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HOLLOW AUGER

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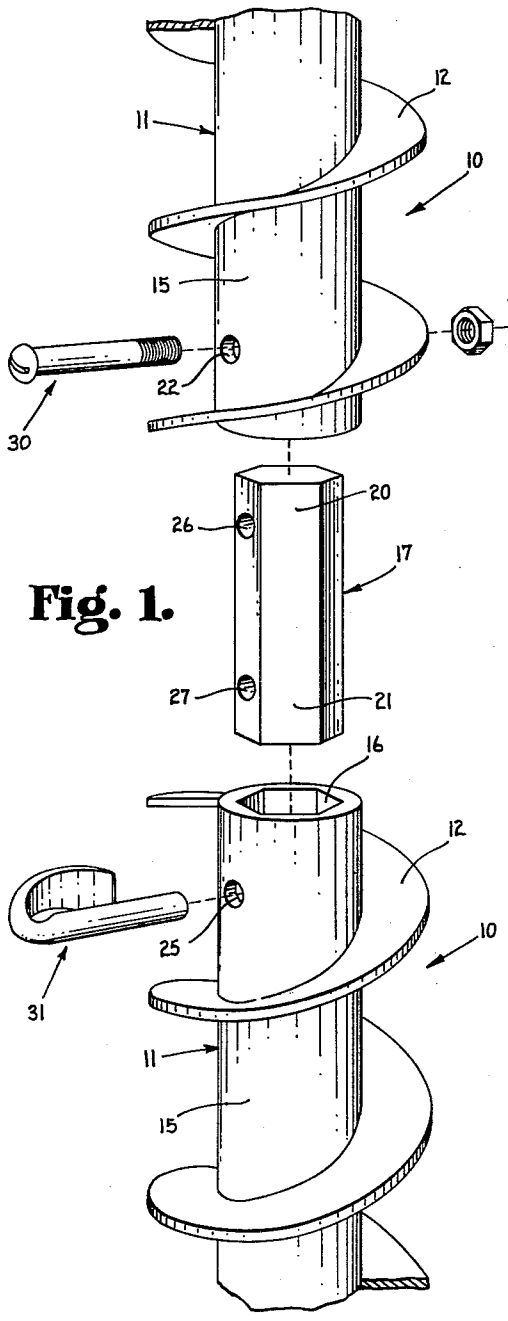


Fig. 1.

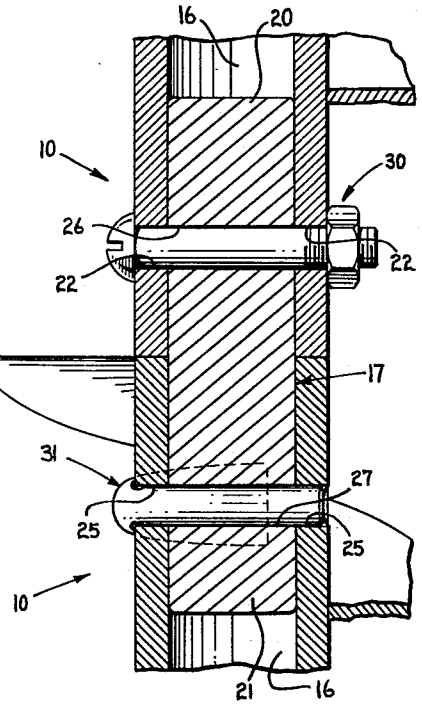


Fig. 2.

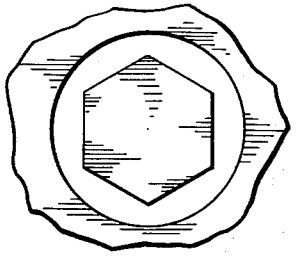


Fig. 3.

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3,178,210
HOLLOW AUGER

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The present invention relates to hollow augers and to improved coupling means for hollow augers.

Hollow augers are conventionally used for various purposes including water well drilling, core drilling, foundation testing and bridge soundings to name only a few. In practically all such applications, the hollow auger is used in sections which are connected together to provide a longer tool as the boring proceeds into the earth. Presently available hollow augers include a cylindrical tube having a helical screw flight welded to the periphery thereof. In order to connect two such sections together it is one present practice to make certain welds which result in brittle material adjacent the welds whereby breakage occurs. One object of the present invention is to provide an improved hollow auger connection which requires no welds and thus has increased strength.

A broad object of the present invention is to provide an improved hollow auger.

Occasionally breakage of a hollow auger will occur at a job site which is far removed from a replacement parts depot. Consequently, a further object of the invention is to provide a hollow auger construction that is easily, quickly and conveniently repaired by use of commonly available tools.

Related objects and advantages will appear as the description proceeds.

One embodiment of the present invention might include a hollow auger comprising a pair of tubes each having a helical flight secured to the external periphery thereof. Each of the tubes is of constant cross section all along its length with the cross sections of the two tubes being congruent. There is provided a connecting element or bar which has an external polygonal configuration complementary in shape to the internal configuration of the tubes. The connecting element has one end received in one of the tubes and the other end received in the other of the tubes.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

FIG. 1 is an exploded perspective view of the hollow auger and coupling means of the present invention.

FIG. 2 is a longitudinal section of the hollow auger of FIG. 1 showing it in assembled relation.

FIG. 3 is a plan view of the shape of an extrusion opening used in forming the tubes or stems of FIGS. 1 and 2.

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawing and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to the drawings, there is illustrated a hollow auger including a pair of sections **10**. Each of the sections **10** includes a tube **11** and a helical flight **12** welded to the tube **11**.

Each of the tubes **11** has a constant cross section throughout its entire length, said cross section being

externally circular and internally hexagonal. That is, the external surface **15** of each tube **11** is cylindrical and the internal hollow **16** of each tube is of constant hexagonal shape. Each tube **11** is integral and is formed by extrusion through a die having an extrusion opening with the shape shown in FIG. 3.

The two sections **10** are coupled together by means of a bar **17** having a hexagonal cross sectional shape complementary to the hexagonal shape of the hollow interior **16** of each tube **11**. The bar **17** has one end **20** inserted into one tube **11** and has its other end **21** inserted into the other tube **11** so as to lock the one hollow auger section **10** against rotation with respect to the other hollow auger section **10**. Each of the hollow auger sections **10** is provided with a bore **22** and **25** through the oposite sidewalls thereof with the axis of the bore intersecting the axis of the tube **11**. The bar or connecting element **17** is provided with bores **26** and **27** which are so positioned that when the bores **26** and **22** are aligned and when the bores **27** and **25** are aligned, the hollow auger sections **10** have their tubes or stems **11** abutting as shown in FIG. 2 and the flight **12** of one hollow auger section is aligned with the flight of the other hollow auger section.

Any satisfactory means may be provided for preventing the bar **17** from falling out of or being withdrawn from the hollow auger sections and for also maintaining the stems of the hollow auger sections in abutment. The illustrated means for this purpose are the stove bolt **30** and the U-shaped pin **31**. The bolt **30** is received through the aligned bores **22** and **26** while the U-shaped pin **31** is received through the aligned bores **25** and **27**. It should be made clear that the upper end of the uppermost hollow auger section of FIG. 1 is identical to the illustrated upper end of the lowermost hollow auger section while the lower end of the lowermost hollow auger section of FIG. 1 is identical to the lower end of the upper hollow auger section of FIG. 1.

It will be obvious from the above description that the present invention provides an improved hollow auger connection which requires no welds and, therefore, has increased strength. While the bolt **30** and the U-shaped pin **31** transmit a certain amount of torque, the primary torque transmitting means is through the hexagonal or polygonal shapes of the member **17** and the polygonal hollow interior **16** of each hollow auger section. Consequently, the connection or coupling provided by the present invention has great strength. A further advantage of the present invention is the fact that if breakage occurs intermediate the ends of the stem **11**, the stem can be cut off square at the broken end and reused after drilling of a further bore such as **22** or **25**.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention and the scope of the claims are also desired to be protected.

The invention claimed is:

1. A readily repairable joint between adjacent sections of a hollow auger comprising a pair of tubes each having a helical flight fixed to and reinforcing the external periphery thereof; each tube of said pair of tubes having a cross sectional area and being of constant cross section all along the length thereof; said cross sections being congruent, internally polygonal and externally circular; a connecting bar having an external polygonal configuration which is complementary to the internal configuration of said tubes; said connecting

bar also having a cross sectional area; said bar having one end received in one of said tubes and the other end received in the other said tubes; readily removable means attaching each of said tubes to said bar; said tubes abutting one another with the end of one flight of one tube forming a continuous spiral with the end of the flight of the other tube; the cross sectional areas of said flight reinforced tubes and said bar being so proportioned that each of said tubes is capable of transmitting a higher torque load than said bar; and the parts being so constructed and arranged that upon the imposition of a sudden increase of torque stress, said bar will shear thereby preventing damage to said tubes and flights.

2. The readily repairable joint of claim 1 wherein said readily removable means attaching each of said tubes to said bar comprises a pair of members; said one tube and said one end of said bar having a first set of aligned bores therethrough; one of said members being received through said first set of bores and coupling said one tube to said bar; said other tube and said other end of said bar having a second set of aligned bores therethrough; said other member being received through said second set of bores and coupling said other tube to said bar.

3. The readily repairable joint of claim 2 wherein said other member is a U-shaped pin having one leg received through said second set of bores and the other leg extending around said other tube and retaining said U-shaped pin through and on said other tube.

References Cited by the Examiner

UNITED STATES PATENTS

593,247	11/97	Smith et al.	
819,434	5/06	Johnston.	
893,143	7/08	Caldwell	287—2
2,260,811	10/41	Kozak	287—2
2,675,257	4/54	Specht	287—127
3,000,656	9/61	Hollaender	287—2
3,104,757	9/63	Dougherty et al.	287—2 X

FOREIGN PATENTS

9,329	6/84	Great Britain.

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