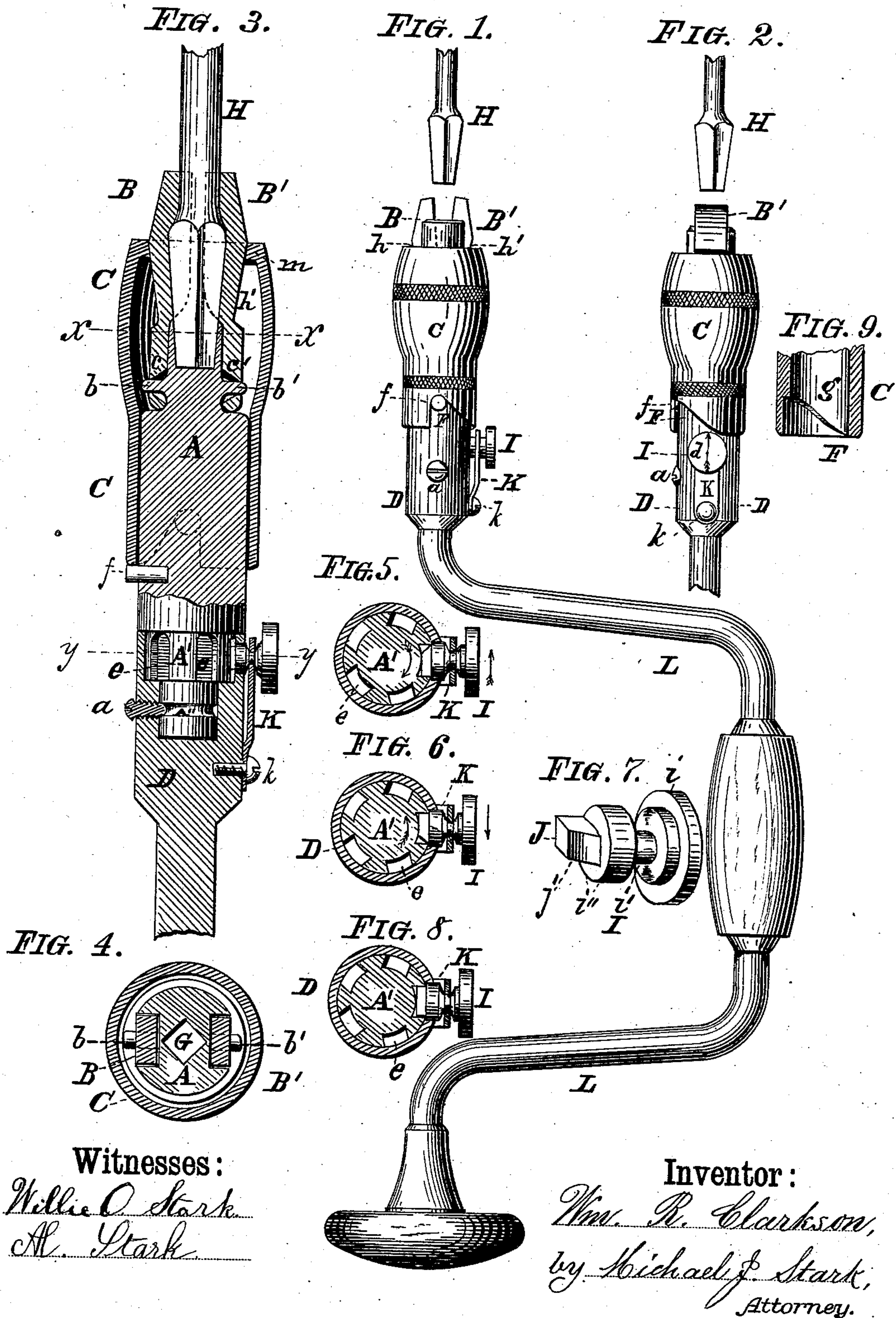


(No Model.)

W. R. CLARKSON.
RATCHET BIT BRACE.

No. 294,762.

Patented Mar. 11, 1884.



UNITED STATES PATENT OFFICE.

WILLIAM R. CLARKSON, OF BUFFALO, NEW YORK.

RATCHET BIT-BRACE.

SPECIFICATION forming part of Letters Patent No. 294,762, dated March 11, 1884.

Application filed October 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. CLARKSON, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements on a Ratchet Bit-Brace; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

My present invention has general reference to improvements in ratchet bit-braces; and it consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already referred to, which illustrate my said invention more fully, Figure 1 is an elevation of my improved ratchet bit-brace. Fig. 2 is a similar view of the ratchet-socket and nut mechanism at right angles to Fig. 1. Fig. 3 is a sectional elevation of the device illustrated in Fig. 2. Fig. 4 is a sectional plan in line *x x* of Fig. 3. Figs. 5, 6, and 8 are transverse sectional views in line *y y* of said Fig. 3. Fig. 7 is a perspective view of the ratchet-dog, and Fig. 9 is a sectional view of a portion of a nut of a modified construction.

Like parts are designated by corresponding letters of reference in all the figures.

The object of my present invention is the construction of a simple and inexpensive ratchet bit-brace that shall be very convenient in operation, not likely to get out of order, and that can be easily changed from a right to a left ratchet-brace by simply turning a button, said ratchet device being also adapted for application on a screw-driver or any other similar tool on which a ratchet mechanism is desirable or useful. To accomplish these results, which are very essential to a good bit-brace, I construct my improved ratchet bit-brace substantially as follows:

On the socket or screw portion A of an ordinary bit-brace I provide, on the lower part thereof, a reduced portion, A', and form on this reduced part a series of longitudinal

grooves, *e*, so as to convert this reduced portion into the ratchet wheel or gear of my bit-brace. Below this ratchet-wheel A', I provide a shank, E; having a circumferential groove, A'', wherewith engages a pin-bolt or screw, *a*, so as to keep the entire socket A in proper position within the socket part D, affixed to or forming a part of the sweep L, as clearly shown in Fig. 3.

On the upper end of the socket portion A, I form two oppositely-located longitudinal grooves or recesses, and locate therein two jaws, B B', there being in said recesses laterally-projecting pins *b b'*, wherewith the said jaws engage by means of countersunk apertures *c c'*.

The exterior surface of the socket A, instead of being screw-threaded, as is usually the case, is left blank, and over it is fitted a nut, C, having also a smooth bore, said nut having on its upper end a shoulder, *m*, to engage the jaws B B', as hereinafter referred to, and in its periphery on its lower end a cam-shaped excision, F, engaging a pin, *f*, secured to the socket A in any desired manner. This cam serves, in conjunction with the said pin *f*, as a means for raising and lowering the nut C whenever the same is revolved around the socket A, it being in fact a screw-thread having a differential pitch, so that the lift of the nut C is first very sudden and abrupt, while when the jaws B B' have nearly closed it becomes more gradual.

In the end of the socket A is an angular depression or "socket," G, Fig. 4, serving as a "center" for the bit H.

In the perimeter of the socket D is a circular aperture, wherewith engages a dog, I, Figs. 5, 6, 7, and 8, consisting of the "milled" head *i*, neck *i'*, spindle or journal *i''*, and the ratchet-dog proper, J, said journal *i''* being arranged to fit the aperture in the socket D, hereinbefore mentioned. The dog proper is an angular projection on the journal, having one beveled side, *j*, engaging the notches or grooves *e* on the shank A' in a manner hereinafter to be explained.

The dog I is kept in proper position by means of a flat blade-spring, K, secured to the socket D by the screw *k* or any other desir-

able means, said spring having an aperture engaging the neck *i* of said dog, as clearly shown in Fig. 3.

In the milled head *i* of the dog there is a pointer or other mark, *d*, indicating the position of the beveled portion *j* of the dog proper, J, and thereby pointing toward or in the direction in which the bit can be revolved.

In operation as an ordinary bit-brace, the socket A is locked to the socket D by the dog I, in virtue of the angular portions of the dog proper, J, engaging the notch *e* in the ratchet-wheel, as shown in Fig. 8, with the beveled portion *j* either upward or downward. In this position the spring K, pressing upon the journal *i'*, tends to keep the said dog proper in the notch *e*, and thereby prevents the gear from being revolved; but if it is desired to use the bit-brace as a ratchet-brace, the dog I is revolved in the proper direction one-fourth of a revolution, so that the inclined portion *j* of the dog proper, J, is in either of the two positions illustrated in Figs. 5 and 6. In this case the dog will engage the gear when revolved in one direction, while the dog is caused to recede as soon as the socket (and sweep L) is revolved in the opposite direction, the direction of motion of the socket A depending upon the position of the dog proper, J.

It will now be readily observed that the ratchet mechanism of this bit-brace is at once very simple and efficient, and that this mechanism may be readily applied to ratchet-drills, screw-drivers, and similar tools or implements without change or modification.

Instead of forming the cam F in the periphery of the nut C, as shown in Figs. 1 and 3, I may form the same in the inner surface or bore, *g*, of said nut C, as clearly illustrated in Fig. 9, such a construction of the said nut being perhaps the most desirable one, owing to the fact that it leaves the outside surface of the said nut perfectly smooth and even.

On the jaws B B' there are inclined portions *h h'*, the narrower portions of which are nearest to the pins *b b'*, upon which they (the jaws) are pivoted. It therefore follows that when the nut C is revolved, so as to cause it to lift, this movement will induce the jaws to close upon each other, while, when the nut C is moved in a contrary direction, the jaws will open, especially so if care is taken that the preponderance of weight in the jaws is outside of their center of gravity, whereby springs or other mechanical means for opening said jaws B B' are dispensed with, and a more positive action of the said jaws B B' attained at a reduced cost for mechanism to accomplish the object.

Heretofore bit-braces have been made in which a cam movement has been attained by means of slotted apertures in the nuts operating in conjunction with a stationary pin to cause the opening and closing of the jaws. In this construction there are several objectiona-

ble features, prominent of which is that the slotted aperture is liable to clog with saw-dust or dirt, and that in turning the nut the hand is liable to be bruised by coming in contact with the stationary abutment-pin. This objection is effectually met by my construction of the mechanism for opening and closing the jaws, as shown in Fig. 9, where the outer surface of the said nut C is entirely smooth and free from indentations, so that there is no place for dirt, &c., to accumulate. So have reversible ratchet-clicks been made prior to my invention of the present mechanism, consisting of a revolving disk or similar device, by which the movement of the bit may be reversed; but I am not aware of an instance in which a revolving button has been used having a neck acting as a journal upon which the reversing and ratchet mechanism revolves in changing its position and the direction of movement, said button having a collar and projecting from the face thereof a dog, one face of which is inclined to and the opposite face parallel with the axis of the button.

Having thus fully described my invention, I claim as new and desire to secure to me by Letters Patent of the United States—

1. In ratchet bit-braces and similar implements, the combination, with the socket A, having the shank A', provided with longitudinal grooves *e*, of the button I, having the milled head *i*, neck *i'*, and a projection, J, having one face, *j*, inclined to and the opposite face parallel with the axial line of said button, said button being journaled upon a blade-spring, K, by the neck *i'*, and the whole constructed and combined substantially in the manner as and for the object stated.

2. In bit-braces and similar implements, the combination, with the socket part A, having a fixed abutment, *f*, of a nut, C, having in its internal surface an inclined portion, *g*, formed in said nut in the process of casting, as described, said nut being constructed to operate in conjunction with the socket portion A, having in its upper end the central angular depression, G, and two longitudinal side grooves fitted with jaws B B', stuck upon projecting pins *b b'*, substantially as and for the object stated.

3. In ratchet bit-braces, a dog for the ratchet-wheel, consisting of an annular head, *i*, neck *i'*, collar *i''*, and the angular projection J, having one of its faces inclined to and its opposite face parallel with the axial line of said dog, said dog being constructed to revolve with its neck *i'* in an aperture of the blade-spring K, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have hereto set my hand in the presence of two subscribing witnesses.

WM. R. CLARKSON.

Attest:

MICHAEL J. STARK,
JOHN C. DUERR.