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K. J. BROWNE

2,591,233

EARTH AUGER

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Fig. 1.

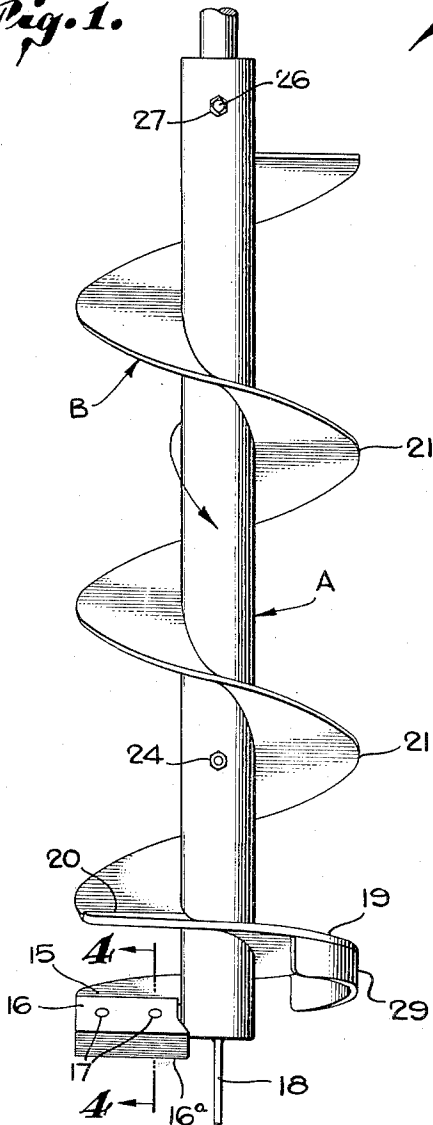


Fig. 2.

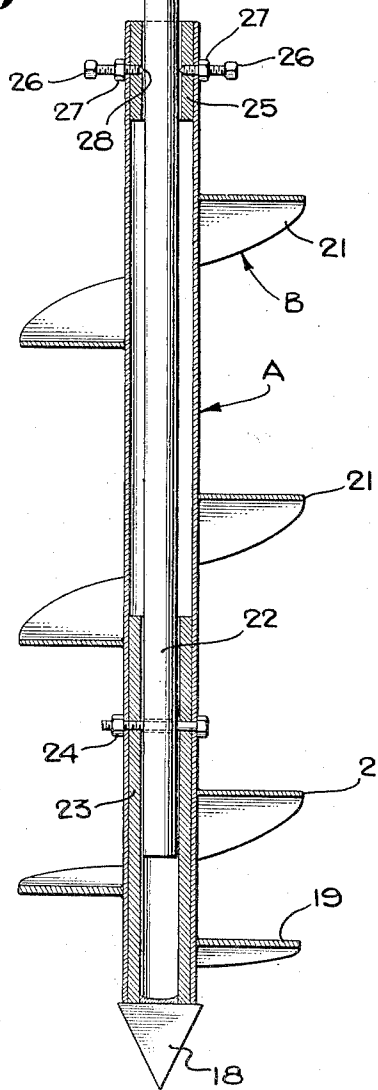


Fig. 3.

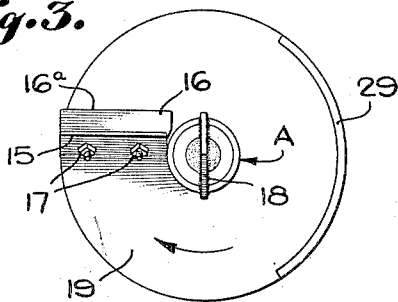
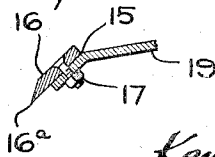


Fig. 4.



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EARTH AUGER

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5 Claims. (Cl. 255—69)

1

My invention relates to power operated earth augers of the rotary type used for digging holes for posts and the like.

Such augers as heretofore designed have many disadvantages the most outstanding of which are as follows: They require repeated full length earth penetrating operations to form a hole of their own length. The hole formed is not of uniform diameter, and frequently the walls of the hole cave in or the earth is not completely removed, requiring additional boring operations to produce a hole acceptable to a post. Particularly in sticky formations, do they bog up and jam, and many mechanisms have been designed for automatically disconnecting the auger from its driving means to prevent breaking of the parts of the driving means incident to jamming of the auger. Lastly, the earth loosened by the auger constantly tends to fall back into the hole during the boring operation, and, in consequence, requires a longer period of operation to bore a hole devoid of loose earth.

It is a purpose of my invention to provide an earth auger which overcomes the disadvantages of prior augers and particularly those above mentioned, and functions in only a single and continuous operation to bore in the earth a hole of uniform diameter throughout its length, thereby greatly reducing the boring time to form a complete hole, and regardless of the stickiness of the formation; conveys all earth from and clear of the top of the hole to prevent it from falling back into the hole; and at the same time firmly packs the walls of the hole to preclude possible cavein.

A further purpose of my invention is the provision of an earth auger having an earth cutting means at its lower end, a second means for gradually elevating the earth as so cut, and a third means for rapidly elevating the earth from the second means, all in a continuous operation. The second and third means have the form of a spiral blade, with the second means comprising the lowermost convolution of the spiral which is at a slight degree of inclination, and the third means comprising the remaining convolutions which are at much greater degree of inclination than the lowermost convolution. To give added weight and, hence, greater boring ability to the lowermost convolutions and to increase its strength to withstand digging shocks, it is made of thicker metal than the remaining convolutions.

It is also a purpose of my invention to provide an earth auger having means for so connecting it to a drive shaft, that should the auger become

2

jammed in the earth against rotation, as when encountering a rock or stone, its driving connection with the shaft is automatically severed to prevent breaking or other injury to the shaft or the auger, but the auger will remain so connected to the shaft that it can still be withdrawn from the hole by the shaft.

I will describe only one form of earth auger embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings:

Fig. 1 is a view showing in side elevation one form of earth auger embodying my invention.

Fig. 2 is a view showing the auger of Fig. 1 in vertical section.

Fig. 3 is a bottom plan view of the auger.

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1.

With specific reference to the drawings, my auger in its present embodiment comprises a spindle A tubular in form, and to the outside of which is welded or otherwise secured an auger flight B of spiral form and substantially coextensive in length with the spindle. The lower end of the flight B terminates in a lineal edge 15 extending radially from the spindle A, and inclined downwardly (see Fig. 4) with a cutting blade 16 secured thereto by bolts 17 or other means, and so that the cutting edge 16a of the blade is disposed radially of the spindle.

Welded or otherwise secured to the lower end of the spindle A is a member 18 preferably of flat triangular form, with one pointed end disposed axially of the spindle so as to center the lower end of the auger in its digging operation.

The structure and functions of the auger flight B are paramount features of my invention because by reason thereof are accomplished the advantages of extremely rapid and complete digging of a hole in a single operation, and of throwing the earth clear of the hole so as to avoid the falling of the earth back into the hole and thus requiring further digging operations.

These advantages are attained by forming the auger flight B so that the lowermost convolution 19 has only a slight degree of inclination, while at the upper terminus of the flight convolution indicated at 20, the flight is abruptly increased in its upward inclination to a much greater degree preferably three fold, so that the remaining convolutions 21 are at a pitch greatly in excess of the convolution 19.

It will be noted that the convolution 19 is of a metal thickness considerably greater than that of the convolutions 21. This not only gives added

weight to the lower end of the boring blade, to increase its boring ability at this point, but it gives added strength to withstand shocks when striking rocks or stones.

For rotating the auger in the digging of a hole, any conventional driving means may be employed including a shaft 22 which extends into the spindle A. The shaft is drivingly fixed to the spindle through the medium of a relatively long and thick metal sleeve 23 which receives the lower end of the shaft, and is secured thereto by a bolt 24 or other means, which extends through the spindle, sleeve and shaft. The sleeve 23, in turn, is fixed to the spindle at its lower end by welding, which operation may be performed simultaneously with welding of the centering member 18 to both the spindle and sleeve, and so that the sleeve is closed with the welding metal.

The bolt 24 is designed to shear when the auger becomes jammed in the digging of a hole, such as by a rock or stone, and whereby the auger is no longer drivingly connected to the shaft so that the latter may continue to rotate without injury to the auger or the shaft.

To prevent complete disconnection of the auger from the shaft so that it may be recovered from a hole in the event of the bolt 24 being sheared, a relatively short sleeve 25 is secured in the upper end of the spindle, and through which the shaft extends, with a pair of diametrically disposed set screws 26 extending through the spindle and threaded in the sleeve. These screws are provided with lock nuts 27 for securing them in adjusted position to cause their inner pointed ends 28 to bite into the shaft and thus hold the shaft against withdrawal from the spindle.

Another structural and functional feature of my invention, is a means for pressing the wall of the hole as it is dug by the auger, to prevent the earth from caving in, and thus requiring re-boring operations to produce a clean hole of the desired depth. This means may comprise an arcuate flange 29 fixed on and depending from the edge of blade convolution 19 and disposed opposite the cutting blade 16.

In operation the shaft 22 drives the auger in a clockwise direction as when viewed in Fig. 3, the member 18 first penetrating the earth to center the auger, and then the cutting blade 16 cutting the earth to dig the hole. The earth as cut by the blade 16 passes onto the lower end of the auger flight B and is thus moved progressively upward of the flight. Due to the low degree of pitch of the lowermost convolution 19 of the flight, there is relatively a gradual elevation of the earth at this point. This affords easy and rapid initial and continued penetration of the auger into the earth.

The cutting action of the blade 16 is made positive by the sleeve 23 because of the added weight it lends to the lower portion of the auger.

Once the loosened earth leaves the blade convolution 19, its elevation is greatly accelerated by reason of the increased pitch of the convolutions 21, resulting in a continuous and rapid rise of the earth to the top of the auger, and finally throwing it clear of the hole to prevent it from falling back into the hole. This method of earth handling allows a hole to be dug not only rapidly but in a single boring operation, that is, the auger can be continuously driven downward its full length without any intervening retracting and re-boring operations as is necessary with augers that operate to lift the earth at a rate of movement which is constant and equal to or less than

the rate at which the earth is fed to the auger flight.

Particularly is my auger effective in digging sticky formation by virtue of the steep inclination of the upper convolutions 21 and the distance therebetween is so greatly increased over the distance between the lower convolutions, that as a result an increased earth elevating speed is produced which conveys the earth away from the lower convolutions with such rapidity that the lower convolutions and the cutting blade 16, can at all times perform their digging functions. In consequence, the earth is allowed to loosen and separate as it is elevated to prevent packing thereof and causing it to jam the auger in the hole, as is the case in augers where the convolutions are spaced uniformly from end to end.

In loose formations my auger is also particularly successful by virtue of the member 29, for in operation of the auger the cutting blade 16 produces a lateral thrust of the auger which forces the member against the wall of the hole and thereby presses the earth sufficiently to prevent it from falling into the hole. Thus the auger is not only operable to form a hole in much less time than is possible with prior augers, but one which is devoid of loose earth as a result of cave in so that a post can without difficulty, be extended into the hole.

Although I have herein shown and described only one form of earth auger embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of my invention and the spirit and scope of the appended claims.

I claim:

1. An earth auger comprising: a tubular spindle; a centering sleeve fixed in the upper end portion of said spindle; a second sleeve fixed in the lower portion of said spindle, and relatively heavy to lend additional weight to the lower portion of said spindle; a centering member fixed to and projecting axially from the lower end of said spindle; a boring blade secured to and extending spirally of the outer side of said spindle; a driving shaft for said spindle extending through the upper sleeve and into the second sleeve; a shearable element extending through said spindle and said second sleeve and said shaft for operatively connecting the spindle to the shaft for rotation thereby; and set screws adjustable in said spindle and centering sleeve for engaging the driving shaft to maintain a connection of the spindle with the shaft should said element shear.

2. An earth auger having a spindle; and an auger flight fixed to and extending in a continuous spiral about the spindle and being of substantially the same diameter throughout, the lowermost convolution of the flight having a smaller pitch than the pitch of the convolutions thereabove, and a cutting blade fixed to the lower end of said flight and disposed laterally of said spindle.

3. An earth auger having a spindle; and an auger flight fixed to and extending in a continuous spiral about the spindle and being of substantially the same diameter throughout, the lowermost convolution of the flight having a smaller pitch than the pitch of the convolutions thereabove, and of thicker material to give added strength thereto and added weight at the lower end of the auger, and a cutting blade fixed to the lower end of said flight and disposed laterally of said spindle.

5

4. An earth auger, including: a spindle, an auger flight fixed to and extending in a continuous spiral about the spindle and being of substantially the same diameter throughout, the lowermost convolution of the flight having a smaller pitch than the pitch of the convolutions thereabove, and of thicker material than the convolutions thereabove; a cutting blade fixed to the lower end of the flight and disposed laterally of the spindle; and an arcuate element on and depending from the edge of the lowermost convolution of the flight substantially diametrically opposite the cutting blade.

5. An earth auger having a spindle; and an auger flight fixed to and extending in a continuous spiral about the spindle and being of substantially the same diameter throughout, the lowermost convolution of the flight having a smaller pitch than the pitch of the convolutions thereabove, and a cutting blade fixed to the lower end of said flight and disposed laterally of said spindle, said blade extending from the spindle to the edge of the flight.

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6

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
228,044	Dine -----	May 25, 1880
732,479	Wheeler et al. -----	June 30, 1903
785,302	Fullard -----	Mar. 21, 1905
919,595	Kessler -----	Apr. 27, 1909
1,010,314	Popky -----	Nov. 28, 1911
1,116,154	Stowers -----	Nov. 3, 1914
1,554,160	Howlett et al. -----	Sept. 15, 1925
1,789,399	Bartenbach et al. -----	Jan. 20, 1931
1,990,341	Meyer -----	Feb. 5, 1935
2,107,958	Pribyl -----	Feb. 8, 1938
2,221,680	Parrish -----	Nov. 12, 1940
2,320,612	Kandle -----	June 1, 1943
2,453,204	Dobbs -----	Nov. 9, 1948