

[72] Inventor **Stephen S. Koziski**  
 872 Upper Sherman Avenue, Hamilton,  
 Ontario, Canada

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*Primary Examiner*—David H. Brown  
*Attorney*—Church & Rogers

[54] **EARTH CORE SAMPLER**  
 7 Claims, 6 Drawing Figs.

[52] U.S. Cl. .... 175/20,  
 175/308, 73/425.2

[51] Int. Cl. .... **E21b 11/02**  
 G01n 1/00

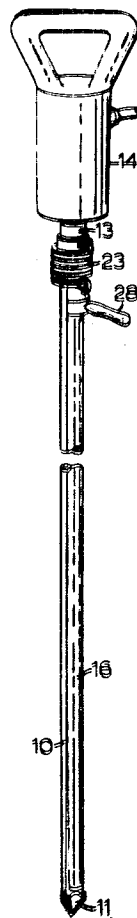
[50] Field of Search ..... 175/20,  
 135, 308; 73/425.2

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**ABSTRACT:** An earth core sampler comprises an elongated body with an elongated sampling member eccentrically mounted therein and movable by a handle against a spring between an open position in which a scraping edge projects from the sampler and a closed position; an earth sampling groove is provided in the sampling member immediately adjacent the scraping edge; the device is driven into the ground by any suitable means, as for example by a vibratory hammer attached to one end, and the sampling member opened while the sampler is rotated to scrape earth from the bore wall and form a sample in the groove; the sampling member is then closed and the sampler withdrawn from the bore. The elongated sample that is obtained is representative of the whole length of the bore.



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2 Sheets-Sheet 1

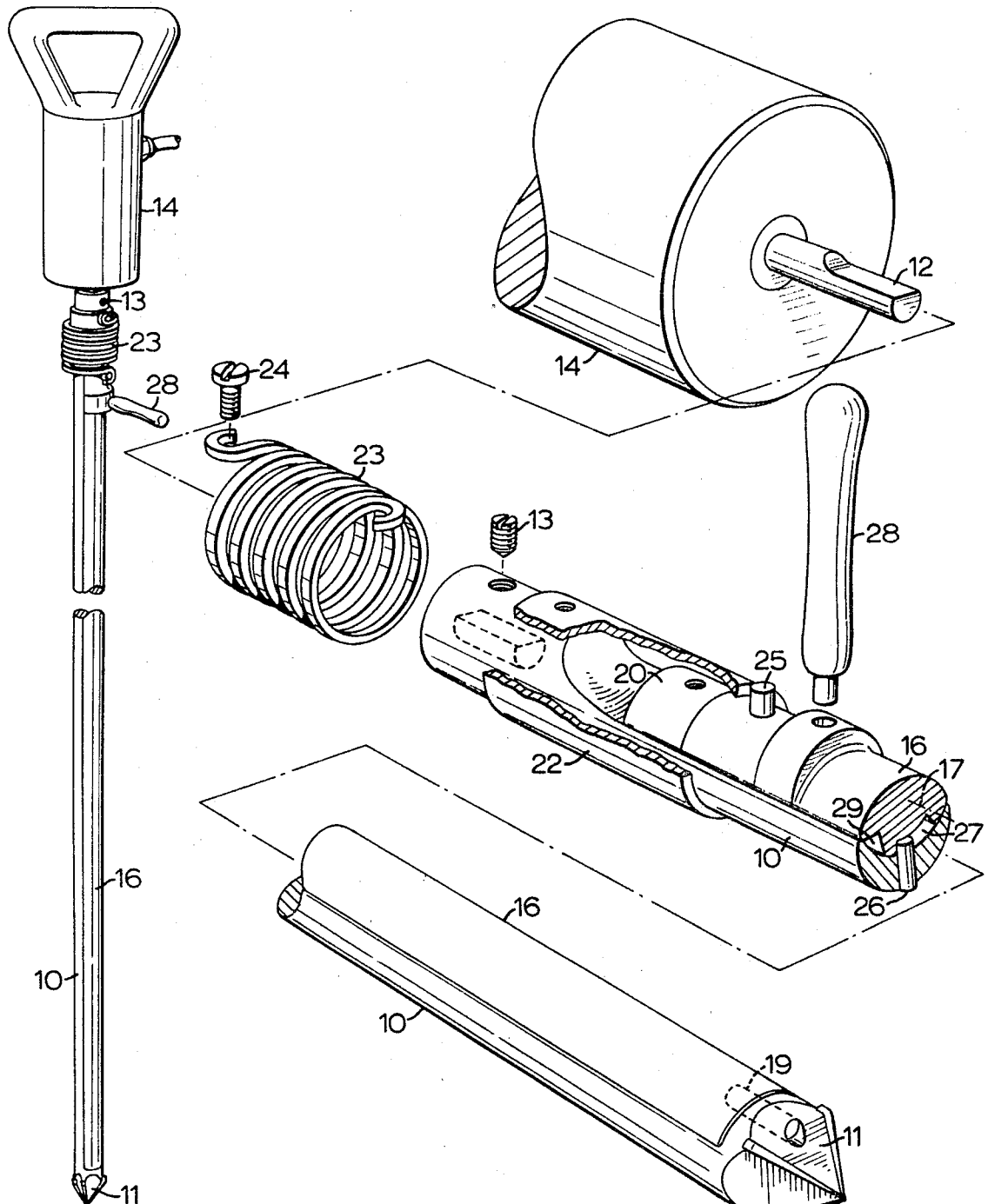


FIG. 1

FIG. 2

INVENTOR.  
STEPHEN S. KOZISKI  
BY *Church & Rogers*  
PATENT AGENTS

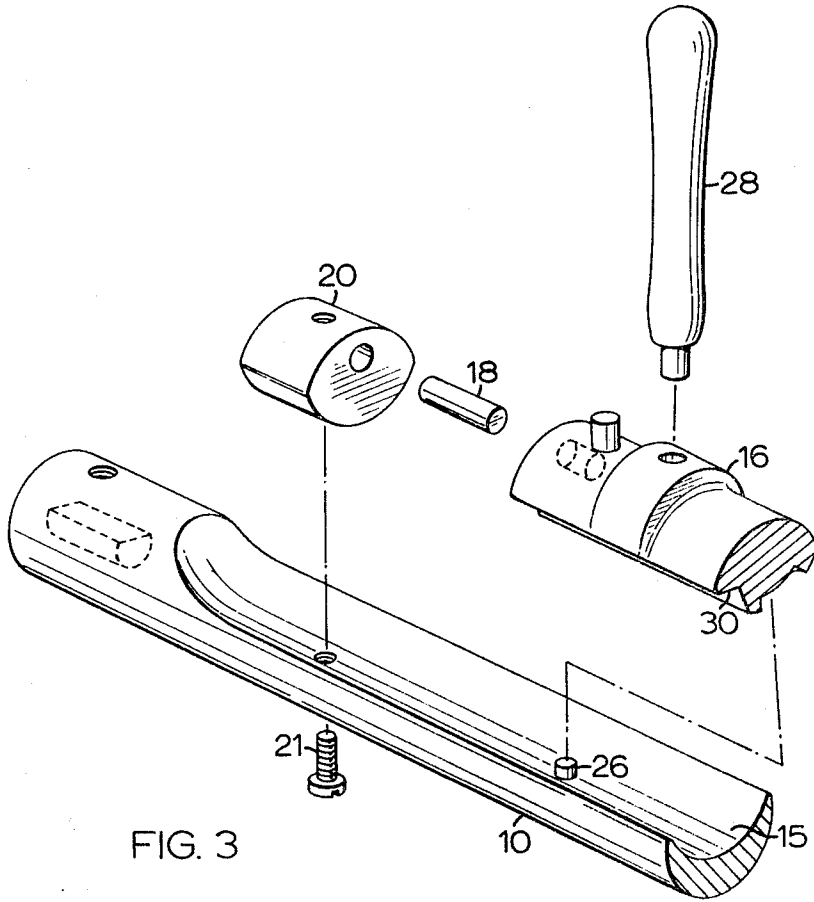


FIG. 3

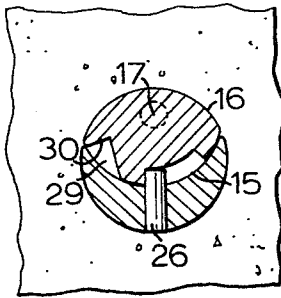


FIG. 4

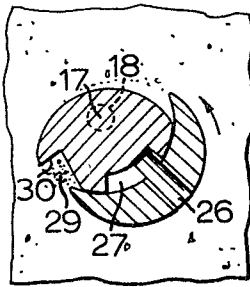


FIG. 5

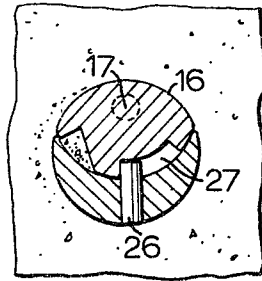


FIG. 6

INVENTOR.

STEPHEN S. KOZISKI

BY *Church & Rogers*

PATENT AGENTS

## EARTH CORE SAMPLER

### FIELD OF THE INVENTION

This invention is concerned with improvements in or relating to earth core samplers of the type intended to provide a core sample of the soil through which they pass.

### DESCRIPTION OF THE PRIOR ART

It is now a common practice to take earth samples at a number of spaced points over that area to be cultivated, the samples being analyzed to determine the specific requirements of the area for fertilizer etc., to suit the particular soil, climate and the crop that is to be grown. Modern techniques in this field require that a large number of samples be provided at different depths, usually to a total depth of about 3 feet, and the production of numerous samples by hand equipment is a laborious and tiring operation.

In my prior application Ser. No. 781,910, filed Dec. 6, 1968, there is described and claimed a motorized earth auger of simple inexpensive form, wherein an earth sample is drawn by an auger upwards through a tube into a collecting tray.

### SUMMARY OF THE INVENTION

It is an object of the present invention to provide an earth core sampler of new form.

It is a specific object of the invention to provide an earth core sampler of simple, inexpensive form that is adapted for the production of an elongated earth sample representative throughout its length of the sample bore from which it has been removed.

In accordance with the present invention there is provided an earth core sampler comprising an elongated body having a longitudinal axis adapted to be driven into the earth in the direction of the longitudinal axis to form therein an earth sample bore, the body having an elongated groove therein extending parallel to the said longitudinal axis, an elongated sampling member rotatably mounted by the body in the elongated groove for movement between open and closed positions, the sampler providing in said open position of the sampling member a scraping edge protruding therefrom to engage with the wall of the bore upon rotation of the sampler in the bore and to gather an elongated earth sample from said bore wall, and the body and the sampling member cooperating in said closed position to provide a closed sample chamber within which the gathered elongated soil sample is enclosed for intact withdrawal of the sample from the bore.

### DESCRIPTION OF THE DRAWINGS

A particular preferred embodiment of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, wherein:

FIG. 1 is a perspective view of the assembled sampler,

FIG. 2 is an exploded perspective view to a larger scale than FIG. 1, and illustrating the relationship of the different parts of the sampler,

FIG. 3 is a similar view to FIG. 2, with the soil-sampling member shown separated from the body to illustrate how the sampling member is mounted in the body,

FIG. 4 is a transverse cross section of the sampler, taken at a suitable point on its length, and showing the sampling member in its closed position,

FIG. 5 is a similar cross section to FIG. 4, showing the sampling member in its open position, so that it will collect earth from the sample bore upon rotation of the sampler, and

FIG. 6 is a similar cross section to FIGS. 4 and 5, showing the sampling member in its closed position with an earth sample gathered in the sample chamber.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

An earth core sampler in accordance with the present invention comprises an elongated body member 10 provided at

its lower end with a reinforced tip 11 to facilitate its insertion into the ground. The device is connected at its upper end, via a shaft 12 and fastening screw 13 to a driving vibratory hammer 14. The body member 10 is provided along most of its length with a deep, arcuate-walled, elongated groove 15 in which an elongated sampling member 16 is mounted for rotation about a pivot axis 17 which is parallel to and displaced transversely from the longitudinal axis (not indicated) of the sampler body. The sampling member 16 is mounted for such rotation by means of upper and lower pivot pins 18 and 19 respectively, the upper pivot pin being carried by a removable carrier block 20 that is fastened in the groove by means of a retaining bolt 21. The sampling member is therefore readily removable from the groove 15 by endwise movement upon removal of the retainer block 20.

A sleeve 22 is mounted around the upper end of the sampler body and carries a helical torsion spring 23 fastened at one end to the sleeve by a bolt 24, and at the other end to a pin 25 extending radially from the sampling member 16. The spring urges the sampling member to move to the closed position illustrated in FIGS. 1, 2 and 4, this position being determined by a pin 26 in the sampler body 10 which rides into a cooperating groove 27 in the sampling member. A radially extending handle 28 is provided to enable the sampling member to be moved at will by the operator to the open position illustrated by FIG. 5, against the urging of the spring 23.

It will be seen that in the closed position of the sampling member it lies wholly within a circular extension of the external arc-shaped circumference of said crescent shape cross-sectioned portion of the sampler body 10, so that the device exhibits a smooth exterior and can readily be driven into the ground. The sampling member 16 is provided with an elongated sample groove 29, which in this embodiment is disposed immediately adjacent an edge 30 thereof. Because of the eccentric mounting of the sampling member in the body 10, upon rotation of the sampling member to what is called herein its open position (illustrated by FIG. 5, and set by the engagement of the pin 26 with the opposite end of the groove 27), the edge 30 and the portion of the sampling member which includes the sample groove 29 projects out of the circular circumference of the sampler and will engage the wall of the bore that has been formed by the device. Upon relatively slight rotation of the sampler in the bore the edge 30 will scrape earth from the wall of the bore along its entire length, and will gather this earth into the sample groove to form an elongated sample that is representative, along its full length, of the earth condition and constitution along the full length of the sample bore.

The sampling member is thereafter allowed to rotate to its closed position, whereupon the elongated earth core sample is gathered into the closed sample chamber that is formed between the sample groove 29 and the immediately adjacent arcuate wall of the groove 15. The sampler device can now be removed from the sample bore, the core sample remaining intact within the said closed sample groove as a true undisturbed sample of the strata of the soil from which the sample has been taken.

Once the sampler has been withdrawn from the ground the device can be laid in a generally horizontal position and the sampling member moved to the open position in order to expose the elongated soil sample. One procedure which can now be followed is to discharge the sample from the device into an elongated tray in which the sample will remain relatively intact, so that the required portions thereof, corresponding to different depths in the bore, can be taken for subsequent analysis, etc.

Although in this embodiment a continuous sample groove 29 is provided, which therefore forms a continuous sample chamber, in other embodiments this groove and the resulting chamber may be discontinuous, so that the resulting sample is taken into a series of longitudinally disposed closed chambers, and will be deposited or removed from those chambers in separate portions. Again, although in this embodiment the

scraping edge 30 is provided by the sampling member, which also contains the sample groove 29, in other embodiments the scraping edge may be provided by the body 10 and is exposed for scraping the wall of the sample bore upon moving the sampling member to the so-called open position. In other embodiments the sample groove may be provided entirely within the sampler body 10, or it may be provided partially within the sampler body 10 and partially within the sampling member 16. Other modifications within the scope of the appended claims will be apparent to those skilled in the art.

What I claim is:

1. An earth core sampler comprising an elongated body having a longitudinal axis adapted to be driven into the earth in the direction of the longitudinal axis to form therein an earth sample bore, the body having an elongated groove therein extending parallel to the said longitudinal axis, an elongated sampling member rotatably mounted by the body in the elongated groove for movement between open and closed positions, the sampler providing in said open position of the sampling member a scraping edge protruding therefrom to engage with the wall of the bore upon rotation of the sampler in the bore and to gather an elongated earth sample from said bore wall, and the body and the sampling member cooperating in said closed position to provide a closed sample chamber within which the gathered elongated soil sample is enclosed for intact withdrawal of the sample from the bore.

2. A sampler as claimed in claim 1, wherein the said elongated body is of crescent transverse cross section, and the

sampling member is mounted for rotation about a longitudinal axis parallel to and transversely displaced from the longitudinal axis of the elongated body, the sampling member in said closed position lying within a circular extension of the external arc-shaped circumference of said crescent cross section for ease of insertion of the sampler into the said bore and its subsequent withdrawal therefrom.

3. A sampler as claimed in claim 2, wherein the said scraping edge is provided by the sampling member and the sample chamber is constituted by an elongated groove provided in the sampling member immediately adjacent the scraping edge.

4. A sampler as claimed in claim 3, and comprising spring means connected between the body and the sampling member and operative to urge the sampling member to the closed position.

4. A sampler as claimed in claim 1, wherein the said scraping edge is provided by the sampling member and the sample chamber is constituted by an elongated groove provided in the sampling member immediately adjacent the scraping edge.

6. A sampler as claimed in claim 1, and comprising spring means connected between the body and the sampling member and operative to urge the sampling member to the closed position.

7. A sampler as claimed in claim 1, in combination with a vibrating hammer connected to the upper end thereof for driving the sampler into the earth and for its removal therefrom.

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