G. M. D. HEARD.

RATCHET BRACE.

APPLICATION FILED FEB. 1, 1908.

935,256.

Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

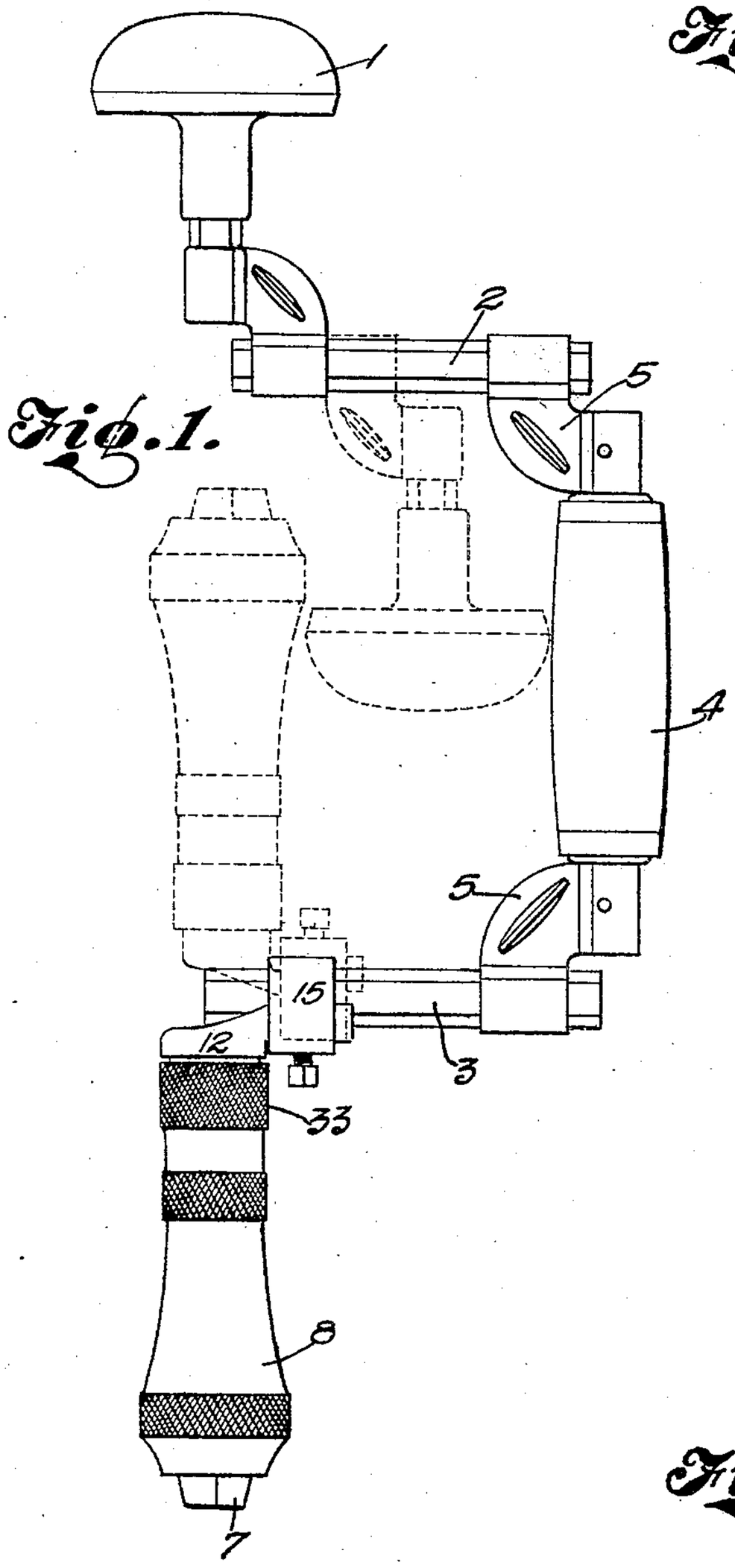
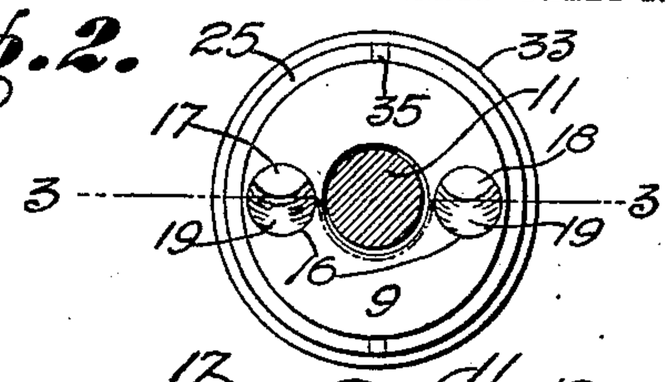


Fig. 2.



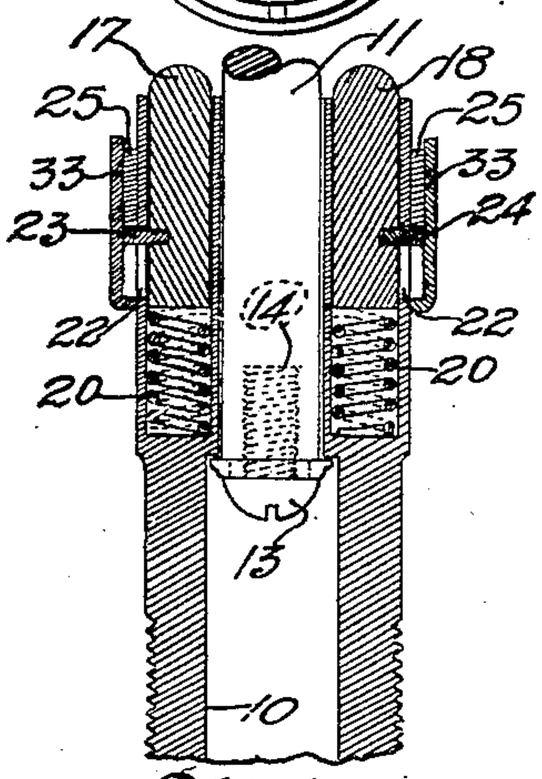


Fig. 3.

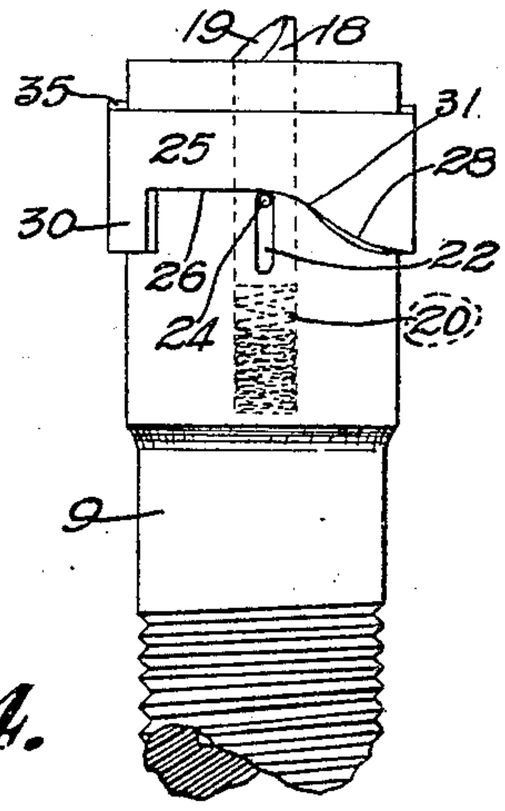


Fig. 4.

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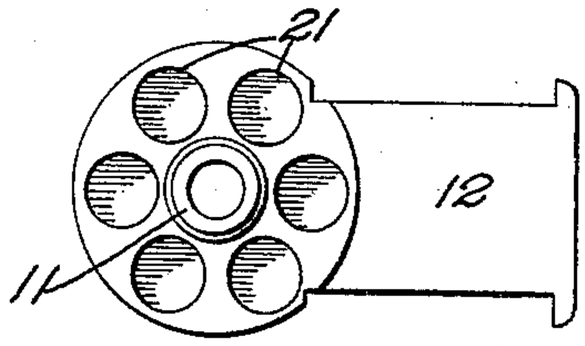
2 SHEETS—SHEET 2.

Fig. 5.



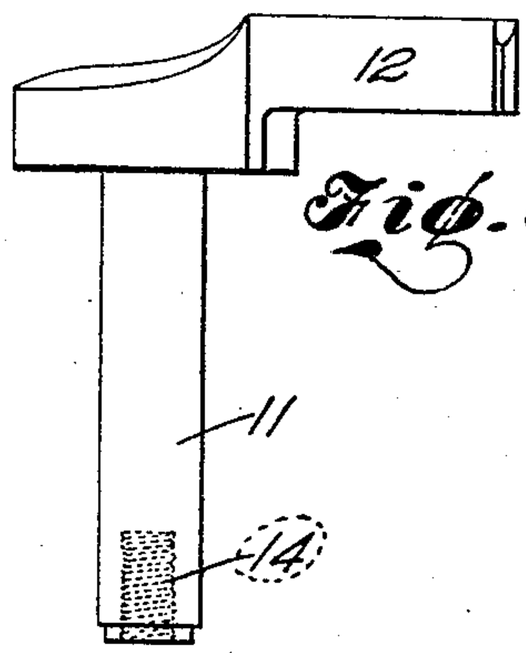


Fig. 6.

Fig. 7.

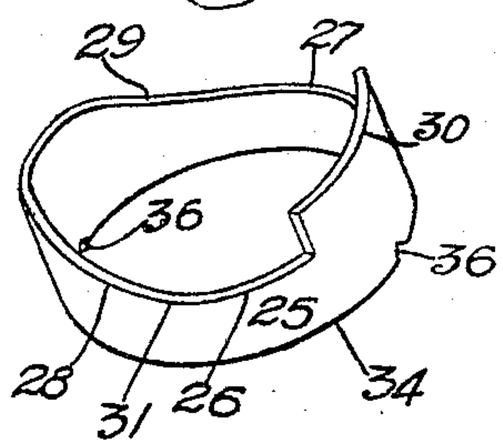


Fig. 8.

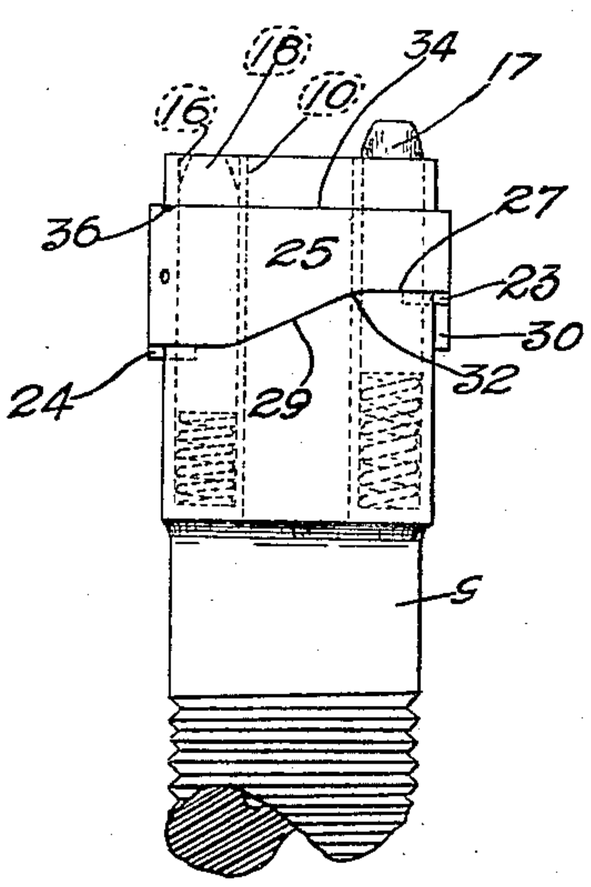
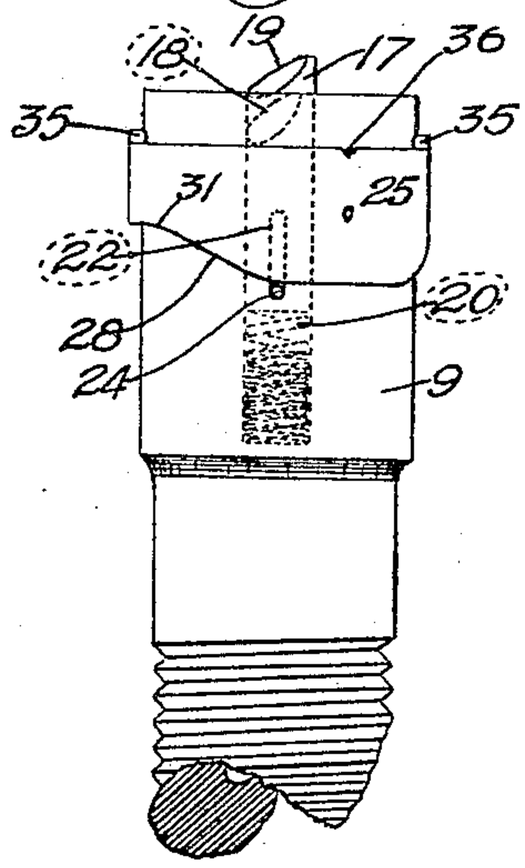


Fig. 9.



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UNITED STATES PATENT OFFICE.

GEORGE M. D. HEARD, OF PAINESVILLE, OHIO.

RATCHET-BRACE.

935,256. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed February 1, 1908. Serial No. 413,866.

To all whom it may concern:

Be it known that I, GEORGE M. D. HEARD, a citizen of the United States, residing at the city of Painesville, in the county of Lake and State of Ohio, have invented certain new and useful Improvements in Ratchet-Braces, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to ratchet-braces, particularly to an improved form of ratchet and an improved chuck-supporting means adapted to be used in connection with the brace illustrated in my prior United States Patent No. 779,079, issued January 3, 1905.

In the drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is a side elevation of a ratchet-brace, equipped with the herein described invention; Fig. 2 is a top-plan view of the chuck; Fig. 3 is a sectional view on the line 3—3, Fig. 2; Figs. 4, 8, and 9, are side views of the chuck, showing the ratchet pawls and ratchet-adjusting collar in various positions; Fig. 5 is a bottom plan view and Fig. 6 a side elevation of the ratchet head, detached from other parts; and Fig. 7 is a perspective view of the ratchet-adjusting ring.

The top 1, sweep-arms 2 and 3, handle 4, and elbows 5 which connect same together are all constructed and arranged as described in my afore-mentioned Letters-Patent. The parts are depicted in dotted lines in Fig. 1 as being adjusted so that the device is as compact as possible, and in shipping condition.

The bit-holder comprises the jaws 7, the revolubly-adjusting drum 8, and the externally-threaded chuck 9 upon which the drum 8 is screwed, and in the hollowed-out part (not shown) of which jaws 7 are normally retained. In the chuck 9 is a perforation 10 in which is journaled the spindle 11, which spindle projects downwardly from the ratchet-head 12, the spindle and head being made either in one piece or of separate members tightly welded or otherwise secured together, as may be preferred. The perforation 10 extends axially through the solid part of the chuck, and the chuck and spindle are held together by a screw 13 which fits in a screw-threaded tap-hole 14 in the lower end of the spindle, said screw bearing upon a suitable shoulder in the interior of the chuck. Since the ratchet-head 12 is clamped at 15 or otherwise secured to the sweep-arm 3, the spindle 11 is firmly held, and serves as a shaft about which the chuck 9 can revolve.

In the top of the chuck 9 sockets or holes 16 are formed, extending downwardly parallel to the axis of the chuck, and in said holes pawls 17 and 18 are inserted, the heads of said pawls being beveled on one side at 19. Helical springs 20 inserted in holes 16 beneath pawls 17 and 18, tend to keep said pawls normally pressed upward. In ratchet-head 12 are sockets 21, which sockets extend parallel to the axis of spindle 11 (and of chuck 9) and are placed in an annular row around said spindle. Into these sockets 21 the pawls 17 and 18 are adapted to project, and, by means hereinafter described, one only of said pawls may project into a socket 21 (as shown in Figs. 8 and 9), or both pawls may, at the same time, so project (as shown in Figs. 3 and 4). If pawl 17, for example, be seated in a socket 21, as shown in Figs. 8 and 9, and the handle 4 be turned counter-clockwise, the handle and chuck will rotate in unison because said pawl will lock the chuck 9 and head 12 together. If, however, the handle be turned clockwise, the beveled face 19 of the pawl will ride out of the sockets 21, force the pawl into its socket 16, and allow the handle to rotate independently of the chuck. If the pawl 17 be retracted and pawl 18 allowed to seat in the sockets 21, the handle will move clockwise in unison with the chuck and counter-clockwise independently thereof. If both pawls 17 and 18 project into the sockets 21 handle and chuck will rotate in unison in both directions.

To determine which of the pawls is to project into sockets 21 the construction described in this paragraph is provided. In the wall of each socket 16 a slot 22 is cut through to the outside of the chuck. From pawl 17 a pin 23 projects outwardly through one of said slots 22 and from pawl 18 pin 24 similarly projects. Closely encircling the upper end of chuck 9 is a sleeve or collar 25, which collar engages pins 23 and 24, and, by bearing upon said pins, forces the pawls to which said pins are secured into sockets 16 or allows the pawls to project from sockets 16 and into sockets 21, as may be desired. That edge of collar 25 which bears upon the pins comprises two straight parts, 26 and 27, two inclined parts or cams 28 and 29, and a stop 30. Pin 24 engages the straight part

26 and cam 28, the pawl 18 carrying said pin projecting outwardly from socket 16 so long as the pin engages the straight part 26, as shown in Figs. 3 and 4, but being forced into the socket when collar 25 is turned so that the cam 28 rides upon the pin, as in Figs. 8 and 9. Similarly pin 23 engages straight part 27 and cam 29, and pawl 17 will be forced into its socket 16 by the action of cam 29, or allowed to project out of it when the cam 29 no longer engages the pin 23. The cams 28 and 29 slant toward each other, and the angle 31 at the junction of cam 28 and straight part 26 and the corresponding angle 32 between cam 29 and part 27 are diametrically opposite each other. If the collar 25 be turned so that pin 24 seats in the angle 31 between parts 26 and 28, pin 23 will, likewise, seat in the angle 32 between parts 25 and 27, and, at such times, both pawls 17 and 18 will project outwardly from chuck 9 as shown in Figs. 3 and 4. If the collar be turned in one direction (say clockwise) cam 28 will ride upon pin 24, and force pawl 18 inwardly, leaving pawl 17 still projecting from the chuck, as shown in Figs. 8 and 9, because the pin 23 carried by said pawl 17 remains in engagement with straight part 27 and is not pressed down by clockwise turning of the collar 25. If, however, the collar be turned in the opposite direction, pawl 17 will be forced into its socket 16 and pawl 18 will be unaffected. It follows that, by turning collar 25 in the proper direction and to the proper extent, one pawl only or the other only, or both of the pawls 17 and 18 will project into sockets 21, thus locking chuck and brace together during movement in one direction only, or in the opposite direction only, or in both directions, as the operator wishes. The stop 30 strikes the pins 23 and 24 when the collar 25 has been turned far enough to force the proper pawl into its socket 16, and prevents further movement of the collar. A knurled sleeve 33 is slipped over collar 25 after all parts are assembled, and is fastened thereto by a pin or in any other convenient manner, which sleeve 33, because of its roughened surface, affords a more secure hold for the fingers of the operator than the smooth collar 25 could, and, in addition, covers over all sharp edges, projecting corners, pins, etc. The edge 34 of collar 25 opposite the one bearing upon pins 23 and 24 engages pins 35 which are fixed to the chuck 9, the edge 34 being provided with a series of notches 36. Since the expansive action of the springs 20 is communicated through pawls 17 and 18 and the pins 23 and 24 carried thereupon to collar 25, said springs tend to keep the collar pressed toward the ratchet-head 12, and pins 35 keep the collar 25 from being pushed too far. By seating in the notches 36, they also serve to prevent rattling or undesired turning of the collar 25, since said collar can not move except when the operator uses sufficient power to overcome the resistance due to the engagement of the notches 36 and the pins 35. It is obvious, of course, that the direction in which the tool will move as a ratchet is determined by the direction in and extent to which the pawl-shifting collar 25 is turned.

The two essential features of this invention are (1) the provision of a chuck rotatable upon a fixed spindle, and (2) the new and improved ratchet means. In most prior braces a shank projects upwardly from the chuck, which shank is journaled in a perforation in the ratchet-head or stock, being secured in place by a screw, which screw is located in an exposed position. Such shank is necessarily a relatively short member, and, after the parts have begun to wear out from use, the brace will rattle and wabble badly. The parts, moreover, because the shank does not have a large sized journal (that being impossible because the stock or ratchet-head is never very thick) tend to wear out quickly, so that such braces are short-lived. In my improved construction, however, the spindle is relatively long, and is journaled in a long bearing, so that the parts do not wear out so quickly as in other braces, and the chuck does not readily wabble or rattle even when the tool is old and worn. Furthermore, the screw which holds the spindle and chuck together is not exposed, so that it will not rust, and does not, when old and disfigured from repeated use of the screw-driver, make the tool unsightly. The beveled pawls, by which the ratchet effect is secured, instead of being mounted on comparatively weak pivots, or otherwise insufficiently supported, are very firmly held in the chuck with plenty of metal surrounding them, and are readily manipulated by the mere turning of an accessible ring.

Although, as stated above, the invention herein described and claimed can be used to advantage in connection with the brace described in my own prior patent, No. 779,079, it can just as well be applied to any other brace. The sweep-arm 3 can be screwed into a tap-hole in ratchet-head 12 or secured thereto by clamps, rivets, or any other fastening device, as the judgment of the maker of the tool may determine, depending upon the shape and size of the various parts, and the uses to which the completed tool is likely to be put.

Having thus described my said invention, what I claim and desire to secure by Letters-Patent is:

1. In a ratchet-brace, the combination of a sweep-arm, a perforated chuck, said chuck being recessed to receive the jaws, a spindle rigidly secured to said arm and downwardly depending therefrom and passing through

said perforation, and a member within said jaw-receiving recess for holding said chuck upon said spindle, there being a threaded connection between said spindle and said member.

2. In a ratchet-brace, the combination of a sweep-arm, a perforated chuck, a spindle which depends downwardly from said arm and which passes through the perforation in said chuck, and means in connection with the lower end of said spindle for fastening the chuck upon the spindle.

3. In a ratchet-brace, the combination of a sweep-arm, a perforated chuck, an elongated spindle which depends downwardly from said arm and which passes through the perforation in said chuck, and screw means in connection with the lower end of said spindle for fastening the chuck upon the spindle.

4. In a ratchet brace, the combination of a sweep-arm, a perforated chuck, an elongated spindle which depends downwardly from said arm and which passes through the perforation in said chuck, and means in connection with the lower end of said spindle for binding said chuck upon said spindle, the binding force of said means being exercised in a line approximately parallel to the axis of the spindle.

5. In a ratchet brace, the combination of a sweep-arm, a perforated chuck, an elongated spindle which depends downwardly from said arm and which passes through the perforation in said chuck, and a screw which is normally inaccessible, which screw binds said chuck upon said spindle.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE M. D. HEARD.

Witnesses:
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HELENE R. NOLAN.