April 7, 1953 J. F. CLAYTON ET AL 2,634,104

AUGER

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Fig. 1

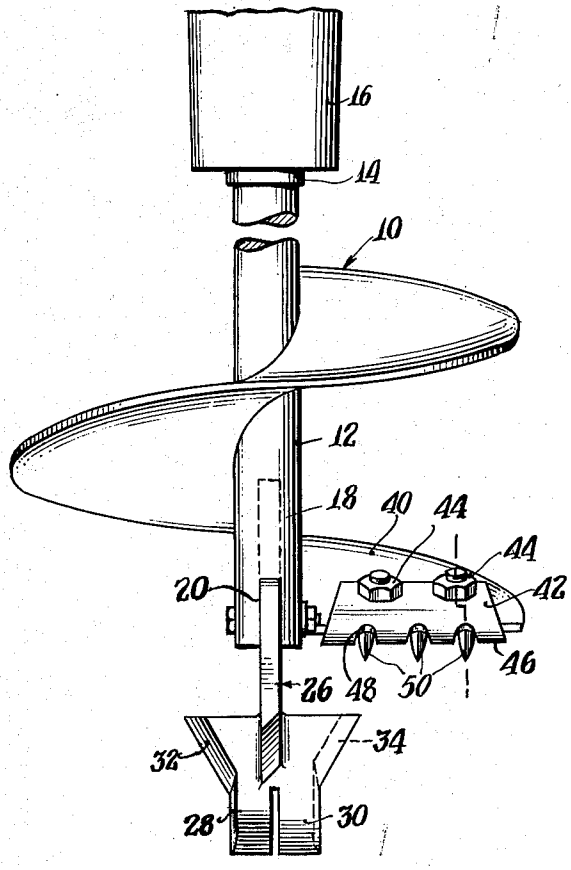


Fig. 3

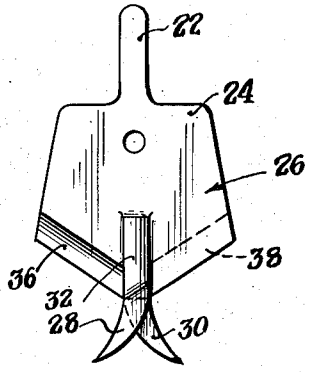


Fig. 4

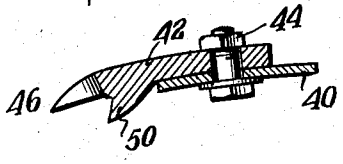


Fig. 5

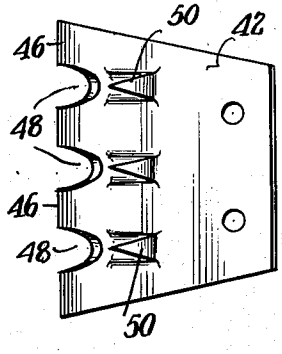
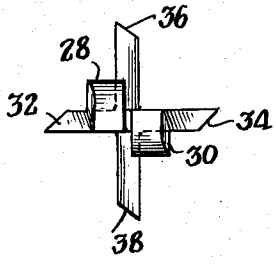


Fig. 2



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10 Claims. (Cl. 255—69)

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This invention relates to augers and more particularly to augers adapted for use with earth boring apparatus for boring large holes into the earth for securing poles and the like therein.

In the drilling or boring of holes in earth formations considerable difficulty has been occasioned upon encountering rock formations. The conventional auger or auger type bits known to the art will not bore through even moderately hard rock formations, but the helix and various associated blades slip on the surface thereof and, accordingly, will not bore or penetrate therethrough.

Accordingly, it is a prime object of our invention to provide an auger which will bore through various rock formations when driven by conventional earth boring apparatus.

It is a feature of our invention to provide an auger blade or bit which will cut into moderately hard rock formations and will not slip on the surface thereof.

It is still a further feature of our invention to provide an auger which will tend to urge itself into earth or rock formations upon rotation thereof, and it is a particular feature hereof to provide pilot and leading helical bits which similarly tend to pull or urge the auger into the formation being bored.

A still further object of our invention is to provide an entering blade or lip on the leading edge of the helix and a pilot bit which will perform the above objects, possess the above features and which are relatively simple and comparatively inexpensive and which may be quickly attached to and detached from the helix of the auger.

The above objects and features as well as other objects and features will be apparent from the following detailed description of an embodiment of our invention taken in connection with the accompanying drawing where like character references refer to like parts throughout the several views, and where

Fig. 1 is an elevation of an assembled auger with our improved blade and fish-tail pilot bit attached thereto,

Fig. 2 is a bottom plan view of the fish-tail bit,

Fig. 3 is an elevation of the pilot type bit,

Fig. 4 is a cross-sectional view of the auger blade taken along the line 4—4 of Fig. 1, and

Fig. 5 is an elevation illustrating the nether side of the leading auger blade or bit.

The auger is generally indicated by the numeral 10 and has the cylindrical body portion or shank 12 provided with the slightly enlarged shank 14 at its upper end in order that the auger may be at-

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tached to the rotating head 16 whereby the auger may be rotated and advanced into the earth by conventional equipment, not shown. A splined socket 18 is provided at the lower end of the body portion 12 and extends to the radial slots 20 to receive the splined neck 22 and shoulders 24 of the fish-tail bit 26. A single bolt 28 passes through the apertures in the opposed walls of the radial slots 20 and the body of the pilot bit 26 whereby the latter is releasably and rigidly secured to the body of the auger.

The fish-tail bit 26 has the lower cutter blades 28 and 30 which are divided and each of which are curved in the direction of rotation, one being curved forwardly and the other backwardly. The fish-tail reamer blades 28 and 30 are integral with and extend upwardly and outwardly to provide the reaming blades 32 and 34. As illustrated the lower fish-tail bits and reamers are formed of substantially flat stock and are secured to the upper substantially flat body 26 of the pilot bit at an angle of 90 degrees. The body 26 has the upwardly and outwardly diverging reamer blades 36 and 38 disposed at its lower end. Thus the special configuration of the beveled fish-tail bit is such that the cutters 28 and 30 tend to urge the bit into the formation and the angularly disposed reaming cutters ream the hole to a size to receive the leading blade 42 of the helix 40.

The helix or screw blade 40 is of conventional construction; however, the leading blade 42 disposed on the entering lip of the helix is of special construction. The auger blade 42 may be secured to the helix 40 at its lower and leading end by means of the bolts 44 extending through cooperating apertures in the body of the cutter blade and the forward end of the helix. The body of the cutter blade is curved downwardly slightly at its leading edge and has the leading beveled cutting blade 46, which may be scalloped as at 48. Spaced back of the leading cutting edge 46 and on the nether side of the body 42 of the auger cutter are the downwardly extending sharply pointed beveled cutters or teeth 48 which are spaced directly behind the scallops 50. The downwardly extending cutting teeth 50 are forwardly pointed in the direction of rotation and beveled on their nether side, in order that they will bite or penetrate into the formation being bored, such as moderately hard rock formations, thereby forcing the forwarding cutting edges 46 into the rock formation and thereby providing a means to bore through rock formations. While we have illustrated three depending cutter teeth 50 and a like number of cooperating recesses or scallops 48, it

is manifest that any desired number may be utilized. The scallops 48 may be omitted if desired, but we have found that the arrangement illustrated is preferable in drilling through moderately hard rock formation. The blade elements may be formed of any suitable material known to the art and preferably case hardened on the cutting surfaces.

It is believed that the mode of operation is manifest from the above description, but by way of summary, the auger is assembled as illustrated in Fig. 1 and connected to conventional power means to rotate and permit lowering of the auger into the earth formation through which it is boring. The configuration of the fish-tail bit and auger blade is such that the auger will not slip on the surface of rock formations, but will be urged into and bite into such formations and thereby drill therethrough.

While a detailed description of a preferred embodiment of our invention has been illustrated and described, numerous modifications may be made in the details of construction thereof and we do not intend to limit ourselves to the details thereof, but only to the invention as defined in the following claims.

We claim:

1. An auger comprising a shank, a helix on said shank, a blade member connected to said helix, said blade member including a forward cutting edge, a plurality of recesses in said cutting edge, and cutting teeth depending from the nether side of said member and spaced back of said recesses, and a second blade member secured to said shank.

2. An auger comprising a shank, a helix on said shank, a blade member connected to said helix, and a second blade member connected to said shank comprising, a substantially flat body member, downwardly converging reamer blades at the lower end of said body member, a second substantially flat body member disposed at right angles to and proximate the lower end of said first body member, downwardly converging reaming cutters on said second body member proximate and at right angles to said first mentioned reaming cutters, and a fish-tail bit disposed at the lower end of said second body member.

3. In an auger including a shaft, a helix on said shaft, a bit at the lower end of said shaft, and a blade member connected to said helix, the improvement comprising, a downwardly beveled leading cutting edge on said blade member and a plurality of cutting teeth spaced back of and under said cutting edge, said cutting teeth being forwardly inclined whereby said blade member will bore into earth formations and urge the auger thereinto.

4. The improvement of claim 3 where the leading cutting edge includes scallops therein and the cutting teeth are disposed back of recessed portions of said scallops.

5. In an auger including a shaft, a helix on said shaft, a blade member connected to said helix and a multiple stage bit connected to the lower end of said shaft, the improvement comprising, substantially flat body members arranged substantially at right angles forming the body of said bit, downwardly converging reaming cutters disposed proximate one another and in the planes of said body members, and a fish-tail bit formed at the lower end of one of said body members and below said reaming cutters.

6. A blade member adapted for use on the leading edge of a helix of an auger comprising, a downwardly inclined bevelled leading cutting edge and a plurality of spaced cutting teeth disposed back of and under said cutting edge, said cutting teeth being forwardly inclined whereby said blade member will urge itself into earth formation being bored.

7. The blade member of claim 6 where the beveled leading cutting edge includes a plurality of spaced segmental recesses and the cutting teeth are spaced back of such recesses.

8. A multiple stage bit adapted for use with an earth auger comprising, a pair of substantially planar body members arranged at right angles to one another, downwardly converging reaming cutters formed on the sides and bottom of said body members and disposed axially of one another, and a fish-tail bit formed at the lower end of one of said body members and below said reaming cutters.

9. A multiple stage bit comprising, a first substantially flat body member, downwardly converging reaming cutters formed on the bottom of said first body member, a second substantially flat body member joined at right angles to the lower portion of said first body member, downwardly converging reaming cutters on the sides of said second body member, the reaming cutters of said first and second body members being disposed along substantially the same axial extent and at right angles to one another, and a fish tail bit disposed at the lower end of said second body member and below said reaming cutters.

10. An augur comprising a shaft, a helix on said shaft, a bit at the lower end of said shaft, and a blade member connected to said helix, said blade member including a downwardly bevelled leading cutting edge and a plurality of cutting teeth spaced back of and under said cutting edge, said cutting teeth being forwardly inclined whereby said blade member will bore into earth formations and urge the auger thereinto.

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