(No Model.)

W. P. NOLAN.

RATCHET DRILL BRACE.

No. 506,931. Patented Oct. 17, 1893.

Fig. 2.

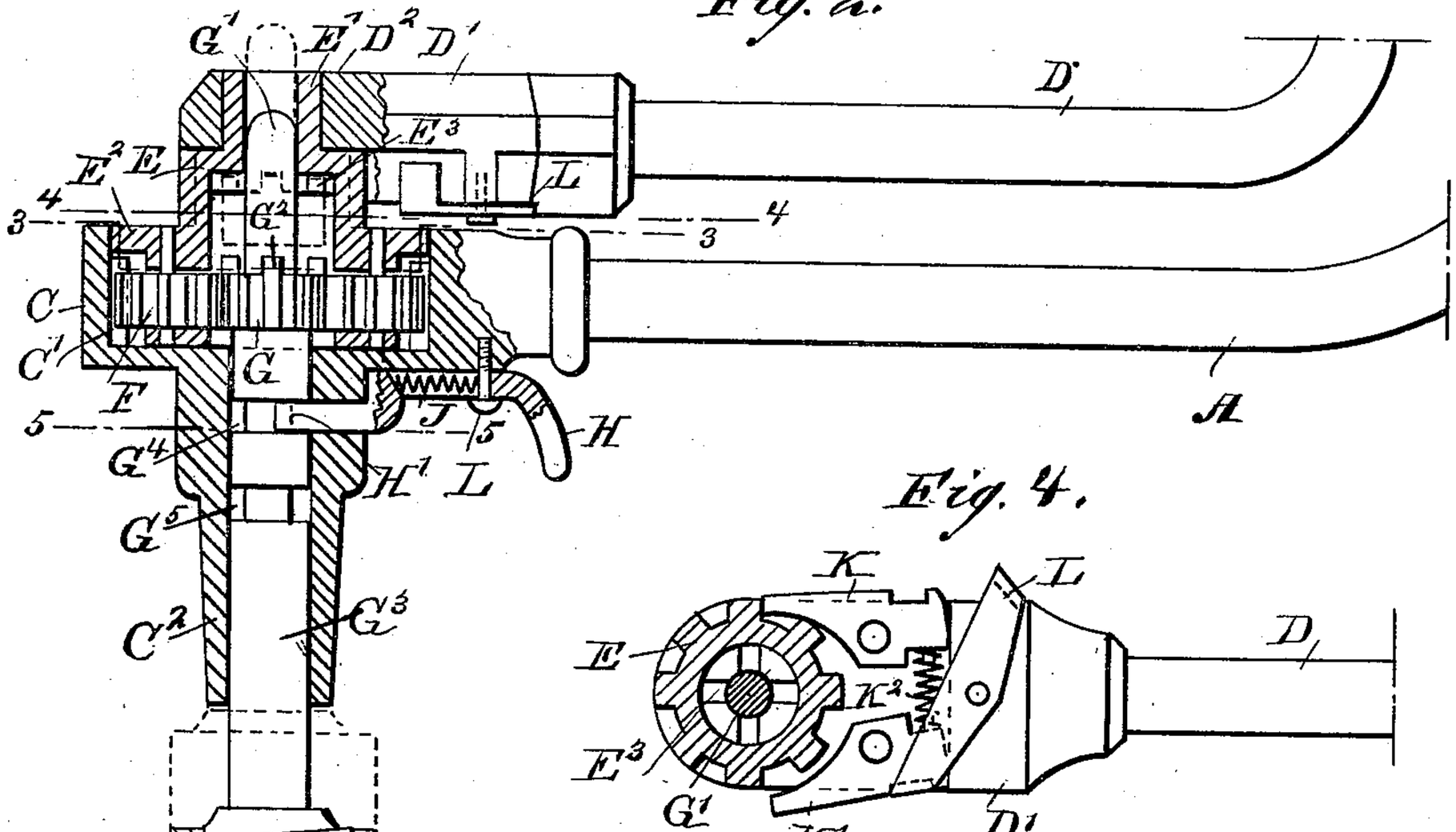


Fig. 4.

Fig. 3.

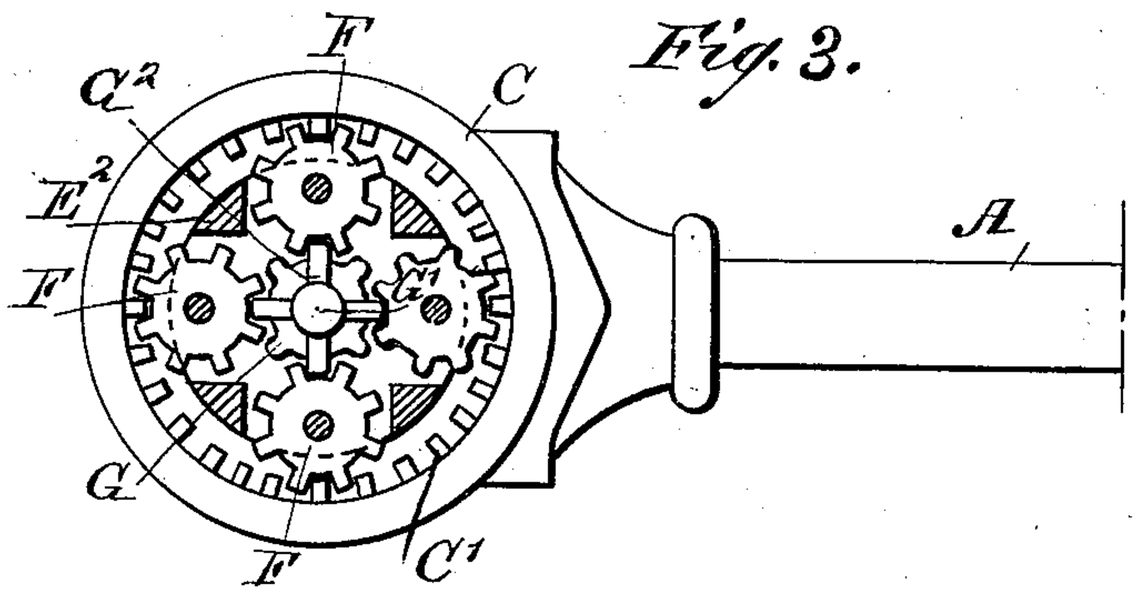


Fig. 5.

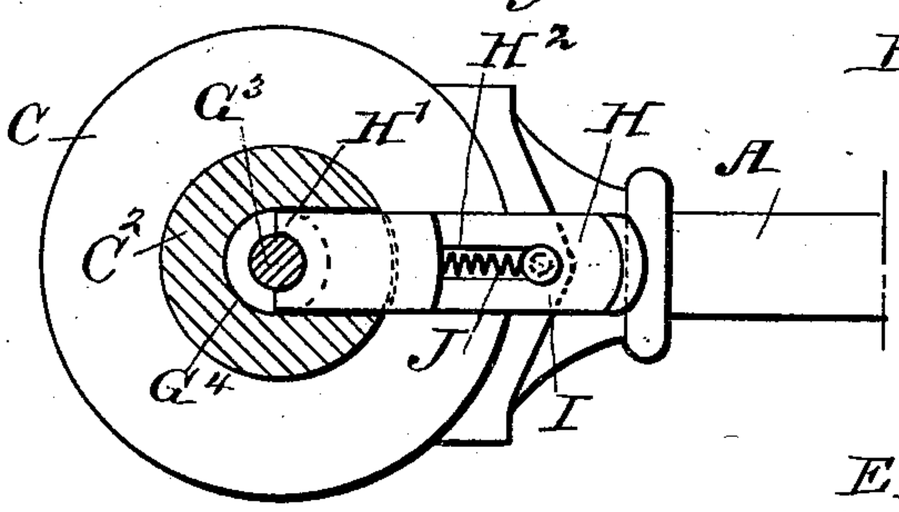
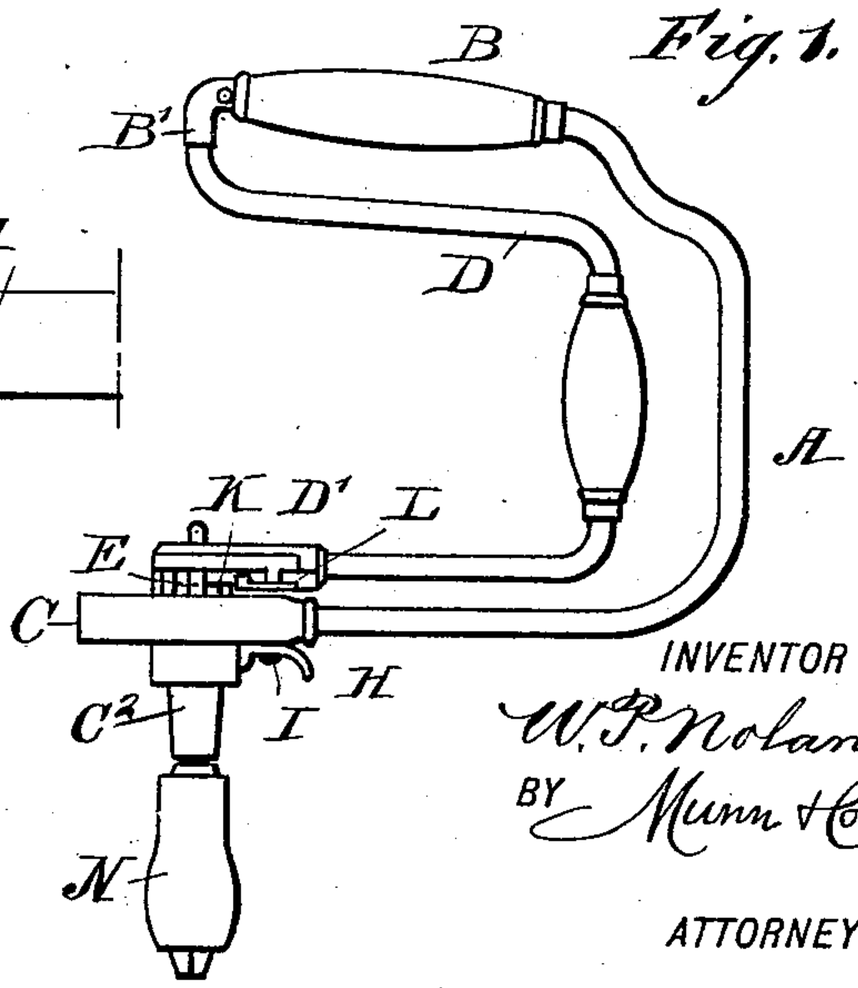


Fig. 1.



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WILLIAM P. NOLAN, OF SAN FRANCISCO, CALIFORNIA.

RATCHET-DRILL BRACE.

SPECIFICATION forming part of Letters Patent No. 506,931, dated October 17, 1893.

Application filed December 15, 1892. Serial No. 455,323. (No model.)

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 invention relates to ratchet drill braces such as shown and described in the Letters Patent of the United States, No. 484,231, granted to me on October 11, 1892.

The object of the invention is to provide a new and improved ratchet drill brace, in which the speed of the tool shaft can be conveniently changed from a high rate of speed to a single motion corresponding to the movement of the crank arm or vice versa.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described 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 a sectional plan view of the same on the line 3—3 of Fig. 2. Fig. 4 is an inverted sectional plan view of the same on the line 4—4 of Fig. 2; and Fig. 5 is an inverted sectional plan view of the same on the line 5—5 of Fig. 2.

The improved ratchet drill brace is provided with a frame A preferably made U-shaped and formed at its upper end with a handle B and at its lower end with a hollow casing or disk C formed with an internal gear wheel C′ and a hub C^2 for the tool shaft, as hereinafter more fully described.

From the handle B projects a bearing B′ engaging one end of the crank arm D arranged to turn within the frame A and formed at its lower end with an enlargement D′ formed with a bearing D^2 arranged in alignment with the hub C^2 of the disk C. The bearing D^2 is engaged by the hub E′ of a ratchet wheel E formed at its lower end with a flange E^2 carrying a number of gear wheels F having their shafts arranged with their centers in a circle, as plainly shown in Fig. 3, so that the said gear wheels are in mesh with the internal gear wheel C′ of the casing or disk C. The gear wheels F also engage a central gear wheel G formed with an upwardly-projecting shaft G′ loosely engaging the hub E′ of the ratchet wheel E, as plainly shown in Fig. 2. On the top of this central gear wheel G are arranged ratchet teeth G^2 adapted to engage corresponding ratchet teeth E^3 formed in the hollow ratchet wheel E, as plainly shown in Figs. 2 and 4.

From the under side of the gear wheel G extends centrally, the tool shaft G^3 mounted to rotate in the hub C^2 projecting from the under side of the casing C, as previously mentioned. On this tool shaft G^2 are formed two annular grooves G^4 and G^5 adapted to be engaged by the forked end H′ of a slide H mounted to slide on the under side of the casing C, as plainly illustrated in Figs. 2 and 5. The forked end H′ of the slide passes through an opening in the hub C^2, so as to either engage the groove G^4 or G^5 in the tool shaft G^3 to hold the latter in the desired position. When the forked end H′ of the slide H engages the groove G^4 then the central gear wheel G is in mesh with the gear wheels F, but when the slide H is pulled outward so that its forked end H′ disengages the groove G^4 and the tool shaft G^3 is moved upward, then the forked end H′ engages the annular groove G^5, thus holding the tool shaft G^3 in an uppermost position. In this case, the gear wheel G slides upward with the tool shaft and consequently moves out of mesh with the gear wheels F and into mesh by its ratchet teeth G^2, with the ratchet teeth E^3 of the ratchet wheel E.

The slide H is formed with a longitudinally-extending slot H^2 through which passes the screw I screwing in the under side of the disk C and in this slot H^2 is held a spring J, one end of which is attached on the screw I and the other end presses onto the inner end of the slide, so as to hold the latter in contact with its forked end H′ with the respective groove G^4 or G^5. The ratchet wheel E is adapted to be engaged by either of two pawls K or K′ pivoted on the under side of the enlargement D′ of the crank arm D; see Figs. 2 and 4. The pawls K and K′ are pressed on by a coiled spring K^2, so as to hold the free ends of the pawls in engagement with the ex-

terior teeth of the ratchet wheel E. In order to throw either of the pawls K or K′ out of mesh with the ratchet wheel E, a lever L is provided similar to the one shown and described in the above mentioned patent, so that further description of this part of the mechanism is not deemed necessary.

The tool shaft G^3 carries a chuck N of any approved construction. Now, it will be seen that when the several parts are in the position illustrated in Fig. 2, and the crank arm D is turned, then a rotary motion is given to the ratchet wheel E by the said crank arm on account of the connection of the latter by the respective pawl K or K′ through the ratchet wheel E. The rotary motion of the latter is transmitted by the gear wheels F rolling off the internal gear wheel C′ to the central gear wheel G, so that the tool shaft G^3 is rotated at a very high rate of speed. Now, when it is desired to rotate the tool shaft G^3 at a low rate of speed corresponding to that of the motion of the crank arm D, then the operator first withdraws the slide H from the groove G^4 and then pushes the tool shaft G^3 upward to permit the slide H to engage the other groove G^5. The upward movement of the tool shaft G^3 disconnects the gear wheel G from the gear wheels F, as previously mentioned but at the same time moves the ratchet teeth G^2 in mesh with the ratchet teeth E^3 of the ratchet wheel E. The rotary motion of the latter is now directly transmitted to the tool shaft G^3, so that the latter rotates with the motion of the crank arm D.

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

1. In a ratchet drill brace, the combination with a frame formed with a casing having an internal gear wheel, of a crank arm mounted to turn within the said frame, a ratchet wheel adapted to be locked to the said crank arm, a series of gear wheels held on the said ratchet wheel and in mesh with the said internal gear wheel, and a tool shaft mounted to slide and carrying a gear wheel having ratchet teeth adapted to engage corresponding ratchet teeth formed in the said ratchet wheel, the said gear wheel being also adapted to mesh into the said series of gear wheels, substantially as shown and described.

2. In a ratchet drill brace, the combination with a frame formed with a casing having an internal gear wheel, of a crank arm mounted to turn within the said frame, a ratchet wheel adapted to be locked to the said crank arm, a series of gear wheels held on the said ratchet wheel and in mesh with the said internal gear wheel, a tool shaft mounted to slide and carrying a gear wheel having ratchet teeth adapted to engage corresponding ratchet teeth formed in the said ratchet wheel, the said gear wheel being also adapted to mesh into the said series of gear wheels, and a spring pressed slide held on the said casing and adapted to engage annular grooves in the said tool shaft, substantially as shown and described.

3. In a ratchet drill brace, the combination with a frame formed with a casing having an internal gear wheel, of a crank arm mounted to turn within the said frame, a ratchet wheel adapted to be locked to the said crank arm, a series of gear wheels held on the said ratchet wheel and in mesh with the said internal gear wheel, a tool shaft mounted to slide and carrying a gear wheel having ratchet teeth adapted to engage corresponding ratchet teeth formed in the said ratchet wheel, the said gear wheel being also adapted to mesh into the said series of gear wheels, and a pawl and lever mechanism for locking the said crank arm to the said ratchet wheel, substantially as shown and described.

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Witnesses:
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