

(No Model.)

J. D. RICHARDSON.  
BIT AND DRILL BRACE.

No. 292,587.

Patented Jan. 29, 1884.

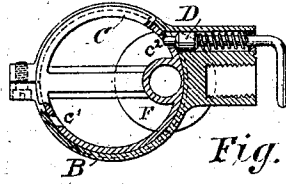


Fig. 3.

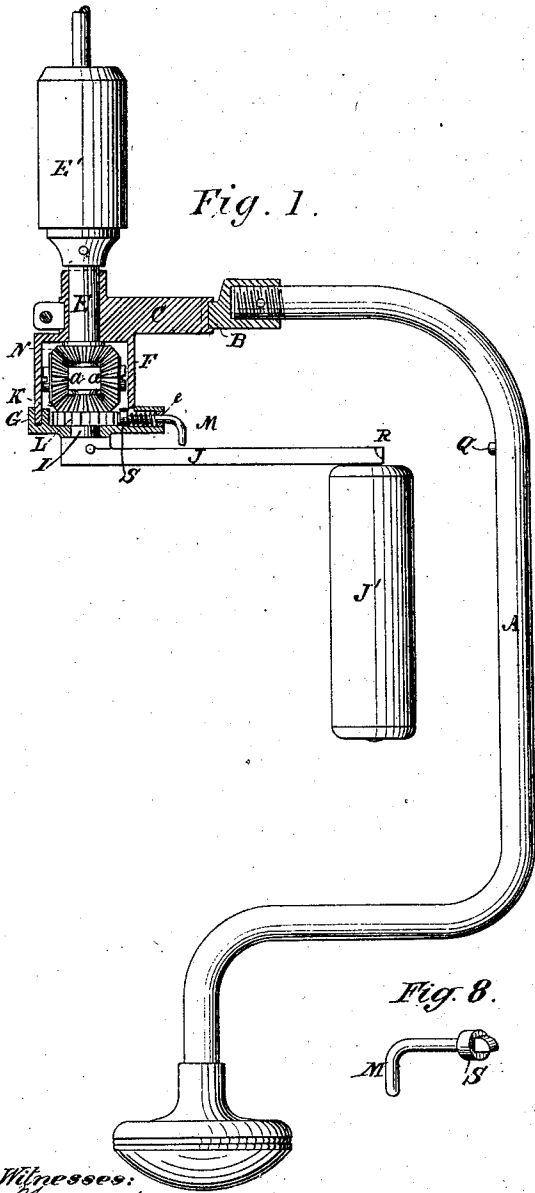


Fig. 1.

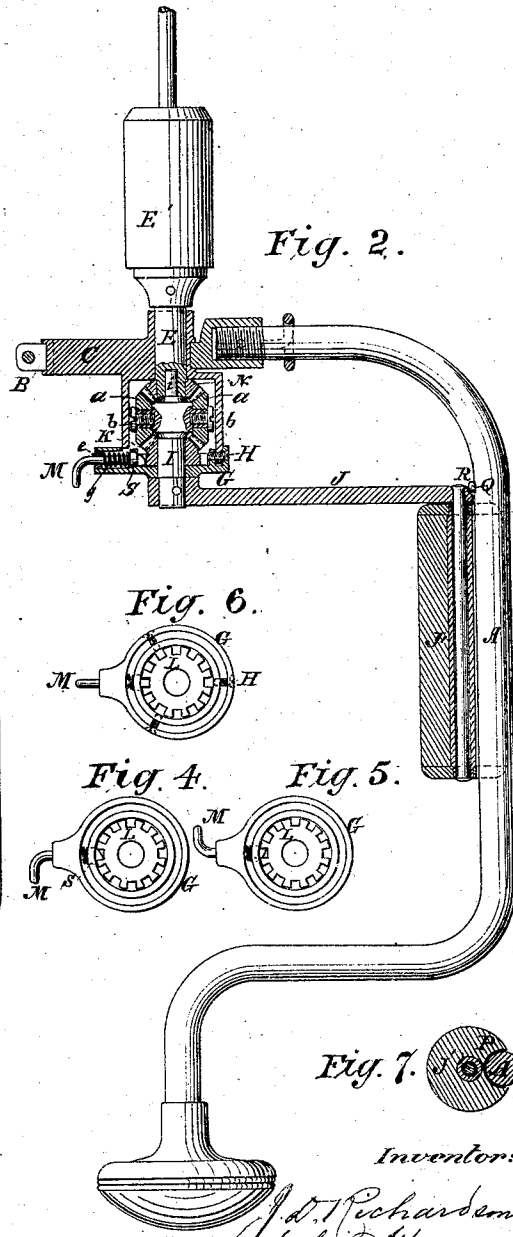


Fig. 2.

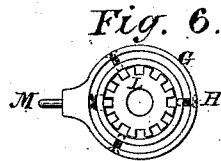


Fig. 6.

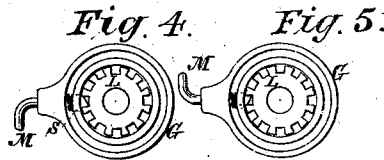


Fig. 4.

Fig. 5.



Fig. 8.



Fig. 7.

Witnesses:  
Wm. Haynes  
C. Sundgren

Inventor:  
J. D. Richardson  
By his Attorneys  
Brown & Brown

# UNITED STATES PATENT OFFICE.

JOHN D. RICHARDSON, OF BROOKLYN, ASSIGNOR OF ONE-HALF TO  
FRANCIS L. MANCHESTER, OF NEW YORK, N. Y.

## BIT AND DRILL BRACE.

SPECIFICATION forming part of Letters Patent No. 292,587, dated January 29, 1884.

Application filed June 18, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. RICHARDSON, of the city of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Bit and Drill Braces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming a part of this specification.

This invention consists in combining with an ordinary brace or stock, and its socket or tool-holder for receiving the bit or drill, a system of gear-wheels, hereinafter described, worked by an independent handle or hand-crank detached from the drill-stock handle, whereby a larger number of rotations can be transmitted to the bit than is imparted to said independent handle.

It also consists in the combination, with the stock, of an eccentric-yoke and an eccentric, to which is attached the tool-holder or chuck, and of a box containing the gearing aforesaid, whereby the brace or stock may be used either as an ordinary brace or with an accelerated motion, and in both cases capable of being operated as a ratchet-drill, or to produce continuous rotations of the bit in either direction by means of a ratchet-wheel and pawl.

The invention further consists in details hereinafter described and claimed.

In the drawings, Figures 1 and 2 are side views of a brace containing my invention, partly in section, Fig. 1 showing the parts in condition for increasing the speed of the bit, and Fig. 2 showing the parts arranged for use on an ordinary brace. Fig. 3 is a plan of the eccentric and yoke partly in section, showing method of uniting the two together. Figs. 4, 5, 6, and 8 are detail views of the ratchet and pawl, showing the latter in three different positions to operate as a ratchet-drill, or for continuous rotation of the bit in either direction. Fig. 7 is a transverse sectional view, showing the independent handle united with the handle of the brace.

Similar letters of reference in the several figures above alluded to indicate corresponding parts.

A is the handle of an ordinary brace, having

firmly attached to it the eccentric-yoke B, in which is fitted the eccentric C, and which is provided with a spring dog or stop, D, to engage in corresponding notches or holes,  $c' c^2$ , in the eccentric to lock the latter in either of the two positions. The eccentric C has the shank E of the bit-holder or chuck E' fitted to turn in it, and has on one side a cylindrical box, F, with cover G firmly secured to it by the screws H.

I is a spindle arranged in line with the axis of the bit-holder or chuck E', and fitted to one bearing in the cover G of the box F, and another at  $i$  in the shank E of the bit-holder or chuck. This spindle has firmly secured to its outer end the handle J. It carries two bevel-gear wheels,  $a a$ , mounted loosely on trunnions projecting from its sides, which has here a square form, the said gear-wheels being secured on said trunnions by the headed screws  $b b$ .

K is a bevel-wheel, having firmly secured to it the ratchet-wheel L, and mounted loosely with the said wheel K on the spindle I, the said ratchet-wheel having applied to it a spring-pawl, M.

M is a sliding spring-pawl, having a straight stem, which works through the side of the cover G of the box F to engage with the ratchet-wheel L. This pawl is made with a collar, S, which works in a bearing in the inner flange of the cover G of the box F. It has a square form on the inner end, any two opposite sides of which will correspond and engage in the teeth of the ratchet-wheel L. One of the four sides is rounded off, as shown in Figs. 4, 5, and 8, to permit the operation of the bit as in an ordinary ratchet-drill. Two other sides are parallel, to lock the ratchet-wheel for continuous rotation, as shown in Fig. 6. The outer end of the pawl passes through and is supported in the lid  $e$  of the cavity formed on one side of the cover G, to contain the spring  $g$ , to press on the collar S, and keep the pawl in contact with the ratchet-wheel. The outer extremity of the pawl is bent to both indicate its position in relation to and the manner in which it will act on the ratchet-wheel, whether for continuous or partial rotation either way, and also to afford increased facility for operating.

N is a bevel-wheel firmly attached to the shank E, and both it and the wheel K engage with the two wheels *a a*, being also equal in number of teeth to the latter.

5 The spindle I has firmly secured to it the hand-crank J, the handle of which is fitted with a loose sleeve, J', in the usual manner. This sleeve has along one side a groove, P, to fit the handle A of the brace, as shown in Figs. 2 and 7.

In the end of the arm of the crank J is a notch, R, to engage with a fixed teat or projection, Q, on the brace A.

To use my invention, in order to give continuous rotation and extra speed to the bit, the eccentric C is turned within the yoke B to a position for the spring-dog D to enter the notch or hole *c'* of the eccentric and secure the eccentric within the yoke in the position shown in Fig. 1, with the tool-holder thrown out to the farthest position from the crank of the brace A, in which position the independent handle-crank is detached from the stock-handle A sufficient to allow its being rotated. By this rotation, while the brace is held stationary, if the ratchet-wheel L and wheel K are positively locked to the box F by the ratchet-wheel being engaged with the two parallel sides of the pawl M, as shown in Fig. 6, the wheels *a a* will have given to them a rotary motion around the wheel K, as well as a rotary motion on their own axes, and consequently will impart to the wheel N and bit-holder or chuck a speed double that of the hand-crank.

To operate as a ratchet-drill, the pawl is withdrawn and turned to bring its rounded side toward the teeth of the ratchet-wheel, as in Fig. 4. The latter being then free to rotate one way, the handle can be turned backward, as the two wheels *a a* will rotate the ratchet-wheel instead of the wheel N, which can only be turned when the said ratchet-wheel is controlled by the pawl. By reversing the position of the pawl, a contrary direction can be given to the drill, as shown in Fig. 5.

It may be observed that in operating by the independent crank-handle J nearly the same leverage is obtained as that obtained in operating the brace in the usual way.

To convert my invention for use as an ordinary brace, (shown in Fig. 2,) the spring-dog D is withdrawn and the eccentric C turned within the yoke B to a position for the spring-dog D to enter the hole *c'* of the eccentric and secure the eccentric within the yoke in the position shown, with the tool-holder brought back in line with the head of the stock and the handle J united with that of the brace, forming one handle, which, on being rotated, carries with it the eccentric C, pawl M, and spindle I. By this rotation, if the ratchet-wheel L and wheel K are positively locked to the box F by the ratchet-wheel being engaged with the two parallel sides of the pawl M, as

shown in Fig. 6, the wheels *a a* will have given to them a rotary motion around the wheel K, and by reason of the rotation of the ratchet-wheel L and wheel K will have no rotary motion on their own axis, consequently will impart to the wheel N and the bit-holder or chuck a speed equal to that of the handle.

The action of the pawl M on the ratchet-wheel L to operate as a ratchet-drill or for continuous rotation is similar to that already described pertaining to Figs. 1 and 6.

By making the bevel-gear N smaller than K the speed of rotation of the bit-holder or chuck may be increased beyond double of that of the hand-crank J. In such case the bevel-gears *a a* must be set at an angle to gear with both K and N.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an ordinary bit or drill brace and a tool-holder or chuck fitted to rotate independently therein, of the bevel-gear N, fast on the shank of the holder or chuck, an independent hand-crank, J, a spindle, I, for said crank, arranged in line with the tool-holder or chuck in bearings provided in or on the brace, two bevel-gears, *a a*, carried by the spindle and gearing with N, a bevel-gear, K, and a ratchet-wheel, L, secured together and placed loosely on said spindle, and a pawl attached to the brace and engaging with said ratchet-wheel, substantially as herein described.

2. The combination, with an ordinary bit or drill brace, of an eccentric-yoke firmly secured thereto, an eccentric fitted to said yoke and having the bit-holder or chuck fitted to rotate therein, and a stop to lock the said eccentric in either of two positions in the brace, substantially as and for the purpose herein described.

3. The combination of the brace or stock A, provided with a yoke, B, the eccentric C, fitted to said yoke and carrying the box F, the drill-holder or chuck E', having its shank E fitted to rotate in said eccentric, the hand-crank J, having its spindle I fitted to rotate in said box, the bevel-gears *a a* N K, gearing the said crank with the drill-shank E, the ratchet-wheel L, fast on the bevel-gear K, which is loose on the crank-spindle I, and the sliding pawl M, fitted to said box F, and capable of engaging with said ratchet-wheel L, all substantially as and for the purpose herein described.

4. The combination, with the stock A and the independent hand-crank J, for operating the bit or drill of the crank-sleeve J', having a recess, P, to fit the said brace, substantially as herein described.

J. D. RICHARDSON.

Witnesses:

FREDK. HAYNES,  
ED. L. MORAN.