D. POWERS.

BIT-STOCK.

No. 191,815. Patented June 12, 1877.

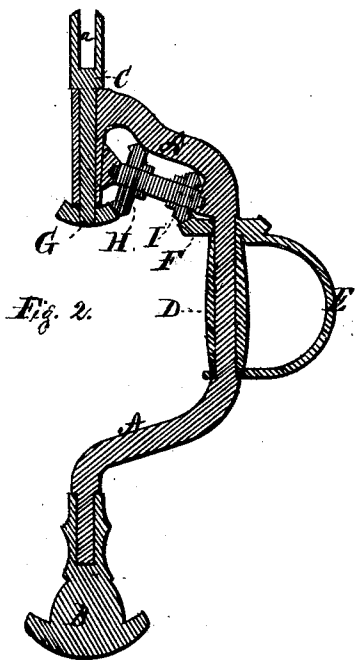

Fig. 2.

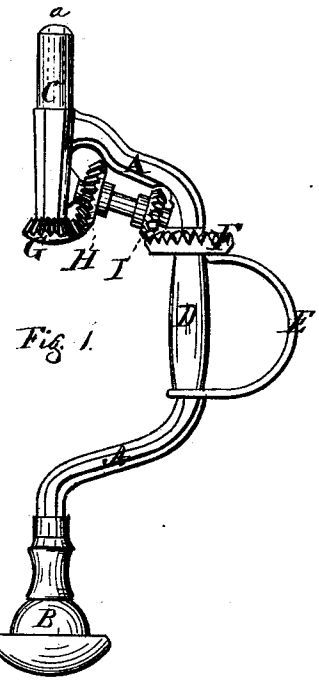

Fig. 1.

Witnesses:
Henry Munn
Francis R. Ralls

Inventor:
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UNITED STATES PATENT OFFICE.

DANIEL POWERS, OF SHELBURNE FALLS, MASSACHUSETTS.

IMPROVEMENT IN BIT-STOCKS.

Specification forming part of Letters Patent No. **191,815**, dated June 12, 1877; application filed May 26, 1876.

To all whom it may concern:

Be it known that I, DANIEL POWERS, of Shelburne Falls, in the town of Shelburne, in the county of Franklin and State of Massachusetts, have made certain new and useful Improvements in Bit-Stocks, whereof the following is a specification, reference being had to the drawings, in which—

Figure 1 is a perspective view of my improved stock. Fig. 2 is a vertical section of the same, dividing the same into two equal or similar parts.

A is the brace or handle. B is the head. C is the socket-shaft. D is the sleeve, taking the place of the ball commonly used in bit-braces. E is a guard attached to the sleeve D, which rests upon the hand or wrist when the stock is used, and prevents the sleeve D from turning on its axis in the handle. F is a gear-wheel, attached to the sleeve D. G is a gear-wheel, attached to the socket-shaft C. H and I are intermediate gear-wheels, connecting the socket-shaft gear-wheel G to the sleeve gear-wheel F, and running on an axis having bearings in the handle A. *a* is the socket in which bits or drills are to be placed, and which, with the end of shaft C on which it is, is to be varied in construction, as one or another of the usual modes of fastening bits or drills shall be adopted in this stock.

The inventor is aware that breast-drills have been used in which the drill-socket, set in a stationary frame, is connected by gearing to a crank, whereby the speed of the drill is multiplied according to the gearing; also, that bit-stocks have been made, operated in the usual way, having the drill-socket constructed in a shaft rotating in the handle, and connected to gearing upon the handle by intermediate gearing held from turning by being fastened to some fixed object, or by a lever attached to it to be held separately by the hand. But the purpose of this invention is to furnish a bit or drill stock which shall rotate the bit or drill a greater number of times than the handle is rotated, and which shall be a tool conveniently operated while detached from all permanent fixtures, and manipulated by the ordinary process of use in boring in the usual way without interfering with the free use of the hand in the operation. This is accomplished by making the stock in the usual general form, and constructing the socket to hold the bit or drill in a shaft which has a bearing in the handle, and is connected by gearing, or its equivalent, to the common ball or any other sleeve upon the handle, which, while it is held from rotation on its own axis by the gripe of the hand or otherwise, nevertheless rotates around, but not upon, the axis of motion of the shaft, (while the handle rotates in the sleeve,) and from its connection aforesaid imparts thereby additional rotation to the shaft, as shown.

This construction of the sleeve to rotate around, but not upon, the axis of motion of the drill-shaft, or a projection thereof, in common with the handle, while the handle rotates in said sleeve, enables me, as shown, to locate said sleeve upon the crank part of the handle, in position to be extended into and become the common ball, and thereby to be held, by the gripe of the operating hand, firmly from turning, while the other hand is left free for other purposes, so that the gripe of said hand combines with the reaction against the guard, (hereafter described,) to give additional rotation to said shaft, although either might alone perform that function. Thus, in the stress of two parts, each relieves the other.

To aid in holding the sleeve from rotating on its own axis while the handle rotates in it, I have attached to the sleeve a guard, which rests upon the hand, arm, or wrist of the operator, and acts as a lever to prevent said sleeve from turning. The use of a sleeve, as described, rotating around the axis of the shaft in common with the crank part of the handle, enables me to give this guard attached to it a reciprocating motion in common with the hand, and prevent friction on the part where said guard bears. If the sleeve be used as a ball, or located on the same axis as the ball usually is on the handle, as is shown in the drawing, then the guard has its reciprocating motion identical with that of the hand in operating the tool, and the guard rests upon one spot on the hand, wrist, or arm during use of the stock. Otherwise the stress of the lever, rubbing upon the arm, would render the tool impracticable. Thus, the sleeve D being held from rotating on its

own axis, each turn of the handle A rotates said handle once in the sleeve D; wherefore a gearing attached to said handle, and taking into a gearing attached to said sleeve, would be rotated thereby at each revolution of the handle. The socket to hold the bits or drills is therefore constructed upon a shaft, C, having a bearing in the handle A, and is connected by gearing with a gear-wheel attached to the sleeve D, whereby in each rotation of the handle the gearing on the sleeve communicates rotation to the socket-shaft C additional to the rotation it receives from the regular rotation of the handle A. Therefore, if the four gear-wheels F, G, H, and I have each an equal number of teeth, one rotation of the handle A (the sleeve D being held from rotation on its axis) would cause two rotations of the socket-shaft C, one of said rotations being caused by the turn of the handle in the usual way, (which would occur if the sleeve were rigidly fastened to the handle A,) and the other by the rotation of the handle in the sleeve and the consequent rotation of the gear-wheel I once upon the gear-wheel F, which rotation is communicated by the gearing to the socket-shaft C. If greater speed of motion is required, it is attained, in the usual way, by increasing the number of teeth on the gear-wheels giving power and lying in the direction of its source, compared with the number on the wheels taking power and lying in the direction of its application. Thus, in the drawings, the gear-wheel F has two teeth to one on the gear-wheel I, and the gear-wheel H has three teeth to two on the gear-wheel G; wherefore the socket-shaft C has three additional rotations taken from the sleeve to each rotation of the handle A, and rotates four times to each rotation of said handle. As the additional rotations are caused by preventing the sleeve D from rotating on its own axis while the handle rotates in it, the power required having a tendency to rotate the same with the handle, I have added a guard, E, which rests upon the hand or wrist of the operator when his hand is holding the sleeve D, and acts as a lever to aid the gripe of his hand in preventing the sleeve D from rotating on its axis while the handle rotates in said sleeve.

The intermediate gear-wheels H and I are not an essential element of the invention, because the gear-wheel F may be of sufficient diameter to reach and connect with the gear-wheel G, and the multiplication of rotations produced as desired by suitable arrangement of the teeth and diameter of said wheels. Said intermediate gear-wheels H and I are added to make the stock less cumbersome from the diminished diameter required for wheel F. The use of gearing, as shown, is not essential to the invention, for shaft C may be driven by the sleeve D, by using a chain running on the wheels F and G, into the links of which chain teeth or pins on said wheels are made to take, or by any other well-known method of driving one shaft or wheel by another, as an equivalent. In case it shall be desired to use the stock as a simple brace without multiplying the rotation of shaft C, the wheel I may be made to slide into and out of connection with wheel F by sliding on a spline in its axis, and may be fastened from turning when out of said connection by sliding into connection with a dog or projection attached to the handle and taking into any depression in it. Said wheel I may then be fastened in either position on its axis by a pin or spring-catch attaching it to said axis.

What I claim, and for which I pray Letters Patent, is—

1. A bit-stock to hold and rotate bits and drills, having the socket to hold said bits or drills in a shaft which has a bearing in the lower part of the brace, and is connected to a sleeve upon the handle, which sleeve is constructed to rotate around, but not upon, the axis of motion of said shaft, or a projection thereof, in common with said handle, while the handle rotates in said sleeve, all constructed and operating substantially in the manner and for the purposes herein shown and described.

2. The combination of the brace, the sleeve D provided with guard E, and the socket-shaft C with suitable operative connecting mechanism, substantially as and for the purposes specified.

DANIEL POWERS.

In presence of—
HENRY WINN,
FRANCIS R. PRATT.