

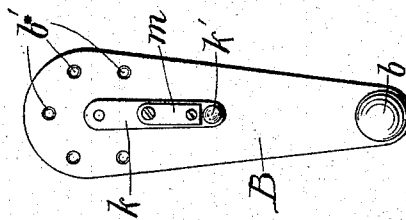
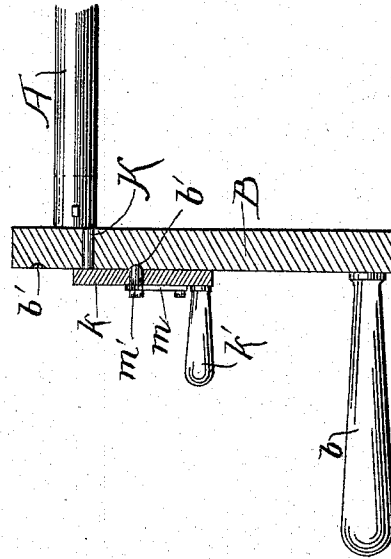
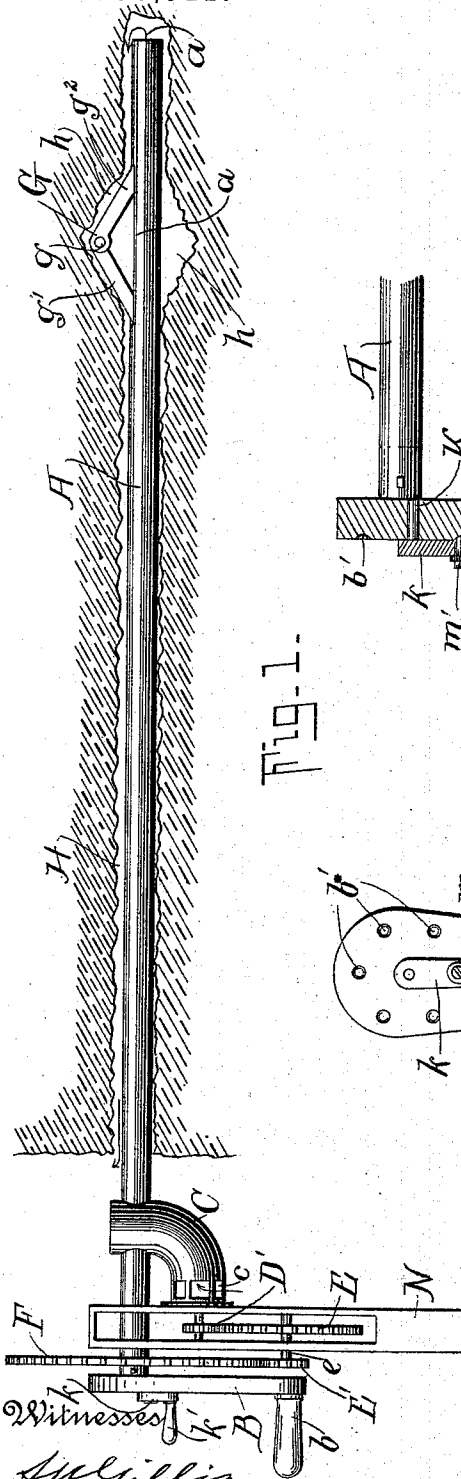
(No Model.)

3 Sheets—Sheet 1.

R. H. ELLIOTT & J. B. CARRINGTON.
MINING DRILL.

No. 530,511.

Patented Dec. 11, 1894.



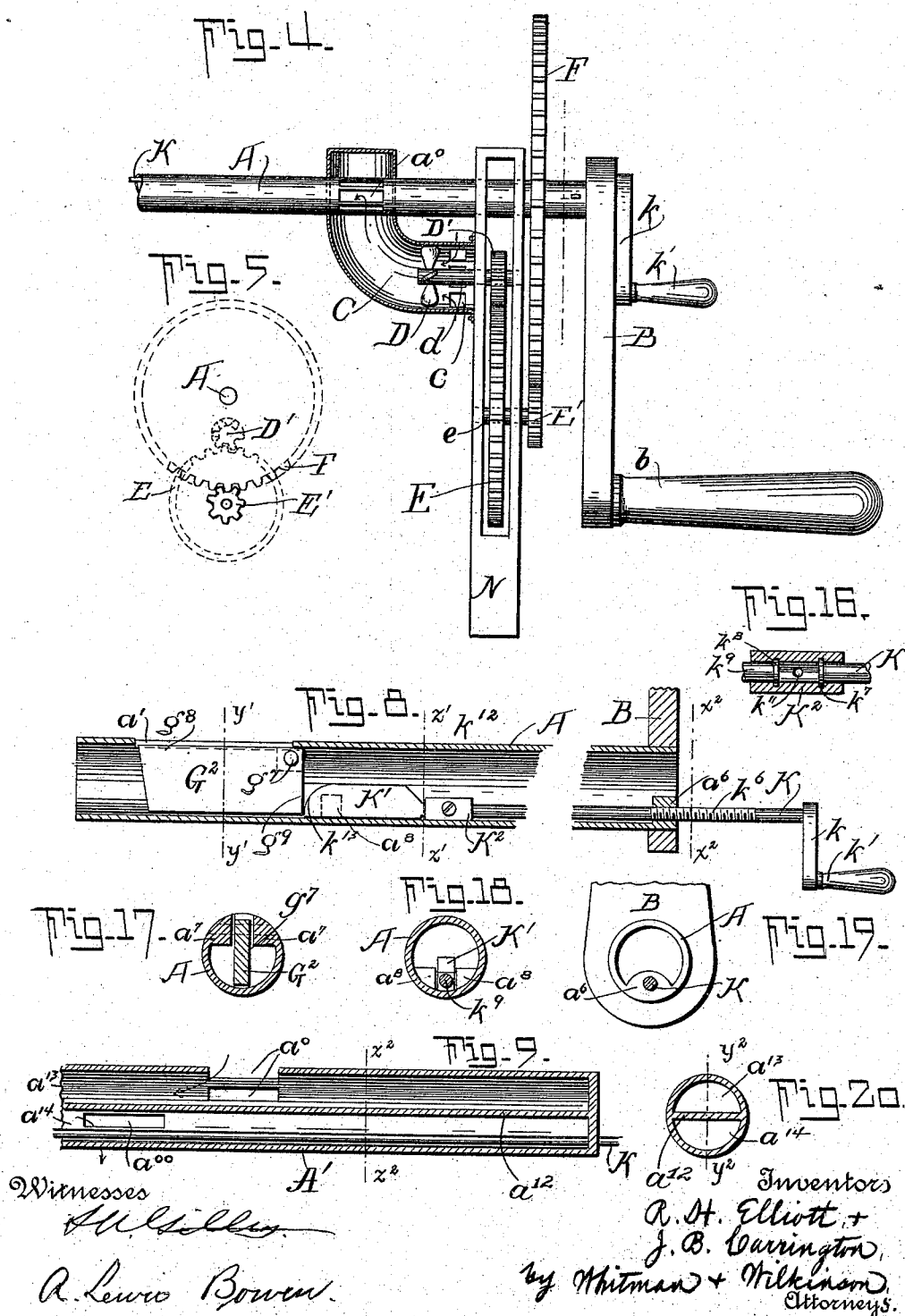
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3 Sheets—Sheet 3.

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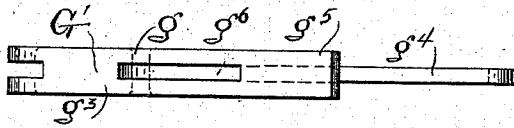


Fig. 13.

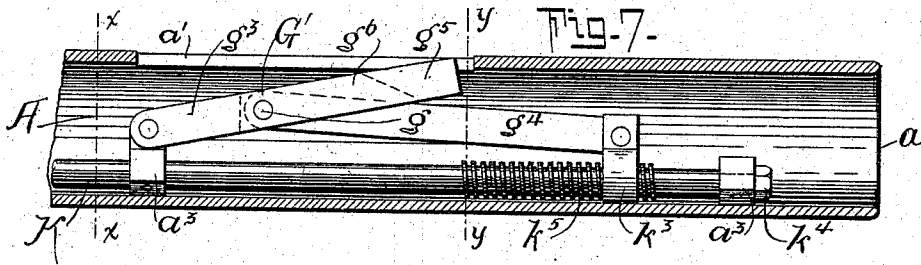


Fig. 7.

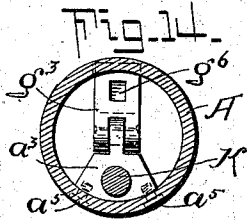


Fig. 14.

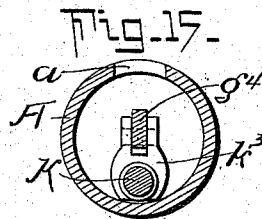


Fig. 15.

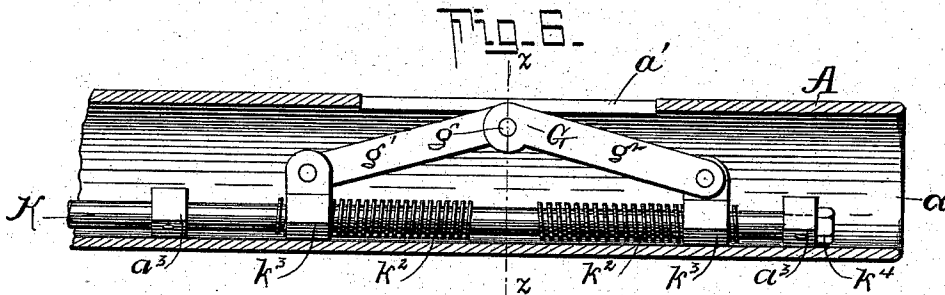


Fig. 6.

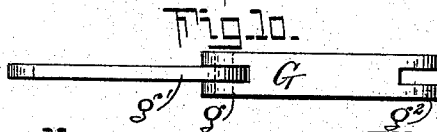


Fig. 10.

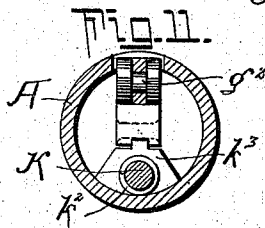


Fig. 11.

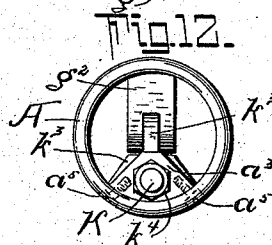


Fig. 12.

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UNITED STATES PATENT OFFICE.

ROBERT H. ELLIOTT, OF BIRMINGHAM, AND JOHN B. CARRINGTON, OF
JASPER, ALABAMA.

MINING-DRILL.

SPECIFICATION forming part of Letters Patent No. 530,511, dated December 11, 1894.

Application filed February 20, 1894. Serial No. 500,910. (No model.)

To all whom it may concern:

Be it known that we, ROBERT H. ELLIOTT, residing at Birmingham, in the county of Jefferson, and JOHN B. CARRINGTON, residing at Jasper, in the county of Walker, State of Alabama, citizens of the United States, have invented certain new and useful Improvements in Mining-Drills; and we 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.

Our invention relates to improvements in mining drills, and it consists in certain novel means for enlarging the cavity already bored by a drill of ordinary construction, and in means for removing the chips or borings made in said cavity.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters.

Figure 1 represents one form of the herein described drill in operation. Fig. 2 represents an end view of the hand crank for revolving the drill shown in Fig. 1, and of the adjusting crank for regulating the position of the cutting blade. Fig. 3 represents a central longitudinal section of the device shown in Fig. 2. Fig. 4 represents an enlarged view of the outer end of the device shown in Fig. 1. Fig. 5 represents a diagram of the gear wheels shown in Figs. 1 and 4. Fig. 6 represents an enlarged detailed view of the cutting blade shown in Fig. 1. Fig. 7 represents a detail view of a modification of the device shown in Fig. 6. Fig. 8 represents a further modification of the devices shown in Figs. 6 and 7. Fig. 9 represents a central longitudinal section of the outer end of an air blast tube adapted to use in our invention, and separated by a longitudinal partition into a delivery and return air passage. Fig. 10 represents a plan view of the toggle-joint cutting blades shown in Figs. 1 and 6. Fig. 11 represents a section along the line $z z$ of Fig. 6, and looking to the right. Fig. 12, represents an end view of the tube and contents shown in Fig. 6, as seen from the outer end a' of the said tube. Fig. 13, represents a plan view of the cutting device shown in Fig. 7, as de-

tached from its connecting parts. Fig. 14 represents a section along the line $x x$ of Fig. 7, and looking to the right. Fig. 15 represents a section along the line $y y$ of Fig. 7, and looking to the right. Fig. 16, represents a sectional view of the revoluble connection between the adjusting rod and the blade tripping device shown in Fig. 8. Fig. 17 represents a section along the line $y' y'$ of Fig. 8. Fig. 18 represents a section along the line $z' z'$ of Fig. 8, and looking to the right. Fig. 19, represents a section along the line $x^2 x^2$ of Fig. 8, and looking to the left, and Fig. 20 represents a section along the line $z^2 z^2$ of Fig. 9.

In the various figures, A represents an air tube adapted to enter into a hole already drilled in the usual way. This tube is made strong enough to form a spindle or driving shaft for the cutting tool. It is closed at its inner end, and open at its outer end a , and also near said outer end as at a' to allow the cutting blade or blades to be moved out into the operative position. The closed end of said tube is rigidly attached to the crank B operated by the handle b , but any other device for revolving the said tube may be substituted for the handle and crank aforesaid. Air is supplied to the said tube through slots a^0 from a bent pipe C which is closed at its upper end, and in which the pipe A is revolubly mounted as shown in Fig. 4. The outer end of the pipe abuts against the frame N, and the said pipe has ports c for the admission of air. Mounted in this pipe is a fan D mounted on the shaft d and driven by the pinion D' . This pinion meshes in a gear wheel E mounted on the same shaft e , with the pinion E' , which gears in the spur wheel F fast on the tube A.

The shafts d and e are journaled in the frame N, which is suspended from the tube A, and may be of any desired construction.

It will be seen that a slow revolution of the hand crank B will cause a much more rapid revolution of the fan D, and hence will blow air under pressure into the tube A.

It will be obvious from the description hereinafter contained, that air pressure from any other source might be used in the invention.

Mounted in the tube A near the inner end thereof, we provide a cutting tool which may be moved outward or inward away from or toward the axis of the said tube. In Figs. 1, 5 6, 10, 11, and 12, this cutting tool consists of a toggle joint G made of steel or other hard metal, and having the arms g' and g^2 pivoted together at g , and revolvably connected at their opposite ends to the nuts k^3 engaging 10 on the oppositely-disposed screw threads k^2 on the adjusting rod K. These nuts k^3 are made to fit the lower side of the tube A so that as rod K is revolved the nuts may not turn round, and so prevent the toggle joint 15 G from entering fairly into the slot a' in the tube.

The outer end of the rod K is provided with a nut k^4 , and the said rod passes through bearings a^3 secured by screws a^5 to the tube A. 20 The rod K is revolved by means of the hand crank k and handle k' . The latter may be provided with a spring m , and pawl m' , adapted to engage in the recesses b' in the face of the hand crank B.

It will be evident that by turning the crank k , the toggle joint may be moved from the position shown in Fig. 1, to that shown in Fig. 6, and that the said pawl m' will hold the said crank k in any desired position. 25

In the form of device shown in Figs. 7, 13, 14, and 15, the toggle joint G' has one of its arms g^3 pivoted to the bearing a^3 fast in the tube A, while the opposite arm g^4 , is pivotally attached to the nut k^3 similar to the nuts k^3 30 already described with reference to Fig. 6. The arm g^3 is slotted as at g^5 , in which slot the arm g^4 is pivoted as at g , and the said arm g^6 is provided with an outwardly-projecting cutting portion g^5 , which is thrown out or drawn 35 in by the revolution of the rod K.

In the form of device shown in Figs. 8, 16, 17, 18 and 19, the cutter G² is pivoted between the lugs a^7 in the tube A, as at g^7 , and the cutting edge g^8 is moved outward by the sliding 40 block K' pressing on the face g^9 . This block K' is curved as at k^{13} to engage the said face g^9 as the said cutter G² swings upward. The block K' is moved longitudinally between guide lugs a^8 in the tube A, and is revolvably 45 connected by means of the neck k^9 , flange k^8 , and union K² to the flange k^7 on the end of the rod K as shown in Fig. 16. For convenience in manufacture this union K² is made 50 in two parts, perforated as at k^{11} to receive the holding screw k^{12} by which the two parts are held together. The rod K is provided with a screw thread k^6 meshing in a nut a^6 in the end of the tube A, and longitudinal motion is given 55 to the block K' by turning the hand crank k .

It will be seen that as the block K' is moved to the left, the cutter G² will be swung outward into operative position. 60

In the tube shown in Figs. 9 and 20, the tube A' is separated by a longitudinal diaphragm 65 a^{12} into two air passages a^{13} and a^{14} , the one provided with an inlet a^9 , and the other pro-

vided with an outlet a^{10} , the incoming air being forced in through the air passage a^{13} , and the outgoing air carrying the borings, chips, &c., passing through the orifice a^{10} . 70

In all of the devices the operation is substantially the same. Thus the cutter is turned out a little at a time, and the tube A is revolved while at the same time air is blown 75 therein. The air rushing out as shown by the arrows in Fig. 1, carries with it through the upper part of the bore hole H, as shown in the said figure, or through the return passage a^{14} in the air tube, as shown in Fig. 9, the small particles of solid material cut out of the cavity 80 h , thus leaving the said cavity partly empty and ready for filling with the explosive used in blasting.

It will be evident that part of the bearings will remain in the said cavity h , but the greater 85 portion will be removed therefrom, and will be blown clear of the mouth of the bore hole.

It will be obvious that many modifications of the herein described devices might be made by any one skilled in the art which could be 90 used without departing from the spirit of our invention.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is— 95

1. In a drill of the character described, the combination with a hollow tube slotted along an element thereof, means for revolving the said tube, of a toggle joint of hard metal mounted in said tube and adapted to move 100 outward and inward through said slot, a rod mounted in said tube and having oppositely disposed screw threads adapted to engage nuts in the ends of said toggle joint and to open and close the same, means for turning said 105 rod, and means for blowing air through said tube, for the purpose of carrying off the cuttings, substantially as described.

2. In a drill of the character described, the combination with an air pipe, of a hollow tube 110 slotted along an element thereof and revolvably connected to said air pipe and receiving air therefrom, a pivoted cutter mounted in said tube, a rod mounted in said tube and adapted to move said cutter outward and inward 115 through said slot, means for moving said rod, a fan mounted in said air pipe, and means for simultaneously revolving said tube and said fan, substantially as and for the purposes described. 120

3. In a drill of the character described, the combination with a hollow tube slotted along an element thereof, with perforations to admit air near the outer end thereof, of a toggle joint of hard metal mounted in said tube and 125 adapted to move outward and inward through said slot; a rod mounted in said tube and adapted to operate said toggle joint, means for moving said rod; an air pipe, an air chamber connected to said air pipe and inclosing 130 said tube over the perforations therein, a fan mounted in said pipe, and means for simul-

taneously revolving said tube and said fan, substantially as and for the purposes described.

4. In a drill of the character described, the
5 combination with a hollow tube slotted along
an element thereof, of an air pipe connected
to said tube and opening thereinto, a toggle
joint of hard metal mounted in said tube and
adapted to move outward and inward through
10 said slot, a rod having oppositely disposed
screw threads adapted to engage nuts in the
ends of said toggle joint and to open and close
the same, means for turning said rod, a fan
mounted in said air pipe, and means for simul-

taneously revolving said tube and operating 15
said fan, substantially as and for the purposes
described.

In testimony whereof we affix our signatures
in presence of two witnesses.

ROBERT H. ELLIOTT.

JOHN B. CARRINGTON.

Witnesses to the signature of R. H. Elliott:

J. B. ROBINSON,

T. D. GILMER.

Witnesses to the signature of J. B. Car-
rington:

JESSE J. YEATES,

T. R. SHIELDS.