

962,994.

Patented June 28, 1910.

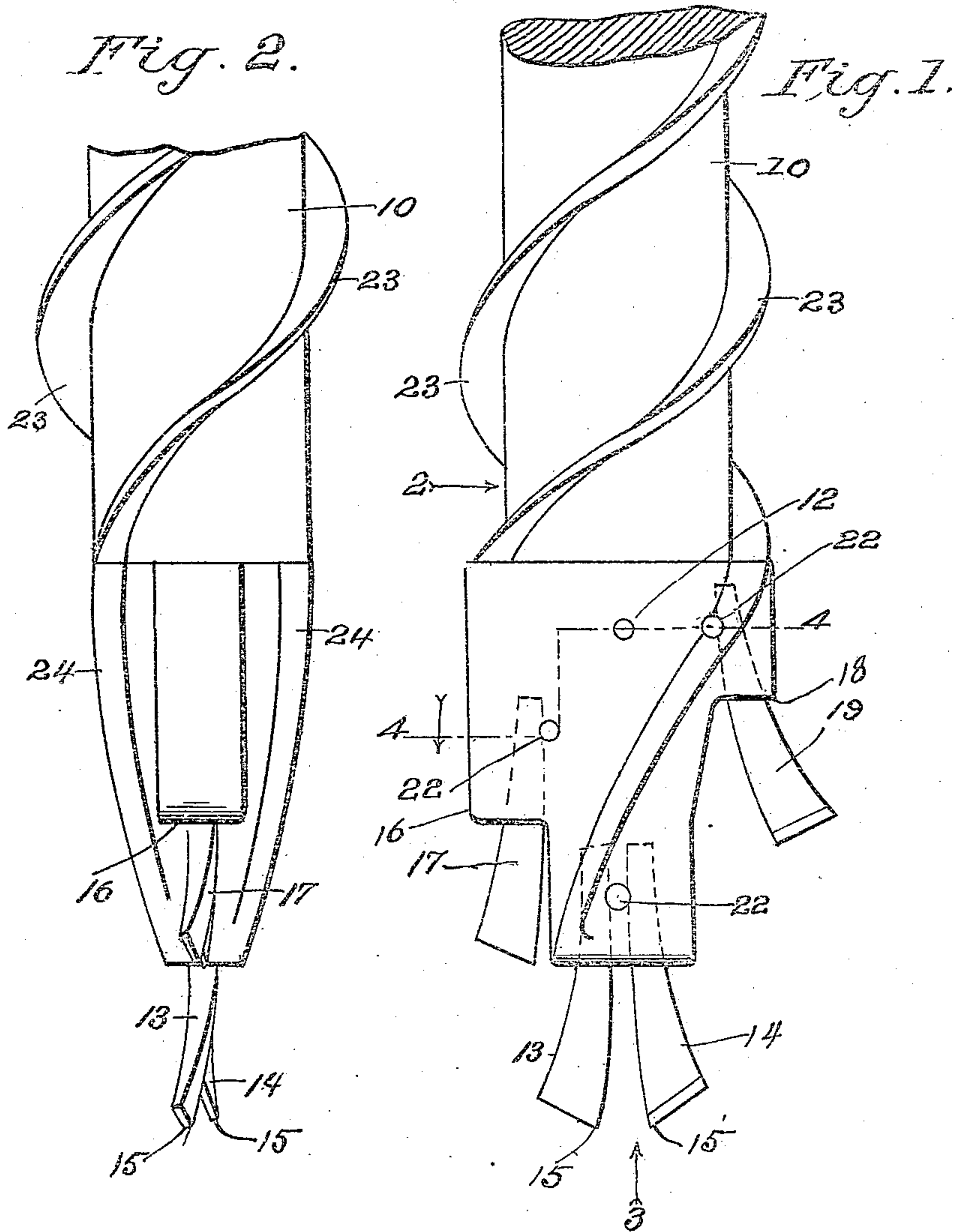


Fig. 5.

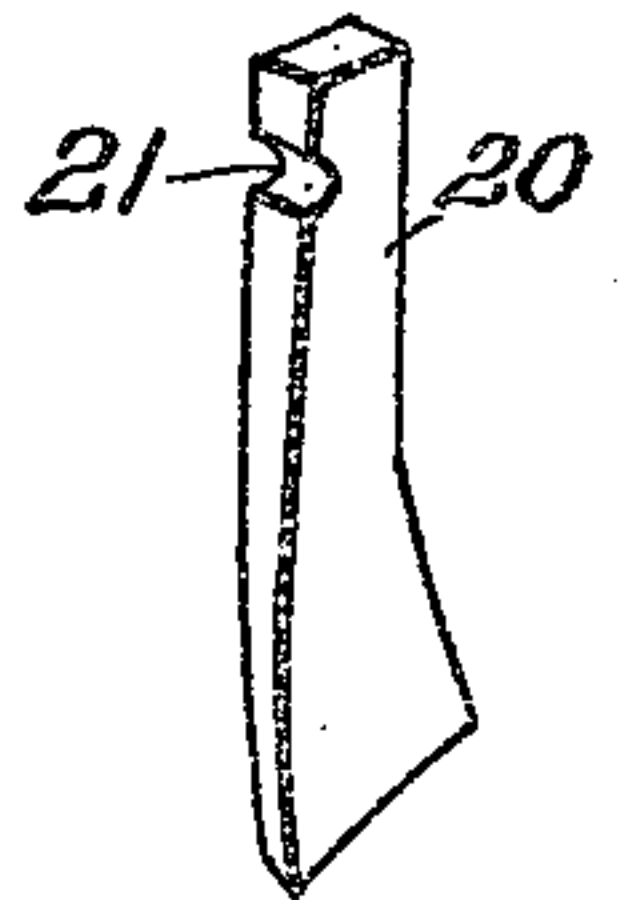


Fig. 6.

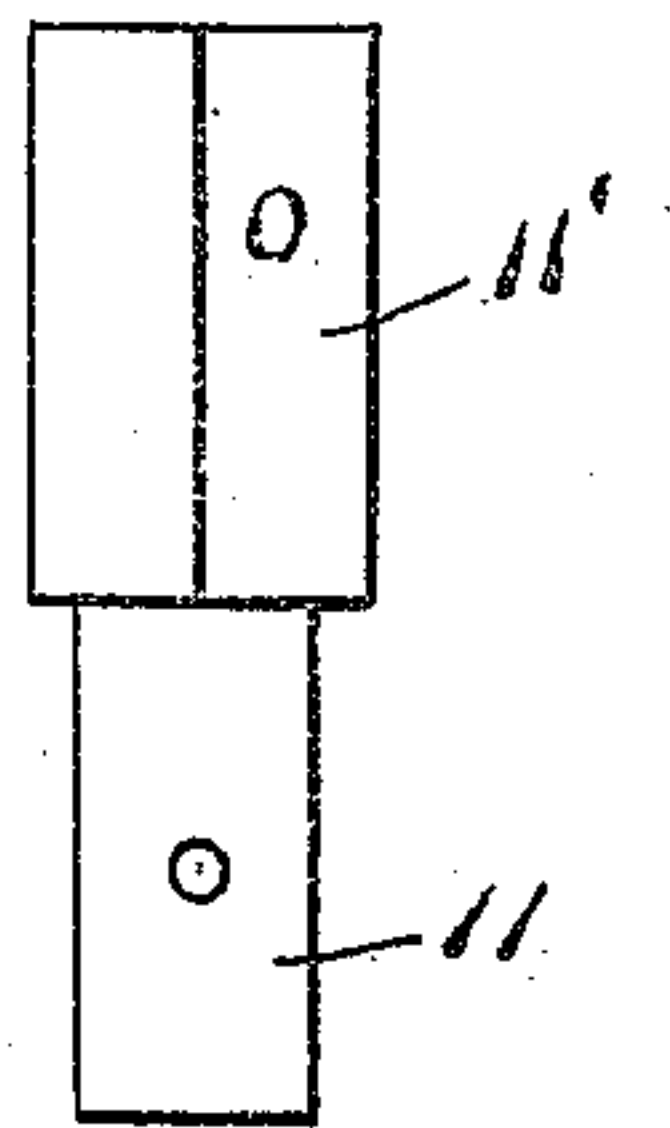


Fig. 7.

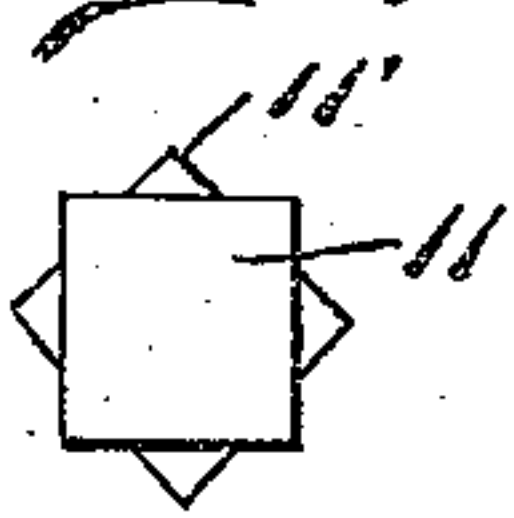


Fig. 3.

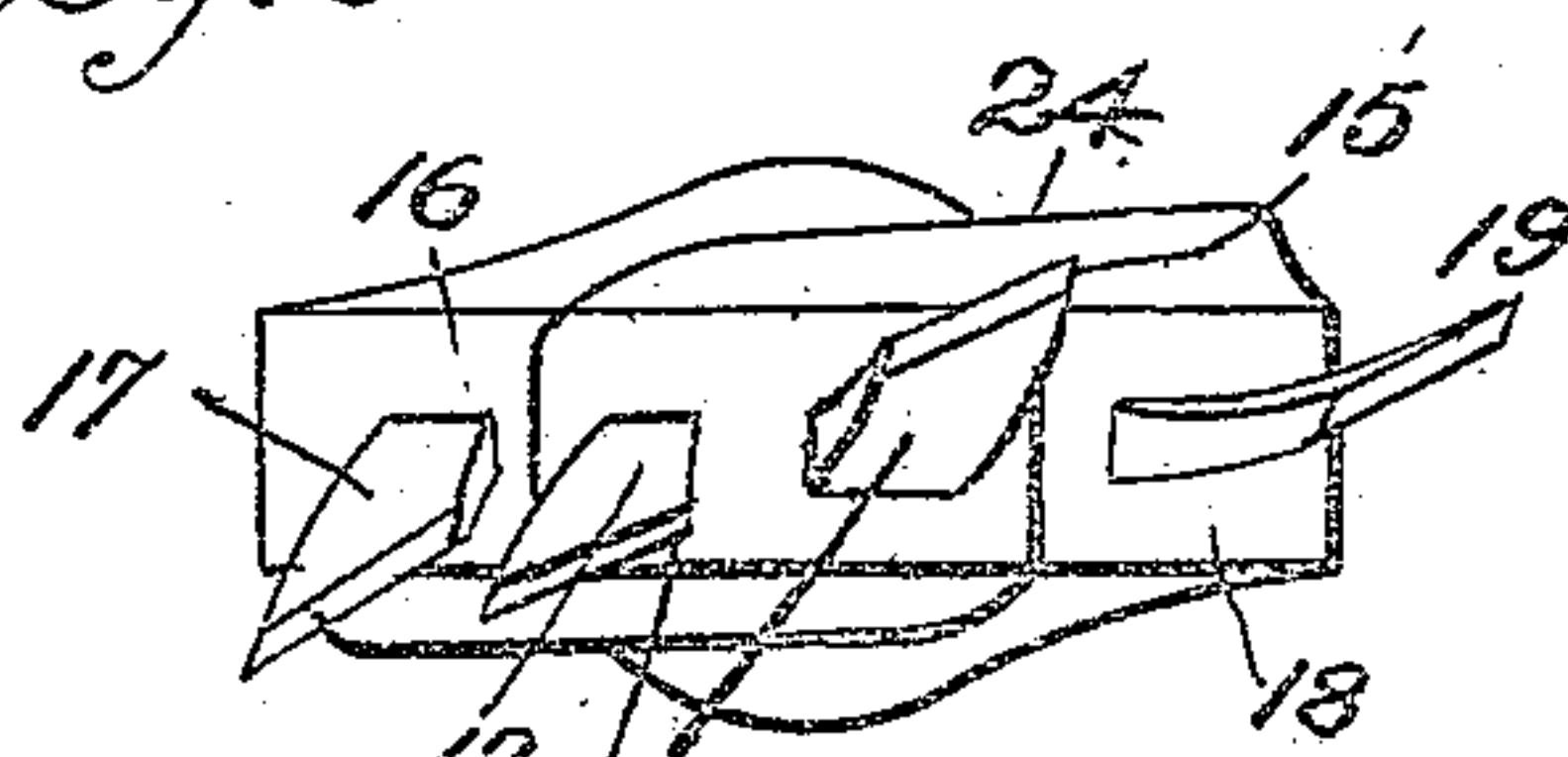
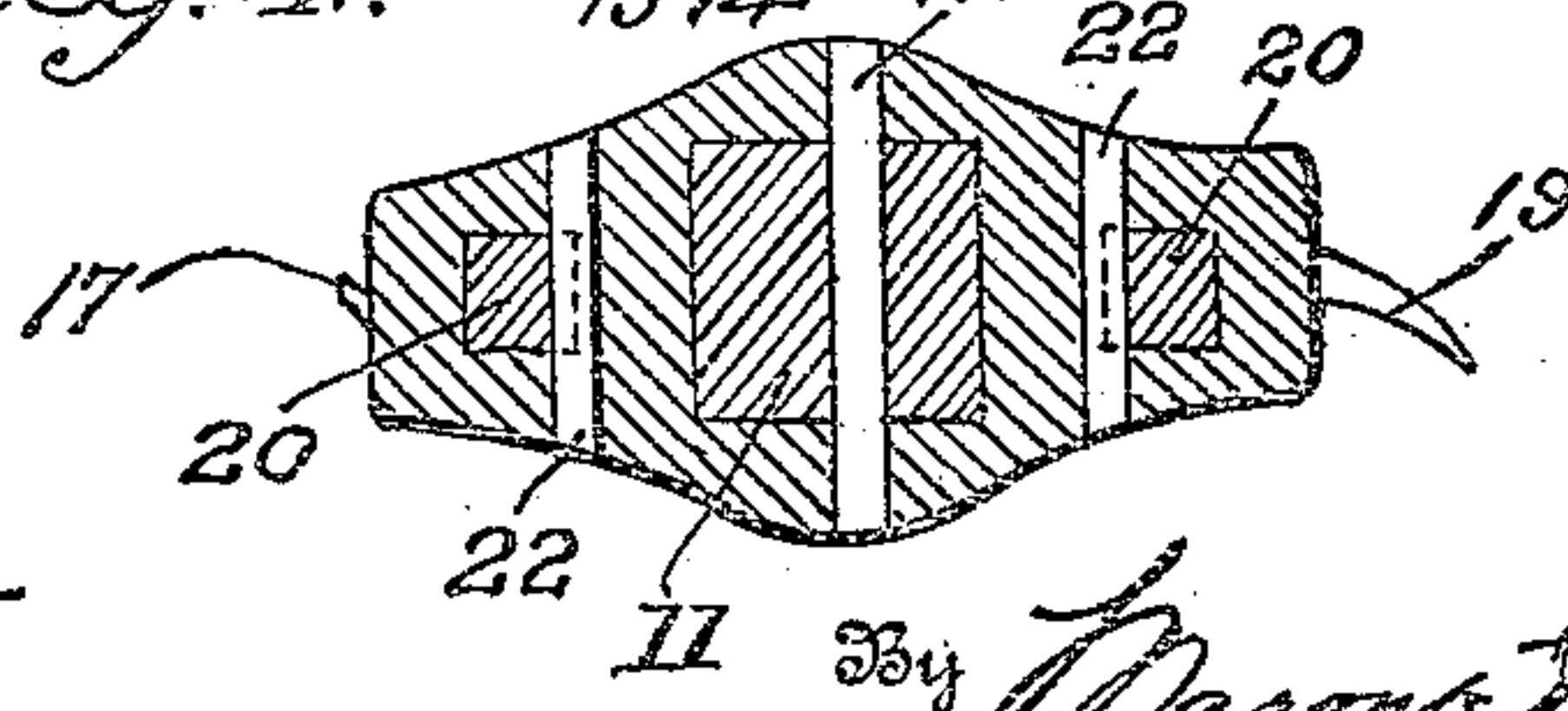


Fig. 4.



Inventor

Witnesses  
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# UNITED STATES PATENT OFFICE.

LLEWELYN WATERS, OF EDWARDSDALE, PENNSYLVANIA.

## DRILL.

962,994.

Specification of Letters Patent. Patented June 28, 1910.

Application filed February 6, 1909. Serial No. 476,544.

*To all whom it may concern:*

Be it known that I, LLEWELYN WATERS, a citizen of the United States, residing at Edwardsdale, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in 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 drills, especially to that class of drills ordinarily employed for drilling coal, slate, rock, and other minerals.

An object of the present invention is to provide in combination a drill head and a plurality of drill bits similar and interchangeable, and so arranged that the several bits will cut concentric paths and cover the entire area from the center to the circumference as determined by the outer edge of the outer bit.

With these and other objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a view of the improved drill in side elevation attached to the usual and ordinary stem or shaft provided with relieving spirals. Fig. 2 is a view of the bit and bit stem in edge elevation. Fig. 3 is a view of the drill head, with bits attached as seen in end elevation and indicated by arrow 3 at Fig. 1. Fig. 4 is a transverse sectional view as taken on line 4—4 of Fig. 1. Fig. 5 is a perspective view of one of the interchangeable bits. Fig. 6 is a view in side elevation of a tang or spindle adapting the drill head for use in association with the common hollow drill spindles now in use. Fig. 7 is a view of the tang or spindle as shown at Fig. 6 and seen in end elevation.

Like characters of reference designate corresponding parts throughout the several views.

As shown in the drawings the drill head forming a part of the subject-matter of the present invention is adapted to be connected with a spindle as 10 substantially of the usual and ordinary form which may have the squared or multi-angular stem 11 in-

serted within the head and secured therein as by the pin 12.

The drill head is intended to be associated with the drill spindles now ordinarily in use in mines, quarries, etc., some of which are solid and provided with a squared or multi-angular shank or tang adapted to be inserted in the squared or multi-angular portion of the head or some are hollow or provided with a socket at the end and for such purpose the shank or tang 11 is provided which will be either continuously rectangular in cross section or one portion of the rectangular bar set at 45 degrees to the other as shown at Figs. 6 and 7, the use depending upon the position of the socket in the shank relative to the fin.

The head is provided at its extremity with two similar bits 13 and 14 having their inner corners 15 and 15' positioned equi-distant from the center of rotation and to form between such points a core or cone which will center the drill and hold it steady, such core or cone of course being broken off as it advances between the bits and the broken-off part being discharged as hereinafter described.

The head is provided with a step wherein is seated a bit 17 cutting the circle exterior to the bits 13 and 14. Upon the side opposite the step 16 another step 18 is provided in which is seated a bit 19 cutting a path concentric to and exterior of the path cut by the bit 17.

The bit shown in perspective at Fig. 5 is the bit employed at each of the places indicated and respectively numbered 13, 14, 17 and 19. The bits are provided with shanks 20 having notches 21 formed in each of such shanks, and pins 22 are inserted through the head and engaging within the several notches 21 maintain the bits in position in the head.

The drill spindle is provided with spiral relieving ribs 23 and the head is provided with a rib 24 positioned to correspond and register with the extremity of the ribs 23 carried by the spindle, so that it will be apparent that as the drill is rotated the rib 24 will engage the material cut by the several bits and convey it upwardly along the head and discharge it into engagement with the spiral ribs 23 which will carry it upwardly and discharge it from the drill hole.

What I claim is:—

1. In a drill, the combination with a shank having a spiral fin, of a drill head having a fin proportioned as a continuation of the fin  
5 of the shank, and cutter blades carried by the head in stepped relation.

2. In a drill, a head having a spirally disposed fin extension, shoulders out of alinement formed at the sides of the head,

and cutter blades secured in the shoulders 10 unequally distant from the center of rotation of the head.

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

LLEWELYN WATERS.

Witnesses:

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