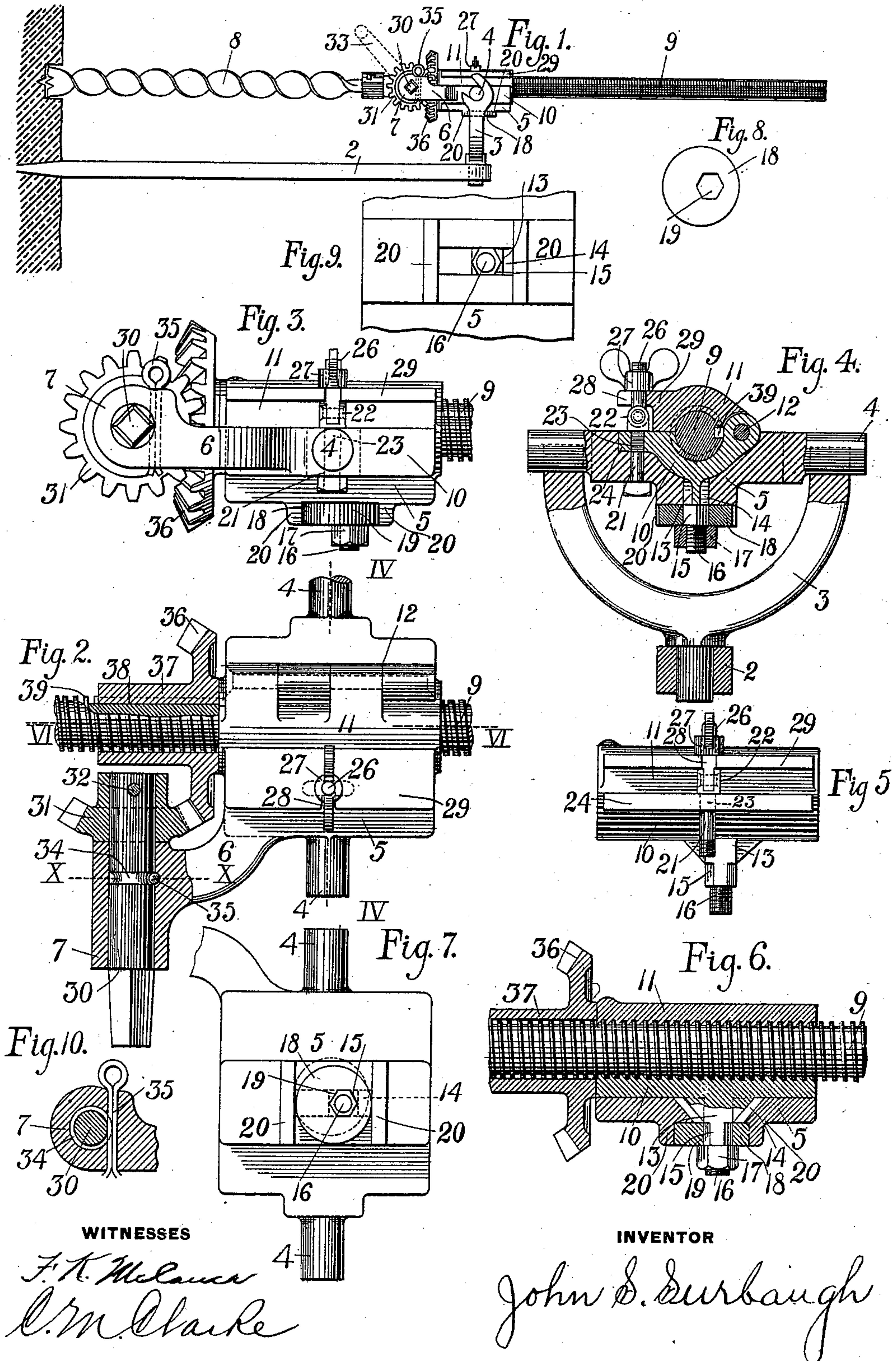


(No Model.)

J. S. SURBAUGH.
DRILL.

No. 538,358.

Patented Apr. 30, 1895.



UNITED STATES PATENT OFFICE.

JOHN S. SURBAUGH, OF DRAVOSBURG, PENNSYLVANIA.

DRILL.

SPECIFICATION forming part of Letters Patent No. 538,358, dated April 30, 1895.

Application filed July 31, 1894. Serial No. 519,066. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. SURBAUGH, a citizen of the United States, residing at Dravosburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Drills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view in side elevation of my improved drill in position for operation. Fig. 2 is a plan view, partly in section, of the driving and feeding mechanism, as constructed according to my invention. Fig. 3 is a side elevation, partly in section, illustrating the method of clamping the threaded boxing upon the threaded shaft. Fig. 4 is a cross sectional view taken on the line IV IV of Fig. 2. Fig. 5 is a detached view in side elevation of the threaded boxing. Fig. 6 is a longitudinal sectional view taken on the line VI VI of Fig. 2. Fig. 7 is a bottom view illustrating the arrangement of the eccentric washer. Fig. 8 is a detail plan view of the eccentric washer. Fig. 9 is a detail view of the end of the bolt extension of the adjustable nut and the slot therefor. Fig. 10 is a cross sectional view taken on the line X X of Fig. 2.

Like symbols of reference refer to like parts wherever used throughout this specification.

My invention consists in an improvement in the art of drilling in coal, rock, &c., and has for its object the construction of the driving and feeding mechanism in such a manner that the various parts may be easily and quickly removed and replaced in case of wear of the parts, requiring their removal, or that adjustment to take up wear may be readily accomplished.

In the various types of drills for similar purposes the practice has been to cut the thread for the feeding shaft in the body of the main casting forming the bearing for the shaft and the driving shaft carrying the bevel wheels, so that when the parts become worn it is necessary to renew the entire box at considerable expense and delay. These objections I have succeeded in overcoming, and also in securing other special advantages as shall be hereinafter described.

Referring now to the drawings, 2 is the bar

driven into the coal which is usually employed to support the drill in position, although I may employ any other of the well known forms, as desired.

3 is a two-pronged fork socketed in the end of the bar in the bearings of which are journaled the trunnions 4 forming part of the main casting constituting the box 5 provided with a bracketed arm 6 terminating in the bearing 7 for the power shaft.

The drilling operation is performed by the auger 8 affixed to the inner end of the threaded shaft 9 which rotates and advances into the material being drilled simultaneously.

Instead of tapping the thread for the boxing surrounding the screw in the main bearing in the usual manner, I prefer to construct such threaded boxing separately so that, as already mentioned, it may be easily renewed at small cost and readily adjusted.

10 represents the bottom of the boxing, resting in a corresponding recess in the main bracket 5 and provided with an upper cap piece 11, also threaded and hinged to the lower part 10 at 12.

The threads on the screw shaft 9 and the corresponding threads in the boxing, I prefer to cut square as I find the best results as to wear and use from such form.

Projecting downwardly from the bottom piece 10 is the locking bolt 13 passing through the slot 14 in the box 5, the bolt being square in cross section for the depth of the slot, then made in the form of a hexagon or other equilateral form for a length equaling the thickness of the eccentric washer, as at 15, and terminating in a threaded end 16 on which is secured the nut 17.

The eccentric washer 18 is provided with a hexagon or other equilateral form hole 19 of the same size and dimensions as the part of the pin 13 on which it is carried. When in the position shown in Fig. 7 the washer 18 is held centrally between two cross ribs 20 extending across the bottom of the main bracket 5 and between which is situated the longitudinal slot 14. Thus it will be seen that when it is desired to take up wear in the bevel wheels the entire threaded boxing may be set up, the eccentric washer turned one equal fraction of a revolution, replaced on the stem and the nut screwed down locking it in posi-

tion, and the bearing of the washer against the cross ribs will effectually prevent its movement.

I do not desire to limit myself to a hexagon form of opening in the washer, as it is obvious that any other desired form of equilateral opening and corresponding form of the stud, may be employed, according to the desired degree of adjustment. In fact I may make the opening a perfect circle journaled on the stud and depending on the pressure of the securing nut 17 to hold it against turning, thus giving a very small adjustment, which is in some cases very advantageous where it is desirable to keep the gearing well in contact.

It is obvious that a nut alone, or a nut and an ordinary washer, may be employed to lock the threaded boxing in position, by simply turning the nut up against the under side of the bearing after adjusting the stem 13 at the proper position in the slot.

Another means of locking the parts together is comprised in the combination clamping bolt 21 provided with a hinge joint 22 forming a shoulder, a square shank 23 passing down through a square hole in a flange extension 24 of the bottom of the threaded boxing. The bolt 21 extends down through a longitudinal slot in the main bearing allowing forward travel, the nut being screwed down in the desired position and thus assisting in locking the threaded box against longitudinal motion. The upper bolt 26 hinged at 22 is provided with a thumb screw 27 and enters a lateral slot 28 in a flange extension 29 of the top of the threaded boxing. This forms an effective means for holding the top box down in contact with the threaded shaft and also provides for readily throwing it back on the hinges by loosening the thumb screw, throwing the bolt 26 back through the slot 28 and retracting the threaded shaft.

Mounted in the bearing 7 is the power shaft 30 to the inner end of which is affixed the driving bevel wheel 31 by means of a key or pin 32, and the outer end is made square for attachment of the driving crank 33 shown in dotted lines in Fig. 1. Midway of its length an annular ring 34 is turned on the shaft 30 and a cotter or round pin 35 is passed down through the casting 7, engaging the annular ring, preventing end motion of the shaft until the cotter is withdrawn, when the shaft may be drawn entirely out of its bearings for the purpose of renewal or repair.

The driving bevel wheel 31 is in mesh with the driven wheel 36, having the extension hub 37 and provided with the spline 38, preferably cast integral with the hub and engaging a keyway 39 running lengthwise of the shaft 9, thus transferring rotary motion to the shaft and auger and permitting it to be fed forward by the screw threads. This feature of removability of the power shaft, together with the driving bevel is applicable to other forms of drills employing bevel gearing, and is a valuable and novel feature of my invention, inas-

much as it permits the operator to easily remove the shaft when desired for any purpose, whereas with the usual collar on the outside end it becomes necessary to first remove the bevel wheel, which is frequently so rusted and permanently set as to cause much trouble, delay and expense.

The method of setting up for wear, locking in position, ease of manipulation and low cost of replacing worn parts, resulting in an economical and effective construction, are valuable features of my invention and will be readily appreciated by those skilled in the art to which it appertains.

Having described my invention and in what manner it operates, what I claim, and desire to secure by Letters Patent, is—

1. In a drill, a threaded socket consisting of a lower bottom part, and an upper top part, hinged together, embracing the threaded auger shaft, provided with a downwardly projecting bolt, passing through a longitudinal slot in the main bearing, the bolt being threaded at its lower end to engage a tightening nut, substantially as shown and described.

2. In a drill, a threaded socket consisting of a lower bottom part and an upper top part, hinged together, embracing the threaded auger shaft, provided with a downwardly projecting bolt, square in cross section for the depth of a longitudinal slot in the main bearing through which it passes, an eccentric washer encircling the bolt and held up against the under side of the main bearing by a nut on the end of the bolt, with two cross lugs, extending across the bottom of the main bearing, against which the eccentric washer bears, substantially as shown and described.

3. In combination with the two part threaded boxing the bolt 21 made in two parts: the lower part having at its upper end a hinge joint and a shoulder bearing against the lower flange of the threaded boxing, the shank being square and passing down through a corresponding square hole in said flange and the lower extension of the bolt passing downwardly through a longitudinal slot in the main bearing and provided with a nut, the upper part having a corresponding hinge joint and a thumb screw the bolt entering a lateral slot in the upper flange of the threaded boxing and capable of being secured therein by the thumb screw, substantially as shown and described.

4. The combination, in a drill, of a main bearing provided with trunnions for its support, and a bracketed arm for the power shaft, provided with a square headed driving shaft journaled in the arm having a driving bevel wheel secured thereon and a pin passing through the arm, engaging a radial groove cut in the shaft, with an adjustable threaded boxing made in two parts hinged together resting on the main bearing and secured thereto by a downwardly extending bolt, passing through a longitudinal slot in the main bear-

ing and provided with an adjusting eccentric washer, together with a combination clamping bolt securing the flanges of the threaded boxing together, and to the main bearing; 5 the threaded box embracing a threaded auger bolt provided with a longitudinal keyway and carrying a driven bevel wheel having a spline engaging the keyway, in a mesh with the driv-

ing bevel wheel, substantially as shown and described.

In testimony whereof I have hereunto set my hand this 24th day of July, 1894.

JOHN S. SURBAUGH.

Witnesses:

F. K. McCANCE,
C. M. CLARKE.