F. W. ARMSTRONG.

ADJUSTABLE COAL BORING AUGER.

APPLICATION FILED APR. 15, 1916.

1,270,092. **Patented June 18, 1918.**

Fig. 1.

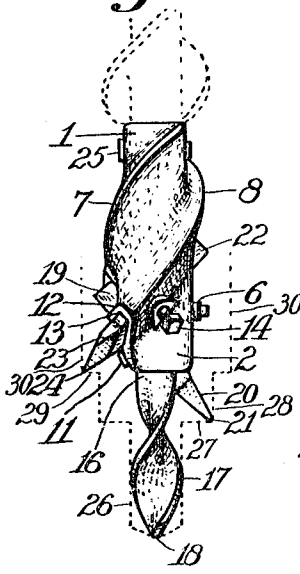


Fig. 2.

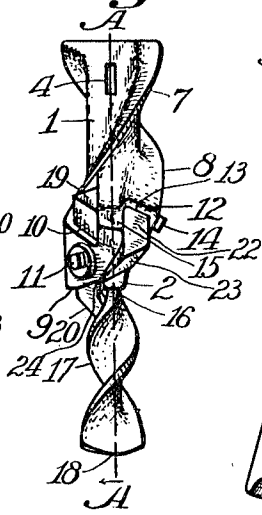


Fig. 3.

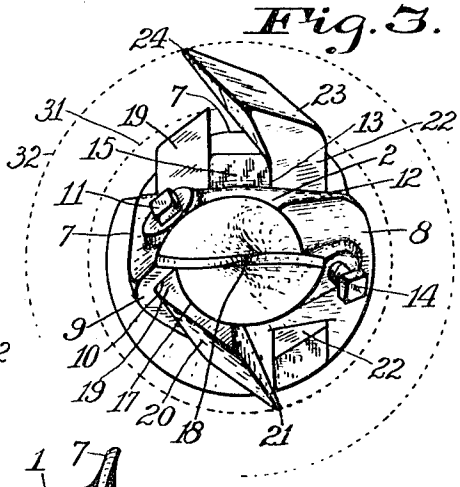


Fig. 5.

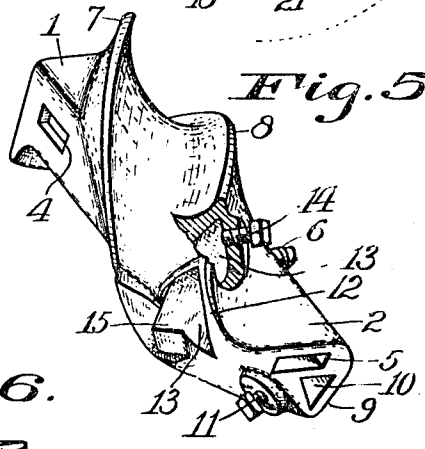


Fig. 4.

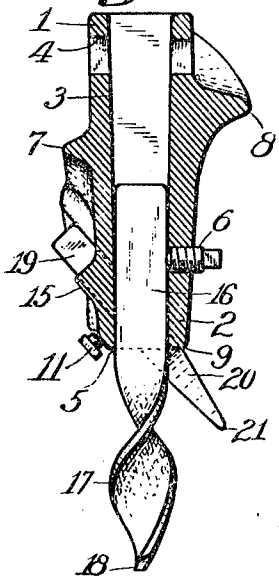


Fig. 6.

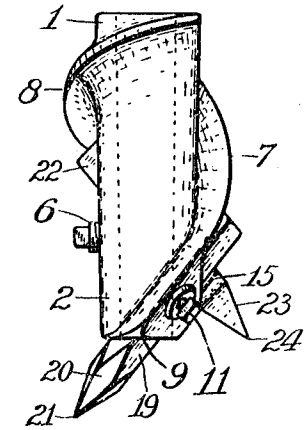
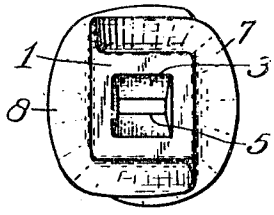


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE COAL-BORING AUGER.

1,270,092. Specification of Letters Patent. Patented June 18, 1918.

Application filed April 15, 1916. Serial No. 91,407.

To all whom it may concern:

Be it known that I, FREDERICK W. ARMSTRONG, a citizen of the United States, residing at Clinton, in the county of Vermilion and State of Indiana, have invented a new and useful Adjustable Coal-Boring Auger, of which the following is a specification, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

This invention relates to the type of auger that is designed to be adjusted so as to drill holes of different diameters, the invention having reference more particularly to an auger or drill that is especially designed to be used for boring holes in coal mines to receive blasting charges whereby the coal is loosened from the veins of coal.

An object of the invention is to provide an improved auger of such construction as to be inexpensive and capable of boring holes in coal veins expeditiously and with the expenditure of the minimum amount of energy. Another object is to provide a coal-boring auger that shall be capable of easily boring holes in coal veins and through relatively hard foreign substances, such as sulfur, that may be encountered in the veins of coal. A further object is to provide a coal-boring auger that shall be so constructed as to be readily readjusted for varying the diameter of the holes to receive the blasting charges. A still further object is to provide a coal-boring auger that shall be so constructed that, after being withdrawn from a boring and expanded, it may be again inserted in the boring and be capable of drilling or boring a continuation of the hole that shall have a relatively larger diameter to receive the blasting charge, in order to obtain the best results under certain conditions in loosening the coal from its natural deposit.

With the above-mentioned and other objects in view, the invention consists in an improved bit head that is capable of carrying reaming-bits in different relative arrangement so that each shall ream a portion of the boring of different diameter from that of the other, and so that the different reaming-bits shall operate on different planes, the invention consisting further in the novel parts, and in the combinations and arrangements of parts, as hereinafter particularly described and further defined in the appended claims.

Referring to the drawings, Figure 1 is an elevation of the improved coal-boring auger, broken lines approximately indicating the contour of a boring or hole that may be made thereby; Fig. 2 is an elevation of the auger as when turned at right angles to that of the preceding figure; Fig. 3 is a front end view of the auger, dotted circles indicating the diameter of different portions of a boring that may be made by different reaming bits; Fig. 4 is a longitudinal sectional elevation approximately on the line A A on Fig. 2; Fig. 5 is a perspective view of the improved bit head partially broken away; Fig. 6 is an elevation of the improved auger minus the pilot drill thereof; and Fig. 7 is a rear end view of the bit head.

Similar reference characters on the various figures of the drawings indicate corresponding elements or features of construction herein referred to.

A bit head constructed in accordance with the invention comprises a base or rear portion 1 and a front portion 2 constituting a body portion that is hollow throughout, that portion of the opening that is in the base portion being formed to constitute a socket 3 to receive a suitable shaft or auger body as in common use for carrying and operating the bit head. The wall of the base portion 1 preferably has a transverse keyway 4 therein, and the opening in the front portion 2 is adapted to constitute a socket portion 5 that is oblong transversely to receive the shank of the necessary pilot drill. A set-screw 6 is suitably inserted in the wall of the front portion 2 so as to be projected inward to secure the shank in place.

Improved means is provided for holding reaming bits in such relative position that one shall operate considerably in advance of the other and relatively nearer than the other to the hole made by the pilot drill for the purpose of enabling each reaming-bit to cut into and break away relatively small portions of the coal, and for this purpose the exterior of the body portion of the head is provided with two spiral ribs 7 and 8 that extend from opposite side portions of the base portion 1, the rib 7 extending continuously to the end of the front portion 2, the pitch of the rib being uniform throughout its length. The other rib 8 is shorter than the rib 7 and does not extend as far as the end of the front portion 2 but terminates

substantially at the opposite side portion to that of the rib 7, being slightly different in pitch along its front portion. The forward portion of the rib 7, the front end 9 of which is at the end of the front portion 2, has a socket 10 therein that extends at an oblique angle relatively to the socket portion 5 and past one side of the latter from the front end 9, the rear end of the socket having its opening in the normal rear side of the rib, a set-screw 11 being inserted in the wall of the socket 10 to secure a reaming-bit therein. The socket 10 preferably is designed to receive a shank that is triangular in cross-section. The front end 12 of the rib 8 has a socket 13 therein that extends backward and out through the normal rear side of the rib, the socket 13 being on the opposite side of the socket 5 from the socket 10 and is similarly triangular in cross-section, the wall thereof being provided with a set-screw 14 for securing a bit in the socket. Preferably the front portion 2 has a projection 15 that is arranged between the sockets 10 and 13 to afford ample support for the shanks of the bit where the shanks project from their sockets. The front orifice of the socket 10, as will be seen, is close to the orifice of the socket 5 and the axis of rotation of the bit head, while the front orifice of the socket 13 is relatively farther away from the axis of rotation and also back of the front end of the portion 2, so that the reaming-bits are both firmly supported by the sockets at very short distances from their cutting points.

A pilot drill of common form may be utilized, the same comprising a shank 16, oblong in cross-section a twisted body portion 17 and a cutting point 18, the shank being removably secured in the socket portion 5 by means of the set-screw 6. The reaming-bits are substantially alike, one comprising a shank 19 and a head portion 20 having a tapered cutting point 21, the head 20 extending forwardly from the shank; the other one of the reaming-bits comprising a shank 22, a head portion 23 and a cutting point 24, the head portion 23 extending forwardly from the shank. Each shank preferably is triangular in cross-section, one being removably and adjustably secured in the socket 10 by means of the set-screw 11, the other being secured in the socket 13 by means of the set-screw 14. By reason of the novel construction of the bit head the head portions 20 and 23 are not required to be projected far from the orifice of the sockets 10 and 13, and therefore the points of the reaming-bits cut most effectively. Preferably a key 25 is provided for insertion into the keyway 4 to secure the bit head to the shaft or auger body, a portion of the latter being indicated by broken lines in Fig. 1.

The contour of the boring made by the pilot drill is indicated by broken lines 26, a broken line 27 indicating the plane on which the cutting point 21 operates to form a counterbore indicated by broken lines 28 as representing the diameter of the counterbore. The broken line 29 indicates the different plane on which the cutting point 24 operates to ream the boring to larger diameter indicated by the broken contour lines 30, as appearing in Fig. 1. In Fig. 3 the broken circular contour line 31 indicates the diameter of the counterbore made by the cutting point 21 of the bit head 20, the circular broken line 32 indicating the larger diameter to which the boring is reamed by the cutting point 24 of the bit head 23.

In practical use the auger is usually turned toward the right, the pilot drill and the reaming-bits being accordingly shaped for the purpose, and the auger may be driven either by hand or by power. As the boring proceeds and the pilot drill has formed the centering-hole 26 the cutting point 21 cuts out a counterbore, the point readily cutting into the coal or other substance and causing fragments thereof to be split off relatively near to the centering-hole 26, so that this stage of the reaming operation is performed with small effort. The cutting point 24 of the remaining reaming-bit being farther back and slightly farther out than the preceding bit point is readily forced into the coal or other substance and scores a circular groove, with the result that the substance is readily broken up between the point and the wall of the counterbore, this separate breaking up of the coal into small fragments at different points permitting the boring to be made with relatively small power. In case the boring is to be made larger in diameter as the works proceeds, the auger is withdrawn from the boring and after readjusting the reaming-bits so that they shall project relatively farther from the sockets, the auger is again inserted in the boring with the pilot drill at one side of the axis of the boring, and when the pilot drill reaches the centering-hole and the auger is rotated the reaming-bits gradually cut into the walls of the boring so as to enlarge the diameter thereof while the pilot drill at first slightly enlarges the centering-hole until it finds its way into it, the boring continuing as before with the result that the rear end of the boring is made larger in diameter wherein to place the blasting charge to great advantage.

Having thus described the invention, what is claimed as new is—

1. The improved bit head herein described comprising a body portion, a spiral rib on said body portion having a reaming-bit socket therein that extends longitudinally thereof from the front end of the rib and

to the normal rear side of the rib, and a set-screw arranged in said rear side of the rib and extending to said socket, as and for the purposes set forth.

2. In a bit head of the character described, a body portion and two spiral ribs of different length thereon, each rib having a reaming-bit socket therein that extends longitudinally from the front end of the rib and to the normal rear side of the rib, the front end of the longer one of said ribs coinciding with the front end of said body portion, there being a pilot-drill socket in said body portion, said reaming-bit sockets being adapted to securely support the reaming-bits at different distances from the pilot-drill and permit short and stout reaming-bits and a relatively long pilot-drill, as and for the purposes set forth.

In testimony whereof, I affix my signature in presence of two witnesses.

FREDERICK W. ARMSTRONG.

Witnesses:
FAYE WEIRICK,
ALBERT C. SHARP.