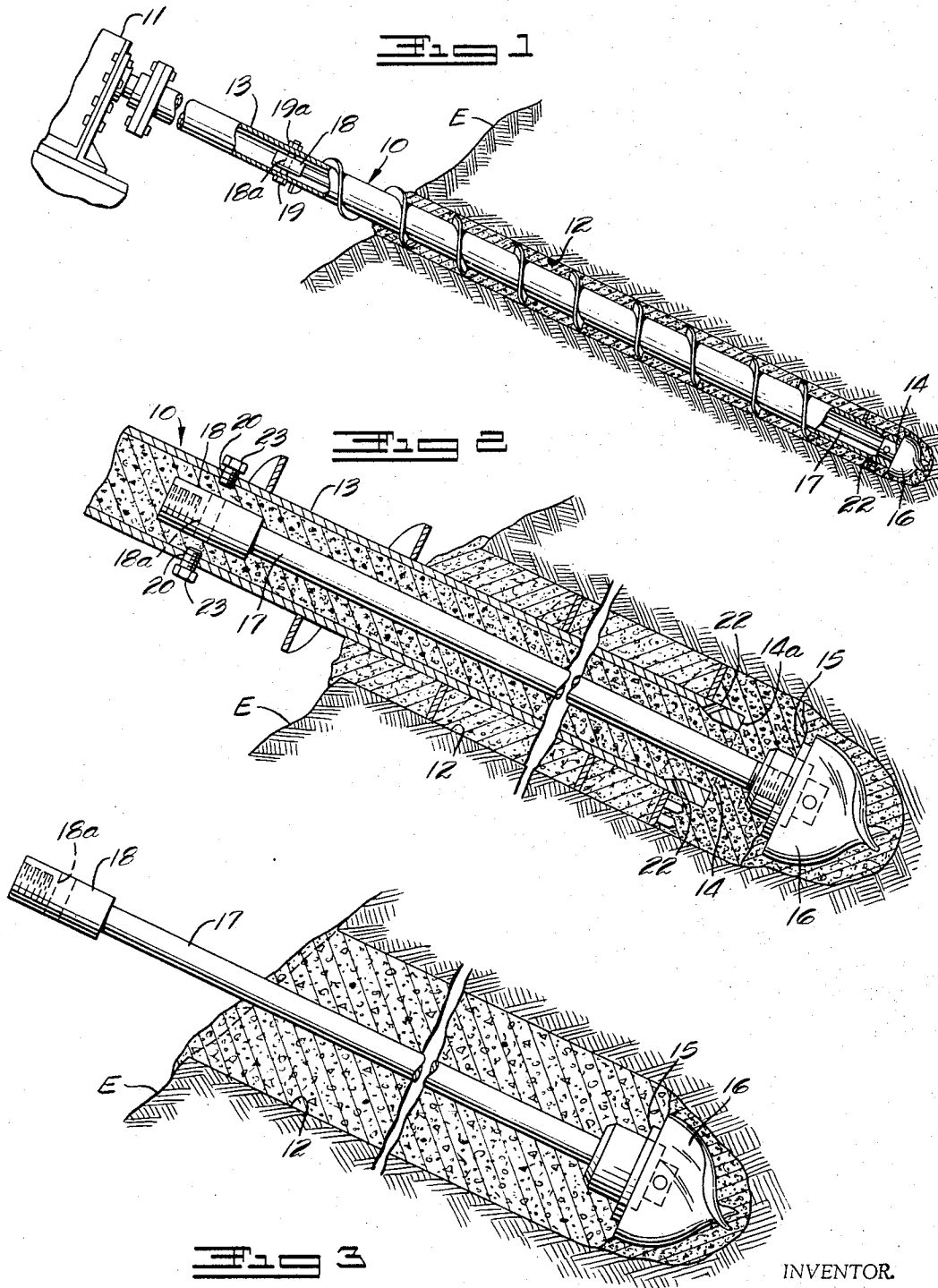


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METHOD AND APPARATUS FOR ANCHORING A TIE-DOWN
BAR IN AN EARTH SITUS
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METHOD AND APPARATUS FOR ANCHORING A TIE-DOWN BAR IN AN EARTH SITUS

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4 Claims. (Cl. 61—53.66)

This invention relates to tie-down bars for anchoring structures to an earth situs and, in particular, relates to an improved method and apparatus for anchoring tie-down bars in situ.

Heretofore, tie-down bars, generally, have been variously anchored *in situ* by making a hole in the earth with an auger flight drill, and feeding concrete into the hole after positioning an anchor bar centrally therein. Frequently, however, the anchor bar was dislodged from centered position in the process of pouring the concrete to cause considerable damage and loss of time in overcoming the resultant defect.

One object of the present invention is to provide improved apparatus and a method for installing a tie-down bar in an earth situs, by which the tie-down bar will be anchored in concrete in predetermined, accurately centered condition.

Another object of the invention is to provide improved apparatus and a method by which the concrete may be supplied to a hole in which the tie-down bar is placed without disturbing the requisite centered relationship of the same.

Other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

FIGURE 1 is a vertical cross-section illustrating a continuous-flight auger, incorporating structural features of the invention therein, and in use for a preliminary hole drilling step in the method of the invention;

FIGURE 2 is an enlarged vertical cross-section corresponding to FIGURE 1, but further broken away and in section, and illustrating a step in the method in which the auger is being withdrawn to leave the tie-down bar in the hole, and grout is being started into the hole about the tie-down bar; and

FIGURE 3 is a view corresponding to FIGURE 2, illustrating the results of the method, by which hardened grout fills the drilled hole to anchor the tie-down bar in centered condition therein.

Referring, particularly, to FIGURE 1 of the drawings, there is illustrated a continuous flight, hollow-shafted auger 10, mounted on a reversible, air-powered, or other motor 11, of known type, which is operable to drill a hole 12 in an earth situs, such as in an embankment E. The lower end of the auger shaft 13 has a reduced opening 14, defining an annular seat portion 14a for complementary seating of a shouldered boss or closure portion 15 on a driving bit 16 of known general type. Non-rotatably affixed to the boss 15 may be a cylindrical tie-down bar 17 of strong metal extending in axially centered relation upwardly through the auger shaft 13. For releasably and non-rotatably retaining the bit 16 seated in the seat portion 14a, a coupling or connector 18 affixed on the upper end of the bar 17 may have a passage radially there-through for reception of a locking bolt of pin 19 removably received through aligned holes 20, 20, and a bore 18a in opposed wall portions of the shaft 13, said bolt being releasably retained in place by a nut 19a threaded on the bolt. In other words, the bolt or pin 19 holds the combination bit and closure 16 complementally seated to rotate with the auger while the latter is rotated to drill the hole 12 in the situs E. Ports 22, 22 may be provided in the lower end of auger shaft 13 for selective passage of

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pressurized grout from the auger shaft into the bottom of hole 12 and around the bit 16 for purposes to be described.

In the use of the apparatus in accordance with the improved method of the invention, to anchor the tie-down bar in the earth E at a situs, the auger 10 with tie-down bar 17 and bit 16 non-rotatably affixed thereto, as shown in FIGURE 1, is by operation of motor 11 screwed into situs E to drill a hole 12 of predetermined depth. During this procedure the locking bolt holds the bar 17 axially centered within the auger shaft and, therefore, likewise centered in the hole 12. When the hole 12 is fully drilled, a quantity of pressurized grout may be momentarily pumped through the auger shaft to pass through the small ports 22, into the bottom of the drilled hole 12, and around the drill bit, and thereby at least partially to encompass and anchor the same centered in the hole.

Next, the locking pin or bolt 19 is removed from the auger to release the anchor bar 17 from the auger, with bit 16 affixed to the anchor bar. Screws or plugs 23, 23 may be releasably threaded into the bolt holes 20 to prevent flow of pressurized grout through the latter.

About the same time that the bit 16 is released from the auger, as described, pressurized grout may be pumped through the auger and into the bottom of the hole 12, as shown in FIGURE 2. Simultaneously, progressive withdrawal of the auger 10 to remove the earth from hole 12, and said injection of grout into the hole 12, is continued until said hole is filled with grout. Upon hardening of the grout in the hole 12, the tie-down bar is permanently embedded and anchored within the same in axially centered condition, as shown in FIGURE 3.

While the tie-down bar 17 and bit 16 thereon becomes a permanent part of the improved tie-down or bracing structure, the auger similarly may be used repeatedly upon attachment of new tie-down bars 17 having bits 16 affixed thereon. Extensions (not shown) of the tie-down bar 17 may be threadably attached to the connector portions 18 in known manner, or as required for bracing various types of concrete wall structures, bulkheads, or the like.

For the purposes of the foregoing method, the concreting or grouting materials may be cement base, non-shrinking cementitious material, or mortar. The pressurized concreting material, when pumped through the hollow auger as it is slowly withdrawn from the drilled hole, helps to displace the earth laden auger and penetrates into open seams and porous areas in the surrounding undisturbed soil, and thereby increases the frictional load-bearing or anchoring capacity of the tie-down bar.

Modifications of the method and apparatus described may be resorted to without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A method as for anchoring a tie-down bar at a situs, comprising: providing a drill having a passage there-through and a driving bit selectively closing its inner end; screwing said drill and bit into the situs to drill a hole of predetermined depth in the situs by outward displacement of earth thereof, while an elongated rigid element is maintained affixed to the driving bit and releasably connected to the drill to extend in axially centered relation within the drill passage for rotating the element and the bit with the drill; progressively removing the drill from the hole after releasing the driving bit and the element thereon in substantially centered position within the hole, and substantially without retraction of the displaced earth into the hole, while progressively feeding a hardenable cementitious fluid into the hole through said drill passage and the end thereof opened by releasing the bit, with the element retained thereon, to fill the hole and surround the element with the cementitious fluid; and thereafter allowing the cementitious

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fluid to harden in the hole and thereby to anchor the element bit in said substantially centered relation therein.

2. A method as for anchoring a tie-down bar at a situs, comprising: providing a drill having a passage there-
through and a driving bit selectively closing its inner
end; screwing said drill and bit into the situs to drill a
hole of predetermined depth in the situs by outward dis-
placement of earth thereof, while an elongated rigid ele-
ment is maintained affixed to the driving bit and releas-
ably connected to the drill to extend in axially centered
relation within the drill passage for rotating the element
and the bit with the drill; progressively removing the
drill from the hole after releasing the driving bit and
the element thereon in substantially centered position
within the hole, and substantially without retraction of
the displaced earth into the hole, while progressively feed-
ing a hardenable cementitious fluid into the hole through
said drill passage and the end thereof opened by releas-
ing the bit and element, to fill the hole and surround
the element with the fluid; and thereafter allowing the
fluid to harden in the hole and thereby to anchor the
element in said substantially centered relation therein,
said cementitious fluid being grout which, prior to releas-
ing said bit and the element, is by-passed from said pas-
sage into the bottom of the drilled hole at least partially
to encompass the bit.

3. Apparatus as for anchoring a tie-down bar in ce-
mentitious material in an earth situs, comprising: a con-
tinuous-flight auger drill having a passage therethrough;
a closure releasably seated on the lower end of said auger
drill to close said passage; a rigid bar affixed to said clo-
sure to extend upwardly in said passage; and locking

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means for releasably locking said rigid bar to rotate with
said auger drill and drive said closure therewith, and
selectively releasable after rotation of the auger drill
to drill a hole defined by displacement of earth in the
situs to permit withdrawal of the auger drill from the
hole without the closure and the rigid bar, and to per-
mit flow of the cementitious material through the pas-
sage into the hole and around said rigid bar, said closure
including a driving bit for the drill; said closure and said
auger drill having seat portions, complementally interen-
gaging in the closed position of the closure; and said
auger drill having by-pass means above said closure for
feeding cementitious material from the passage at least
partially to encompass said closure prior to said with-
drawal of the auger.

4. Apparatus as in claim 3, said locking means includ-
ing pin means operable through said auger shaft and said
rigid bar from the exterior of the auger shaft.

References Cited

UNITED STATES PATENTS

1,805,265	5/1931	Taussig	61—53.62
2,146,645	2/1939	Newman	61—53.64
2,667,037	1/1954	Thomas et al.	61—45
3,113,436	12/1963	Nalen	61—53.66 X
3,148,739	9/1964	Mattingly et al.	61—53.68 X
3,228,200	1/1966	Dufresne	61—53.64

OTHER REFERENCES

German printed application DAS 1,104,905, Bauer,
1961.

JACOB SHAPIRO, *Primary Examiner*.