(No Model.)

C. BORNET.

BIT OR DRILL FOR BORERS, &c., AND MANUFACTURE OF SAME.

No. 574,980. Patented Jan. 12, 1897.

FIG. 1.

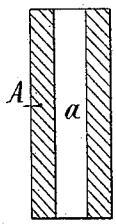


FIG. 4.

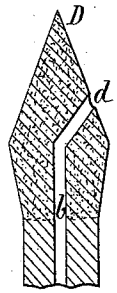


FIG. 2.

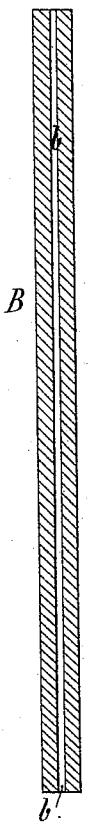


FIG. 3.

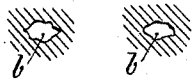


FIG. 5.

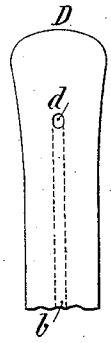
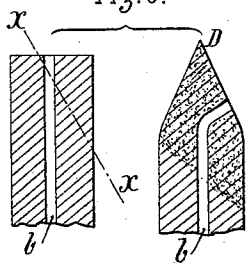


FIG. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

CAMILLE BORNET, OF PARIS, FRANCE.

BIT OR DRILL FOR BORERS, &c., AND MANUFACTURE OF SAME.

SPECIFICATION forming part of Letters Patent No. 574,980, dated January 12, 1897.

Application filed April 2, 1896. Serial No. 585,985. (No model.) Patented in France April 6, 1894, No. 237,565; in Germany April 11, 1894, No. 79,226; in England April 17, 1894, No. 7,614; in Belgium July 13, 1894, No. 110,960; in Spain July 18, 1894, No. 16,080, and in Austria April 8, 1895, No. 45/1,946.

To all whom it may concern:

Be it known that I, CAMILLE BORNET, engineer, a citizen of the Republic of France, residing at Paris, in the Republic of France, have invented certain new and useful Improvements in Bits or Drills for Borers and the Like and in the Manufacture of the Same, (for which I have received Letters Patent in France, No. 237,565, dated April 6, 1894; in Germany, No. 79,226, dated April 11, 1894; in England, No. 7,614, dated April 17, 1894; in Belgium, No. 110,960, dated July 13, 1894; in Spain, No. 16,080, dated July 18, 1894, and in Austria, No. 45/1,946, dated April 8, 1895,) of which the following is a specification.

This invention relates to hollow steel bits or drills, and more particularly to that class of drills used for mining purposes in which it is desired to inject centrally therethrough a stream of water adapted to cool the same and to insure the continuous, automatic, and perfect cleansing of the holes which are being bored.

The invention has for its object to construct a drill of this character which will be strong and durable and in which the water-passage will not be liable to injury in use by the great strain to which these drills are subjected.

To this end the invention consists in a seamless bit or drill, drawn from a hollow steel tube or ingot, having a longitudinal opening therethrough and having one of its ends formed into a cutting-head.

The invention further consists in the details of construction more fully hereinafter described and claimed.

The invention will now be described in detail with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the hollow steel block used for the manufacture of these bits, borers, or the like. Fig. 2 is a longitudinal section of the hollow bar obtained by drawing out the block of steel in a rolling-mill. Fig. 3 is a view in detail showing the irregular shapes of the hole or internal passage of the extended rod. Fig. 4 is a section of a completed hollow bit, showing the cutting-head. Fig. 5 is a side view of the cutting-head. Fig. 6 is a detail view showing the method of making the above-named cutting-head.

In the manufacture of bits or drills embodying my invention hollow blocks of steel, such as A, Fig. 1, are employed, which are made directly by casting and have, for instance, an external diameter of sixty millimeters, while the central hole *a*, which is formed therein, is about twenty-five millimeters in diameter. This block is suitably heated and submitted to the action of an ordinary rolling-mill, which draws it out, the grooves of said mill being either semicircular or of other form, but gradually diminishing in size. By this means after it has been passed through the mill a certain number of times with intermediate reheatings the external diameter of the hollow bar B, Fig. 2, obtained is only, for instance, twenty-seven or thirty millimeters, and the central opening *b* then has a diameter of from five to six millimeters only, the length of the hollow bar B obtained depending on that of the block A employed. It has been found easy in practice to obtain bars of two meters and more in length. The result of this special mode of treatment is that the central hole *b* of the hollow bar is not circular in section, but always more or less oblong, and presents sometimes angles or longitudinal folds, as shown in Fig. 3. As, however, this hole or central conduit is only intended to form a passage for the water injected into the hole being bored, it is obvious that the form or section of this passage is a matter of absolute indifference.

The cutting-head of the bit or drill is formed by cutting off obliquely a corner of one end of the hollow tube B employed to intersect the central longitudinal opening therethrough, as shown at *x x* in Fig. 6, and then in bending or swaging the end of the same thus cut over laterally to the ordinary shape of drill-heads. By this operation the central opening *b* of the rod is bent down and forms the lateral passage *d* a little behind the cutting-point. By this construction the weakening of the cutting end of the bit or drill, which would be attendant on the central opening *b* passing therethrough, is avoided.

It is evident that this mode of manufacture by drawing and forcibly compressing hollow cast-steel blocks by means of a rolling-mill insures the necessary hardness and rigidity. Nevertheless, solid steel forged blocks, if preferable, can also be made use of in which is made a central hole or bore by operating on them while hot by means of a punch, which is caused to penetrate successively into the two ends of the block and by then perfecting the bore obtained by means of a cylindrical rod. The boring of solid blocks may also be effected by means of a boring-machine or a lathe; but the punching process avoids any loss of metal.

In the foregoing it has been mentioned that the hole or bore *b* obtained in the rod of steel B was placed in the center of this rod; but it must be understood that this passage may, even with advantage, be placed eccentrically as regards the axis of this rod with a view to facilitate the making of the cutting-head and the lateral discharge-opening of the said passage behind the point of the cutting-head. It is sufficient in this case to employ blocks the interior bores of which are eccentric. The operation is then performed exactly the same as before; but the section of the passage *b* is a little more malformed by the action of the rolling-mill than when this hole coincides with the axis of the block.

The novelty of my drill resides in the feature of bending its end to form a cutting-head, by which operation the structural formation of the cutting-head where it is bent is changed and rendered more dense and harder, which is a condition most favorable for an effectual cutter.

I declare that what I claim is—

1. The method of forming seamless drills containing cleansing-openings, which consists in elongating a hollow metallic block to reduce its diameter and the opening therein, severing the end of the elongated block in an oblique line passing through the opening, and finally bending the severed end of the same and the opening therein to form a cutting-head, substantially as described.

2. As a new article of manufacture, a seamless bit or drill having its cutting-head bent laterally and provided with an opening extending longitudinally through the shank of the drill and then laterally through the bent head of the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CAMILLE BORNET.

Witnesses:
EUGÈNE DUMAS,
JACQUES CONDOMY.