screwed into the earth and at the same time to act to pack or consolidate the earth immediately adjacent to the anchor per se, extending over its threaded length, down to its end, and thereby afford the maximum holding power for a given size of anchor.

The pitch of the thread of the anchor is important. Where the inclination of the spiral grooved surface, between the edge of the thread and the root of such spiral grooved surface advances upward, there is an angle for such an incline as will give the best elevating effect to the material occupying the spiral groove.

If we take, as I have found for practical purposes, an approximate inclination of 45 degrees, for the spiral groove, then the depth of the groove will be about one quarter of the distance between adjoining convolutions of the single thread, making the cross section of the material in the groove, long and thin. I therefore, desire to provide an intermediate thread, which will then afford a more balanced cross section of material in the groove, between adjoining convolutions of the threads, giving the same depth, but having half as much length as with the use of the single thread.

Another object in providing such a double thread for the anchor, is the balance it affords for keeping the anchor screw automatically propelled in the line in which it is initially directed, when turned into the earth or other foundation.

A further object of my invention is to provide a cylindrical portion to the anchor, immediately above, and larger in diameter than the threaded portion, to effect an overhang resistance to material in the spiral grooves, as it reaches the top or outlets of the spiral grooves between the threads, and thus cause a packing or consolidating effect to the earth or other material being elevated by the turning of the anchor and its spiral grooves.

Another object is to provide at the lower end of each spiral groove, a cutting edge, which is approximately perpendicular to the thread edge, and serves as the termination of such spiral groove surface, to act like the edge of a scoop, without change in the spiral formation of the groove surfaces, adjoining the edge, while at the same time, maintaining the full width of the spiral groove surface all the way down to this cutting edge, also I desire to have these cutting edges meet at an obtuse angle to form a blunt point, so as to get the ends of the thread edges as low as possible.

Another object in having this particular form of screw end, is to bring the elevating action of the spiral grooves as low as possible, so that when the larger and over hanging cylindrical portion of the anchor enters and descends into the earth, the packing resistance thus set up, in the earth, within the spiral grooves, extends all the way down to the end of the anchor, effecting the automatic planting of the anchor in packed earth, surrounding it, affording a stronger hold, especially in loose earth, than can be secured with screw anchors which are void of these special features of construction, which features fulfill the other objects of my invention.

Another object of my invention is to provide a construction of threaded anchor having an adjustably secured, flanged, collar surrounding the upper part of the anchor body or shank, and adapted to be secured thereto in a position to rest upon the surface of the earth, when the anchor has nearly reached the desired penetration into the earth, so that after the collar is secured, a few extra turns of the anchor will compress it against the earth's surface to right the anchor and the pole which it supports, as well as adding a resistance feature against any swaying action of the pole. In providing such a flanged collar, I prefer to have the collar dished, to be concave on the underside, to concentrate the pressure at the edge of the collar, against the earth, for a more rigid hold on the earth's surface, at a lever arm distance from the anchor body.

Another object is to provide a loose disc beneath, and concentric with, the flanged collar, to lessen the friction attending the final turns in

planting the collar tight against the earth's surface.

A further object of my invention is to provide a form of screw anchor construction, including a plurality of anchor bodies which will cross one another, through a cast metal form, and enter the earth's surface in an inclined position, as well as being at an angle to cross themselves, affording a toe-nail holding effect, for use with a guy wire, attached to the said cast metal form, to which the said anchor bodies are adjustably fixed. My object here is to thus provide for the heavier guy wire strains.

In connection with the many uses to which such an anchor can be put, the anchor has to resist an oscillating movement of the pole it supports, whether for flag poles, tent poles, umbrella handles, fence posts, or whatnot. It is therefore another object to provide a form of anchor which, while fulfilling the main objects above mentioned, as well as being easily and readily planted, to resist, in a practical way, all that is required of it, will, at the same time be of such simple construction as to be inexpensive to manufacture, so that it can be offered for sale at a less price than many other anchors of less holding power.

With these and other objects, which will hereinafter appear, my invention resides in certain construction fulfilling the above named objects.

Various embodiments of this invention are illustrated in the drawing and are hereinafter described, their use is explained and what I claim is set forth.

In the drawing,

Figure 1 is an elevation of one form of screw anchor embodying my invention.

Figure 2 is a section taken on the line 2—2 of Figure 1.

Figure 3 is a perspective view of a fragmental end, of the screw body portion, of said anchor.

Figure 4 is an end view of the screw portion of the anchor, showing the cutting edges.

Figure 5 is an elevation showing an inclined anchor passing through an adapted flange disc collar.

Figure 6 shows an anchor with pipe end and guy wire attached, having the anchor in concrete, buried in the ground.

Figure 7 is a perspective view of another form of anchor device shown inclined to the earth, which it penetrates.

Like figures of reference refer to like parts.

In the figures, referring first to Figures 1, 2 and 3, the cast metal anchor body **10**, has a hollow, cylindrical, shank portion **11**, with a hexagonal socket **12**, in which fits the member **13**, which may be a pole end or the end of a turning tool. **14** is a screw which secures the member **13** in the socket **12**. Upon the portion **11** is the longitudinal keying projection **15**, integral therewith. Fitting about the portion **11**, to be adjustably positioned up or down thereon, is the flanged collar **16**, having a sleeve portion **17**, which has a recessed lug **18**, in sliding engagement with the keying projection **15**. A thumb screw **19** serves to fix the flanged collar **16**, upon the body **10**. The cupped flange **20**, of the collar **16**, has beneath it, the cupped loose disc **21**, through which passes the anchor body **10**. Below the shank portion **11**, of the body **10**, is the threaded portion **22**, which is smaller in general outside diameter than the cylindrical shank portion **11**, so that the lower end of the portion **11** overhangs, circumferentially, the upper termination of the threads of the portion **22**, which terminate below in the cutting end **23**. The portion **22** has two spiral threads **24** and **25**, made alike in pitch and size, having their respective edges **26** and **27** running in the length at a uniform distance from the axis of the threaded anchor portion **22**, except being slightly tapered, convergently toward the cutting end **23**, for casting purposes, when the body **10** is made of cast metal.

There are formed between adjoining convolutions of the threads **24** and **25**, two spiral grooves **28** and **29**, having the spiral surfaces **30** and **31**, of the respective grooves, advanced at approximately an angle of 45 degrees with the axis, of the portion **22**. The surfaces **30** and **31** continue unchanged in shape and form down to the blade edges **32** and **33**, which, while of equal length, and being at an angle to themselves, at the point **34**, are at approximately right angles, respectively, to the edges **27** and **26**, of the respective threads **25** and **24**, at the points **35** and **36**, respectively. The surfaces **30** and **31** form spiral elevating guides to the earth or material filling into the grooves **28** and **29**, respectively, and cause a sliding, upward movement of the material, starting from the blade edges **32** and **33**, as the body **10** is turned to screw in. While the grooves **28** and **29** continue practically unchanged in shape and form, thruout the length of the screw or threaded portion **22**, the upper ends of their respective surfaces **30** and **31** are turned outwardly and form obstructions in themselves to the up-coming material, moving up these grooves **28** and **29**. The shape of the end **23** can also be seen in Figure 3, illustrating the termination of the spiral surfaces **30** and **31**.

Referring now to Figure 5, the inclined anchor body **37** has a cylindrical portion **38**, overhanging circumferentially a screw portion **39**. Within the portion **38**, is fixed the pole member **40**, by the screw **41**. The portion **38**, of the body **37**, slidingly fits where it passes through the inclined boss **42**, and is secured thereto by the screw **43**. Integral with the boss **42**, is the flange **44**, adapted to lay upon the earth's surface, when the screw portion **39** is embedded in the earth, in the inclined position shown. Upon the boss **42**, is the ear **45**, attached to which, is a guy wire **46**.

In Figure 6, the screw portion **47**, of the anchor **48** is co-axially integral with the pipe portion **49**. The guy wire **50** is imbedded in the anchor **48**. Any suitable means for fixing the screw portion **47**, the pipe portion **48**, and the wire **50**, all together, may be used. The screw portion **47** is shown embedded in concrete **51**, in which it is screwed, before it sets. **52** is the ground. **53** is the shank, overhanging circumferentially the screw portion **47**. Adjustably fixed by the screw **54**, upon the shank **53**, is the toothed collar **55**, having teeth **56**, which, by being somewhat flared, and materially to the holding power of the anchor, when these teeth **56** are embedded in the concrete, before it sets.

Referring now to Figure 7, the two anchor parts **57** and **58**, of the device, have each a screw portion **59**, and a shank portion **60**. The shank portion **60** overhangs, circumferentially, the screw portion **59**. The shank portions **60** slidingly fit respective holes passing through the block **61**. Screws **62** adjustably fix the shanks **60** to the block **61**. **63** is an eye portion of the block **61**, to which is fixed a guy wire **64**. The plane of the shanks **60**, of the device, is inclined to the surface of the earth portion **65**, represented as the approximate angle of inclination of the guy wire **64** with the earth's surface.

The shank portions 60 extend below the surface of the earth to give additional rigidity to the anchor beneath the surface of the ground.

Having described such forms of my invention as are illustrated, I will now proceed to explain their application to the uses for which they are designed, and show how they fulfill the objects set out above.

Considering the use of the form of anchor illustrated in Figures 1, 2 and 3, having the member 13 attached, whether that member be the shank of a tool fitting the hexagonal socket 12, or the pole of a flag or other object, the same held by the operator in the line in which it is to stand up from the earth, and having its cutting end 23 partly penetrating the same, the operator then standing erect, turns the member 13, and with it, the anchor body 10. With the continued turning, the weight of the anchor and its attachments, together with the slight downward pressure, naturally exerted by the operator, the cutting blade edges 32 and 33 work their way down into the earth and the part thereof dislodged at these edges, immediately starts to slide up the spiral grooves 28 and 29, a little faster than the anchor works its way down, until the lower end of the portion 11, which overhangs the threaded portion 22, as well as until the upper out-turned ends of the groove surfaces 30, and 31 reach into the earth and effects a stoppage to the upward movement of the earth being generally elevated by the threads 24 and 25 and the grooved surfaces 30 and 31, between them, respectively, causing a packing action all the way down the length of the threaded portion 22, to the end 23, where, by having the groove surfaces 30 and 31 maintained in form and width, down to the points 35 and 36, there is afforded a practically uniform packing action all the way down to the end, effecting an earth locking action, starting at the lower ends of the threads 24 and 25, and extending all the way up to the upper ends of the spiral grooves 28 and 29. At the same time, this locking action occurs consequently in a manner, to leave the anchor body 10 planted in packed or consolidated ground, regardless of the fact that the ground may be sand or loose earth. Of course, in more compact ground, as clay, the anchor will be more firmly held than in loose ground, yet in loose ground or sand my form of anchor holds better than others, not so designed with the balanced thread and other features which my anchor has, including its full width and pitch of groove action, all the way to the end, with its attendant packing action, effected by the overhang or overreach of the portion 11 as well as by the obstruction afforded by the upper out-turned ends of the groove surfaces 30 and 31, above the threaded portion 22.

The holding power of the anchor also varies with the number of threads in the anchor, as well as with the diameter of the threaded portion, but for certain purposes I have found the particular form shown in Figure 1, empirically, to be very practical.

In order to supplement the resistance of the body 10, in the ground, to any tilting action, such as attending the swaying of a flag and pole, or wind blown umbrella, attached to the anchor, in the wind, I provide the collar 16, which is first allowed to drop to the ground surface around the body 10, after the anchor is near the desired depth. Then it is secured by the thumb screw 19. Upon further turning of the anchor, to screw the same in, the collar 16 is brought tight against the earth's surface, which action tends to bring the member 13 more nearly perpendicular to the earth's general surface. It will be noted that the collar 16 is keyed, at the keying portion 15, which resists turning relative to the body 10. This relieves the screw 19 from any force tending to cause the body 10 to turn within the collar 16, and at the same time, this collar 16 can be adjustably fixed anywhere, up or down on the long key projection 15. To cheapen the construction, the collar 16 can be cast integral with the shank of the anchor.

With the collar 16 fixed to the body 10, and against the earth's surface, it offers additional resistance to the turning of the device as a whole, on account of the friction of the collar 16, with the ground. By using the disc 21 beneath the collar 16, and having the disc 21 loose with respect to the body 10, and to the collar 16, this frictional resistance to turning the device is much reduced, leaving the operator more strength to be applied directly to turning the anchor deeper into the ground, and more firmly setting the collar 16 against the ground surface, so as to offer better swaying resistance. I prefer to make the collar 16 concave downward, so as to bring the periphery in more concentrated pressure against the ground surface, when not using or using the disc 21, and at the same time to better pack the ground within the hollow of the collar 16, or its disc 21, when said disc is also used.

Referring now to the form of my invention shown in Figure 5, with its inclined anchor and collar, here we have a form including means for attaching a guy wire 46. The collar 44 serves to fix the angle of screw penetration into the earth, as well as acting as a flange to offer additional tilting resistance to the tendency of the guy wire to pull it over, inasmuch as the pull is at an angle to the axis of the anchor.

In Figure 6, the anchor is also inclined to the earth's surface, but in this case, the pull of the guy wire 50 is in line with the axis of the anchor. The guy wire is protected part way up its length from the ground by the pipe portion 49.

As additional security, for holding the anchor, I have shown the use of concrete 51, to be buried in the ground. The anchor is preferably screwed into the concrete, just prior to the setting of the concrete, so as to better consolidate the concrete and crowd out the air pockets therein around the anchor. If we were to position the anchor and then pack the concrete in its fresh condition around the anchor, we would lose the packing action attending the screwing of the anchor into the concrete. In fact, it is easier to position the anchor by screwing it into the partially set concrete, than to hold it in position and pack the concrete around it, thus saving considerable time in setting such a guy wire anchor.

When using the device shown in Figure 7, the strain from the guy wire 64 is substantially and additionally resisted by the toe-nail effect of the spread of the screws 59, in the ground 65, produced by crossing the anchors passing through, and fixed to the block 61.

It will be observed that the anchor constructions illustrated and above described are such as to lend themselves to comparatively simple and ordinary casting operations, and they have been made in quantities, moulded from a gated pattern. This makes it possible to manufacture these devices at comparatively small cost, besides the forms of my threaded anchors are such as to require a comparatively small amount of cast metal in the anchor.

Other forms of anchors, than those shown and described, can be made without departing from the spirit and scope of my invention, I therefore wish to include all forms which come within the purview of the following claims.

I claim:

1. A threaded anchor of the class described, adapted to be turned into earth or other like penetrable material, said anchor including a shank portion and a screw portion of double threaded formation, the pitch of each thread thereof being such as to afford a complete turn of said thread in a pitch length equal to approximately twice the diameter across the periphery of said threads, said double threaded formation affording two substantially deep, concaved spiral grooves thruout the length of said screw portion, said threaded formation being substantially of the same cross-section thruout its length, except where it terminates at said shank portion, where the bottom surfaces of said grooves turn outward into the outer surface of said shank portion, in shouldered formation, to form an obstruction at the upper ends of said grooves, and resist the upward movement of material caused to travel up the said spiral grooves, during the turning of said anchor, in said material, a cutting edge at the lower end of said screw portion, positioned across the general spiral direction of the bottom surface of said grooves, said bottom surface continuing in substantially the same depth toward and down to said edge.

2. A threaded anchor made in accordance with claim 1, wherein the said shank portion is larger in diameter than the said screw portion, where said portions join.

3. A threaded anchor made in accordance with claim 1, and having in addition thereto, a flanged collar about said anchor.

4. A threaded anchor made in accordance with claim 1 having in addition thereto, a block thru which said anchor passes, a second anchor passing thru said block across the first mentioned anchor, and means for securing said anchors to said block.

5. A threaded anchor made in accordance with claim 1 and having in addition thereto a flanged collar, with the plane thereof inclined to the axis of said anchor.

6. A threaded anchor made in accordance with claim 1, having in addition thereto a concave collar, concave to the screw end of said anchor.

7. A threaded anchor made in accordance with claim 1, and having in addition thereto a collar, and teeth projecting from said collar.

8. An anchor adapted to penetrate and hold within ground or other material, said anchor including a screw portion, a shank portion of greater diameter than said screw portion, and adjoining said screw portion, said screw portion having double threads forming spiral grooves, a flange on said shank portion extending radially thereto, and a loosely fitting plate encircling said shank portion adjacent and beneath said flange.

WASHINGTON LEE ROBINS.