(No Model.)

W. J. PEARCE.

STEAM DRILLING MACHINE.

No. 434,883. Patented Aug. 19, 1890.

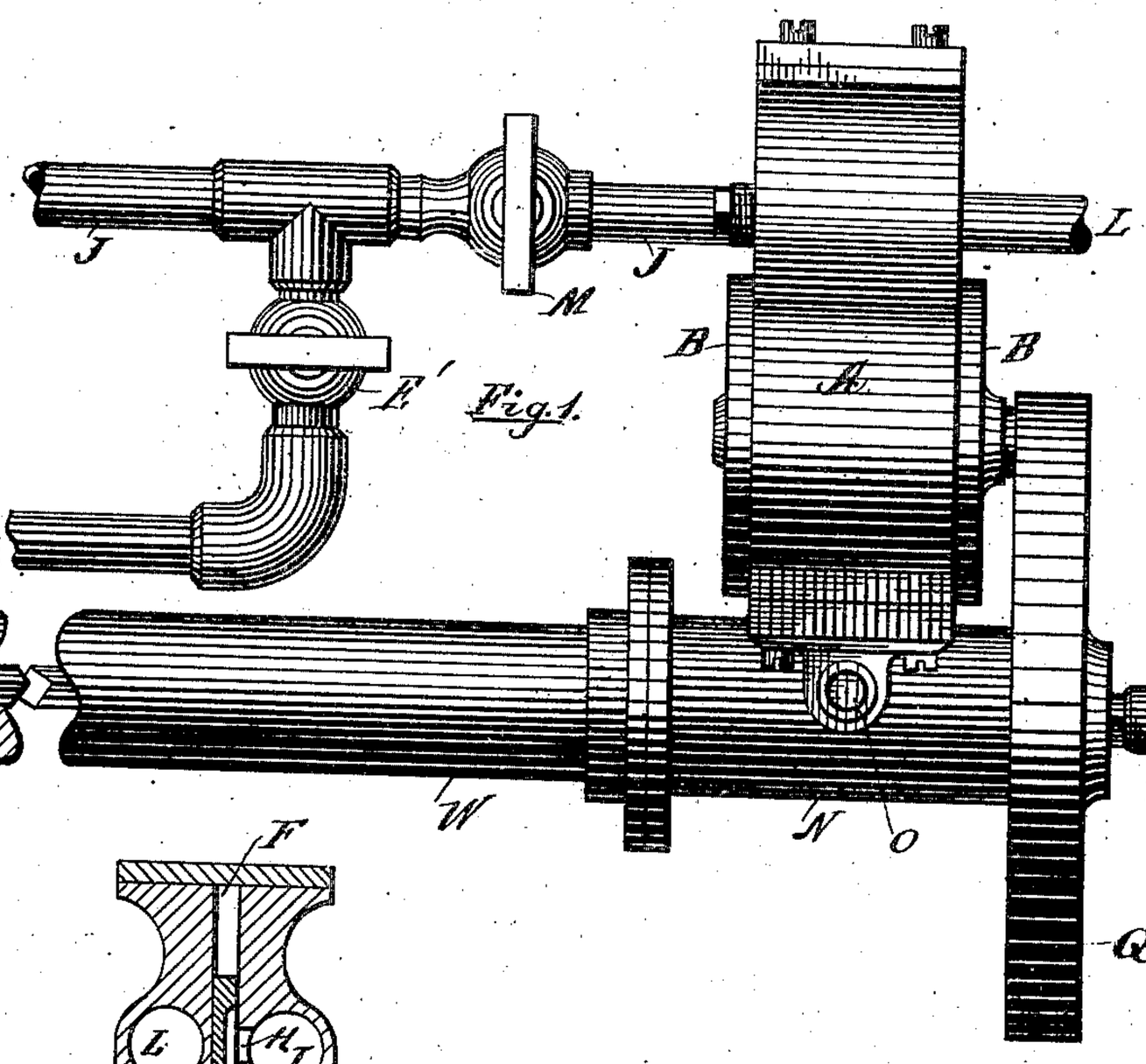

Fig. 1.

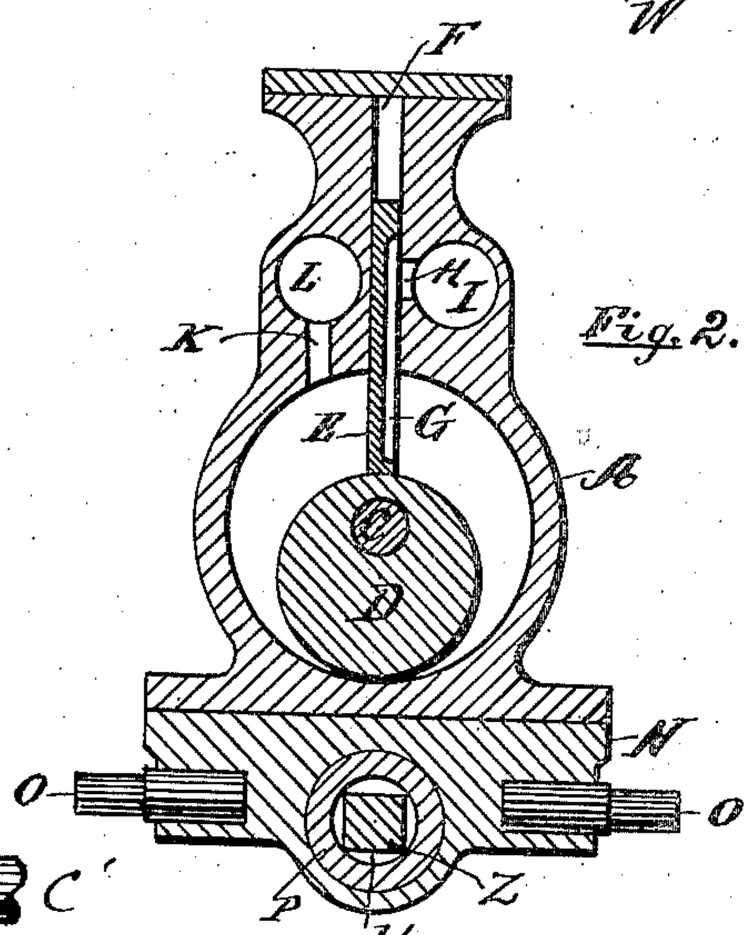

Fig. 2.

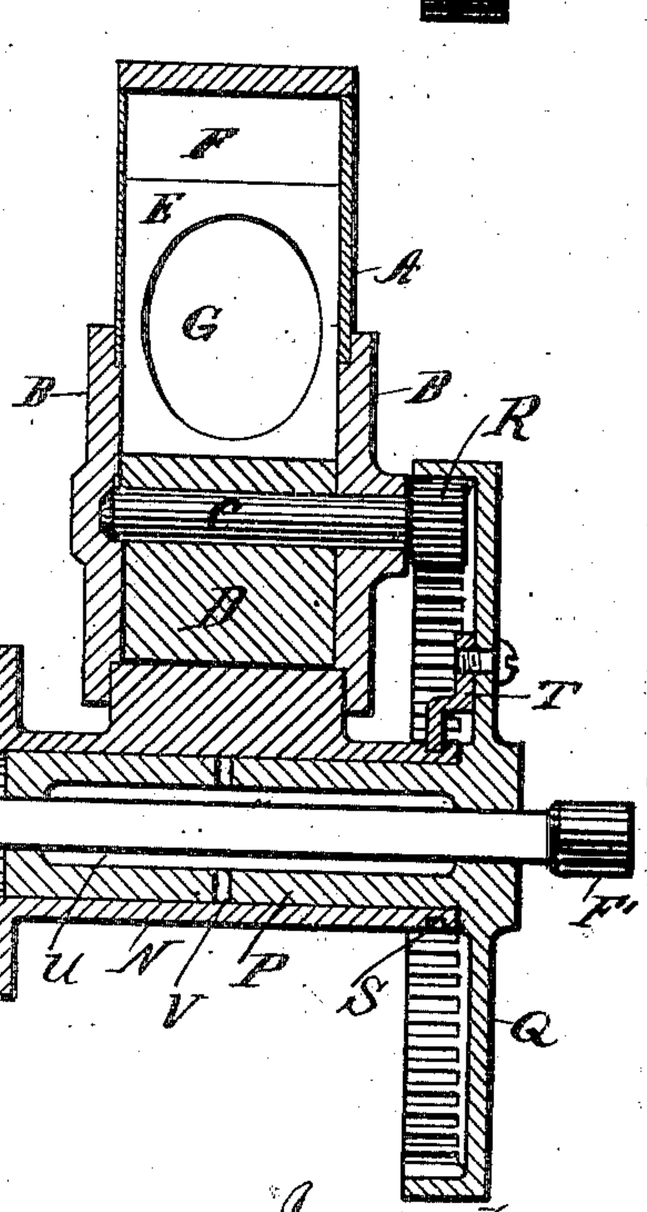

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM JOSEPH PEARCE, OF TERRE HAUTE, INDIANA.

STEAM DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 434,883, dated August 19, 1890.

Application filed May 2, 1890. Serial No. 350,323. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOSEPH PEARCE, of Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Steam Drilling-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to improvements in steam or fluid power drilling-machines.

The object of the invention is to provide an improved mining or coal-drilling machine exceedingly simple, durable, and compact in construction, extremely effective in operation, and provided with improved means of giving constant outward pressure to the drill during rotation. I accomplish these objects by means of the mechanism set forth in the following specification and the drawings accompanying the same and forming a part thereof, in which—

Figure 1 is a side elevation. Fig. 2 is a vertical cross-section of the engine. Fig. 3 is a vertical longitudinal section of the engine and drill mechanism.

Like letters of reference refer to similar parts in all the views.

A is the cylinder of a rotary engine which is provided with the heads B and a central shaft C, which is pivoted in one of the heads B and passes through the other head, which may be provided with the usual stuffing-box and gland. A piston-wheel D is secured to the shaft and bears at its outer edge against the inner circumferences of the cylinder and against the two heads. Suitable packing-strips may be employed at the points of contact. A sliding abutment E moves in a slot F provided for it in the upper part of the cylinder-casing. When air is the motive power, this abutment is made of gutta-percha or vulcanized fiber, thereby avoiding all friction on the wheel D or cylinder. When steam is used, this abutment is made of metal. The abutment presses against the piston-wheel and is provided with a port G, communicating with a port H, into which steam or compressed air passes by means of the passage I, which communicates with the pipe J, leading from a boiler or an air-compressor.

K is the exhaust-port, through which the motive fluid passes to the exhaust-passage L after the piston has passed it.

M represents any ordinary stop-valve or throttle, by means of which the working of the engine is controlled. The base of the engine is bolted to a casing N, in which are secured trunnions O for adjustably mounting the engine and drill upon a suitable tripod or standard, as is usually used with mining-drills. The casing N is provided with a cylindrical bore, into which fits the sleeve P. At the outer end of this sleeve there is a wheel Q, which is provided with gear-teeth, preferably internal gearing, which mesh with a pinion R, secured to the end of the engine-shaft C. The casing N has a groove S turned upon it, into which bears a bracket T, which is bolted to wheel Q, thereby holding it up against casing N and allowing the wheel Q and sleeve P to turn, while the casing is stationary. P is provided with an oil-chamber U, from which suitable oil-holes V lead to the surface of the sleeve. The casing N is secured by flanges to a barrel W, which is of suitable length to correspond to the length of drill to be used.

W is a bored-out cylinder, and piston X, which is suitably packed with leather or metallic packing, is fitted to slide therein. This piston is provided with a conical counterbore Y, in which the square drill-spindle Z, which is also conical at its end, automatically centers itself. The square drill-spindle Z passes through square openings in the ends of the sleeve P, which forms a clutch to turn the spindle. It should be observed that this drill-spindle is removable and can be taken out at any time for repairs or any other purpose, the conical end of the spindle merely resting in the conical socket in the piston.

A′ is a cap secured to the end of W, and it is provided with a removable plug B′, by means of which the piston X may be removed for repairs. A pipe C′ connects with the cap A′, and a port D′ is provided in the plug B′, thus affording communication between the pipe C′, the hollow in the cap A′, and the barrel W.

The pipe C′ is connected with the air or steam inlet pipe J of the motor, and a stop-valve E′ is provided to open and close communication therewith.

F′ is the drill-chuck into which the drill is secured.

The operation of the device is as follows: Air from a compressor or steam from a boiler being led by the pipe J enters and operates the engine-shaft. The pinion R turns the gear-wheel Q, which in turn rotates the drill-spindle Z. The stop-cock E′ being opened permits the working fluid to enter the barrel W and push the piston X and drill-spindle forward against its work.

Although I have shown and described one form of rotary engine to be used in connection with the drilling device, it is evident that any other type of engine may be used to operate the pinion R and the gear Q.

The drill-spindle is here shown square. Still it may be given any angular cross-section, so as to be readily turned by the gearing without the use of a splint or feather.

Having fully described the nature of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a drilling-machine, the combination of an elongated cylinder, a piston therein, a hollow casing secured to the front end of said cylinder, a rotary sleeve in said casing, a drill-spindle extending through said sleeve and against which the piston bears, and a rotary engine rigidly secured to and mounted on said casing, and having its engine-shaft connected with said sleeve to rotate it, substantially as described.

2. In a drilling-machine, the combination of the rotary engine, a casing upon which the same is rigidly mounted, said casing having a cylindrical bore at its lower portion, a cylinder secured to said casing in continuation of the bore, the rotary sleeve in said bore having the wheel driven by the engine-shaft, and the piston and drill-spindle, as set forth.

3. The combination of the rotary engine having a pinion on its engine-shaft, the casing upon which the engine is mounted, the sleeve therein forming the drill-spindle clutch, the large wheel on said sleeve provided with internal gearing meshing with said pinion, the drill-spindle, and the cylinder containing the piston constantly feeding said spindle forward, substantially as set forth.

4. In a rotary drill, a feed-cylinder and piston therein, and means for supplying outward-forcing fluid-pressure to said piston, in combination with the removable drill-spindle separate from and against which said piston presses, and means for rotating said spindle, substantially as described.

5. In a drilling-machine, the combination, with a drill-spindle, of a closed casing surrounding said spindle, a piston in said casing pressing against the end of the drilling-spindle, a conical counterbore in said piston, a conical end on said spindle resting in said counterbore, and means for conducting fluid under pressure behind said piston, substantially as described.

6. The combination, with an engine-shaft, of a pinion thereon, a wheel gearing with a sleeve attached to said wheel and fitting in a cylindrical casing attached to the engine, a drilling-spindle of angular cross-section fitting axially in a corresponding opening in said sleeve, an annular groove S on said casing, and bracket T, revolving in said groove and secured to said wheel Q, substantially as described.

7. The combination of a rotary engine mounted on a casing, said casing being provided with trunnions, a drill-clutch revolving in said casing and operated by gearing from the engine-shaft, a drill-spindle rotated by said clutch, a piston in said casing bearing against the end of the spindle, and fluid-pressure connections for operating said engine and pressing forward said piston, substantially as described.

8. The combination of a rotary engine, a drill-spindle rotated thereby, a piston separate from and bearing loosely against said spindle and sliding in a casing surrounding the spindle, and means for conveying fluid-pressure to operate said piston, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM JOSEPH PEARCE.

Witnesses:
MARTIN HOLLINGER.
FRANK MCKINNY.