

(No Model.)

G. H. BITTENBENDER.  
COAL DRILL.

No. 519,466.

Patented May 8, 1894.

FIG. 1.

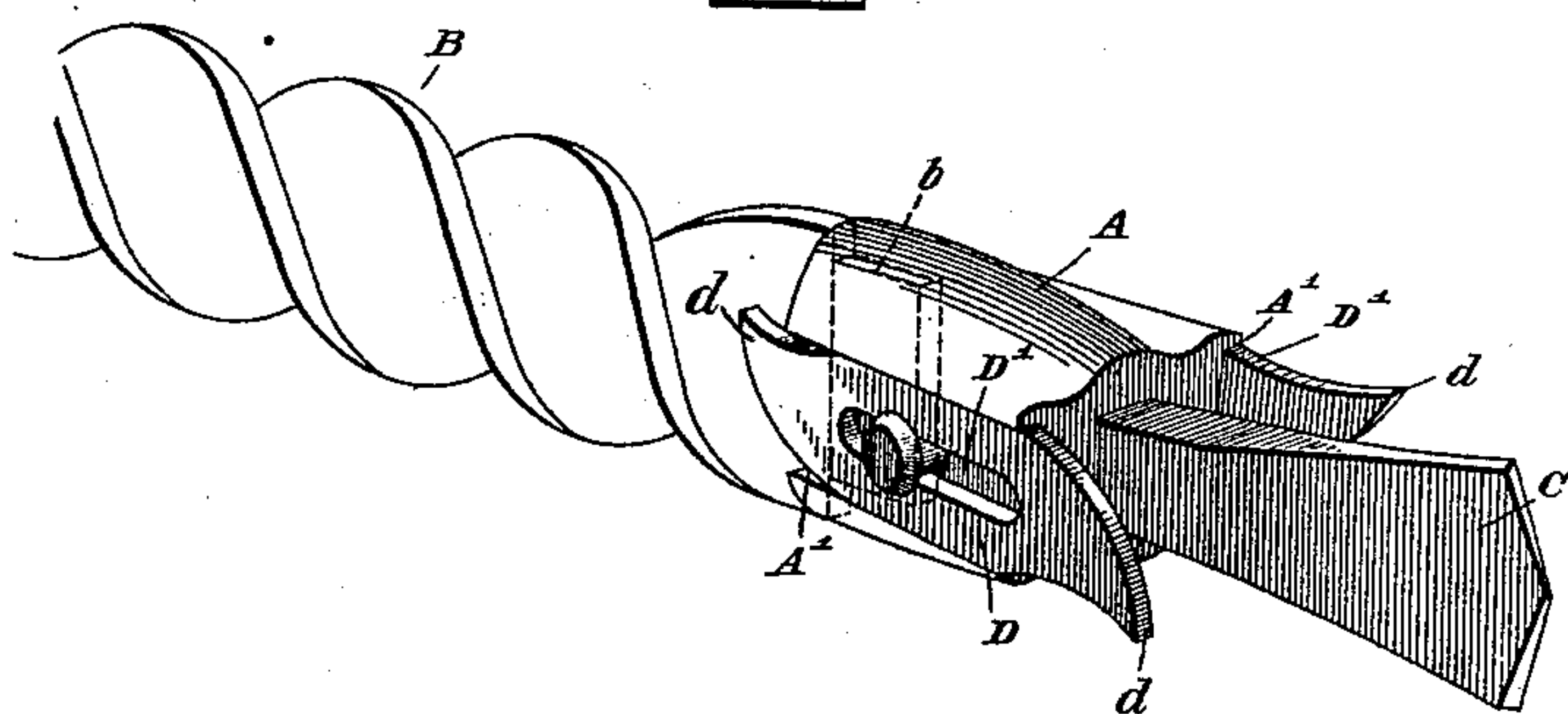


FIG. 2.

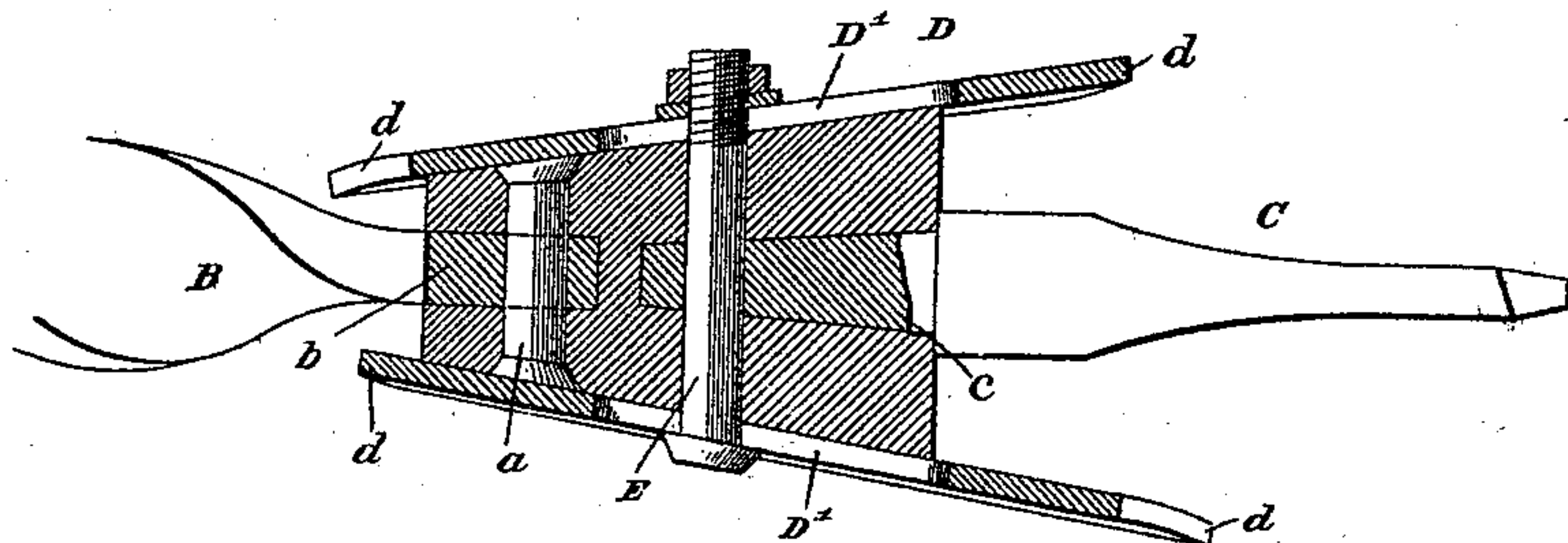
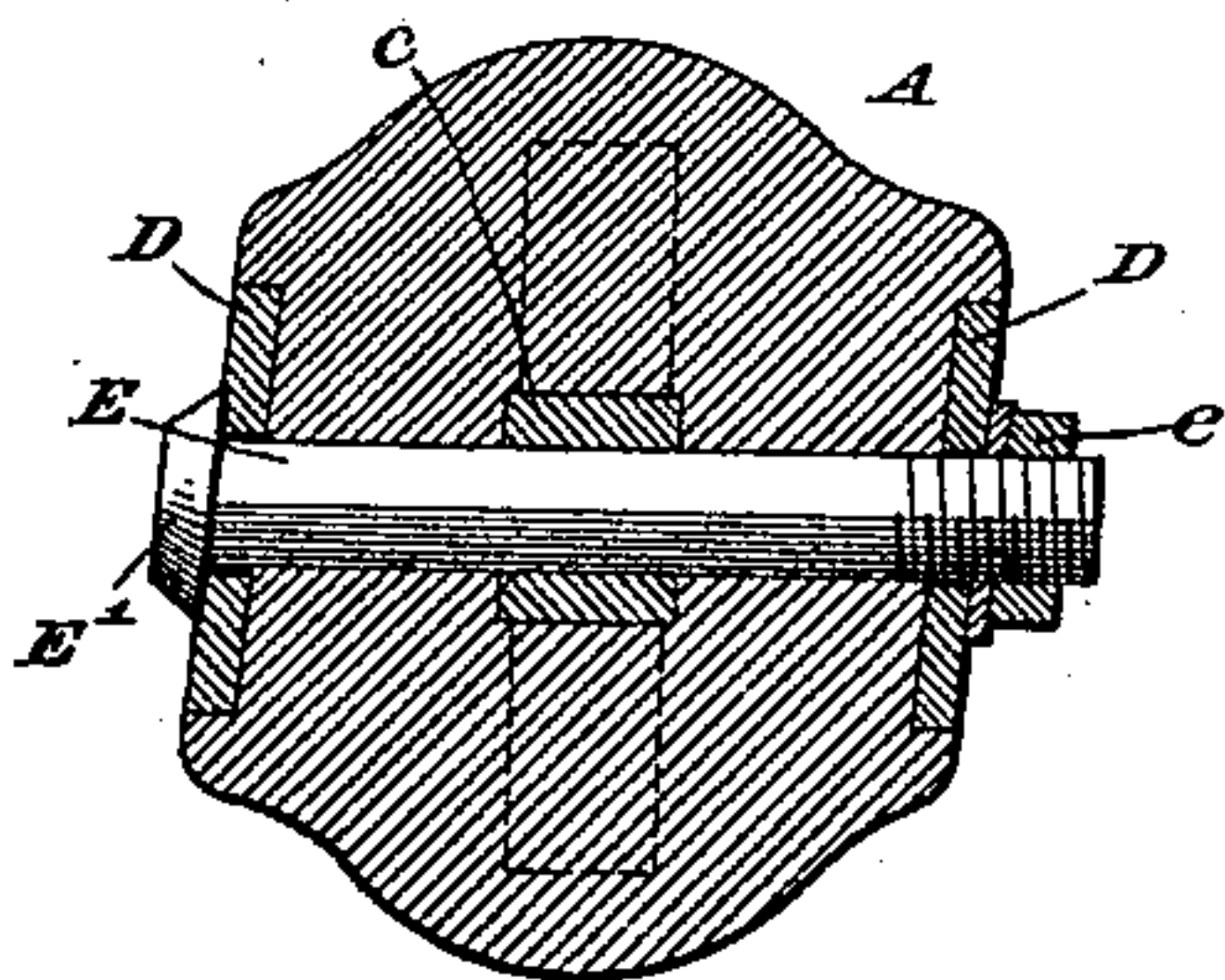


FIG. 3.



Witnesses

C. W. S. Swale, Jr.  
W. M. L. Boyden

Inventor

George H. Bittenbender  
per Fred W. Parker  
Attorney



# UNITED STATES PATENT OFFICE.

GEORGE H. BITTENBENDER, OF PLYMOUTH, PENNSYLVANIA.

## COAL-DRILL.

SPECIFICATION forming part of Letters Patent No. 519,466, dated May 8, 1894.

Application filed March 24, 1893. Serial No. 467,428. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. BITTENBENDER, a citizen of the United States, residing at Plymouth, 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 has reference to an improvement in bits or independently-constructed cutting points for use with coal drills or other similar boring implements, the object of the invention being to provide adjustable and reversible cutting devices so arranged in a carrying head that when they are applied to their work, the gage of incision may be graduated to produce borings of different sizes as may be desired, said cutting devices and other parts being readily capable of rearrangement, withdrawal, substitution, and many other changes for the production of different actions and functions and the invention therefore consists essentially in an independently-constructed cutter-head provided with adjustable and reversible cutters operating to accomplish the aforesaid ends and it also consists in the construction, arrangement and combination of parts, substantially as will be hereinafter more fully described and then particularly pointed out in the appended claims.

In the annexed drawings illustrating my invention: Figure 1 is a perspective view of my improved coal drill bit. Fig. 2 is a horizontal section of the same. Fig. 3 is a transverse section.

Similar letters of reference designate corresponding parts in the several figures.

B designates a drill of any ordinary kind, having the usual spiral groove which provides an outlet way for the refuse material which is cut and broken up by the advancing or working end of the drill. This drill may be of any suitable size and kind and employed for any desired purpose and operated by any kind of machinery.

A designates a cutter-head adapted to be rigidly fixed to the working end of the drill B in lieu of the common integral screw point

with which the end of the old-fashioned drill has been commonly provided. The cutter-head A carries peculiarly-constructed cutting blades or points to be hereinafter accurately described in detail, the same being adapted to enter into and cut the coal or other substance that is being drilled. This cutter-head A may be of any desired size and shape. It is provided at one end with a recess, preferably rectangularly-shaped, although it may be of any desired shape which is adapted to receive a correspondingly shaped projection *b*, on the end of the drill stem *b*. A rivet *a* passes through the end of the cutter-head A, and the projection *b*, and thereby the cutter-head is rigidly and immovably secured upon the drill stem.

The cutter-head A, is provided at its forward end with a centrally-located forwardly extending cutter or leading bit C, having a shank *c*, which enters an opening in the cutter-head, as is clearly shown in Fig. 2 and is firmly secured in said opening by means of the transverse bolt E, which is also employed for the purpose of keeping the lateral cutters in position as will be hereinafter described. The leader bit C obviously is used for the purpose of making the first impression upon the material which is being bored and it cuts out the central portion of the boring, while the other cutters with which the cutter-head is provided, follow after it and cut the sides or wall of the hole. This central bit C can be removed whenever desired for the purpose of sharpening or for permitting the substitution of a new one.

I will now describe certain peculiarities in the construction of the cutter head A which clearly distinguish it from anything of the kind now in use. Said cutter head has a wedge shape or tapering construction, its outer end being larger or of greater diameter than its inner end, that is to say, the end which carries the front bit C, is wider than the end which is attached to the drill stem B. The cutter-head therefore is provided on two opposite sides with inclined or tapering surfaces and these inclined sides are provided with longitudinal recesses *A' A'*. These recesses therefore are not parallel to each other, but are inclined, sloping rearwardly inward so that they are closer to each other at the



inner end of the cutter-head A, than at its outer end. These recesses are not of a dove-tailed character, but their edges are rectangular. Furthermore it is to be particularly observed that these recesses A' A', have not only a longitudinal inclination as I have already described and as is clearly represented in Fig. 2, said inclination being an inclination to the longitudinal axis of the cutter-head, but they also have a transverse inclination as is clearly shown in Fig. 3, the same being an inclination to a transverse axis of the cutter-head. The transverse inclinations of the recesses A' A', are preferably of about the same degree, which obviously may vary in different cases. Thus it will be seen that the cutter-head is provided with laterally-located, doubly-inclined longitudinal recesses A' A', and these recesses provide space for the adjustable and reversible blades or knives D D which constitute the effective cutting mechanism of the bit.

The cutters D D are simply thin flat metallic plates of suitable length and width to permit them to be inserted nicely and accurately into their receiving recesses A' A'. The opposite ends of the cutters D are provided with cutting points  $\bar{d}$   $\bar{d}$  which are capable of cutting coal or other material which is being drilled. These cutters D D are therefore similarly constructed at each end so that they are readily reversible. Furthermore they are provided with longitudinal slots D'. Through these slots of the cutters passes the transverse bolt E, already referred to, having on one end a head E' and provided at its other end with the nut e. This bolt when screwed up tightly, holds the two cutters D D firmly in any predetermined position. By removing the bolt, the cutters can be readily taken out of place or reversed or adjusted in position. The long slots D' obviously permit a considerable longitudinal adjustment of the cutters D. Since the edges of the receiving recesses A' are rectangular and the edges of the cutters D which contact with them are likewise rectangular it will be seen that the cutters may be removed laterally from the recesses whenever desired and readily replaced therein without any difficulty or entanglement of the parts. When the cutters D D are located in place in recesses A', it will be manifest that in consequence of the doubly-inclined character of said recesses, the cutters will occupy doubly-inclined positions, that is to say, they will be inclined to each other longitudinally and will also have the transverse inclination which is so clearly shown in Fig. 3. When the cutters are in place, their forward cutting points lie opposite to the central bit C. By adjusting the cutters, their forward cutting points can be placed farther from or nearer to the cutter-head. The nearer they are to the cutter-head, the nearer to each other will be the cutting points, consequently the smaller the diameter of the hole which is being bored. The

farther the forward cutting points  $\bar{d}$   $\bar{d}$  are placed from the end of the cutter-head, the larger will be the hole which is being bored. Thus it will be obvious that the gage of incision of these points may be graduated so as to cut holes of different diameters. It is often necessary in drilling, especially in drilling coal, to cut a hole of large diameter and often necessary to cut one of considerably smaller diameter.

My improved bit by reason of the adjustability of the parts, permits the operator to vary the size of the hole within considerable limits. This capacity in the bit for cutting a hole of variable size results very clearly from the arrangement of the cutters in the doubly-inclined position which I have already described. If desired these cutters may be situated simply in the longitudinal inclined position, the transverse inclination being omitted. Further it is found in actual practice that good results may be achieved with the employment of a single cutter. Therefore I do not wish it to be understood that I am obliged in all cases to use both cutters. Also the cutters may be so adjusted that one of the forward cutting points  $\bar{d}$  will be closer to the cutter-head than the other forward cutting point. An example of this is illustrated in Fig. 2. When the cutters are thus arranged, one point will cut on a smaller circle than the other point and it will be found in many cases that this will be an efficient method of action resulting in cleavage of the material which is being acted upon.

Numerous possible uses and novel advantages accruing from the use of a drilling bit constructed as herein described might be mentioned but it is unnecessary as they will be evident to those versed in the practical employment of drills of this character. As already suggested the cutters D D may be at any time removed and reversed. They can thus be readily taken out for sharpening. Also they will last a long time, because having cutting points at each end, when one of the points has been worn down, the other set of points can be used with equal efficiency.

Many changes in the exact construction, detailed arrangement and precise proportions and form of the several parts of my improved drill bit may obviously be made without departing from the clear intent and scope of the invention and I reserve the liberty of re-constructing and re-arranging and changing the numerous parts so that they may operate to the best advantage and for the attainment of the highest possible degree of efficiency.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the cutter-head, one or more cutters situated in a recess thereof and at an inclination to the longitudinal axis of the head, said cutter or cutters being adjustable and reversible, substantially as specified.



2. In combination with the cutter-head, having one or more doubly inclined recesses, of a cutter or cutters located in said recess or recesses, substantially as described.

5 3. In combination with a cutter-head, firmly secured to the drill stem, of a central forward leading cutter and lateral cutters located adjutably and reversibly in doubly-inclined re-

cesses on the sides of the cutter-head, in the manner and for the purpose specified. 10

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

GEORGE H. BITTENBENDER.

Witnesses:

E. E. GALLAGHER,

GEORGE HECKLES.