July 12, 1955 A. G. STEINMAYER 2,712,865

GROUND ANCHORS

Filed Oct. 10, 1951 3 Sheets-Sheet 1

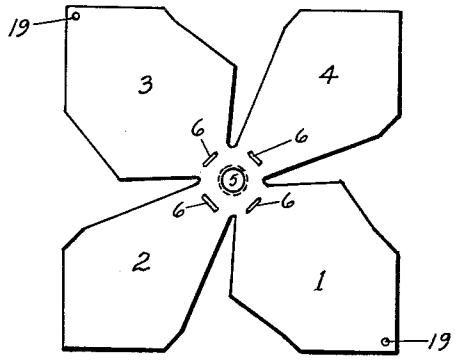


Fig. 1

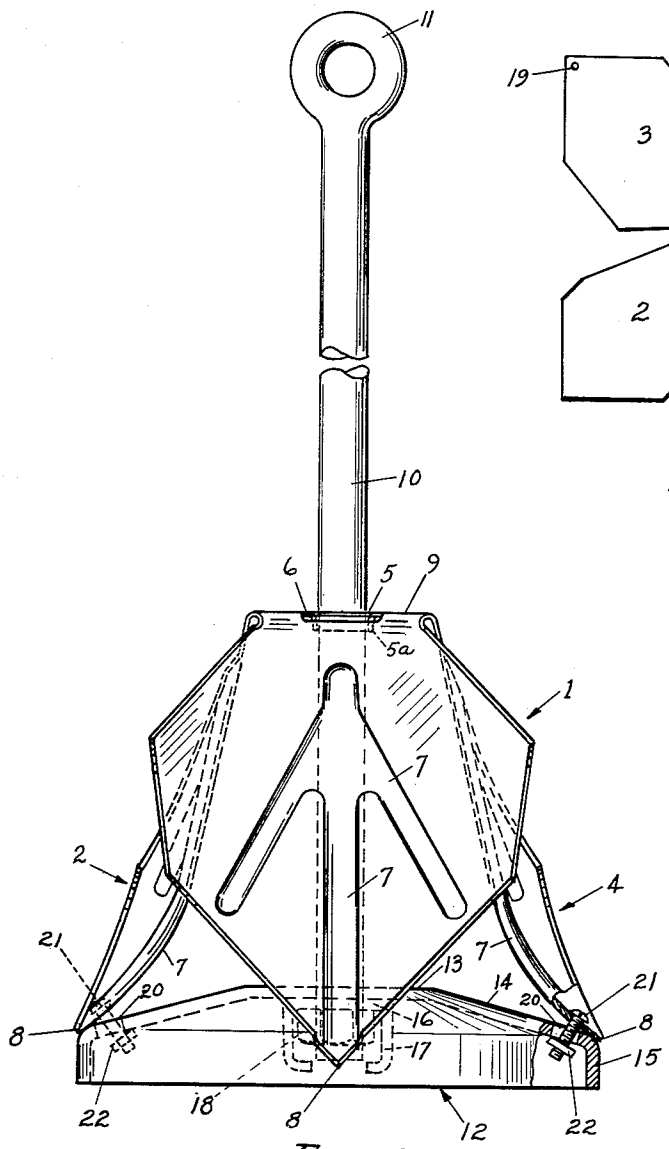


Fig. 2

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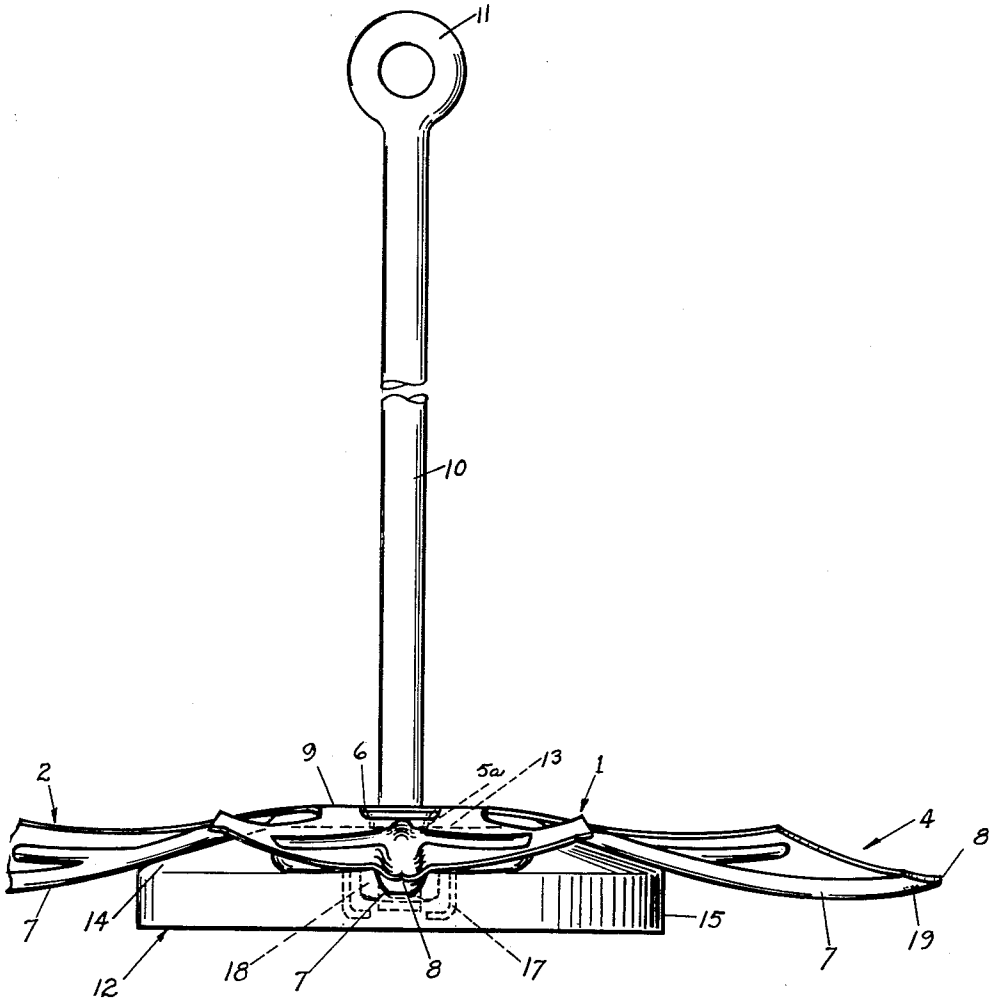


Fig. 3

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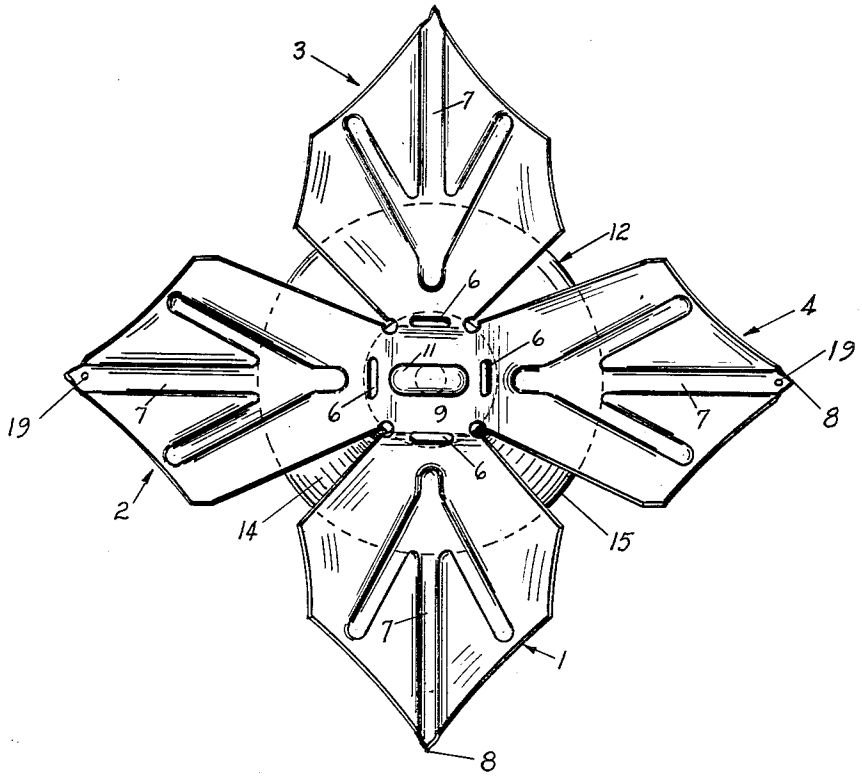


Fig. 4

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GROUND ANCHORS

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Application October 10, 1951, Serial No. 250,598

5 Claims. (Cl. 189—92)

My invention relates to ground anchors which are normally used to secure guy wires attached to poles of power distribution lines and the like.

Ground anchors are usually inserted in a hole which is of relatively small diameter in comparison with the expanded diameter of the ground anchors but is sufficiently large for the insertion therein of the ground anchor in its folded state. When the anchor has been inserted, the blades of the fluke are forced outwardly so that they dig into and underhang the undisturbed ground so as to attain greater holding power.

Ground anchors are used in a great variety of soils; some soils may be soft, viz. loam; some may be sticky, viz. wet clay and some may be stoney. In the latter type soil, known type anchors are at a disadvantage for they do not pierce the undisturbed soil readily and are apt to buckle and distort so as to lose valuable holding area. This is by reason of the fact that the blade or flukes may lose their broad confirmation and also may be mechanically weakened at point of attachment to the body of the anchor which is usually attached to a guy wire, whereupon the guy may pull out of the imbedded anchor.

It is an object of this invention to provide an anchor which can be facily used in a wide variety of said conditions.

One object of my invention is to provide a fluke of integral construction with four blades equally and symmetrically balanced that will possess great gripping strength and area.

Another object of my invention is to provide a fluke with blades having a center rib, the back of said rib being the only point of contact with the base plate as the fluke is being expanded.

A further object of my invention is to provide a fluke with blades that are arched and ribbed to give greater strength and to reduce creepage of the flukes to the minimum.

And another object is to provide a fluke cut from one sheet of metal with one pair of diametrically spaced blades wider than the other pair, the wider pair overlapping the narrow pair while in the unexpanded position.

Other objects will appear from time to time in the course of the specification and claims.

An embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 illustrates the sheet metal blank cut in such a manner that the fluke can be formed out of one sheet of metal.

Fig. 2 is an elevation of the fluke shaped and assembled with the base plate and handle rod.

Fig. 3 is a fragmentary elevation of the fluke assembly in its expanded position.

Fig. 4 is a top view of the ground anchor in its expanded position.

Like reference characters illustrate like parts throughout the various drawings.

Referring to Fig. 1 it can be seen that opposite blades 1 and 3 are identical and also blades 2 and 4, thus making

the fluke balanced and symmetrical while at the same time cutting the metal sheet advantageously. An opening 5 at the center is for an anchor rod, and elongated slots 6 centered at the base of each blade define the line of bend of its respective blade. It will be apparent that the line of bend of each blade will be substantially coincident with the major axis of the corresponding slots 6.

The metal blank of Fig. 1 is then ribbed, arched, and bent as shown in Fig. 2. An arrow-shaped ribbing 7 is centered on each blade and is of sufficient depth to contribute strength to the blade. The blades are arched inwardly as can be seen on blades 2 and 4. This arching or scooped shape gives a shovel quality to the blade for greater strength and holding power. Pointed ends 8 on the blades are an aid to easy expansion of the blades into the ground.

The opening 5 on the pounding plate 9 has an extruded downward extension 5*a* to give greater stiffness to the plate 9 and to aid in preventing deformation during pounding. The extruded opening extension 5*a* also forms a smooth bearing against an anchor rod 10 when the fluke rides to its expanded position.

The anchor rod 10 is formed of solid metal rod with a guy wire receiving means 11 at one end. The anchor rod 10 extends through the opening 5 of the fluke to a base plate 12. A circular base plate 12 is shaped with a flat portion 13 on its top which serves as a sounding surface when the extruded opening extension 5*a* contacts it. The remainder of the top surface tapers downwardly and outwardly at an angle 14 to its outer perimeter 15. This angle 14 serves as a guide and contact surface for the ribs 7 of the blades as they expand. The blades are thus directed into the ground at a slight downward angle which gives greater holding power to the anchor.

Welded to the underside of the flat top portion 13 of the base plate 12 is a nut retainer strap 16 to provide additional metal support. The length of an overhanging skirt 17 provides a section of sufficient strength to resist deformation of the base plate. The skirt section 17 and the retainer strap 16 can be made of sufficiently strong material to augment the support area under a nut 18 and develop full strength of the base plate metal.

At the tips of two diametrically opposed blades are holes 19 and in corresponding positions on the base plate are similar holes 20. Screw 21 and nut 22 position the fluke on the base plate by means of these holes. They are light weight screws of sufficient strength to hold the two parts together during handling but are easily sheared apart when pressure is placed on the pounding surface to expand the blades of the fluke.

The use and operation of my invention are as follows:

There are many ground anchors for guying installations on the market but my invention offers some new advantages. The design of this fluke makes a very strong anchor for various reasons: The blades occupy a large area so that when expanded they grip against a large area of ground. The blades are ribbed with a deep arrow shape to add strength and to contribute a limited point of contact between the central rib and the base plate as the fluke is expanded. The blades are arched in such a manner that when expanded they form a shovel face upwardly against the ground, whereby the natural arching of the ground is utilized to engage more holding area; in other words, an inverse pyramid acts on each fluke. The blades have pointed tips so as to cut into the ground more easily. A nut retainer strap and skirt welded to the underside of the base plate add sufficient strength to the base plate to resist deformation tendencies under great loads.

The ground anchor is inserted into a hole which has a diameter similar to the diameter of the fluke in its folded position as shown in Fig. 2. An expanding tool, not shown, is seated on the pounding area 9 and then pounded

with considerable weight. This forces the pounding surface **9** downwardly until the extruded opening **5***a* touches the flat top portion **13** of the base plate **12**. The meeting of these two surfaces **5***a* and **13** serves as a sounding board to signal to the man pounding that the fluke has been expanded. As the pounding surface **9** moves downward the blades **1**, **2**, **3**, and **4** of the fluke spread downwardly and outwardly, the ribs ride on the tapered surface **14**, so that the expanded fluke cuts into the ground at a downward angle similar to the angle **14** of the base plate. This cutting into undisturbed ground, at an angle with a ribbed shovel faced blade has great holding ability. Tests have proven that this ground anchor offers an extremely strong anchor of compact symmetrical shape and is superior to types presently available.

One embodiment of the invention has been duly disclosed; however, the invention is to be limited only by the clear import of the following claims.

I claim:

1. In an earth anchor including a base plate, an anchor rod secured to said base plate, a blade structure seated on said base plate and having a central opening through which the anchor rod extends, said blade structure being integrally formed of a square blank of sheet metal, said blank having a generally triangular recess in the mid-portion of each side thereof, and a slot extending inwardly from the apex of each said recess, said recesses and slots defining the inner side marginal portions of four blades whose longitudinal axes extend diagonally of the blank, said inner side marginal portions being upturned whereby they embrace the overlying earth and resist removal of the embedded anchor from the earth, and said blades being bent downwardly from apertured sides of a diagonally disposed, square central portion of the blank.

2. The earth anchor defined in claim 1 having the said central opening in said blade structure defined by an integral collar extending from said blade structure parallel with the axis of said opening.

3. The earth anchor defined in claim 1 wherein each of said blades includes an embossed arrow-shaped ribbing comprising a substantially centrally located longitudinal rib and opposed ribs angularly diverging relative to one another and each having one end terminating at said longitudinal rib in the proximity of a respective side of said square central portion.

4. The earth anchor defined in claim 1 having an opposed pair of said diagonally extending blades of relatively greater width than the remaining pair of blades.

5. The earth anchor defined in claim 1 having an elongated aperture in each side of said square central portion, the major axis of each aperture being substantially coincidental with the line of bend of each of said blades.

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