

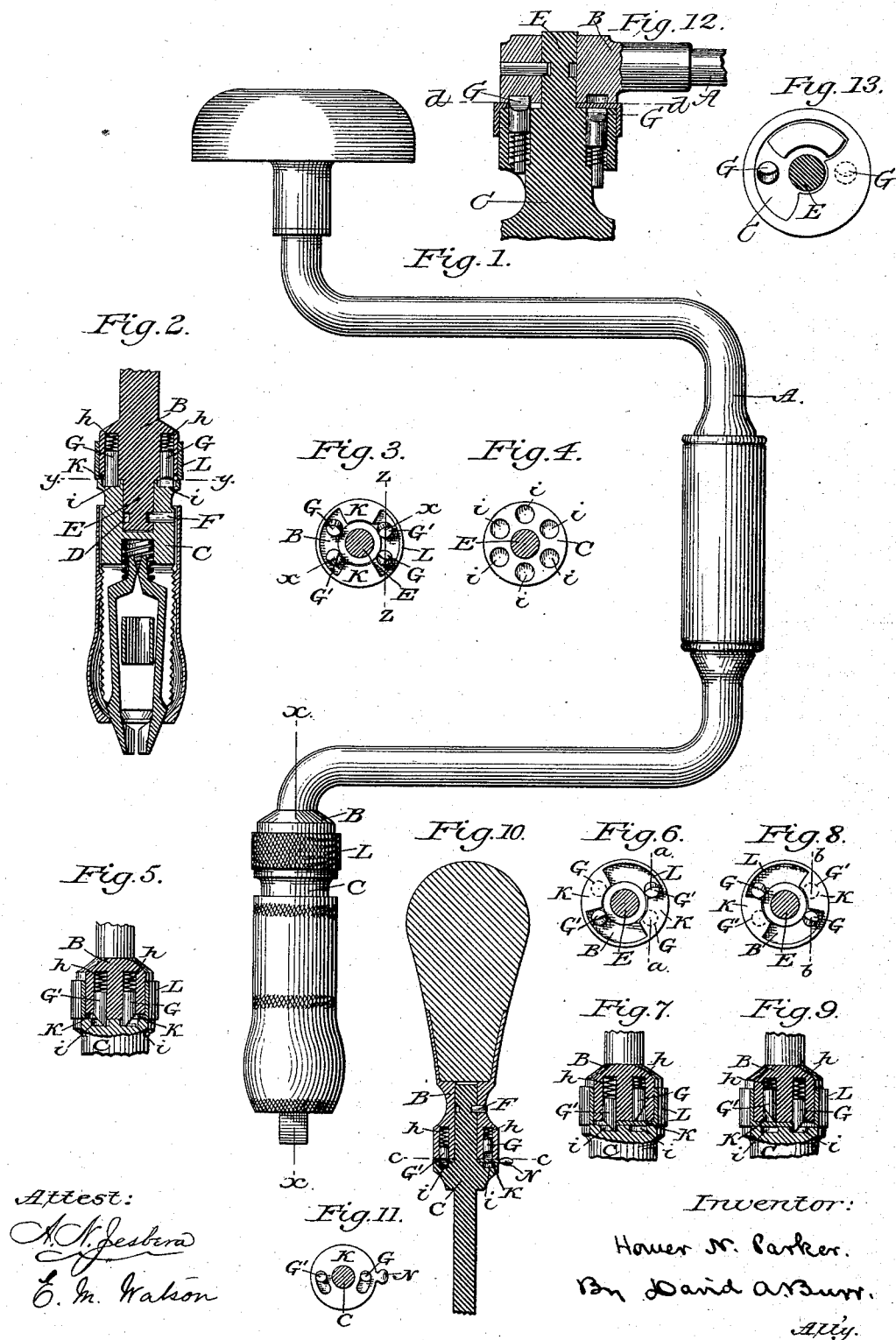
(No Model.)

H. N. PARKER.

PAWL AND RATCHET COUPLING FOR BIT BRACES, &c.

No. 384,865.

Patented June 19, 1888.



# UNITED STATES PATENT OFFICE.

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## PAWL-AND-RATCHET COUPLING FOR BIT-BRACES, &c.

SPECIFICATION forming part of Letters Patent No. 384,865, dated June 19, 1888.

Application filed January 27, 1888. Serial No. 262,099. (No model.)

*To all whom it may concern:*

Be it known that I, HOMER N. PARKER, of Winchendon, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Pawl-and-Ratchet Couplings for Bit-Braces, Screw-Drivers, and other Purposes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is an elevation of a brace fitted with my improved concentric adjustable ratchet to control the bit-stock. Fig. 2 is a central longitudinal section through the bit-stock and end of the brace-handle in line *x x* of Fig. 1. Fig. 3 is a transverse section in line *yy* of Fig. 2, looking upward, the socket or ratchet plate being removed; and Fig. 4, a similar section looking downward upon the ratchet-plate with the pawls removed. Fig. 5 is a section in line *zz* of Fig. 3, showing the pawl-pins in elevation in their fully active positions, whereby the bit-stock is locked to the brace. Fig. 6 is a transverse section similar to that in Fig. 3, but showing the stop-plate turned in one direction to uphold two of the pawls and permit the brace to turn to the right independently of the bit, Fig. 7 being a section in line *aa* of Fig. 6, illustrating this position of the active and passive pawls. Fig. 8 is a transverse section similar to that in Fig. 6, but showing the stop-plate turned in position to reverse the action of the pawls and permit the brace to turn to the left independently of the pawls, Fig. 9 being a section in line *bb* of Fig. 8, illustrating this position of the active and passive pawls. Fig. 10 is a sectional elevation of a screw-driver fitted with my improved concentric adjustable ratchet; and Fig. 11, a transverse section in line *cc* of Fig. 10, illustrating the use of two pawl-pins instead of four. Figs. 12 and 13 illustrate various modifications of the invention.

Similar letters indicate like parts in all the figures.

My invention relates to that class of bit-braces in which a pawl and ratchet is interposed between the end of the brace and stock to allow the brace to be turned to the right or

to the left independently of the stock, and thereby produce an intermittent rotation of the latter in either direction by a reciprocating movement of the former. It has for its object to provide a strong, simple ratchet bit-brace in which the ratchet device shall be wholly concealed in the head entirely out of the way in handling the brace, and to obviate thereby the disadvantages attendant upon the cumbersome and ungainly ratchet devices commonly employed in this connection, in which a pawl in some form is made to engage a ratchet formed in the periphery of a wheel or disk.

It consists in the combination, with a tool-holder or bit-stock journaled so that it may rotate upon its longitudinal axis independently of the crank or handle to which it is attached, and with one or more adjustable pawls fitted to project parallel with said axis from one face of the joint between the handle and stock to engage a ratchet formed concentrically about the same axis in the opposite proximate face of the joint, of a device, substantially as hereinafter described, whereby the engagement of the pawls with the ratchet may be governed and adjusted for the purpose of modifying and controlling the relative movements of the handle and tool.

In the accompanying drawings, A represents the crank or sweep of a bit-brace, and B the end thereof to which the tool-holder or bit-stock C is attached. This end B is bent at a right angle to the arms of the crank, so as to coincide with its axis, and is made to terminate in a stud or spindle, E, (see Fig. 2,) to serve as an axial pin upon which the bit-stock or tool-holder C may revolve. The stock C is joined to the end B of the brace, so that the two shall meet, end to end, forming a butt-joint, and they are pivoted together, so that the one may turn independently of the other, by means of the axial pin or stud E, made to project centrally from the end B of the handle into a cylindrical socket in the upper end or head of the stock, and confined by a pin, F, projecting into an annular groove in the pin or stud E, as shown in Fig. 2; or, as an equivalent, the pin may be formed upon the stock to project into a cylindrical aperture or socket in the handle end B, as shown in Figs. 10 and

12. In either case the longitudinal axis of the tool and stock and the axis of the pivotal pin or stud upon which the brace is free to turn independently of the tool are made to coincide in length, so that the joint shall be wholly within the length of the stock. The diameter of the end B being greater than that of the pin E, an annular shoulder is formed about the pin, against which the end of the stock fitted upon the pin abuts to form the joint.

The rotation of the handle or brace independently of the stock C is prevented by means of one or more spring-seated pawls, G, fitted in one of the faces of the joint between the handle and stock, to spring automatically in a direction parallel with the axis of the pivotal pin E, upon which the stock revolves, into engagement with a ratch formed concentrically in the opposite face of the joint, and which may consist of a series of straight parallel-sided holes or sockets, *i i*, (see Fig. 4,) drilled in the flat face of the end of the stock or handle, each parallel with the pivot-pin E.

The end of each pawl is beveled off at an angle, and the pawl so mounted as that, if it be moved so as to carry the inclined face of its bevel into contact with the edge of the ratchet hole or socket *i*, into which it is sprung, it will be thereby forced inward, so as to pass readily over the partition between said hole and the next, thereby permitting an independent rotation of the handle or stock in that direction, while, if the pawl be carried in the opposite direction, the straight face of the pawl, engaging the straight side of the hole into which it is sprung, will lock therewith and prevent an independent rotation of the stock or handle in said direction.

To control the pawl or pawls G so as either to permit of the independent rotation of the brace in either direction or to wholly prevent it, an annular perforated plate, K, is interposed between the ratch and the pawls to turn freely about the axis of the stock. This plate will operate to render the pawls inactive when it is turned so as to pass its imperforate portions over their ends, or will liberate them by being turned so as to bring its perforated portions in register therewith. It may thus be turned upon its axis by means of a concentric collar or band, L, (see Figs. 1 and 2,) encircling the end B of the brace, and to which the rim of the plate K is made fast, or otherwise, by means of a knob or lug, N, projecting from its rim, as shown in Fig. 10. In the use of this controlling-plate K two pawls, G and G', are required. These are preferably arranged, as shown in Figs. 11 and 13, diametrically opposite each other in the end B of the brace or handle, and their beveled ends are turned with their inclined faces toward the same side of the diametric plane in which they are placed, so that when they are both in engagement with the ratch *i i* the brace and stock are thereby locked together, as is shown in Fig. 5, and the brace prevented from turning in either direction independently of the stock. To per-

mit of this simultaneous engagement of the oppositely-beveled pawls with the recesses *i i* of the ratch, the controlling-plate K is cut away or perforated to permit the ends of the pawls to pass through it, (see Figs. 2 and 3,) an edge of each perforation being, however, in contact with or close proximity to the inclined face of each pawl, so that if the plate be turned about its axis in either direction one of said edges shall bear against the inclined face of the proximate pawl G and force it inwardly in its seat clear of the ratch. The pawl will then rest against the imperforate portion of the plate and be held inwardly, leaving the other, G', free. (See Figs. 7 and 12.) When one or other of the pawls is thus left free, (see Figs. 7, 9, and 12,) the braces may be turned in one direction independently of the stock, but will engage it to carry it with it when turned in the opposite direction, the direction in which freedom of movement is permitted being determined by the inclination of the beveled face of the particular pawl which is left free for engagement, in manner as described. To strengthen and make more positive and absolute this pawl-and-ratchet movement, I prefer to duplicate the pawls, as illustrated in Figs. 3 and 9, in which case they are arranged to operate in pairs, (see Figs. 6 and 8,) so that two at a time may be held out of engagement with the ratchet, although all four may be allowed to drop into engagement therewith, as shown in Figs. 3 and 5.

In the operation of the stop-plate K, if it be desired to lock the brace and bit-stock together, so that the one may not rotate independently of the other, the controlling or stop plate K is turned by means of its outer collar or band, L, or knob N until the openings therein allow the several pawls G G' in the end B of the brace to be forced by their springs *h h* into engagement with the ratchet *i i* on the end of the stock. The straight sides of the pawls, engaging the straight sides of the recesses of the ratchet, (in manner as shown in Fig. 5,) will effectually prevent any movement of the bit-stock apart from the handle. By turning the stop-plate K, however, in one direction or the other, the one set of pawls, G G, or the other, G' G', will, by the action of the edge of the opening in the disk against the inclined faces of said pawls, operate to lift them out of engagement with the ratch, and, passing under them, will hold them up, as shown at G G in Figs. 6 and 7 and at G' G' in Figs. 8 and 9, leaving the opposite set still in engagement with the ratch, so that a reciprocating rotation of the brace will operate to produce an intermittent rotary movement of the bit-stock in one direction only, said direction being determined to the right or to the left, according as the set of pawls G or G' are brought into play.

Since the pawls are confined and supported throughout their length within cylindrical recesses, and are brought into close engagement with recesses formed in the solid head of the

bit-stock, there is no possibility of wear such as will cause the pawls to become loose or slip, and the novel arrangement of the pawl-pins, whereby they are brought into parallelism with the axis of the brace and bit-stock, permits them to be disposed of very neatly and compactly, and wholly inclosed or incased in the stock immediately under the jaw, entirely clear of the brace or handle, as shown in Figs. 1 and 10.

It is evident that my improvement is applicable to screw-drivers, as is illustrated in Fig. 10 of the drawings.

I claim as my invention—

The combination, in a tool head or holder formed in two divisions jointed end to end with a butt-joint and pivoted to rotate independently upon a common longitudinal axis, of a

ratch formed concentrically in one face of said joint, one or more spring-actuated pawls fitted in the opposite face of the joint to move into and out of engagement with said ratch, and a slotted or perforated annular plate interposed between the pawls and ratch to revolve independently upon said longitudinal axis and control the engagement of the pawls with the ratch, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOMER N. PARKER.

Witnesses:

FRANK B. SPALTER,  
EZRA C. LAMB.