

P. J. SMITH.
COAL DRILL.

APPLICATION FILED JAN. 26, 1916.

Patented Dec. 19, 1916.

1,209,058.

FIG. 1.

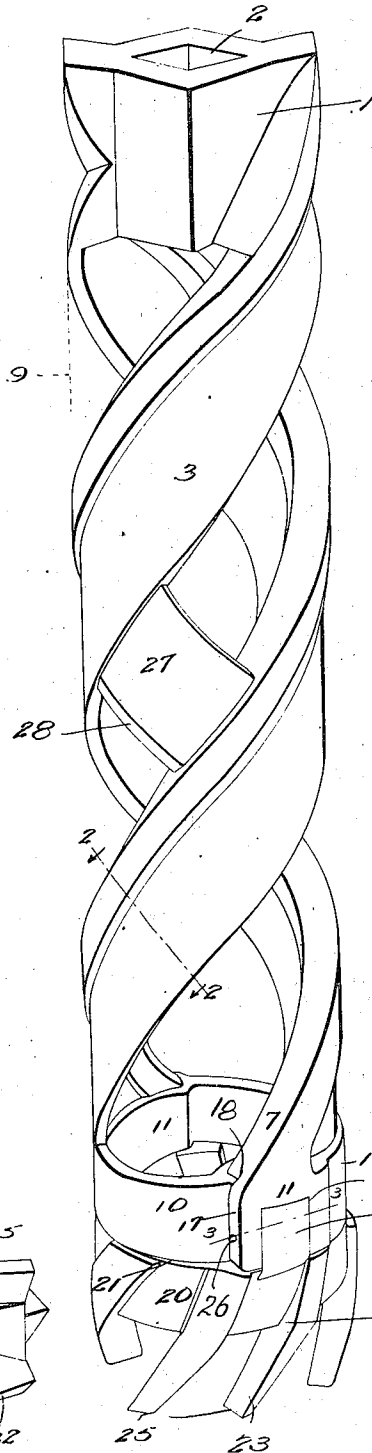


FIG. 2.

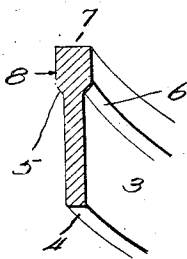


FIG. 3.

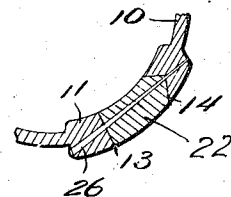
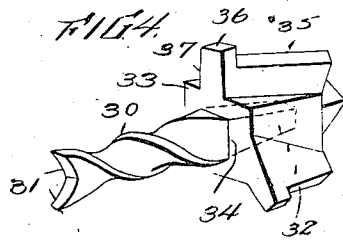


FIG. 4.



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COAL-DRILL.

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To all whom it may concern:

Be it known that I, PETER J. SMITH, a citizen of the United States, residing at Kingston, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to boring, and more especially to drills; and the objects of the same are to produce an improved core drill for boring coal and an improved starting auger for opening the hole into which the drill is to be inserted. These objects are carried out in the manner hereinafter more fully described and claimed and as shown in the drawings wherein:—

Figure 1 is a perspective view of this improved drill with all parts assembled. Figs. 2 and 3 are sectional details on the lines 2—2 and 3—3 respectively of Fig. 1. Fig. 4 is a perspective detail of the starting auger.

This drill comprises a head, a hollow shaft, and a bit. In the drawings herewith the head is indicated by the numeral 1, and shown as provided with a square socket 2 for the reception of the square front end of the shaft by means of which the drill is to be rotated. The head may be cast integral with the upper or outer end of the tubular shaft, and as this head usually projects from the wall into which a hole is being drilled it is quite possible to have the head close the bore of the shaft because the coal or other material being drilled and constantly traveling out said bore will fall out of it over the face of said wall. The tubular shaft in the present instance consists of two spiral ribs 3 of rather steep pitch, and it is immaterial what is their length or the number of their convolutions. Each rib as seen in Fig. 2 has a narrow front edge 4, outer and inner beveled shoulders 5 and 6 making its rear portion somewhat thick, and a flat and comparatively wide rear edge 7; and the outer flat side of the wide portion of the drill, as shown

at 8, stands in the imaginary cylinder which defines the contour of the drill, as indicated by the dotted line 9.

At the lower or inner end of the shaft is a comparatively thin ring 10 whose walls are by preference made thicker on both inner and outer sides at two opposite points, and it is at these points that the lower ends of the spiral ribs unite integrally with the ring as seen in Fig. 1. Said thickened portions constitute blocks 11 which not only increase the strength of the drill at the points of union between the ring and the ribs, but also provide extra material and thickness around notches 12 which are cut into said blocks at diametrically opposite points as shown. One wall of each notch may be straight and radial as shown at 13, and the other irregular as shown at 14 in Fig. 3. Finally the front wall of each block in the direction of rotation, on the outer side of the ring 10, is formed into a shoulder 17 which at its upper end 18 merges into the lower end of the wide outer edge 7 of the rib 3, as seen in Fig. 1.

The bit of this improved drill comprises a comparatively thin ring or annular body 20 whose rear or outer edge rests against the front or inner edge of the ring 10 along the line 21, a pair of integral fingers 22 projecting from said body and shaped at their side edges to fit the walls 13 and 14 of the notch 12, and a plurality of obliquely or spirally disposed cutting points 23 whose shanks are wider than the body 20 so as to produce exterior shoulders 24 and are longer than the width of the body so as to project beyond it as seen, and whose tips 25 are beveled off on the rear sides so as to produce cutting edges standing approximately radial to the axis of the drill. To prevent the fingers 22 from slipping laterally or radially out of the notches 12, at least one wall 14 of each notch is made irregular as shown. To hold each finger 22 in its notch 12, a pin 26 may be run through the block and the finger as seen in Fig. 3, and when the drill is in the hole in the material being acted on, this pin cannot become dislodged. Particular attention is invited to the fact that the cutting points can be sharpened

by the use of an ordinary file, or with a grindstone or emery wheel if it be so shaped that it can pass between any two tips 25. Therefore when a drill of this character becomes dull the bit is removed and replaced by one whose cutting points are sharp, while the one taken off is sharpened without interrupting the work.

In Fig. 4 is shown a starting auger which I preferably use in conjunction with this bit, for opening a hole in the wall of coal or other material to be treated and into which hole the above-described bit of my improved drill is to be inserted. Said auger comprises a spiral bit 30 having a forked tip 31 at its front end and a tapered shank 32 at its rear end, and a head 33 preferably square, having a socket 34 in its front end for said shank, and around its body a number of blades 35 (preferably three, although more or less could be used) which stand oblique to its axis and have outward extensions 36 at their front ends, the front edges of the blades and extensions being filed or sharpened as shown at 37. This starting auger is used by placing the tips 31 of its bit 30 against the wall of coal or other material to be treated, and revolving it. Thereby a hole is made whose depth will equal the length of the bit. Further revolution of the tool causes the cutting edges 37 to enlarge this hole to a size which will permit the entry of the tips 25 of the cutting points 23 of the drill described above. The starting auger is then withdrawn from the hole thus made, detached from the handle if necessary, especially if said handle is the same one that enters the socket 2 in the drill, and the drill bit inserted and turned to the right. Whether the starting is made in this manner or otherwise, the rotation of the drill to the right will cause its cutting points to bore into the coal and produce an annular hole therein, leaving the core which passes upward or outward through the annular body 20 of the bit and the ring 10 of the shaft, projecting finally along the center of the same until it breaks off. Meanwhile the parts cut by the tips 25 are in powdered or granular form, and the beveled front faces of the points 23 carry this substance out the hole, whence it passes along the shoulders 24, outside the annular body 20 and the ring 10, along the shoulders 17, past the point 18, and then along the wide outer edges 7 of the spiral ribs 3. The pitch of these edges causes it to be carried rapidly out of the hole, while the core yet projects into the bore of the shaft. Moreover the widening of the rear edge of each rib 3 as shown in Fig. 2 strengthens the rib to a great extent.

Another feature of my invention is the provision of braces as indicated in Fig. 1.

These are simply narrow strips 27 cast integral with the two contiguous convolutions of the ribs 3, 3 and considerably narrower than the wide rear edge 7 of the rib in advance; and by preference the front of each strip or brace 27 is sharpened as at 28 so as to interfere as little as possible with the clearance of material being drawn out of the hole. I do not wish to be limited as to the number or disposition of these braces, but it is quite obvious that in a long drill more of them would be desirable or necessary than in a short drill. After drilling the hole to the desired depth, the direction of rotation is reversed and the drill shaft with its bit comes out of the hole and brings a mass of material with it. Whether the pin 26 is employed or not, the bit can then be readily removed from the ring for the substitution of one whose cutting points are sharp. If it be removed, it may not be necessary to make one face 14 of the notch 12 irregular, although nothing is lost by doing so. The reason for this irregularity (especially if the pin be omitted) is to prevent the lateral displacement of the fingers from the notches, either in the hole or after the drill is drawn out of it.

What I claim is:

1. In a tubular drill, the combination with a shaft whose body is made up of ribs, a ring at the front end of and smaller than the body, and blocks connecting the ring with the body and of equal thickness with said ribs whereby the edges of the blocks in the direction of rotation constitute shoulders merging into the edges of the ribs; of a bit comprising an annular body, and a plurality of cutting points radially wider than the thickness of said annular body to produce shoulders, certain of which coact with and deliver clearance to the shoulders of said blocks, for the purpose set forth.

2. In a tubular drill, the combination with a shaft whose body is made up of a plurality of spiral ribs having wide rear edges, a ring at the front end of the body narrower than said edges, and blocks integrally connecting the ring with the front ends of said ribs and of equal thickness with said ribs whereby the forward edges of the blocks in the direction of rotation constitute shoulders merging into the rear edges of the ribs; of a bit comprising an annular body, means for detachably connecting it with said ring, and a plurality of cutting points radially wider than the thickness of said annular body to produce shoulders, certain of which coact with and deliver clearance to the shoulders of said blocks, for the purpose set forth.

3. In a core drill, the combination with a tubular body made up of spiral ribs having

thick rear edges of steep pitch, and a ring
cast integral with the front ends of said
ribs and thinner than their thicker edges;
of a bit comprising an annular body detach-
ably connected with the front edge of said
ring, and a series of cutting points wider
than the thickness of said annular body,
disposed obliquely to the axis of the drill

and having their tips beveled from the rear,
for the purpose set forth.

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

PETER J. SMITH.

In presence of us:

ALBERT GALLOS,

CATHERINE M. KANE.