(No Model.)

C. B. DAWSON.

ROCK OR COAL DRILLING MACHINE.

No. 421,821. Patented Feb. 18, 1890.

Fig. 1.

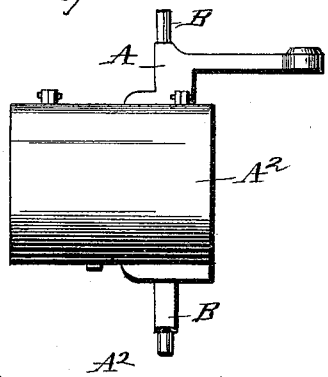


Fig. 5.

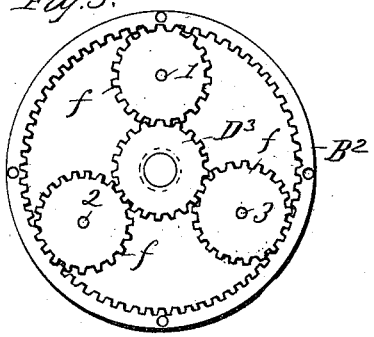


Fig. 3.

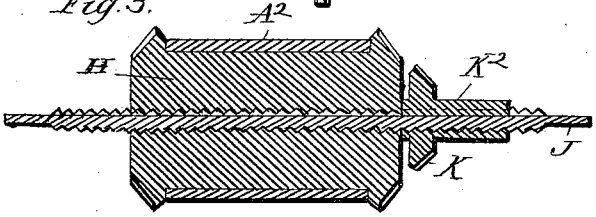


Fig. 6.

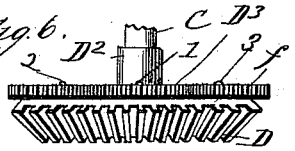


Fig. 10.

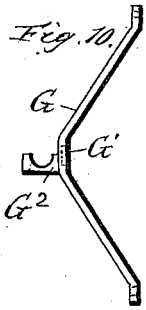


Fig. 4.

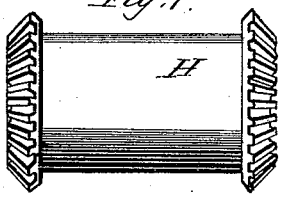


Fig. 7.

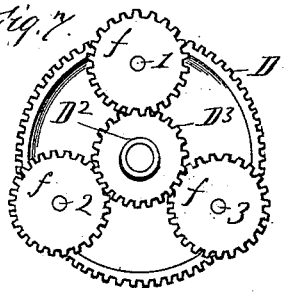


Fig. 9.

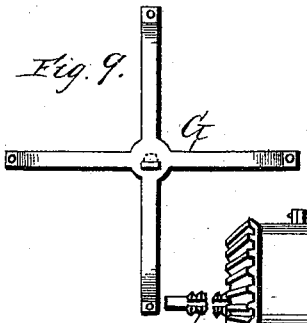


Fig. 2.

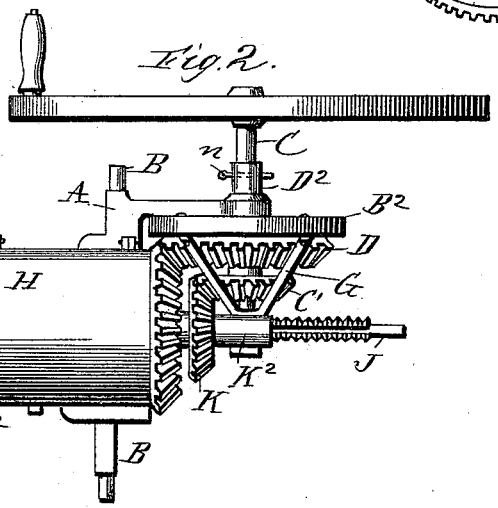
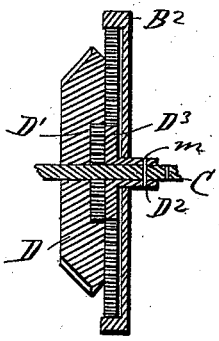


Fig. 8.



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Inventor
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By his Attorneys
R. S. & A. L. Lacey

UNITED STATES PATENT OFFICE.

CHARLES B. DAWSON, OF ANGUS, IOWA.

ROCK OR COAL DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 421,821, dated February 18, 1890.

Application filed September 21, 1885. Serial No. 177,735. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. DAWSON, a citizen of the United States of America, and a resident of Angus, in the county of Boone and State of Iowa, have invented an Improved Rock or Coal Drilling Machine, of which the following is a specification.

My invention relates to the driving and feeding mechanism of the machine described in my application for Letters Patent of the United States filed June 23, 1883, Serial No. 99,206; and it consists in the construction and combination of a frame having bearings to support a rotating shaft and a rotating cylinder at right angles to each other, an annular gear, a driving-shaft having a bevel-gear, a bevel-gear having journals on its side face to carry three small wheels and a recess to admit a small gear-wheel, a tubular shaft having a fixed gear-wheel, an auxiliary frame, journal-box, and shaft-support combined, a screw-threaded drill-shaft, and a screw-threaded cylinder or feed device in such a manner that power and motion can be imparted direct from the driving-shaft to rotate and advance the drill-shaft through the stationary feed device in a common way to form a bore in coal or other soft substances, and also in such a manner that the drill-shaft and the feed device can be simultaneously rotated at different rates of speed to advance the drill-shaft slowly while boring in rock or other hard substances, and at the same time increase the power of the machine.

Figure 1 of the accompanying drawings is a top view of the main frame. Fig. 2 is a top view showing all the parts combined. Fig. 3 is a longitudinal section, and Fig. 4 a top view, of the cylindrical feed device. Fig. 5 is a face view of the annular gear; Fig. 6, an edge view of the annular gear and the bevel gear-wheel carrying the small wheels. Fig. 7 is a face view of the bevel-gear carrying the wheels, and also of the gear-wheel on a tubular shaft. Fig. 8 is a sectional view of the driving-shaft, tubular shaft, and annular gear combined. Fig. 9 is an end view, and Fig. 10 a side view, of the auxiliary frame and shaft-support. Jointly considered, these figures clearly illustrate the construction and operation of my complete invention.

A is an elbow-shaped cast-metal frame having an integral bearing A^2 to support the feed device, and also a bearing A^3 formed in or attached to the opposite end to support a tubular driving-shaft.

B B are trunnions integral with the frame A and adapted to support the entire machine upon a portable base wherever and whenever desired.

B^2 is an annular gear formed on or fixed to the frame in a concentric position with the bearing A^3, through which the driving-shaft C and a tubular sliding shaft are extended.

C′ is a bevel-gear fixed on the end of the shaft C.

D is a bevel-gear placed loosely on the shaft C.

1 2 3 are journals extending from the side face of the wheel D, upon each of which journals is a small gear-wheel *f*.

D′ is a cavity in the side face and center of the wheel D, adapted to admit a gear-wheel of corresponding size.

D^2 is a tubular shaft having a gear-wheel D^3 on its end that will fit in the cavity D′ of the wheel D and serve as a clutch device in such a manner that the tubular shaft D^2 and the wheel D can be rotated jointly whenever desired.

G (shown in Figs. 2, 9, and 10) is an auxiliary frame having a journal-box G′ and a shaft-bearing G^2 extending from its center. The ends of the radial arms of this frame are rigidly bolted fast to the rigidly-fixed annular gear B^2 on the frame A in such a manner that the journaled end of the driving-shaft C will enter the journal-box G′.

H is a cylindrical feed device having integral bevel-gears on its ends, supported in the bearing A^2 of the frame A, and retained by means of a hinged cap in such a manner that it can be rotated, when desired, by means of the loose wheel D on the driving-shaft C. The bore extending longitudinally through the center of the cylinder is screw-threaded and adapted to engage and move a screw-threaded drill-shaft, as required to advance a drill while forming a bore in coal or rock.

J is a drill-shaft that has a socket at each end adapted to receive the shanks of interchangeable bits or augers and a screw-thread

corresponding with the thread in the cylinder H, through which it extends from its bearing G′ on the end of the auxiliary frame.

K is a bevel-gear on the end of a sleeve K^2, placed loosely upon the drill-shaft J, and connected therewith by means of a feather, that enters a longitudinal groove in the drill-shaft in such a manner that they will rotate jointly while the drill-shaft is advanced by means of the feed device H.

m is a perforation in the tubular shaft D^2. Two corresponding perforations extend through the driving-shaft C. To lock the tubular shaft D^2, the driving-shaft C, and the wheel D together, I slide the tubular shaft toward the wheel C′ and allow the wheel D^3 on its end to enter the cavity D′ in the face of the wheel D, and then pass a key or pin *n* through the coinciding perforations in the two shafts D^2 and C. When these parts are thus locked together, power applied to the driving-shaft C by means of a crank or driving-wheel on its end will rotate the wheels C′ and D simultaneously and power and motion will be transmitted from the wheel C′ to the wheel K to rotate the drill-shaft J, and from the wheel D to the feed device H, so that all the rotating parts will move in a common way to operate a drill on the end of the drill-shaft in coal.

To diminish the speed of the feed device H and obtain a triple purchase to increase the power applied to the drill-shaft, as contemplated in boring rock, I withdraw the key *n*, slide the tubular shaft outward to make the perforation therein coincide with the outer perforation in the shaft C, and also to bring the wheel D^3 on its end in contact with the three wheels *f*, carried by the wheel D, and then insert the key *n* again to lock the two shafts together. Power and motion will then be transmitted through the medium of the stationary annular gear B^2 and augmented thereby, and the increased power thus produced transmitted through the wheel D^2 and cylinder H to the driving-shaft J, so that the feed device which advances the drill will also aid the wheels C′ and K to rotate the drill-shaft. The rotary speed of the feed device H will at all times be greater than the rotary speed of the drill-shaft, as required to impart a longitudinal movement to the drill-shaft as it rotates.

To advance or retract the drill speedily relative to the substance that is to be bored, I simply withdraw the key *n* and rotate the shaft C to impart rotary motion to the wheels C′ and K only while the feed device and other operative parts remain stationary.

I claim as my invention—

1. The combination of the elbow-shaped frame having the bearing A^2 and the annular gear B^2, located wholly to one side of a line passing through the center of the bearing A^2, secured to the frame of the feed-cylinder, having a gear at its end journaled in said bearing A^2, the drive-shaft arranged at right angles to the axis of the feed-cylinder and concentric with the annular gear B^2, and the gearing interposed between and connecting the feed-shaft with the feed-cylinder, substantially as described.

2. The combination, with the frame having the bearing A^2, the annular gear B^2, fastened to the frame, the feed-cylinder, and the drive-shaft, of the gear-wheel D, meshing with the feed-cylinder, mounted loosely on said shaft, and having a depression on its side, the gear-wheels *f*, journaled on the side of the gear-wheel and meshing with the gear B^2, and the gear-wheel D^3, placed on said shaft and adapted to move longitudinally thereon to mesh with said gear-wheels *f* or interlock with the gear-wheel D, as and for the purpose specified.

3. The combination of the frame A, having the bearing A^2 at one end, the feed-cylinder H, journaled in said bearing A^2, the annular gear B^2, fastened to the frame, the drive-shaft journaled in the frame, the gear-wheel D, loosely mounted on the shaft, the gear-wheels *f*, journaled to the gear-wheel D and meshing with the annular gear B^2, and the gear-wheel D^3, placed on the shaft and adapted to move longitudinally thereon in and out of mesh with said gear-wheels *f*, substantially as and for the purpose set forth.

4. The combination, with the frame A, having the bearing A^2 and the bearing A^3, arranged at right angles to each other, the feed-cylinder mounted in the bearing A^2, the feed-shaft J, the feed-gear K, having extension K^2, and the drive-shaft C, having a bearing at its outer end in the frame A, of the auxiliary frame G, secured to the frame A and having the bearing G^2 to receive and support the extension K^2 of the feed-gear K, and having the journal-box G′ to receive and support the outer end of the shaft C, substantially as shown and described.

5. The herein shown and described drilling-machine, composed of the frame A, having the bearings A^2 A^3, the feed-cylinder journaled in bearing A^2, the shaft journaled in bearing A^3, the annular gear B^2, fastened to the frame, the gear-wheel D, loosely mounted on said shaft and recessed on its face, the gear-wheels *f*, meshing with the gear B^2, journaled to the gear-wheel D, the gear-wheel D^3, placed on the shaft and adapted to move thereon in and out of mesh with the gears *f* and D, the feed-shaft J, passed through the feed-cylinder, the feed-gear K, mounted on the feed-shaft and held thereto by feather-and-spline connection, the gear-wheel C′, keyed to the shaft and meshing with said feed-gear, the auxiliary frame G, fastened to frame A and having journal-box G^2 for the feed-gear K, and bearing G′ for the outer end of the feed-shaft.

CHARLES B. DAWSON.

Witnesses:
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