

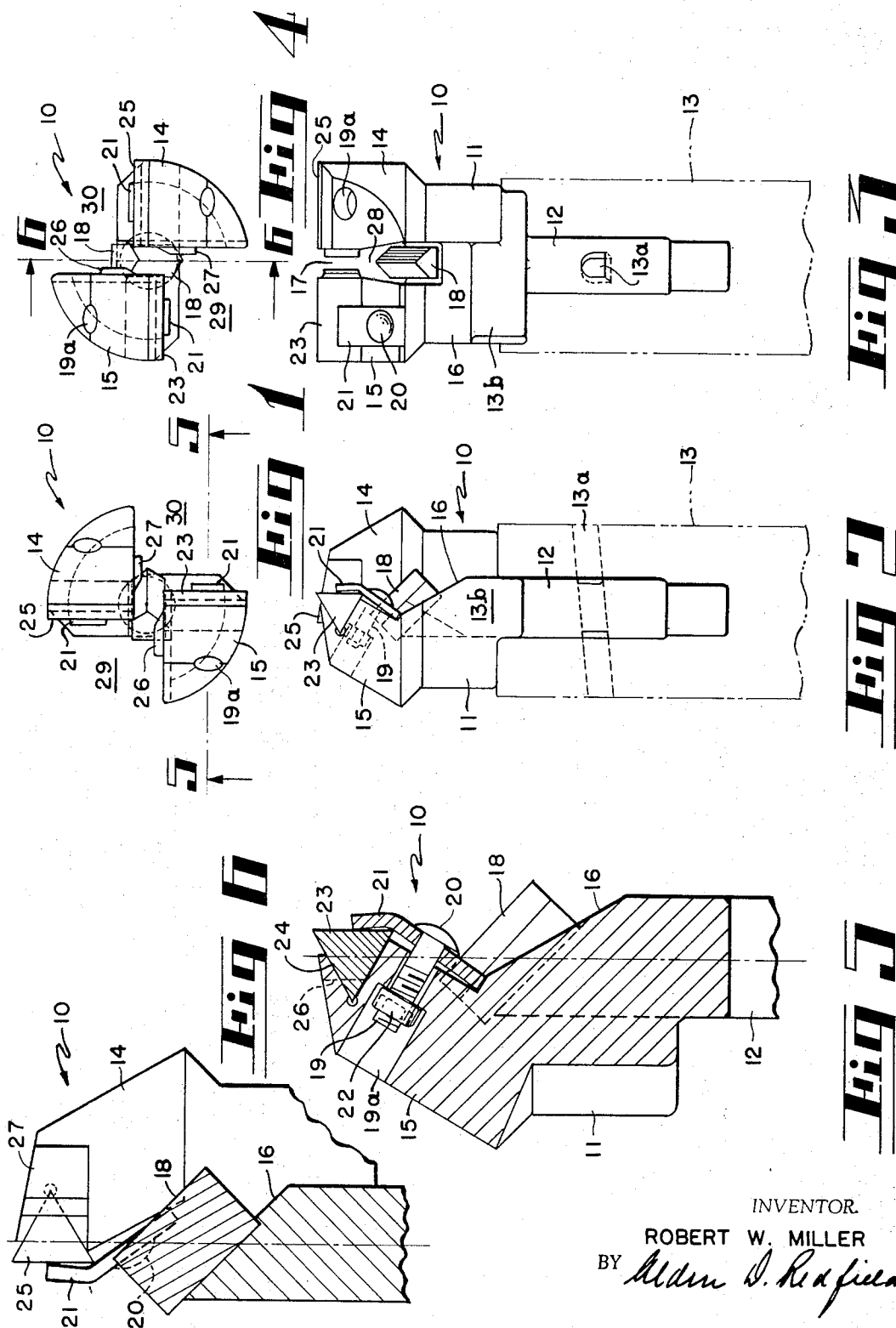
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EARTH AUGER BIFURCATED POINT

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EARTH AUGER BIFURCATED POINT

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ABSTRACT OF THE DISCLOSURE

The invention involves the construction of the point of an earth auger, namely that part of the auger which first penetrates the working surface. The cutting members of applicant's point are mounted upon integral bifurcations extending outwardly from a generally cylindrical mounting and occupy opposite quadrants of the cylinder with the remaining quadrants being left open for the passage of spoil. The cutters are radially disposed but are separated a measurable amount at the center with a space left in between.

This invention relates to earth augers and particularly to earth augers designed to bore cylindrical holes in rock, hard or frozen soil, or hardpan. The invention is particularly concerned with the "point" of auger heads. The "point" of an auger is customarily regarded as that part of the auger which first penetrates the work surface.

The invention is applicable to both boom type and multiple flight augers and provides a point constituted of a unique mounting and orientation of hard metal or carbide cutting members of tungsten carbide or the like which can be easily replaced when worn.

It also provides a point which can be easily assembled and secured as a unit to the auger head—that part of the auger which contains the cutters which widen the holes created by the initial penetration of the point.

Auger points constructed according to the invention have been found to work more efficiently in hard rock than points constructed according to the prior art, and to last considerably longer.

Auger points have heretofore been designed by juxtaposing a pair of carbide cutting members, usually in the form of triangular prisms, on a radius extending an inch or two outwardly of the longitudinal center line of the cutting bit. Such cutters have usually been placed on radii extending 180 degrees from such center line and have been placed in abutment with one another at the center line. The present invention departs from this practice in that the cutting members are separated a measurable amount at the center and a space is left between them. A third cutting member located on a different horizontal plane—a higher plane when the point is extended downwardly in working position—is provided, which cuts or breaks up the column of rock left in such space. Thus the radially disposed cutting edges of the point operate to cut out an annulus around a central column of rock extending longitudinally of the bit, which column is subsequently eroded or broken out by the third cutter.

This function is accomplished by providing a point having a generally cylindrical contour with bifurcations extending longitudinally in opposite quadrants of the cylinder, the remaining quadrants being left open for the passage of spoil.

The invention is more particularly described in the accompanying drawings, in which:

FIG. 1 is a plan view of an auger point constructed according to the invention, looking endwise into the working surfaces of the point;

FIG. 2 is a front elevation of the point of FIG. 1, showing the point upside down from its normal operating position;

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FIG. 3 is a side view of FIG. 2;

FIG. 4 is a plan similar to FIG. 1 with the point turned clockwise 90 degrees;

FIG. 5 is an enlarged section taken in the direction of the arrows 5—5 of FIG. 1; and

FIG. 6 is an enlarged section taken in the direction of the arrows 6—6 of FIG. 4.

Referring particularly now to FIGS. 1 and 3, the illustrative point is designated generally at 10 and comprises a main body portion or mount 11 and a shank 12 in which there is provided a diametrical opening 13a by means of which the complete unit 10 may be secured in a chuck 13 of an auger head. The mount 11 has a diametrical extension 13b adjacent the shank 12, extending at right angles to opening 13a, to fit into a complementary recess in the chuck 13. Thus when the auger head and chuck are rotated by the rock drill (not shown) the point is likewise rotated and the considerable torque created under working conditions is transmitted to the mount. The mount is preferably made of tough, hard molybdenum steel alloy such as that commonly known as 4140 steel.

The mount 11 is provided with bifurcations 14 and 15 extending upwardly from a central portion 16. The central portion is provided with an angular surface upon which is mounted a central cutter 18 within the space 17 between the bifurcations. The angle at which central cutter 18 is placed is preferably between 30 and 50 degrees. As will hereinafter be more clearly described, hard metal cutting bits are mounted in the distal end of each of the bifurcations.

The mounting of each of these cutting members is best shown in the section of FIG. 5 in which cutting member 23 is seated in a pocket 24 in bifurcation 15 and held in place by a clamp or holding member 21 and by bolt 20 which extends through an opening 19 in bifurcation 15. Upon the end of the bolt is fitted an internally actuated nut 22 fitting into an enlargement 19a of opening 19. When the cutting member 23 is seated in its pocket 24 the clamp 21 is brought up firmly to hold the same in place. The cutter 23 is mounted with one face in a vertical plane parallel to but in advance of a plane extending through the center line of shank 12. It will be understood that the actual cutting edge of the cutting member 23 is the edge which extends outwardly to the right as shown in FIG. 5 and a different cutting edge can be substituted by simply removing the strap 21, turning the prism 23 120 degrees, and reclamping the same in the manner shown.

In the other bifurcation 14 is clamped a similar cutting member 25 in identical fashion but with its front surface in a different plane in advance of a plane through the longitudinal center line of shank 12.

It is important that the space 17 be maintained of predetermined diameter and in order to prevent the cutting members 23 and 25 from being forced inwardly into this space and reducing this diameter, stops 26 and 27 are provided. These stops are desirably brazed on the internal vertical sides of the upstanding bifurcations.

It will be understood that the contour of the mount is fairly complex and may desirably be built up into sections by welding components together or they may be made in one piece by precision casting. The cutting members 23 and 25 are clamped in place in the pockets provided therefor by the means previously described. Central cutting member 18 is desirably brazed on the angular surface upon which it is mounted.

As previously indicated, when the point of the invention is operatively secured to a boom type or multiple flight type auger, the same initially cuts and chips an annular recess around an upstanding column or rock, which is subsequently cut and broken off as the bit proceeds into the rock and as the third cutting member 18 operates thereon from the top. The chips and spoil resulting from

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this operation are moved within the remaining space 28 below space 17 which is provided between the bifurcations and are forced upwardly through spaced quadrants 29 and 30 along with the spoil created by the operation of the cutters 23 and 25.

I have found that points constructed according to the invention penetrate at least 50% faster than points made according to the prior art previously described.

Having thus described my invention, I claim:

1. An auger point comprising a shank, a mount integral with one end thereof, bifurcations on said mount extending beyond said shank and parallel thereto, said bifurcations being integral with said mount, seating means formed in each bifurcation and cutters removably secured thereon, the working edges of said cutters being disposed on opposite sides of a vertical plane extending through the center line of said shank, said bifurcations defining an open space in alignment with said shank, a third cutter secured to said mount and extending into said open space, and said third cutter mounted angularly with respect to the other two cutters.

2. An auger point comprising a shank, a mount integral

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with one end thereof, bifurcations on said mount extending beyond said shank and parallel thereto, said bifurcations being integral with said mount, seating means formed in each bifurcation and cutters removably secured thereon, the working edges of said cutters being disposed on opposite sides of a vertical plane extending through the center line of said shank, and providing a space therebetween, and retaining means provided in said space to prevent said cutters from creeping laterally thereinto.

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