(No Model.)

W. P. NOLAN.

RATCHET DRILL BRACE.

No. 484,231. Patented Oct. 11, 1892.

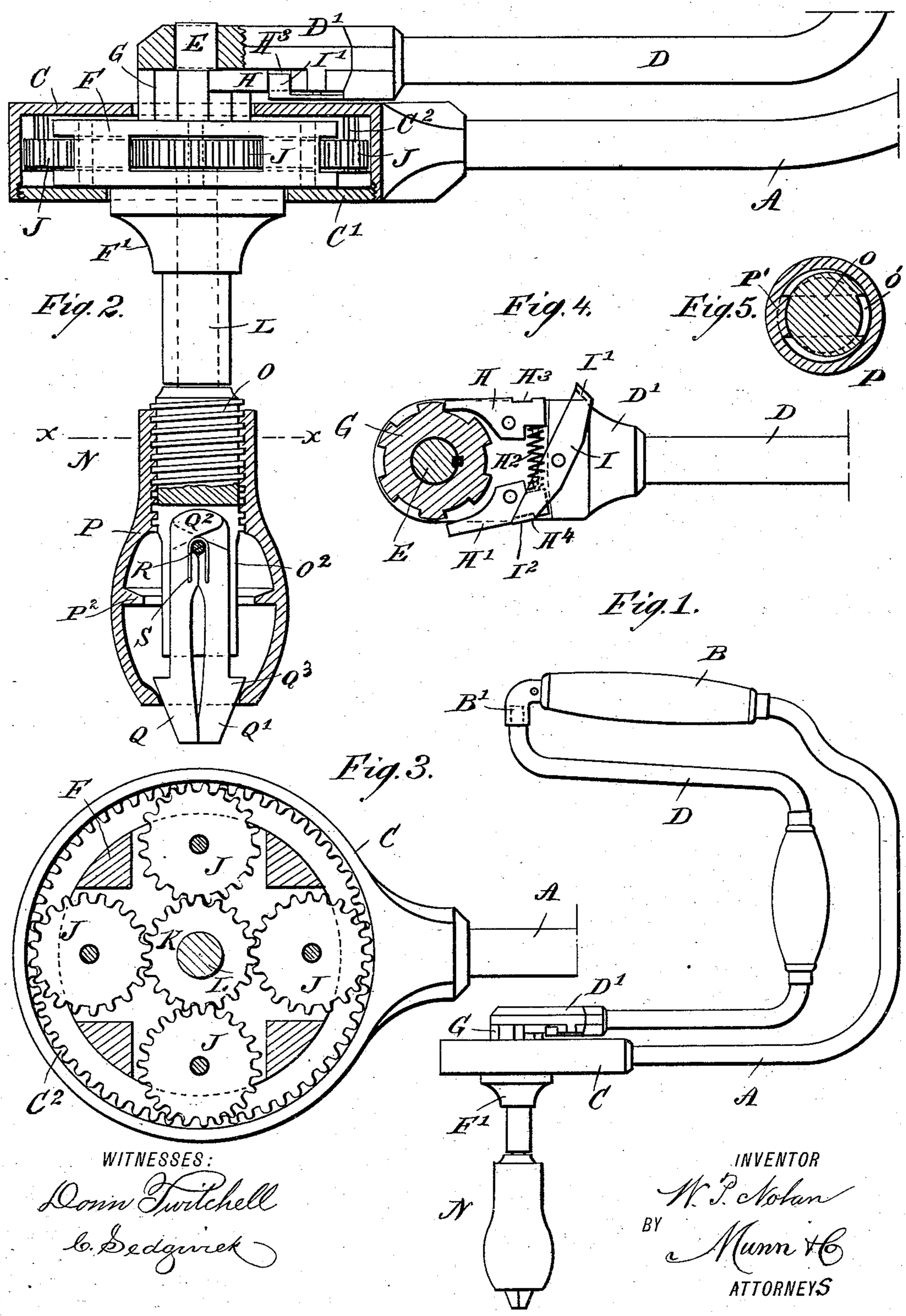

Fig. 2.

Fig. 4.

Fig. 5.

Fig. 1.

Fig. 3.

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RATCHET-DRILL BRACE.

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To all whom it may concern:

Be it known that I, WILLIAM P. NOLAN, of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Ratchet-Drill Brace, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved ratchet-drill brace which is simple and durable in construction, very effective in operation, and arranged to revolve the drilling-tool at a high rate of speed in either direction.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is an enlarged sectional elevation of part of the improvement. Fig. 3 is an inverted sectional plan view of part of the frame, the revoluble disk, and gear-wheels. Fig. 4 is an inverted plan view, with parts in section, of the crank-arm and ratchet-wheel; and Fig. 5 is a sectional plan view of part of the improvement on the line $x\ x$ of Fig. 2.

The improved ratchet-drill brace is provided with a U-shaped frame A, formed at one end with a handle B and at its other end with a hollow casing or disk C, closed on the under side by a suitable cover C′. From the handle B projects a bearing B′, engaging one end of the U-shaped crank-arm D, arranged to turn within the U-shaped frame B, as can be readily seen by reference to Fig. 1. The other end of the crank-arm D is formed with an enlargement D′, loosely engaging a pin E, arranged in line with the bearing B′ and forming a bearing for the enlarged end of the crank-arm D. The pin E projects from a disk F, mounted to revolve in the casing C and carrying on the pin E a ratchet-wheel G, adapted to be engaged by either of two pawls H or H′, pivoted on the enlargement D′ of the crank-arm D. The pawls H and H′ are pressed on by a coiled spring H^2, so as to hold the free ends of the pawls in engagement with the teeth of the ratchet-wheel G. In order to throw either of the pawls H or H′ out of mesh with the ratchet-wheel G, a lever I is provided, pivoted on the enlargement D′ and formed at its ends with projections or lugs I′ and I^2, adapted to engage corresponding notches H^3 and H^4, respectively, in the pawls H and H′, respectively. When the lever I is turned into the position illustrated in Fig. 4, the projection I^2 engages the notch H^4 in the pawl H′, so that the free end of the said pawl H′ is held out of mesh with the ratchet-wheel G and only the pawl H is in mesh with the said ratchet-wheel. Thus when the crank-arm D is turned a rotary motion is given to the said ratchet-wheel and the disk F in one direction only. When it is desired to reverse the movement of the said disk, the operator changes the position of the lever I, so that the lug I′ engages the notch H^3 of the pawl H to move the latter out of engagement with the ratchet-wheel G. At the same time the other lug I^2 is disengaged from the notch H^4, so that the spring H^2 forces the pawl H′ into engagement with the ratchet-wheel G at a point opposite the previous engagement of the pawl H. When the operator now turns the crank-arm D in an opposite direction, the disk F is given a movement which is the reverse of the movement it had at the time the pawl H was in engagement with the ratchet-wheel G. The pawls H and H′, as well as the lever I, are preferably arranged on the under side of the enlargement D′, the lever I projecting slightly at its ends from the sides of the said enlargement, so as to be under control of the operator.

In the disk F is journaled a series of gear-wheels J, in mesh at their inner sides with a central gear-wheel K, secured on a shaft L, mounted to turn in suitable bearings formed in the hub F′ of the disk F. The lower end of the shaft L carries the chuck N of an improved construction for supporting the drill tool or bit.

The gear-wheels J above mentioned mesh at their outer edges into an internal gear-wheel C^2, formed integral with the casing C of the frame A. Thus when the disk F is rotated in either direction by revolving the crank-arm D in the manner above described the gear-wheels J are caused to revolve by rolling off on the internal gear-wheel C^2. The rotary motion of the gear-wheels J is

transmitted to the central gear-wheel K, so that the shaft L, carrying the chuck and drilling-tool, is revolved at a very high rate of speed. As shown in the drawings, the proportion is such that one revolution of the crank-arm D gives four revolutions to the shaft L and the chuck N. The latter is preferably constructed in the manner illustrated in Fig. 2, the lower end of the shaft L being provided for this purpose with an enlarged screw-threaded end O, formed with recesses O′, and on which screws and slides a casing P, formed with a partial thread P′, engaging the recesses and engaging with its lower end the beveled ends of the gripping-jaws Q and Q′, adapted to engage and support the drill-tool. The shanks of the gripping-jaws Q and Q′ are formed with lugs Q^2, extending past each other in opposite directions and supported on a pin R, forming the pivot for the jaws and held transversely in a fork O^2 of the threaded end O, in which work the shanks of the jaws Q and Q′, which are free to swing open or shut. The casing P is formed on the inside with an annular flange P^2, adapted to engage the shoulders Q^3, formed on the jaws Q and Q′, to prevent the casing from dropping off the threaded end when the partial thread P′ engages the recesses O′. A spring S is held on the pin R and presses with its free end on the shanks of the jaws Q and Q′, so as to open the latter, the closing being accomplished by the casing engaging the wedge-shaped ends of the jaws Q and Q′. It is understood that by sliding the casing P well up into the slot of the threaded part O and by giving it a quarter-turn it will close the jaws and rigidly secure the bit or tool.

It will be seen that a ratchet-drill brace constructed in this manner is very simple, can be readily taken apart to be examined, and permits of reversing the motion of the drill-tool. It will further be seen that the speed can be increased or diminished, as the case may be, by changing the relative proportions of the gear-wheels described.

In using the ratchet-drill brace the handle B on the frame A is very convenient for holding the latter in proper position while operating the crank-arm D.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a ratchet-drill brace, the combination, with the ratchet-wheel, of the operating-crank provided with two pivoted pawls H H′, having notches H^3 H^4 on the outer edges of their rear ends, and the transverse centrally-pivoted lever I, having end projections I′ I^2, adapted to engage said notches and hold the respective pawls out of engagement with the ratchet-wheel, substantially as set forth.

2. In a ratchet-drill brace, the combination, with a U-shaped frame formed with a casing having an internal gear-wheel, of a crank-arm mounted to turn within the said frame, spring-pressed pawls pivoted on the said crank-arm, a ratchet-wheel adapted to be alternately engaged by the said pawls, a disk mounted to turn within the said casing and carrying the said ratchet-wheel, a series of gear-wheels journaled in the said disk and in mesh with the internal gear-wheel of the said casing, a shaft journaled in the said disk and carrying a gear-wheel in mesh with the said series of gear-wheels, and a lever pivoted on the said crank-arm and formed with lugs adapted to alternately engage notches in the said spring-pressed pawls, substantially as shown and described.

3. In a ratchet-drill brace, a chuck comprising a revoluble shaft formed with a forked end, a screw-thread and recesses therein, a casing fitted to slide and to screw on the said thread and recesses, jaws held in the forked end of the said shaft and adapted to be closed by the said casing, the said casing being provided with an annular flange adapted to engage shoulders on the said jaws, and a spring for opening the said jaws, substantially as shown and described.

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Witnesses:
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