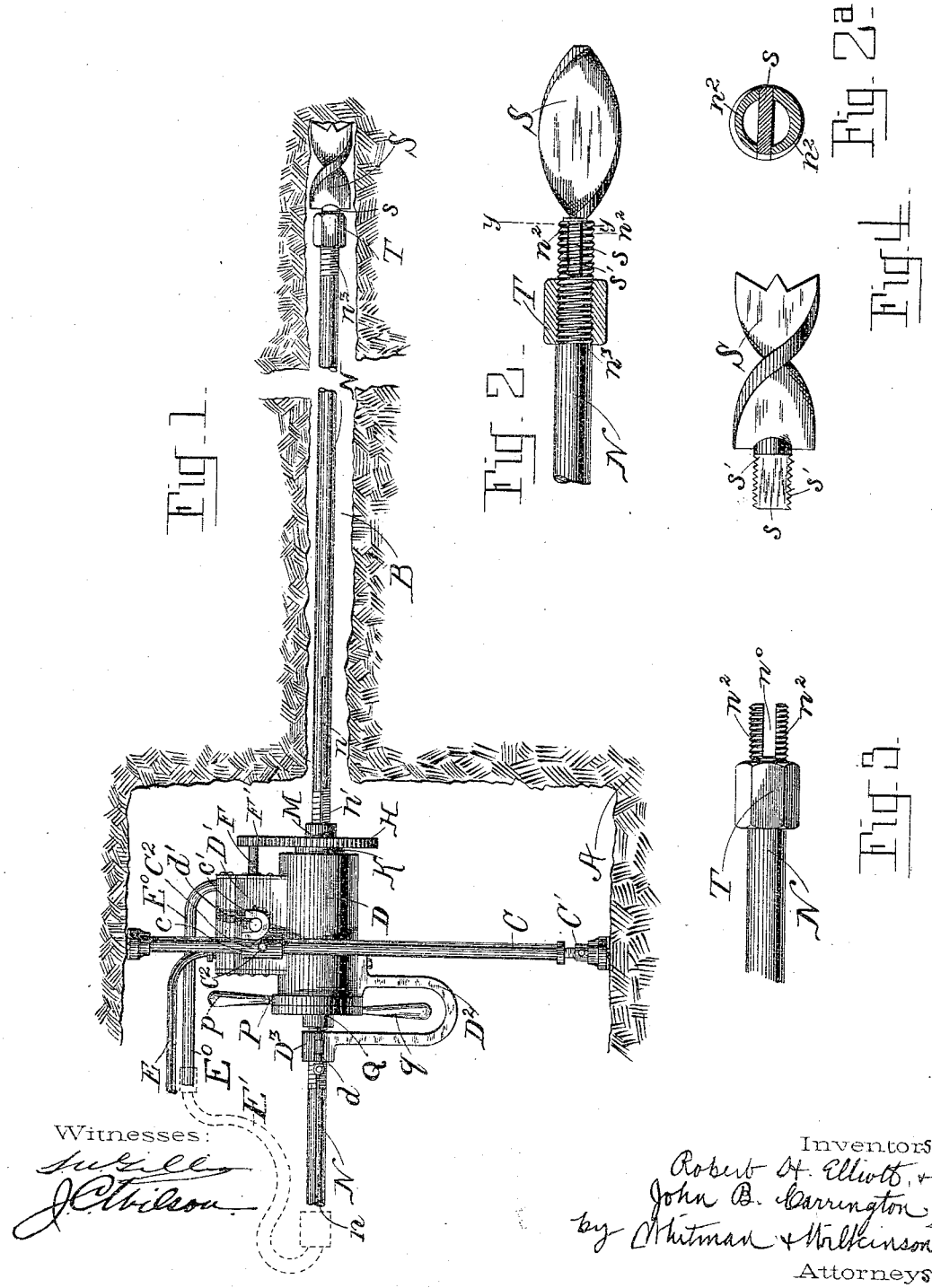
(No Model.) 3 Sheets—Sheet 1.

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

MINING DRILL.

No. 542,153. Patented July 2, 1895.



Witnesses:
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Attorneys.

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MINING DRILL.

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Fig. 5.

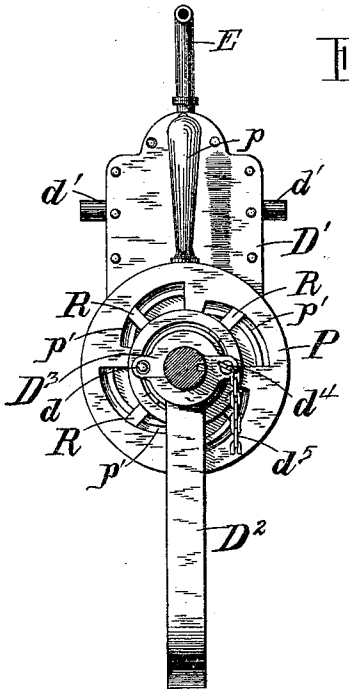


Fig. 6.

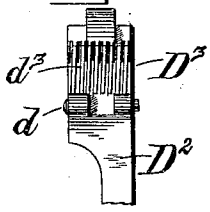


Fig. 7.

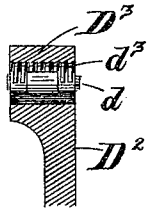


Fig. 10.

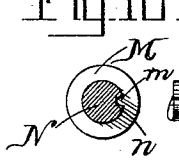


Fig. 8.

Fig. 11.

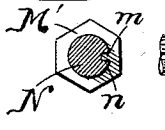
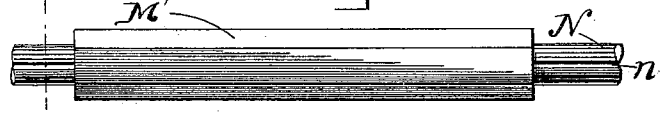


Fig. 9.



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(No Model.) 3 Sheets—Sheet 3.

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

MINING DRILL.

No. 542,153. Patented July 2, 1895.

Fig. 12.

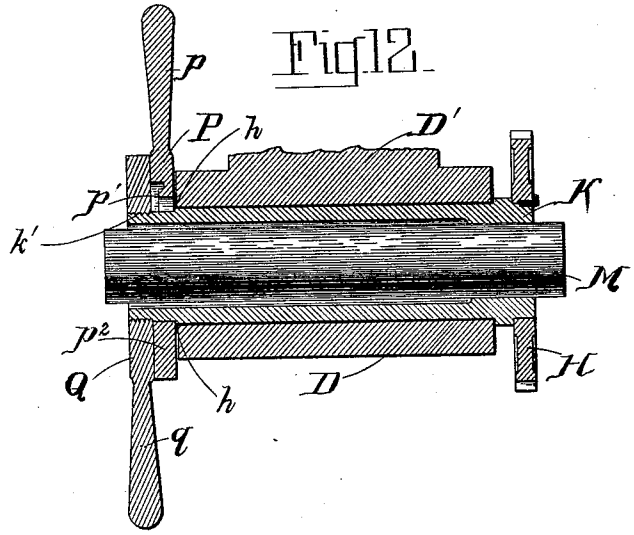


Fig. 13.

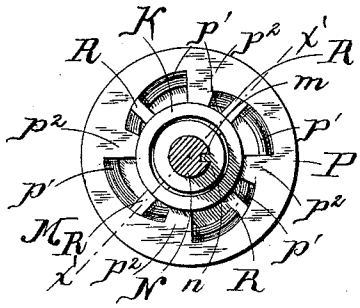


Fig. 15.

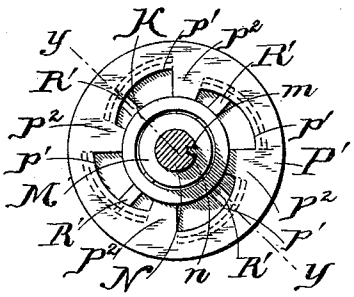


Fig. 14.

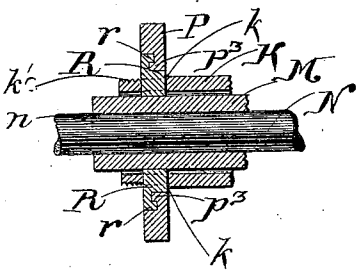
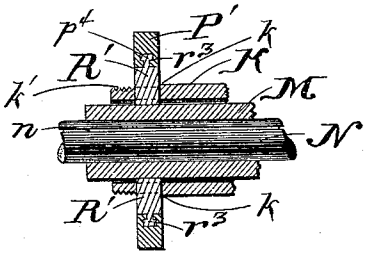


Fig. 16.



Witnesses:

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Robert H. Elliott
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UNITED STATES PATENT OFFICE.

ROBERT H. ELLIOTT AND JOHN B. CARRINGTON, OF BIRMINGHAM, ALABAMA, ASSIGNORS TO THE ALABAMA BLASTING AND MINING COMPANY, OF ALABAMA.

MINING-DRILL.

SPECIFICATION forming part of Letters Patent No. 542,153, dated July 2, 1895.

Application filed November 1, 1894. Serial No. 527,683. (No model.)

To all whom it may concern:

Be it known that we, ROBERT H. ELLIOTT and JOHN B. CARRINGTON, citizens of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, 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 especially in those drills intended for use in mining coal and similar soft minerals; and it consists in certain novel features hereinafter described and claimed.

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

Figure 1 represents a side elevation of one of our improved drills in use in a mine. Fig. 2 represents a detail view, on an enlarged scale, of our method of securing the auger to the end of the drill-spindle. Fig. 2^a represents an enlarged section on line $y\ y$ of Fig. 2. Fig. 3 represents a detail view of the end of the drill-spindle to which the auger is attached, and Fig. 4 represents a detail view of the auger as detached from the drill-spindle. Fig. 5 represents a front view of the drill after the clamping-ring has been removed. Fig. 6 represents a detail view of the feeding device when out of engagement or raised, and Fig. 7 represents a detail view of the feeding device when in the closed or operating position. Fig. 8 represents a side elevation of the holding-sleeve and the drill-spindle sliding therein, and Fig. 9 represents a modified form of sleeve from that shown in Fig. 8. Figs. 10 and 11 represent sections of the devices shown in Figs. 8 and 9, respectively, and along the line $x\ x$ of the said figures. Fig. 12 represents a central longitudinal section through the revolving sleeve and the mechanism for clamping the same on the holding-sleeve. Fig. 13 represents an end view of the cam-plate after the clamping-ring has been removed. Fig. 14 represents a section along the line $x'\ x'$ of Fig. 13. Fig. 15 represents a modified form of cam-plate, and Fig. 16 represents a section along the line $y\ y$ of Fig. 15.

A represents the end of a drift in a mine, and B the bore-hole.

The drilling-machine is mounted on the columns C, adjusted by means of the jacks C′, which columns have the sleeve C^2 clamped thereon, as by means of the clamp-screws c^2, at the desired elevation. c represents the sleeve proper, while c' represents a heavy hook in which the trunnions b', attached to the jacket of the drilling-machine, are supported. There is one of these columns C on either side of the machine which supports the trunnions on that side, which trunnions are most clearly shown in Fig. 5.

The jacket of the drilling-machine incloses the motor-engine D′, which is of any desired type, but preferably an air-engine, fed by the pipe E and discharging the exhaust air by the pipe E^0, connected by a hose E′ to the end of the hollow spindle N, as shown in dotted lines in Fig. 1.

The lower portion of the jacket of the drilling-machine is made cylindrical, as at D, and carries a yoke D^2, having a semi cylindrical groove in the outer arm thereof to form a journal-bearing for the drill-spindle, to which bearing is hinged at d a cap D^3, with female screw-threads d^3 cut on the interior thereof, as shown most clearly in Figs. 6 and 7. The drill-spindle N is provided with screw-threads n' to engage in these screw-threads d^3, and thus the drill-spindle N will be fed forward when the said cap D^3 is down, as shown in Fig. 7, and will simply revolve in its journal-bearings when the cap D^3 is lifted, as in Fig. 6.

F represents the driving-shaft, which is driven by the power-engine, and carries a pinion F′, meshing in the gear-wheel H, which is keyed on the sleeve K, revolubly mounted on the holding-sleeve M, which holding-sleeve is mounted on the drill-spindle N, and is provided with a feather m, adapted to engage in the key-way n, longitudinally disposed in the drill-spindle N.

P represents a cam-plate, which is provided with a handle p for operating the same. The said cam-plate is provided with a plurality of

cam-grooves p', separated by lugs p^2, and having lips p^3, adapted to engage under the heads r of the holding-pins R, as shown in Figs. 13 and 14.

In the device shown in Figs. 15 and 16, the cam-grooves p^4 are made T-shaped to receive the T-shaped heads r^3 of the holding-pins R'.

It will be seen that a motion of the cam-plate P in one direction will force the holding-pins R, which pass through holes in the sleeve K, down firmly on the holding-sleeve M, and thus clamp the same to the sleeve K, causing it to revolve with said sleeve, and thereby imparting a rotary motion to the drill-spindle N.

In order to hold the cam-plate P in the same position while it is revolving with the sleeve K, a shoulder k is provided on the said sleeve, and the clamping-ring Q is turned by means of its handle q on the screw-threads k', so as to clamp the cam-plate P firmly in the desired position on the sleeve K.

It will be obvious that when the cam-plate is moved in the opposite direction, as may be readily done after easing up on the clamping-ring, the holding-pins R or R' will be withdrawn from engagement with the holding-sleeve M, and this sleeve will remain fixed while the outer sleeve K revolves upon the same.

By the use of the herein-described friction clutch it will be evident that the drill-spindle will be held firmly against ordinary strains, as in boring coal or soft rock, and will be able to stop or slow down without breaking when hard rock is encountered. It will be evident that under these conditions the holding-pins will slip over the holding-sleeve M, should the drill-spindle refuse to turn. It will also be evident that the hold of the holding-pins on the sleeve M may be regulated by the force expended on the cam-plate in forcing them into the holding position.

In the form of device shown in Fig. 9, the end of the holding-sleeve M beneath the holding-pins, is shown as polygonal, which would be the preferred form where hard rock was to be bored into.

The auger or drill-steel is connected to the end of the drill-spindle by the apparatus shown in Figs. 2, 3, and 4, in which S represents the auger (a drill-steel of any other ordinary form may be used if desired) and T represents a nut mounted on the screw-threads n^3 on the forward end of the drill-spindle.

The end of the drill-spindle is slotted, as at n^0, forming two jaws n^2, each exteriorly screw-threaded. Between these two jaws the tenon s on the shank of the auger fits, said tenon being screw-threaded on opposite sides, as at s', to correspond with the screw-threads n^3. In order to attach the auger to the drill-spindle, the nut T is screwed backward to the position shown in Fig. 3, the tenon s is inserted between the jaws n^2, as shown in Fig. 2, and the nut T is screwed forward to the position shown in Fig. 1. To remove the auger or substitute another the operation is reversed.

The operation of the device is as follows: The auger being put in position on the drill-spindle and properly placed in the mine, the clamp-plate is revolved through a sufficient angle to put the holding-pins into operative position, the feed-cap D^3 is turned down and locked as by the pin d^4, (see Fig. 5,) and the engine is started ahead. It is obvious that the drill-spindle will be revolved and fed forward at the same time. To withdraw the drill-spindle from the bore hole, it will only be necessary either to reverse the engine, when the screw-threads d^3 will cause the drill-spindle to move slowly backward, or to lift the cap D^3 and draw the drill-spindle directly backward, either by hand or otherwise. The exhaust-air escaping through the pipe E is carried, by means of the hose E', to the rear end of the hollow drill-spindle N, and after passing through the entire length of the drill-spindle, it escapes through the orifices at the forward end thereof, as shown in Fig. 2^a, whence the air passes backward through the bore-hole, blowing out the chips.

The various advantages of the herein-described construction will readily suggest themselves to anyone skilled in the art.

It will be obvious that various modifications might be made, which could be 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—

1. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve, and journal bearings therefor; means for revolving the said loose sleeve; a cam plate revolubly mounted on said loose sleeve, and holding pins passing through holes in said loose sleeve, and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

2. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve, and journal bearings therefor; means for revolving the said loose sleeve; a cam plate revolubly mounted on said loose sleeve, a clamping ring mounted on said loose sleeve and adapted to clamp said cam plate in position, and holding pins passing through holes in said loose sleeve and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

3. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move

longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve, a frame supporting said loose sleeve and forming journal bearings therefor; a gear wheel fast to said loose sleeve, a driving gear mounted in said frame and gearing into said gear wheel, a cam plate revolubly mounted on said loose sleeve, and holding pins passing through holes in said loose sleeve, and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

4. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve, a frame supporting said loose sleeve and forming journal bearings therefor; a gear wheel fast to said loose sleeve, a driving gear mounted in said frame and gearing into said gear wheel, a cam plate revolubly mounted on said loose sleeve, a clamping ring mounted on said loose sleeve and adapted to clamp said cam plate in position, and holding pins passing through holes in said loose sleeve and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

5. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve; a trunnioned jacket supporting said loose sleeve and forming journal bearings therefor; columns with hooks clamped thereon supporting said jacket, mechanism for revolving the said loose sleeve; a cam plate revolubly mounted on said loose sleeve, and holding pins passing through holes in said loose sleeve, and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

6. In a drilling machine, the combination with a holding sleeve and a drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve; a trunnioned jacket supporting said loose sleeve and forming journal bearings therefor; columns with hooks clamped thereon supporting said jacket, mechanism for revolving the said loose sleeve; a cam plate revolubly mounted on said loose sleeve, a clamping ring mounted on said loose sleeve and adapted to clamp said cam plate in position, and holding pins passing through holes in said loose sleeve and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, substantially as described.

7. In a drilling machine, the combination with a holding sleeve and a screw threaded drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve; a trunnioned jacket supporting said loose sleeve and forming journal bearings therefor; columns with hooks clamped thereon supporting said jacket, mechanism mounted in said jacket for revolving the said loose sleeve and clutch mechanism for connecting and disconnecting the loose sleeve from the holding sleeve, a yoke projecting from the rear end of said jacket and bent upward to form a journal bearing for the screw-threaded drill spindle, and a screw threaded cap hinged to said yoke and adapted to be thrown into and out of engagement with said screw threaded spindle, substantially as described.

8. In a drilling machine, the combination with a holding sleeve and a screw threaded drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve; a trunnioned jacket supporting said loose sleeve and forming journal bearings therefor; columns with hooks clamped thereon supporting said jacket, mechanism mounted in said jacket for revolving the said loose sleeve, and holding pins passing through holes in said loose sleeve, and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate; a yoke projecting from the rear end of said jacket and bent upward to form a journal bearing for the screw threaded drill spindle, and a screw threaded cap hinged to said yoke and adapted to be thrown into and out of engagement with said screw threaded spindle, substantially as described.

9. In a drilling machine, the combination with a holding sleeve and a screwthreaded drill spindle held against rotary motion therein but free to move longitudinally relative to said sleeve, a loose sleeve mounted on said holding sleeve; a trunnioned jacket supporting said loose sleeve and forming journal bearing therefor; columns with hooks clamped thereon supporting said jacket, mechanism mounted in said jacket for revolving the said loose sleeve, a cam plate revolubly mounted on said loose sleeve, a clamping ring mounted on said loose sleeve and adapted to clamp said cam plate in position, and holding pins passing through holes in said loose sleeve and adapted to be thrown into and out of engagement with said holding sleeve by means of said cam plate, a yoke projecting from the rear end of said jacket and bent upward to form a journal bearing for the screw-threaded drill spindle, and a screw-threaded cap hinged to said yoke and adapted to be thrown into and out of engagement with said screw-threaded spindle, substantially as described.

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

ROBERT H. ELLIOTT.
JOHN B. CARRINGTON.

Witnesses:
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H. C. KENNARD.