

[54] **AUGER DEVICE**

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[51] Int. Cl. **F25c 5/04, E21c 13/04**

[58] Field of Search **175/18, 323, 394, 310, 102, 175/88, 395**

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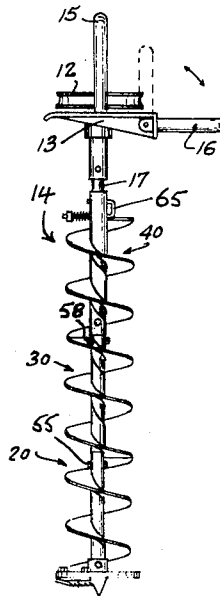
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[57] **ABSTRACT**

An auger made in at least two and preferably three parts, which can be made compact for transportation and storage by sliding one bit portion down over the other. A screw member of each bit portion projects through a helical slot in each bit portion outside it. In operation, the bit portions are disengaged and connected end-to-end by means of separate shafts so that the screw members form continuations of each other.

2 Claims, 8 Drawing Figures



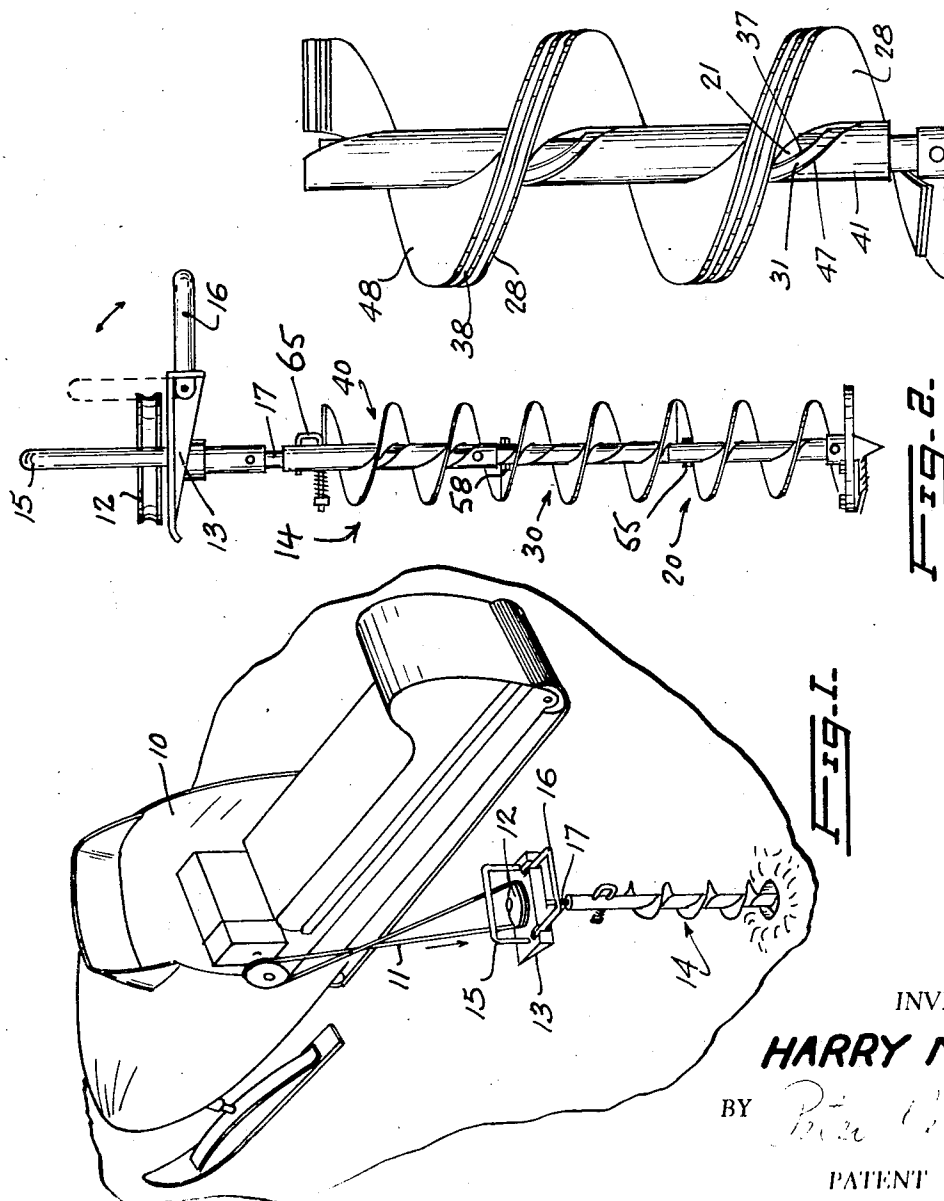


Fig. 1.

Fig. 2.

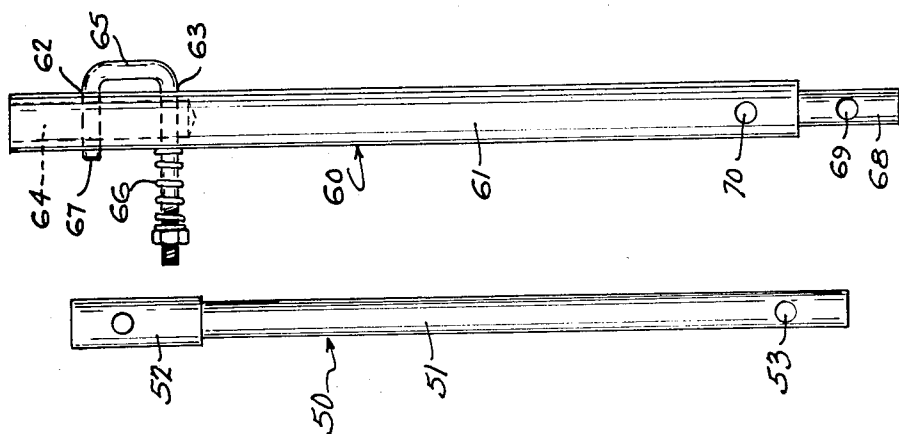


Fig. 3.

Fig. 4.

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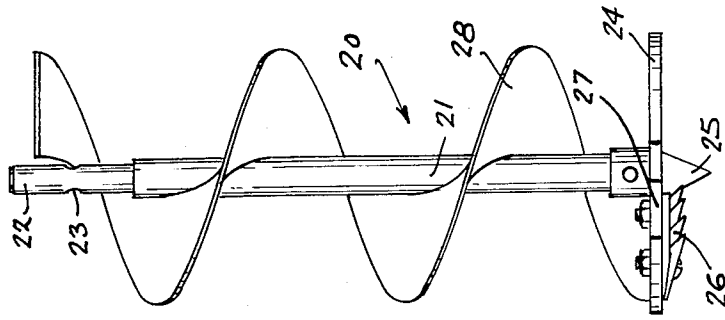


Fig. 3a.

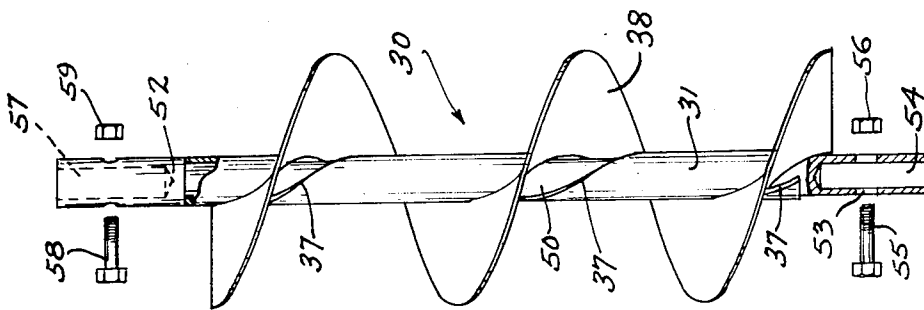


Fig. 3b.

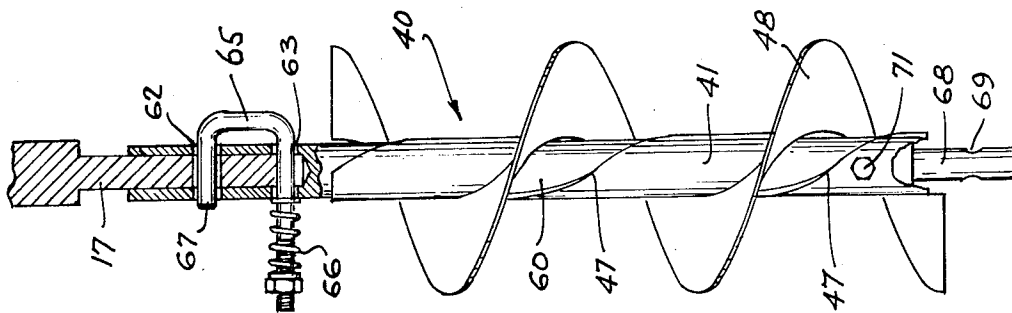


Fig. 3c.

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AUGER DEVICE

This invention relates to improvements in auger devices, and is more particularly directed towards the construction of an ice auger for drilling holes through a sheet of ice. Such drilling may be required for any one of various purposes, for example, by fishermen during winter, by scientists studying ice conditions or by engineers engaged in ice clearance for flood control purposes.

Such ice augers are well known, but have previously suffered from the disadvantage that they are comparatively bulky devices, and, more particularly, that they are too long for convenient storage and transportation (for example in a pack on a man's back).

The object of the present invention is to provide a manner of rendering a relatively lengthy auger device conveniently reducible in length for packing and transportation purposes. A further object of the invention is the ability to convert the auger device from its extended (operative) condition to its contracted (compact) condition both quickly and conveniently, with a minimum expenditure of time and effort by the user.

To this end, the invention in its broad scope consists of an auger comprising:

- a. a first bit portion including a first shaft, cutting means on an end of said shaft and a first screw member extending helically along said shaft away from the cutting means for the removal of debris therefrom,
 - b. a second bit portion including a hollow shaft, a second screw member of the same pitch as said first screw member extending helically along the hollow shaft and a helical slot in said hollow shaft extending therealong with the same pitch as the screw members,
 - c. and a first separate shaft for insertion into the hollow shaft and into end-to-end engagement with said first shaft so that the second screw member forms a smooth continuation of the first screw member,
 - d. the dimensions being such that, upon removal of the separate shaft from within the hollow shaft, the latter can slide and rotate down over the first shaft to enclose the same with the first screw member projecting through the helical slot, whereby to form a compact assembly of the two bit portions for convenient storage and transportation.
- Preferably the auger will include
- e. a third bit portion comprising a second hollow shaft, a third screw member of the same pitch as the first and second screw members extending helically along the second hollow shaft and a second helical slot in said second hollow shaft extending therealong with the same pitch as the screw members,
 - f. and a second separate shaft for insertion into the second hollow shaft and into end-to-end engagement with the first separate shaft so that the third screw member forms a smooth continuation of the second screw member,
 - g. the dimensions being such that, upon removal of the second separate shaft from within the second hollow shaft, the latter can slide and rotate down over the second hollow shaft to enclose the same with the first and second screw members project-

ing through the second helical slot, whereby to form a compact assembly of the three bit portions for convenient storage and transportation.

One example of a construction made in accordance with the present invention is illustrated diagrammatically and by way of example only in the accompanying drawings. The broad scope of the invention is as defined in the appended claims.

In the drawings:

FIG. 1 is a perspective view demonstrating the general manner of use of the auger device;

FIG. 2 is a side elevation view of the device in its operative condition;

FIGS. 3a, 3b and 3c form continuations of one another and show by means of a larger scale, side, exploded view the three main auger bit portions that make up the device;

FIG. 4 is a view of these same three auger bit portions reduced to the compact condition;

FIG. 5 is an elevation view of a first removable shaft; and

FIG. 6 is an elevation view of a second removable shaft.

FIG. 1 shows a snowmobile type of vehicle 10 from which power is obtained through a drive belt 11 engaging fly wheel 12 mounted on a frame portion 13 for supporting the auger 14. As also seen in FIG. 2, the frame 13 is supplied with a fixed upper handle 15 and a side handle 16 which can be pivoted between the two positions shown in FIG. 2. It is locked in its full line position during use of the device, and is moved to its dotted line position for storage and transportation of the device. This arrangement is conventional in these devices.

The fly wheel 12 is connected to a shaft 17, to which, in turn, the auger 14 will be connected in the manner shown in FIGS. 1 and 2 when the device is to be used. When it is to be dismantled for storage or transportation the auger 14 is separated from the shaft 17. The head portion (frame 13 and parts connected thereto) is relatively compact and there remains to reduce the auger 14 to more manageable dimensions.

The auger 14 consists of three portions, a lower bit portion 20 (FIG. 3c); an intermediate bit portion 30 (FIG. 3b) and an upper bit portion 40 (FIG. 3a).

The lower bit portion 20 consists of a central shaft 21 having a reduced head portion 22 formed with a transverse hole 23. At the foot of the shaft 21 there is secured a circular bottom plate 24 of conventional form, this bottom plate 24 incorporating a downwardly projecting central spike 25 and a set of downwardly tilted, radially extending teeth 26 located adjacent a cut-out portion 27 in the plate 24. The teeth 26 cut and deflect ice through the cut-out 27 to the upper side of the plate 24 and onto the upper surface of the lower end of a helical screw member 28 which is secured around the shaft 21 to wind its way up to the upper end thereof.

The intermediate bit portion 30 consists of a hollow cylindrical shaft 31, the inside diameter of which is large enough to receive the shaft 21 of the lower bit portion 20 when the parts are in the compact position, as will be more fully explained below. During operation the bit portion 31 receives a separate shaft 50 (shown alone in FIG. 5), which shaft comprises a main portion

51 having an outside diameter to fit within the hollow shaft 31 and an enlarged head 52 of outside diameter similar to that of the hollow shaft 31. The end of the shaft portion 51 contains a transverse hole 53 and a longitudinal cavity 54 for receiving the reduced head portion 22 of the shaft 21 of the lower bit portion 20, as suggested by FIGS. 3b and 3c, the parts being secured together by bolt 55 and nut 56.

The intermediate bit portion 30 also contains a screw member 38 for forming a continuation of the screw member 28 of the lower bit portion, this member 38 being secured to the outer surface of the hollow shaft 31. A helical slot 37 is cut through the hollow shaft 31 and winds its way up this shaft at a location just below that of the screw member 38. The purpose of this slot will become apparent from the description below of the manner of compacting the device.

The upper bit portion 40 is generally similar to the intermediate bit portion 30, except that its hollow shaft 41 is somewhat bigger, being sufficiently large for its inner diameter to engage over the outside of the hollow shaft 31 of the intermediate bit portion 30 when the parts are in the compact condition. In use, the hollow shaft 41 receives a shaft 60 (shown alone in FIG. 6), which shaft has a main large diameter portion 61 having at one end a pair of transverse holes 62, 63 and a longitudinal cavity 64. The holes 62, 63 receive a fixing device 65 urged to the position shown by a spring 66, in which position one leg 67 of the device 65 engages the shaft 17 which is inserted in the cavity 64 in the fully assembled condition of the device. The shaft 60 also has a reduced diameter portion 68 at its other end, formed with a transverse hole 69. A further transverse hole 70 (FIG. 6) is formed in the portion 61 to receive a bolt and nut assembly 71 that serves to secure the bit portion 40 to the shaft 60.

Portion 68 is adapted to engage in a longitudinal cavity 57 in the head 52 of the shaft 50 and to be secured therein by bolt 58 and nut 59, as suggested by FIGS. 3a and 3b.

The upper bit portion 40 also has a screw member 48 arranged to form a continuation of the screw member 38 of the intermediate bit portion 30, and the hollow shaft 41 is likewise formed with a helical slot 47 which winds its way up the shaft 41 just below the screw member 48. It will be noted that the slot 47 is somewhat wider than the slot 37.

FIG. 2 shows the auger device in its operative condition with the head 22 of the shaft 21 of the lower bit portion 20 inserted into the cavity 54 in the shaft 50 located inside the hollow shaft 31 of the intermediate bit portion 30 and secured in place by the bolt and nut 55, 56. The upper end of the intermediate bit portion 30 is similarly connected end-to-end to the upper bit portion 40 by the insertion of the lower end 68 of the shaft 60 into the cavity 57 and fixed in place by means of the bolt and nut 58, 59.

When it is desired to disassemble the device and place it in its compact condition, the auger 14 is first separated from the drive shaft 17 by manual operation of the fixing device 65. The nuts 56 and 59 are then unscrewed and the bolts 55 and 58 removed. The inner shafts 50 and 60 are then slid out of their corresponding hollow shafts 31 and 41. The intermediate bit portion 30 is then rotated and slid onto the lower bit por-

tion 20 with the hollow shaft 31 passing down over the shaft 21 and with the screw member 38 sliding down along the screw member 28, which latter projects through the slot 37 at this time. In like fashion, the upper bit portion 40 is then twisted and slid onto the intermediate bit portion 30 with the hollow shaft 41 sliding over the shaft 31 and the screw member 48 sliding around the screw member 38 and with both the screw members 28 and 38 accommodated in the slot 47. After these actions, the final compacted assembly is then as shown in FIG. 4, and will be seen to have a length basically the same as that of each bit portion, i.e., one third the total length of the auger when assembled in its operative condition, and an outer diameter no greater than that of one of the individual bit portions.

While the auger must be divided into at least two portions to be capable of compaction in the manner of the invention, the preferred number of portions will normally be three. However, in the case of an especially long auger, a fourth or even still further portions may be connected to the first three bit portions in essentially the same manner.

I claim:

1. An auger comprising

- a. a first bit portion including a first shaft, cutting means on an end of said shaft and a first screw member extending helically along said shaft away from the cutting means for the removal of debris from said cutting means,
- b. a second bit portion including a hollow shaft, a second screw member of the same pitch as said first screw member extending helically along the hollow shaft and a helical slot in said hollow shaft extending therealong with the same pitch as the screw members,
- c. and a first separate shaft for insertion into the hollow shaft and into end-to-end engagement with said first shaft so that the second screw member forms a smooth continuation of the first screw member,
- d. the auger being such that, upon removal of the separate shaft from within the hollow shaft, the latter can slide and rotate down over the first shaft to enclose the same with the first screw member projecting through the helical slot, whereby to form a compact assembly of the two bit portions for convenient storage and transportation.

2. An auger according to claim 1, including

- e. a third bit portion comprising a second hollow shaft, a third screw member of the same pitch as the first and second screw members extending helically along the second hollow shaft and a second helical slot in said second hollow shaft extending therealong with the same pitch as the screw members,
- f. and a second separate shaft for insertion into the second hollow shaft and into end-to-end engagement with the first separate shaft so that the third screw member forms a smooth continuation of the second screw member,
- g. the auger being such that, upon removal of the second separate shaft from within the second hollow shaft, the latter can slide and rotate down over the second hollow shaft to enclose the same with

the first and second screw members projecting through the second helical slot, whereby to form a compact assembly of the three bit portions for convenient storage and transportation.

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