(No Model.)

W. C. JOHNSON.

COAL DRILLING APPARATUS.

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UNITED STATES PATENT OFFICE.

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COAL-DRILLING APPARATUS.

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To all whom it may concern:

Be it known that I, WARREN C. JOHNSON, a citizen of the United States of America, residing at Oskaloosa, in the county of Mahaska and State of Iowa, have invented certain new and useful Improvements in Coal-Drilling Apparatus, of which the following is a specification.

The object of this invention is to provide a device to be used in a coal-drilling apparatus for supporting and rotating an auger-stem, which device shall be of simple, cheap, strong, and durable construction and the parts thereof compactly assembled and not liable to get out of order or displaced in the rough usage to which these tools ordinarily are subjected.

My invention consists in certain details in the construction, arrangement, and combination of the sleeve for supporting the auger-shaft, the hub of the bevel gear-wheel for driving the shaft, the means for rotatably securing this hub in said sleeve, and the device for applying motion to said gear-wheel; and my invention consists, further, in certain details in the construction of a swiveled adjustable chair for supporting the drilling mechanism from a suitable post, as hereinafter set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation of the complete device in use as a vertical-post drill. Fig. 2 shows a like view illustrating the device adapted for use with a grip-bar. Fig. 3 shows a longitudinal section of the cylindrical boxing and accompanying parts mounted on the drill-shaft. Fig. 4 shows a section on the line 4 4 of Fig. 3. Fig. 5 shows a section on the line 5 5 of Fig. 3. Fig. 6 shows a chair or bracket for supporting the cylindrical boxing on the vertical post. Fig. 7 shows a view like Fig. 6 of a modified form of chair or support. Fig. 8 shows a view illustrating the chair or bracket for supporting the cylindrical box on a grip-bar. Fig. 9 shows the lower end of the post enlarged and parts thereof broken away. Fig. 10 shows the lower end of the grip-bar. Fig. 11 shows a modified form of the device for securing the hinged nut in the cylinder.

Referring to the accompanying drawings, I will first describe the device arranged for use as a vertical-post drill.

The letter A is used to indicate a tubular upright open at its top and having a screw-threaded pointed bar A^2 mounted in its lower end, so that when turned the length of the post may be adjusted. At the top of the upright is a collar A^3, having therein a lever-screw A^4 with its point extended through the collar into the interior of the pipe.

B indicates a grip-bar of the usual construction, having at one end a wedge device B^2, and its other end adapted to enter the top of said post and be clamped therein by means of said lever-screw. In use the two parts are telescopically connected and the grip-bar adjusted therein so as to reach to the top of the gallery in which the tool is to be used. It is then securely clamped by the screw A^4, and finally the pointed bar at the lower end of the post is operated to firmly fix the post in position.

It is obvious that the grip-bar may be readily detached and used independently.

The drill-shaft is mounted in a device that may be supported from either the post or grip-bar. It is composed of a cylinder C, having two trunnions C^2 on opposite sides thereof, and a boss C^3, in which is screwed a shaft C^4, and on this shaft a bevel gear-wheel C^5 is rotatably mounted. A crank C^6 is attached to the wheel whereby it may be manually driven. The interior of the cylinder is unfinished, or in some way roughened, preferably by longitudinal flutes, as shown in Fig. 4.

D indicates a sleeve designed to enter one end of the cylinder and slightly smaller than the interior thereof. A number of annular grooves D^2 are formed on its exterior, and the bevel gear-wheel D^3 is formed on or fixed to its one end to mesh with the gear-wheel C^5. On the interior of the sleeve is a feather D^4, designed to enter a longitudinal groove D^5 in the drill-shaft. The sleeve is rotatably mounted in the cylinder and is held against longitudinal movement relative to the cylinder as required to hold the wheels in mesh as follows: The two parts are first held in their proper relative positions and then a quantity of molten Babbitt metal is run into the annular space between the two parts. It is obvious that the said metal will be held against longitudinal movements by the annular ribs F and against a rotary movement relative to the boxing by means of the longitudinal

flutes formed in the boxing. It is obvious that the sleeve will readily rotate within the Babbitt metal because the outer surface of the sleeve has been previously turned smooth, and also that it cannot move longitudinally on account of the annular ribs and grooves. Therefore the two wheels are held firmly in mesh, and the inner surface of the cylinder need not be turned smooth.

To provide for the advancement of the screw-threaded shaft H of the drill relative to the cylinder, I have provided a hinged nut J, designed to enter the end of the cylinder and when in said position engage the threads on the shaft. It is held therein by a screw J^2, seated in the cylinder.

In the modified form shown in Fig. 11 two openings L are extended through the cylinder, preferably at the base of each of the trunnions, where the additional metal provides ample room. Notches L^2 are also formed in the opposite sides of the nut to aline with said openings. The nut is secured in place by means of a pin L^3, which may be passed through either of the openings and when in place holds the nut against movement in any direction.

I have provided a chair or bracket for supporting the cylinder upon the post as follows: K indicates a collar slidingly mounted on the post and open at one side. On its ends are two perforated lugs through which a bolt K^2 is passed having on one end a lever K^3 and on its other end a nut K^4. It is obvious that when the bolt is screwed into the nut and tightened the chair or bracket will be firmly clamped to the post. Two arms K^5 project upwardly and then outwardly at an angle from said ends and have notches K^6 or openings in their ends to receive the trunnions of the cylinder and permit it to swing in a vertical plane.

In the modification shown in Fig. 7 the bracket or chair is supported on the post by means of a screw-lever L, seated in the collar to engage the post.

When the device is to be used with the grip-bar, the bar is detached from the post and secured in the coal by the use of the wedge at its end in the ordinary manner. A chair or bracket is provided for the support of the drilling mechanism as follows:

M indicates a collar designed to slide on the bar and be secured thereon by means of a screw-lever M^2, seated therein. On one of its sides is a flattened projection to receive a U-shaped device N, having notches N^2 in its ends to receive the trunnions of the cylinder. This U-shaped part is pivoted to said flat projection by means of a rivet N^3. Hence when the grip-bar is secured in an approximately horizontal position the cylinder may be swung in a horizontal plane on the rivet N^3 and in a vertical plane by rocking on its trunnion.

In practical use, assuming that the device is in the position shown in Fig. 1, it is obvious that the rotation of the crank will rotate the shaft and the auger on its end, and also advance the auger-shaft. When it has reached its limit, the shaft may be quickly returned by releasing the hinged nut. The shaft may then be drawn backwardly within the device and the hinged nut again inserted in the cylinder. When used either as a grip-bar machine or as a vertical-post machine, the auger may swing into any position.

I am aware that heretofore the hub of a gear-wheel has been provided with annular grooves and held in a sleeve by means of a Babbitt-metal filler, that will permit its rotation relative to the sleeve and yet prevent its longitudinal movement in substantially the same way that I have shown, and I am also aware that a great number of devices have been invented for advancing and rotating an auger-shaft by hand-power, but I am not aware that the particular construction of the parts I have shown have ever been arranged and assembled in the same way that I have done nor that any prior device can be made so cheaply and with so small an amount of skilled labor or machine-work and that is so durable, compact, strong, and easy to keep in repair.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent of the United States therefor, is—

In a coal-drilling apparatus, the combination of the following elements, a suitable sleeve cast complete in one piece and having trunnions on its sides and a boss near one end, a straight axle screwed into the boss, a bevel gear-wheel rotatably mounted on said axle, a crank secured to the hub of the gear-wheel, a hub designed to enter said sleeve, and having annular grooves on its exterior and a feather on its interior designed to enter a groove in the auger-shaft, a bevel gear-wheel on the end of the hub in mesh with the aforesaid bevel-gear and a Babbitt-metal filler placed between the sleeve and hub to permit a free rotation of the hub and prevent its longitudinal movement in the sleeve, substantially as and for the purposes stated.

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