

[54] **EARTHWORKING TOOL**
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172/123
[51] Int. Cl.**E21c 13/00**
[58] Field of Search.....172/540, 122, 123,
172/118, 540, 713, 719, 765; 37/94, 80, 86,
96, 142; 175/410; 299/79, 88-90

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[57] **ABSTRACT**
The specification discloses an earthworking tool, in which the tool has a pointed forward end with a hard insert therein, while rearwardly of the pointed end, the tool has laterally extending inclined shoulders, each provided with a hard wear resistant element mounted thereon.

1 Claim, 6 Drawing Figures

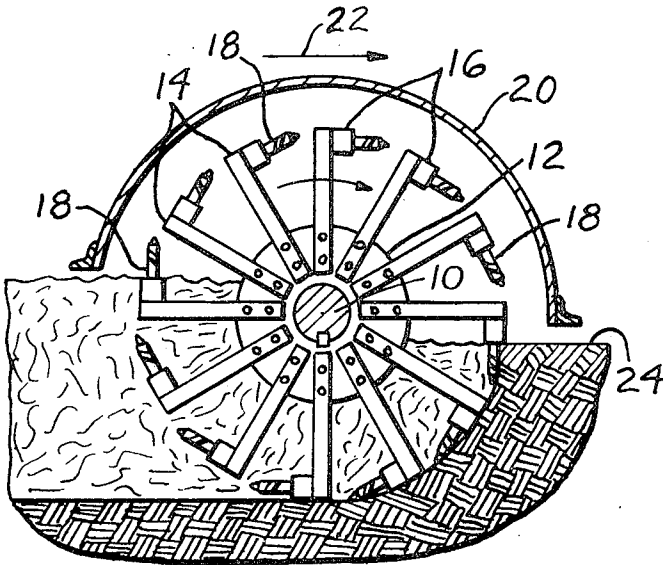


FIG-1

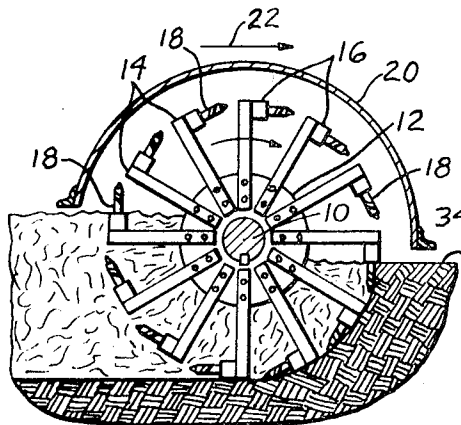


FIG-2

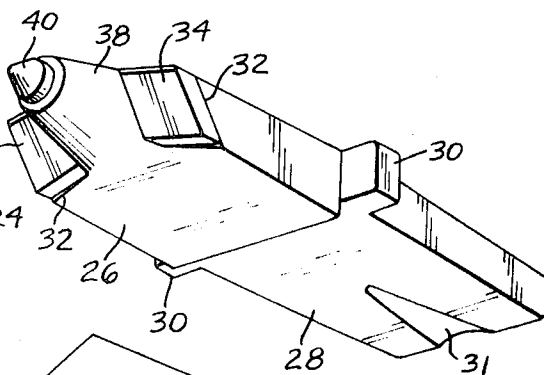


FIG-6

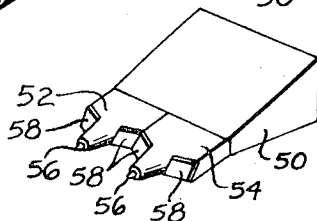


FIG-3

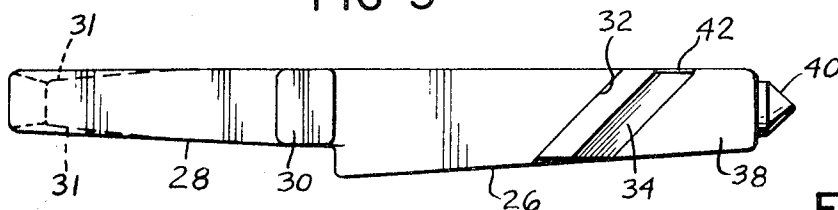


FIG-4

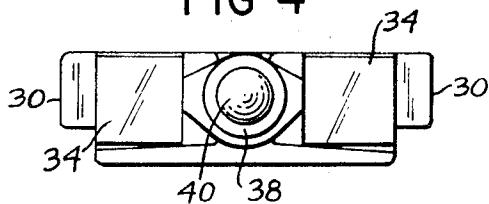
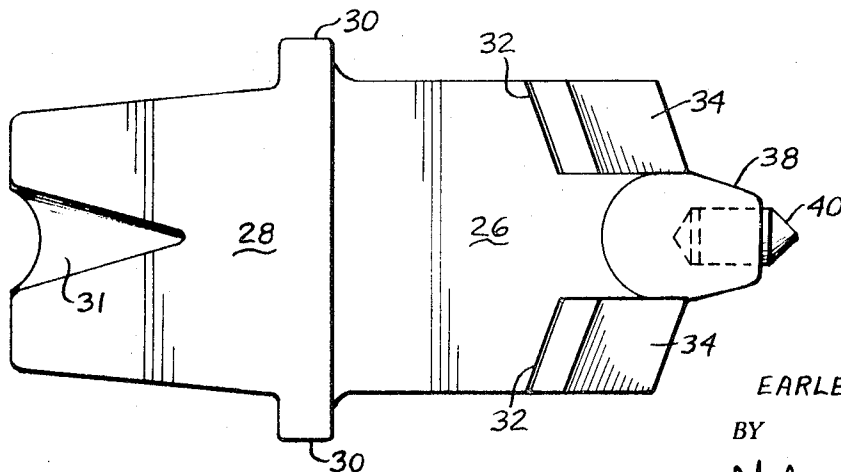


FIG-5



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EARTHWORKING TOOL

The present invention relates to earthworking equipment and is particularly concerned with a tool, or tooth, for use with soil stabilizers, trenchers, excavating buckets and like equipment.

Soil stabilizers, for example, are employed in certain regions in which the soil is of such a nature that it can be broken up into a rather fine condition and then supplied with cement and water to provide a hard foundation for a roadway.

The mechanism employed for breaking up the soil is known as a stabilizer and consists of at least one shaft extending parallel to the surface to be worked and having a plurality of radial arms distributed therealong, with each arm at the outer end carrying a tooth, or tool, which cuts, pulverizes and mixes the soil as the stabilizer is advanced in the forward direction.

Due to the abrasive nature of soil, generally, and the extremely abrasive nature thereof under certain circumstances, such stabilizer teeth wear out quite rapidly, and the cost of replacing the teeth periodically, including the down time of the mechanism, is a substantial item in respect of preparation of roadbeds in the aforementioned manner.

Other earthworking machines encounter like conditions.

With the foregoing in mind, the primary objective of the present invention is the provision of an earthworking tooth, or tool, construction of improved characteristics.

Another object of the present invention is the provision of a tool, or tooth, for earthworking equipment which will remain in operation for a substantially longer period of time than tools, or teeth, according to prior art practices.

Another object of the present invention is the provision of a stabilizer tool, or tooth, which will remain in operation for a substantially longer period of time than previously known tools, or teeth, and which will do a superior job of breaking up and mixing the soil.

The foregoing objects, as well as still other objects and advantages, will become more apparent upon reference to the following detailed specification taken in connection with the accompanying drawings in which:

FIG. 1 is a schematic sectional view showing a portion of a stabilizer mechanism employing a tooth, or tool, according to the present invention;

FIG. 2 is a perspective view of the tooth according to the present invention;

FIG. 3 is a side view of the tooth;

FIG. 4 is a view looking in at the front end of the tooth;

FIG. 5 is a bottom plan view of the tooth; and

FIG. 6 is a perspective view of a modification.

BRIEF SUMMARY OF THE INVENTION

According to the present invention, a tool, or tooth, is provided which is a substantially flat bar-like element, and is formed so as to have a forwardly projecting pointed central part, with a hard wear resistant element mounted in the pointed end, said element comprising, for example, cemented tungsten carbide.

Rearward of the pointed end of the tool are two laterally extending shoulders, each provided with a hard wear resistant element mounted thereon, and with the shoulders inclining rearwardly from the center of the

tool outwardly and also inclining forwardly in the radially outer direction of the tool when it is mounted in working position.

In operation, the pointed end of the tool makes an initial penetration into the formation being worked and, likewise, tends to fracture hard formations while the shoulders following the point complete the displacement of the formation being cut and breaks up the formation. When the machine using the tool is a soil stabilizer, the soil being treated is in a rather finely broken up condition rearwardly of the stabilizer and can receive cement and water so as to form a hard roadbed to receive a topping material such as black top or concrete.

DETAILED DESCRIPTION OF THE INVENTION

A stabilizer mechanism with which a tool, or tooth, of the present invention can be used, comprises a horizontal driven shaft mounted on a suitable conveying vehicle which supports the shaft and moves it parallel to the surface to be treated so that stabilizer tools, or teeth, carried by the shaft can engage and work the surface being treated.

In FIG. 1, the driven shaft is indicated at 10, and it carries a plurality of discs 12 in axially spaced relation which are fixed to the shaft so as to rotate therewith. Each disc carries a plurality of substantially radial arms 14 at the outer end of each of which is a support block, or box, 16 having mounted therein a stabilizer tool, or tooth, 18 according to the present invention.

The arms 14 can be distributed circumferentially in any desired manner and can support blocks or boxes 16 in any desired manner so that the teeth 18 are distributed circumferentially about the shaft and axially therealong in order to treat the surface being worked with a high degree of efficiency.

A hood 20 surrounds the shaft 10, and the arms 14 run inside the hood. The hood 20 at the forward end, considering it to be moving in the direction of arrow 22, is disposed adjacent the surface 24 being worked, whereas at the trailing end of the hood a greater clearance from surface 24 is provided, since the material behind hood 20 is broken up and is, therefore, deeper than the material in front.

Surface 24 is earth, and the objective of using the stabilizer arrangement referred to is to break up and pulverize and mix the earth so that it can be treated, as by the addition of cement and water thereto to form a roadbed. The stabilizer provides a convenient and inexpensive manner of forming beds for roadways in certain areas where it is possible to break the soil up finely with a stabilizer arrangement.

At the same time, many of these regions have earth of a highly abrasive nature, containing a great deal of sand, for example, and the stabilizer teeth wear away quite rapidly. In other regions, the soil may contain a good bit of rock and such rocks present a problem because they tend to break or bend or blunt stabilizer teeth making the operation of the machine less efficient.

According to the present invention, a novel tool, or tooth, construction is proposed in which the tool, or tooth, is more resistant to wear due to abrasion while, furthermore, the tool includes a portion especially adapted for breaking rocks and shale and the like so that more efficient treatment of soil of this nature can be had.

The tool, or tooth, of the present invention will be clearly seen in FIGS. 2 to 5. The tooth, as shown in the aforementioned figures, is generally bar-like and comprises a forward portion 26 and a rearward portion 28, with lateral shoulders 30 at the juncture of the said portions. Rearward portion 28 is provided when the tool is mounted in a holder and tapers inwardly toward the back in both horizontal and vertical directions and may terminate in a recess portion 31, which facilitates driving the tooth from the support block therefor when it must be changed.

The forward portion 26 terminates at the front of the tooth in a pair of laterally spaced inclined surfaces 32. Surfaces 32 incline toward the front of the tooth from the radially inner side thereof to the radially outer side and also incline toward the front of the tooth from the sides thereof inwardly. Fixedly mounted on each surface, as by brazing, is a hard wear resistant element 34 which may, for example, be formed of a cemented hard metal carbide, such as tungsten carbide.

Intermediate the inserts 34 is a somewhat frusto-conical forwardly projecting portion 38 having a hard wear resistant pointed element 40 mounted in the leading end thereof. Element 40 is made of a hard wear resistant material, such as a cemented hard metal carbide, tungsten carbide, again, being a suitable carbide for this purpose.

As will be seen in FIG. 3, each of inserts 34 presents a relatively sharp leading edge 42 in the direction of movement of the tooth so that the earth engaged by the tooth is readily cut or sheared thereby. In earth which is free of hard formations, the sharp edged inserts 34 operate quite satisfactorily, but when hard formations such as rock are encountered, the hard point 40 is of advantage in that it breaks the rock, thereby permitting the inserts 34 to operate in the usual manner.

FIG. 6 schematically illustrates a wedge shaped tooth 50 which might be employed, for example, on an excavation bucket. With such teeth, the pointed leading edge is subjected to considerable abuse, particularly when hard formations or rocks are encountered during working operations.

One or more tools, or teeth, according to the present invention, may be mounted on the leading edge of tooth 50, as by welding. Such a tooth 50 might be up to eight inches wide and one or more tools according to the present invention might be mounted thereon. In FIG. 6, for example, two of the tools 52 and 54 are shown mounted in side by side relation with each hav-

ing a forwardly projecting point 56 and lateral shoulders 58 rearwardly of the pointed forward end.

The tools 52 and 54 in FIG. 6 do not comprise mounting shanks projecting rearwardly therefrom, but instead terminate rearwardly of the lateral shoulders 58 a suitable distance so that they can be placed on a prepared surface at the leading edge of tooth 50 and welded thereto.

It will be apparent that a tool according to the present invention could be constructed to the extent over the entire width of the leading edge of tooth 50, or that two or more of the tools according to the present invention could be mounted thereon in side by side relation.

Still further, a tool according to the present invention, having more than one forwardly projecting hard tipped pointed end, could be provided with lateral shoulders rearwardly of the pointed ends.

The tool according to the present invention has utility also in connection with trenchers and ditchers and the like because the tool is relatively wide and is effective for moving the earth which it penetrates. Thus, a large disc having tools according to the present invention distributed around the periphery could effectively dig a trench in the earth for any desired purpose such as for receiving a cable or tile.

Modifications may be made within the scope of the appended claims.

What is claimed is:

1. An earthworking tool comprising: a bar-like body having a pair of oppositely facing major faces and side edges and also having a forward portion and a rearward portion, said forward portion having at least one pair of shoulders near the free end projecting laterally outwardly from said forward at a steep angle, at least one projection integral with said forward portion and extending forwardly from between said shoulders, said projection tapering inwardly toward the front, said shoulders inclining from one of said major faces toward the other thereof and also toward the rear from the ends nearest said projection thereof to the other ends thereof, said projection having a hard wear resistant insert mounted in the forward end thereof, hard wear resistant plates mounted on said shoulders, said rearward portion being adapted to be received in a holder, and said body including shoulder means at the juncture of said forward and rearward portions of said body adapted to abut the forward end of a holder in which said rearward portion is disposed.

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