

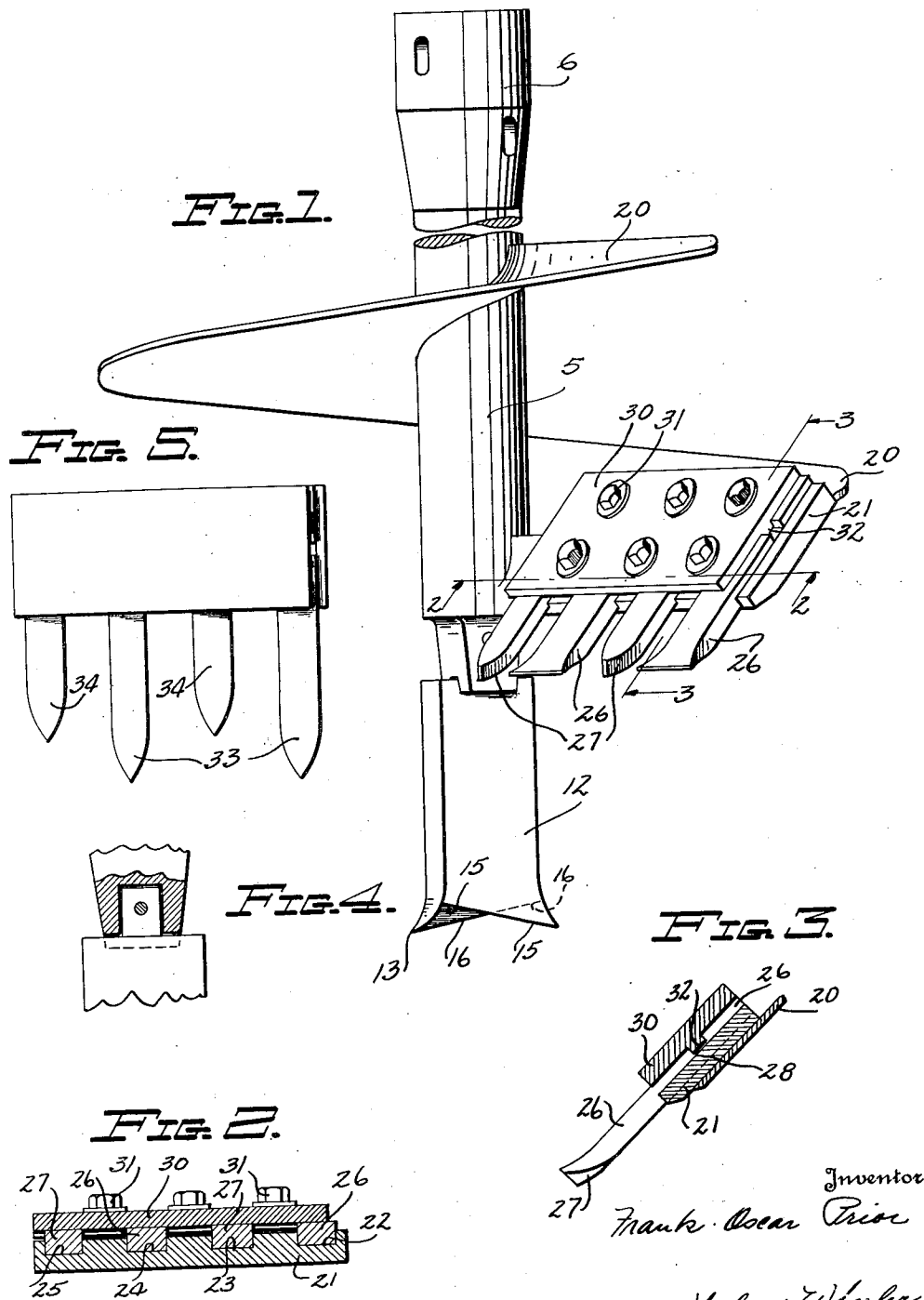
April 16, 1935.

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1,997,887

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Filed Sept. 12, 1927



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UNITED STATES PATENT OFFICE

1,997,887

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Application September 12, 1927, Serial No. 219,051

6 Claims. (Cl. 255—69)

This invention relates to improvements in augers.

The invention is particularly adapted for use in boring large holes into the earth for setting poles. It is intended especially for use where shale, loose rock or gravel must be removed in boring a hole to the proper depth.

It is the primary object of the present invention to provide an auger adapted for the quick performance of such heavy boring work as that indicated above. It is my purpose to provide an auger with interchangeable points and teeth adapted not only to permit and facilitate replacement of damaged parts, but also to provide teeth specially designed to perform the special functions necessary in a tool of this kind.

I do not claim herein per se the fish-tail auger point here illustrated, such point comprising the subject matter of my divisional application.

It is a further object of the invention to provide the entering lip of the auger with a plurality of different types of teeth, certain of which are designed for cutting and others for breaking the shale formation into which the auger penetrates.

In the drawing:

Figure 1 is an assembly view of a complete shale auger embodying this invention.

Figure 2 is a transverse section through the teeth of the auger lip in the plane indicated at 2—2 in Figure 1.

Figure 3 is a longitudinal section through the auger lip in the plane indicated at 3—3 in Figure 1.

Figure 4 is a fragmentary detail of the means for connecting the fish-tail point to the body portion of the auger.

Figure 5 is a fragmental detail view showing an alternative set of teeth in the auger lip.

Like parts are identified by the same reference characters throughout the several views.

The body portion 5 of the auger is provided with a shank at 6 adapted for attachment to any desired source of power for rotating and advancing the auger in the earth. The lower end of the body portion is socketed at 7 and provided with lateral notches at 8 to receive respectively the neck 9 and shoulders 10 of the fish-tail point 12. A single bolt 13a passes through apertures in the opposed walls of socket 7 and in the neck portion 9 of the fish-tail point releasably to secure the point to the auger.

The fish-tail point is of unusual construction. It is made of a flat piece of stock which is comparatively thin and has side margins flaring at 13 and 14 to form pointed teeth at the lower

corners of the point of the device. The lower margins of the plane sides of the auger point are oppositely inclined and are perfectly straight lines, each of which defines the base of one tooth and the cutting edge of the other. Margin 15 forms the base of tooth 13 and the cutting or leading edge of tooth 14, whereas margin 16 comprises the cutting or leading edge of tooth 13 and the base or root of tooth 14. This construction gives the teeth a peculiar rolling bevel and it is found that flaring teeth so beveled have great adaptability for performing the functions of cutting and breaking shale in addition to the normal function of guiding the auger. An ordinary auger is not suitable for the purpose of cutting shale and one of the features which it lacks is any means for cutting and breaking the material at the center of the hole. This need is satisfied by the special fish-tail point herein described. Other points may be substituted, however, for the different purposes for which the auger in general is adapted and it is only necessary to remove the single bolt 13a to enable a substitution to be made. With any point in place its shoulders are engaged in the notches 8 of the auger to receive motion from the auger and also to guide the auger in its movement.

The auger body or shank extension 5 carries a broad helical screw blade 20 which is adapted to support for withdrawal the debris cut by the auger from the bottom of a hole in the course of being bored. The lower margin of this blade is provided with a special lip incorporating removable teeth especially designed for enabling the auger to work in shale, gravel or loose rock.

An auger tooth plate 21 is fastened in an inclined position on the lower end of the screw blade 20 and is provided with a series of longitudinally extending channels 22, 23, 24 and 25 adapted to receive removable teeth 26 and 27. These teeth are transversely notched at 28 and a clamping plate 30 engages the upper surface of the several teeth under pressure of bolts 31 and is provided with further means for rigidly anchoring the teeth in their places which consists of a transverse rib 32 receivable in the notches of the several teeth.

It will be noted that the teeth 26 have broad bevelled edges which are slightly curved toward the horizontal and which are adapted to perform the function of cutting shale or the like. The alternate teeth 27 also have cutting edges but these edges extend in a vertical plane and are formed between the converging side margins of the tooth instead of between the con-

verging upper and lower faces as in the case of the cutting teeth 26. Teeth 27 are adapted to perform a breaking function.

In the Figure 5 device the auger tooth plate 21 and the clamping plate 30 may be understood to correspond exactly to the parts already described. The teeth 33 and 34, however, differ from those previously described in that the character of their respective points is all alike and it is only their length that varies as between alternate teeth in the series. It will be noted that the teeth 33 and 34 all have points somewhat similar to the points of hand pick axes but alternate teeth are relatively short and long. This set of teeth has been found peculiarly adapted for work in hard gravel and it will be obvious that other special forms of teeth may be used in the auger to enable it to operate under different conditions.

The point which I desire to emphasize is the fact that the auger appears to work very much more effectively when a plurality of different kinds of teeth are used than it does if all of the teeth are alike. As described herein it is possible to vary the cutting edges of the teeth as between horizontal or vertical and it is likewise possible to vary the length of the teeth to secure the desired result. In either case the difference between teeth enables the auger to enter the earth far more readily than is the case where the teeth are all alike and I attribute this desirable result to the fact that a set of similar teeth affords no opportunity to stones or pieces of shale for that relative movement which is necessary to permit the auger to advance. Where the teeth are different, however, and do not all act alike there is an opportunity for a stone or piece of shale which is not contoured properly for action thereon by one tooth to yield and, in yielding, either to present a new surface to the next tooth or reach a tooth adapted to break or lift the particular fragment. Thus, whatever the particular type of teeth which it is desirable to use for a particular piece of work, I prefer that there shall be a variation between successive teeth in order to obtain the advantages above described.

As above indicated the special mounting plates for the teeth enable the teeth to be replaced readily when wear occurs and are also adapted to permit teeth to be interchanged. This is highly desirable in connection with portable equipment for boring holes for telephone posts or the like because of the fact that soil conditions are subject to wide variations within the field of operation of such a device and the clamp arrangement shown not only holds the teeth with rigidity but permits substitutions to be made without materially delaying the operation of the machine.

I claim:

1. An auger of the class described comprising a shank, a helical screw and a set of teeth at the lip portion of said screw including a plurality of

different types of teeth, alternate teeth being provided respectively with substantially horizontal edges for cutting and substantially vertical edges for breaking, each of said edges having a substantial rectilinear extent.

2. An auger of the class described comprising a body portion carrying an auger tooth plate with channels therein, teeth removably mounted in said channels, a clamping plate secured to and acting with said auger tooth plate and adapted to retain said teeth in their respective channels, said teeth being transversely notched and said clamping plate being provided with a rib engaged in the notches of the several teeth, whereby positively to fix the positions of said teeth.

3. An auger comprising the combination with a body portion, of a lip portion connected therewith and teeth projecting from said lip portion, and means detachably connecting said teeth and lip portion, certain of said teeth having their upper and lower faces converging to a cutting edge and alternate teeth having their side margins converging to a cutting edge whereby said several teeth are adapted respectively for cutting and breaking functions.

4. An auger of the character described, comprising a shank portion, a body extension thereof, a broad lifting plate upon said body extension and a downwardly inclined plate disposed adjacent the end of said lifting plate and carrying teeth transversely spaced in a series in which alternate teeth are of differing types, and a clamping plate co-operating with said first mentioned plate and fixing the positions of said teeth, said teeth being removably interlocked.

5. An auger of the class described comprising a shank, a helical screw and a set of teeth at the lip portion of said screw, each said tooth comprising a shank portion detachably secured adjacent said lip of said helical screw and a forwardly and downwardly projecting working head portion, said head portion comprising a rectilinear continuation of said shank portion, said heads of alternate teeth of said set being provided respectively with substantially horizontal edges for cutting and substantially vertical edges for breaking, each of said edges having a substantial rectilinear extent.

6. An auger comprising the combination with a body portion of a lip portion connected therewith, and a set of teeth projecting from said lip portion, each tooth of said set comprising a shank portion detachably secured adjacent said lip and a forwardly and downwardly projecting working head comprising a rectilinear continuation of said shank portion, certain of said teeth having their upper and lower faces converging to a cutting edge and alternate teeth having their side margins converging to a cutting edge whereby said several teeth are adapted respectively for cutting and breaking operations.

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