

1,280,696.

Fig. 2 is a perspective view of a twisted, elongated object, possibly a rope or cable. It shows the object's internal structure and various components labeled with numbers 1 through 14. The object is twisted, with the label '1' indicating the main body. Other labels include '2', '3', '4', '5', '6', '7', '8', '9', '10', '11', '12', '13', and '14', which point to specific parts of the structure, such as the twisted strands and the central core.

Fig. 3.

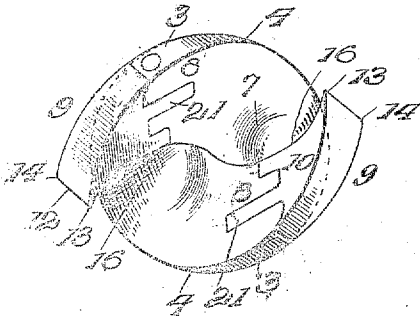
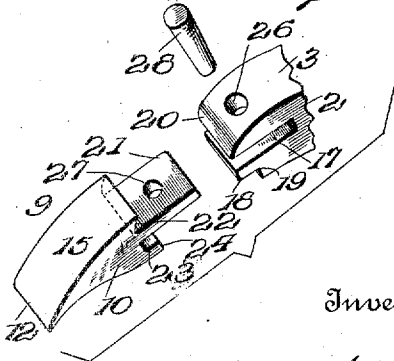


Fig. 4.



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COAL-AUGER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MILTON FIRL, a citizen of the United States, and resident of Meyersdale, county of Somerset, State of Pennsylvania, have invented certain new and useful Improvements in Coal-Augers, of which the following is a specification.

This invention relates to certain improvements in and relating to coal augers or drills and the like, and the objects and nature of the invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawing illustrating what I now believe to be the preferred mechanical expression or embodiment of my invention from among other forms and constructions within the spirit and scope thereof.

An object of the invention is to produce an auger or drill of the spirally twisted type, peculiarly adapted for boring holes for blasting purposes in coal mining operations and the like, provided with a cutting end embodying improved renewable cutting bits whereby the stem and twisted body of the bit can be composed of iron or other comparatively inexpensive material which will not break as readily as steel under lateral or bending strain, and whereby reduction in the length of the twisted body by wear will be avoided and only a comparatively small quantity of expensive steel will be needed for the bits or cutters which can be readily removed for sharpening and when unduly worn be renewed at comparatively small expense.

A further object of the invention is to provide a coal auger or the like, with an improved cutting end or point embodying renewable removable cutting bits of peculiar formation and designed and arranged to break up the core formed in the boring operation and joined to the body of the auger in a novel manner to withstand the strains and stresses to which said bits are subjected in operation.

With these and other objects in view, my invention consists in certain novel features in construction and in arrangements and combinations as more fully and particularly pointed out hereinafter.

Referring to the accompanying drawings:—

Figure 1, is a side elevation showing a portion of a spirally twisted auger stem or body

equipped with a cutting point or end embodying my invention.

Fig. 2, is also a side elevation from a point of view at right angles to that from which Fig. 1, is taken.

Fig. 3, is an end view of the cutting end of the auger.

Fig. 4, is a detail view.

In the drawings, I show a portion of the spiral or twisted body or stem 1, of a coal or like auger. In common practice, such augers are usually composed throughout of steel and the ends thereof are split and formed into cutting points integral with the spiral body. When such points become unduly worn it is a difficult and comparatively expensive operation to resplit the end of the body and reform the points, without considering the constant reduction in the length of the auger and the consequent waste as the auger must be discarded when reduced to a certain length.

Furthermore, the nature of the steel is such, that the long augers sometimes break or snap off when subjected to undue lateral pressure and strain during operation as is apt to occur when the augers are used in body or breast braces and rotated by hand.

I prefer to make the spiral or twist body 1 of iron or other comparatively inexpensive metal that can flex or bend under the conditions mentioned, without fracturing or breaking.

My invention also contemplates the formation of the end of the spiral or twisted body 1, to provide a pair of similar forwardly diverging projecting stubs, fingers or bit bases 2, integral with the body. These stubs diverge with respect to each other to form an angle of approximately ninety degrees and each stub is approximately equal to one half the width of the bar forming the spiral, while the end of the bar forming said fingers gradually increases in thickness toward the stubs to render said stubs of increased thickness.

The two stubs are diametrically opposite each other with respect to the longitudinal axis of the spiral body of the auger and are inclined at like angles with respect thereto, one to the right and the other to the left. The outer longitudinal faces or edges 3 of said stubs are curved in longitudinal continuation of the like curvature of the two longitudinal edges 4 of the spiral body so

that the exterior circle or diameter of the end of the body formed by said stubs will be approximately the same as the exterior diameter of the body behind said end and the edges 3 will engage or follow the wall of the bore or hole being cut in the same manner as edges 4.

The side faces 5, 6, of the stubs form continuations of the corresponding side faces 10 of the spiral body, and the front or advancing side faces 5, of the stubs are comparatively flat and meet the inner faces 8 of the stubs to form inner front longitudinal cutting edges 7, to aid in breaking down the core as hereinafter explained.

The outer ends of the stubs are cut off or otherwise formed to present oblique faces or shoulders to receive and interlock with the heels of the bits as hereinafter set forth.

Each stub is provided with a bit or cutter 9 shaped to form a longitudinal continuation of its stub and of its outer, inner and side faces.

The two cutters or bits are similar and interchangeable, and each is preferably of the same thickness throughout its length so that its front and rear faces 10, 11, are approximately parallel, but each bit reduces or tapers forwardly in width to provide the front cutting or chisel edge 12. The edge 12 is straight and extends from face 10 to face 11 but is arranged obliquely or at an inclination to form the front cutting point 13, and cause the edge to cut with a shearing action with the maximum diameter of the cut at the rear points or ends 14 of said edges.

The bits are curved longitudinally in longitudinal continuation of the stubs and the outer edges or faces 15 of the bits form continuations of the edges 3 of the stubs and edges 4 of the spiral body and are longitudinally curved in approximate accordance therewith.

The advancing or front side faces 10 of the bits squarely meet the inner edge faces of the bits to form longitudinal inner or advancing cutting edges 16 in continuation of the cutting edges 7 of the stubs and co-operating therewith to cut and break down the core left within the circular path of operation of points 13 and edges 12.

The bits are removably secured to and suitably anchored in the stubs to withstand the tremendous pressure and strain to which they are subjected in action. In the particular example illustrated, each stub is formed with an intermediate longitudinal slot or mortise 17, arranged about midway between and parallel with its inner and outer faces and the end of the stub at the inner side of the slot forms a square or angular tenon 18 and shoulder 19 while the end of the stub at the outer side of the slot forms a tapered or wedge-shaped tenon 20.

The heel of each bit is correspondingly formed to provide a tenon 21, to snugly fit mortise 17 and a tapered or wedge-shaped depression or mortise 22 to receive tenon 20, and an angular or square mortise 23 to receive tenon 18 and an edge 24 to abut shoulder 19.

It will be noted that the transverse end edges of the heel of the bit and of the stub are parallel with the length of the cutting edge 12 and that the flat side faces of the tenon 21 are parallel with said edge and also that the end faces of the various tenons squarely fit and abut against the floors of the various mortises forming abutting shoulders parallel with the edge 12 and thereby tending to directly receive the thrust and pressure of the bits in action and maintain the same in rigid continuation of the stubs.

The wedge like mortise and tenon 22, 20, are arranged at the outer or rear edge portion of the bit so that the outward pressure or strain on the bit during action will tend but to tighten the heel of the bit in the stub.

Various means can be provided to lock the bits in the stubs although I show locking pins 28 removably fitting registering perforations 26, 27, extending transversely through the stubs and tenons 21. These pins are arranged transversely with respect to the cutting edges 12 and are preferably so arranged as to be driven inwardly with their heads or large ends flush with the outer faces 3. Thus should a pin become loose and start to work out while the auger is boring, the operator would immediately become advised of such fact by reason of the engagement of the head of the pin with the wall of the hole or bore. When the pins are thus arranged with their large ends at the outer surfaces of the stubs, the pins are removed by applying extracting means at their inner ends at the inner edges or faces of the stubs.

These bits can be readily sharpened without removal by filing or grinding their inner faces. When the bits have been unduly shortened by repeated sharpening, they can be easily removed and new and perfect bits can be applied, at comparatively slight expense.

It is evident that various changes, modifications and departures might be resorted to without departing from the spirit and scope of my invention and hence I do not wish to limit myself to the exact disclosures hereof.

What I claim is:—

1. In coal augers and the like, a spirally-twisted body having a cutting end composed of a pair of similar forwardly diverging cutters; said cutters consisting of a pair of diverging stubs integral with the body and

a pair of short interchangeable bits forming longitudinal continuations of said stubs, the stubs and bits being longitudinally mortised and tenoned and interlocking for both transverse and longitudinal removal and application of either bit, the heels of the bits and ends of the stubs providing transverse squarely abutting shoulders, the mortised and tenoned portions of a bit and stub being arranged approximately midway between the inner and outer edges of the cutter and providing flat faces of the same width as and approximately parallel with said edges of the cutter, said inner and outer edges of the bit meeting at the outer end to form the same with a straight cutting edge, and means for independently locking each bit to its stub.

2. In coal augers and the like, an elongated body rotatable around its longitudinally axis and having a cutting end consisting of a pair of forwardly diverging cutters composed of diverging stubs integral with the body and short bits forming longitudinal continuations of the stubs respectively, each cutter having a straight front chisel cutting edge forming an inner front cutting point and an outer rearward point, said edges being inclined rearwardly and outwardly from said front points to said rear points, the distance between said rear points exceeding the extreme diameter of the body, each cutter having a front longitudinal corner edge meeting its front point and extending rearwardly and inwardly therefrom toward said longitudinal axial line, the heels of the bits removably interlocking with the stubs, and means for locking the bits to the stubs, each stub presenting transverse oblique shoulders and each bit having transverse shoulders approximately parallel with its chisel edge and squarely abutting said stub shoulders.

3. A coal auger comprising a spirally-twisted body having a pair of end stubs of increased thickness with respect thereto and integral therewith and diverging forwardly to form an intervening angle of approximately ninety degrees, the outer longitudinal edges of said stubs forming curved longitudinal continuations of the spiral lon-

gitudinal edges of the body, the front and rear side faces of the stubs forming longitudinal continuations of the corresponding spiral side faces of the body, and a pair of short interchangeable bits forming longitudinal forward continuations of the stubs and removably interlocked therewith and secured thereto, the inner and outer edges of each bit forming longitudinal continuations of the inner and outer edges of its stub and converging forwardly to a front cutting edge, the front and rear faces of each bit forming longitudinal continuations of the corresponding faces of its stub, the front inner longitudinal corners of the bits and stubs forming cutting edges to break down the core.

4. In coal augers and the like, a body of the spirally twisted type provided with a pair of short forwardly diverging removable cutting bits having their outer longitudinal edges curved in continuation of the spirally curved longitudinal edges of the body, each bit having a heel longitudinally interlocking with the end of the body, and removable bit locking means extending inwardly through said edges and the interlocking portions of the bits and body, said means being removable outwardly whereby the outer ends of said means will engage the wall of the hole should said means accidentally work loose while the auger is in action.

5. In coal augers and the like, a spirally-twisted body of increased thickness at its cutting end and provided with a pair of independent forwardly-diverging interchangeable bits having chisel cutting edges and also having their outer edges curved in longitudinal continuation of the spiral outer opposite edges of the body, respectively; said bits being removably and separately anchored in and interlocked with diametrically-opposite portions of said thickened end of the body, and separate and independent locking pins extending into the respective interlocking portions of the bits and body and through said opposite edges of the body, respectively.

Signed,

MILTON FIRL.