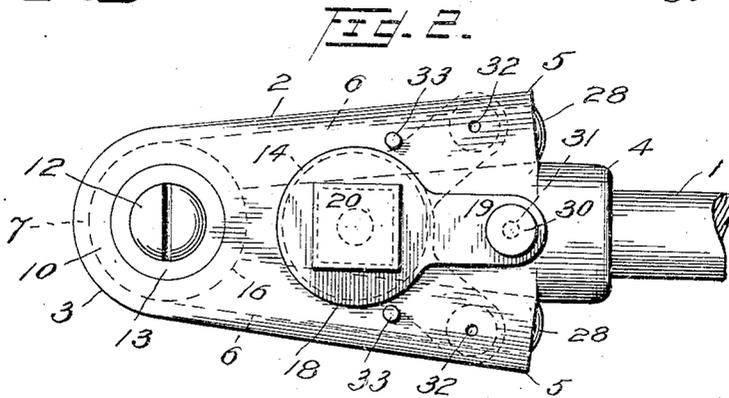
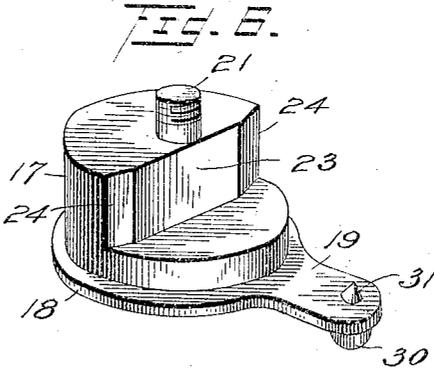
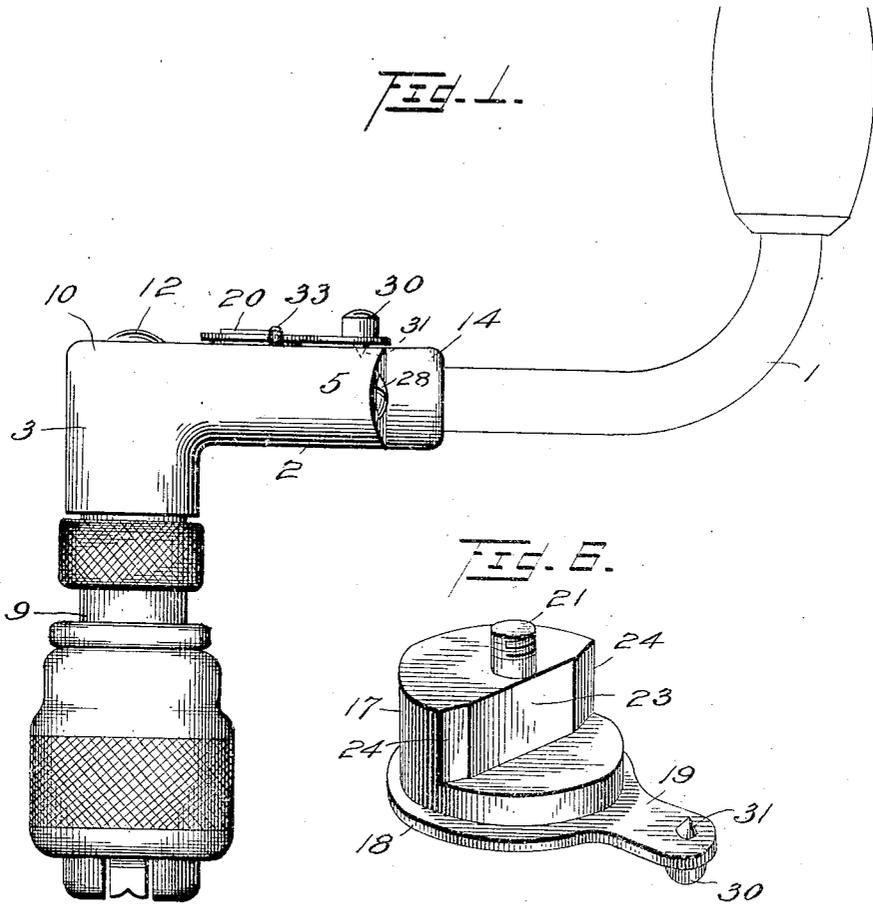


1,363,954.

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RATCHET MECHANISM FOR BRACES, DRILLS, &c.
APPLICATION FILED JAN. 17, 1920.

Patented Dec. 28, 1920.
2 SHEETS—SHEET 1.



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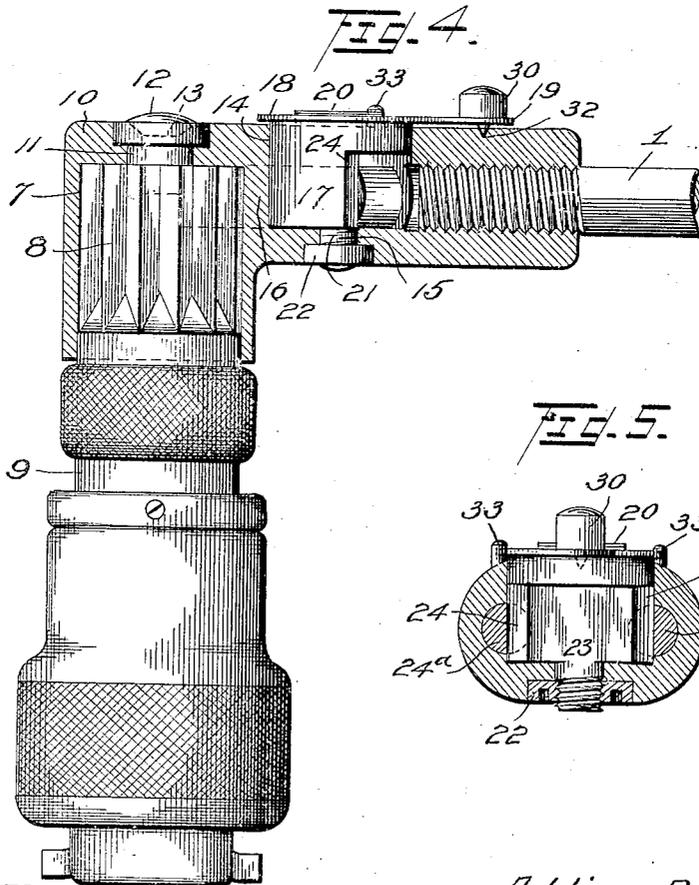
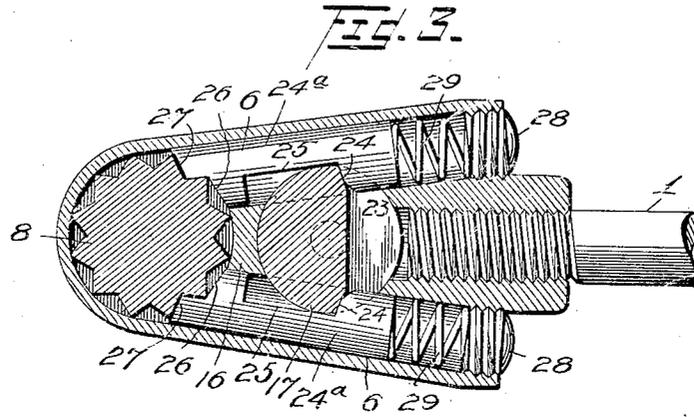
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RATCHET MECHANISM FOR BRACES, DRILLS, &c.

1,363,954.

Specification of Letters Patent. Patented Dec. 28, 1920.

Application filed January 17, 1920. Serial No. 352,189.

To all whom it may concern:

Be it known that I, ADDISON B. CARLL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Ratchet Mechanism for Braces, Drills, &c., of which the following is a specification.

This invention relates to ratchet mechanism for braces, drills or similar implements.

The object is to provide simple, strong and easily operated mechanism for the continuous operation or step-by-step movement of the tool-heads of braces or drills, as desired, and to effect the change from one method of operation to the other in a quick and simple manner, such change requiring only the movement of a pawl-actuating lever exposed on the right-angle extension of the head-carrying member and in easy reach of the hand of the operator used to steady the brace at the tool end.

Another object is to provide a drill or brace ratchet mechanism in which all the parts are concealed within the said tool-head carrying member except the said lever, the said parts being so constructed and arranged as to permit of their ready removal in the event of breakage, and in which all undue friction and lost motion are reduced to a minimum, the parts being so related that oppositely disposed pawls will positively prevent the relative rotation of the tool head, when the said lever is in an intermediate position, and will permit of a right or left hand step-by-step movement, when the lever is swung to the right or left hand position respectively.

A full and complete understanding of the invention may be obtained from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, it being understood that while the drawings show a practical form of the invention, the latter is not confined to strict conformity therewith, but may be changed and modified, so long as such changes or modifications mark no material departure from the salient features of the invention, as specifically pointed out in the appended claims.

In the drawings, in which similar reference characters designate corresponding parts throughout the several figures:—

Figure 1 is a side elevation of the lower

or tool-carrying end of a brace constructed in accordance with the invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a horizontal sectional view of the same;

Fig. 4 is a vertical longitudinal sectional view;

Fig. 5 is a transverse sectional view through the right-angle extension of the tool-head carrying member, and

Fig. 6 is an inverted detail perspective view of the pawl adjusting member.

In the device of the present invention, a pair of oppositely disposed pawls are employed entirely concealed from view within the angular extension of the tool-head carrying member, said pawls being under the control of a rock-lever arranged exteriorly of the said extension and within easy reach of the hand of the operator to permit the said pawls to engage the tool-head ratchet simultaneously to cause the latter, together with the tool carried thereby, to positively turn in the direction the brace is turned, either forward or backward, and immediately following such action by "backing out" the bit or other tool. Also, when desired, the said lever may be shifted either to the right or the left of the central position, to cause one or the other of the pawls to be removed from engagement with the ratchet, so that the remaining pawl will rotate the tool-head in one direction and permit of a retrograde movement of the brace with no corresponding movement being imparted to the head, as when boring in a corner or other cramped position.

In Fig. 1 of the drawings, there is illustrated in outline, at 1, the lower portion of an ordinary brace which may be of any other well-known construction, the horizontally disposed arm of the same being screwed or otherwise secured within the angular extension 2 of the longitudinally disposed tool-head socket 3, the axis of which is in alignment with the axis of rotation of the brace.

The horizontally disposed, angular extension 2 is of even thickness from the socket 3 to its inner end where connected to the crank arm of the brace 1, as viewed in side elevation in Fig. 1, while in plan view the said extension 2 is tapered in form, being somewhat wider at the inner end than where connected to the socket 3, as clearly shown in Figs. 2 and 3 of the drawings. The said inner end is provided with an interiorly

threaded boss 4 for the reception of the crank arm of the brace 1, thus providing oppositely disposed off-set portions 5, converging toward the front end of the extension and, provided with longitudinally disposed bores 6, round in cross section, and arranged at a slight angle to the longitudinal medial line of the extension 2 and parallel to the outer tapered walls thereof.

These bores or passageways 6 extend throughout the length of the extension 2 and communicate at their front ends with the vertically disposed circular ratchet chamber 7, at the top thereof, the outer walls of the said bores 6 being tangential to the circular walls of the said chamber, the latter, as shown, projecting somewhat below the under side of the extension 2, and adapted to receive therein the ratchet member 8 of a tool-head 9, which forms no part of the present invention, being the subject-matter of a co-pending application for patent, filed of even date herewith, Serial No. 352,188.

The upper end of the socket 7 is closed by an integral wall 10, formed with the socket and the extension, and provided with a counterbored passageway for the reception of a round stud 11 formed axially on the upper end of the ratchet member 8 and provided with a suitable threaded aperture centrally thereof, for the reception of a suitable screw 12, the head of which bears upon an interposed washer 13 having its seat in the counterbore of the passageway, and thus lying flush with the top surface of the wall 10 and preventing the accidental displacement of the ratchet 8 of the tool-head 9 from its proper location within the socket 7.

The teeth comprising the ratchet 8 are formed integrally with the tool-head and are of the double-acting Λ -pointed type, having their opposite faces disposed at similar angles with relation to the axis of rotation of the tool-head, as clearly shown in Fig. 3 of the drawing. Teeth of this shape are easier to cut than the square teeth, give a broader bearing for the pawls and are not liable to slip.

At a point substantially mid-way between the center of the ratchet socket 7 and the rear end of the tapered extension 2, the vertically disposed circular socket 14 is formed in the top surface thereof, said socket having its bottom wall on a level with the bottoms of the bores 6, said bottom wall having a centrally located counterbored passageway 15, for a purpose to be described. The diameter of the vertically-disposed circular socket 14 is such as to intersect the longitudinal axes of the bores 6, as shown in Fig. 3, and to leave a narrow wall 16 interposed between the respective sockets 14 and 7.

A pawl-shifting block 17, circular in

cross-section and of a diameter to snugly fit the socket 14 without any lost motion or play therein and of even height therewith, is adapted to rotate in said socket, when actuated by the hand of the operator in a manner to be described. The upper end of the block is substantially flush with the top surface of the extension 2, the joint being covered by the slightly over-hanging enlarged body-portion 18 of an actuating lever or plate 19, which is secured to the block by a centrally located rectangular projecting portion 20 of the latter traversing a similar rectangular aperture formed in the body portion 18, and being hammered over or upset in a well known manner, thus forming a rigid connection between the block and the lever.

On its under or inner end, the block 17 is provided with a threaded stud 21 for the reception of a nut 22, preferably round, to lie snugly in the counterbore of the passageway 15, and provided with suitable recesses for the reception of a spanner, for the purpose of tightening the nut 22 to hold the block 17 within the socket, or to permit of the removal thereof in the event of breakage.

The block 17 is cut away or recessed on the side remote from the ratchet 8 as indicated at 23, the cut-away portion extending slightly above the top walls of the bores 6 and having the corners, thus provided, beveled, as at 24, to provide vertical walls extending entirely through the bores 6 at their inner portions, said walls or shoulders 24 being at a slight angle to the perpendicular of the longitudinal axis of the bores.

Located within the bores 6 are a pair of identical pawls 24^a in the form of round bolts, having their opposed faces provided with recesses 25 located intermediate their ends, and having flat walls, the inner ends of the recesses being cut to form shoulders at an angle to fit flat against the angularly disposed wall 24 of the pawl-shifting block 17, the other or outer ends of the recesses being located substantially mid-way of the wall 16. The pawls are made cylindrical because the bores are so shaped, it being easier to make a round hole than a square one.

At their outer ends where contacting with the teeth of the ratchet 8, the bolts or pawls 24^a are cut away at their ends as at 26 to provide teeth or projections 27 having two sides or faces, one of which, it will be noted by reference to Fig. 3 of the drawing, is in exact alinement with the longitudinal axis of the bores 6. It will also be noted that the teeth of the ratchet 8 are cut at an angle so that one pair of said teeth will always be located with their outer faces in longitudinal alinement with the axes of the bores 6, and that the pawls 24^a are free at all times

to be projected forwardly to come into proper intermeshing relation with the teeth of the ratchet. The teeth of the pawl are substantially semi-circular in form in cross section and are designed to enter between and engage faces of two adjacent teeth of the ratchet, as Fig. 3 illustrates. This provides a wide bearing on the teeth. The round faces of the pawls bear against the walls of the bores; and at the point where the teeth engage the ratchet, the round faces of the walls bear against the round walls of the ratchet chamber (Fig. 3), and thus are held from any movement except a longitudinal one.

The rear ends of the bores 6 are suitably threaded for the reception of plugs 28 which confine, between the inner ends of the same and the adjacent ends of the pawls, suitable coiled springs 29 having a normal tendency to push the said pawls into contact with the ratchet, and by screwing the said plugs inwardly, or outwardly, more or less tension may be imparted to the said springs.

The actuating lever 19 is provided at its outer end with a button-handle or finger knob 30 located on the top side thereof, and carries beneath the same a pointed projection or friction point 31 adapted to project into one of a series of indentations 32 formed in the top surface of the extension 2, and equi-distant from the axis of rotation of the block 17, one of said indentations being centrally located and the other two being located near the opposite side walls of the extension 2, as clearly shown in Fig. 2 of the drawings.

Pins 33 are secured to the top surface of the extension in a position to be struck by the actuating lever 19 when the projection 31 seats itself in the recess 32 on that side. These pins 33 form positive stops for the lever in order to arrest the same from further outward movement, and to hold the wall 24 of the block 17 in proper location to entirely withdraw the tooth 27 of the adjacent pawl 24^a from its engagement with the ratchet when the opposite pawl is free to move back and forth, under the pressure of the spring 29, and permit of a step-by-step action on the ratchet 8, in a well known manner.

When the block 17 is in an intermediate position, as shown in Fig. 3, the teeth 27 of the pawls will fit in a pair of the teeth of the ratchet 8, and by reason of the engagement of that face of the teeth which is in longitudinal alinement with the axes of the bores 6, it will be seen that the said ratchet will be rotated either to the right or the left, depending upon the direction of rotation of the brace, the ratchet 8 being locked and acting as though it were one solid member. When the block 17 is swung in either direction, one of the pawls is drawn

back away from the ratchet, the length of the recess 25 permitting of sufficient movement to free the tooth 27 from the ratchet 8, the other pawl remaining in contact therewith and free to have the desired ratcheting action to turn the bit or other tool in one direction only.

It will be noted that the block fills the space between the flat walls of the recesses 25 of the pawls, so that the pawls cannot turn sidewise and do not require any other limiting or guiding means.

In practical operation, both pawls may be in engagement with the ratchet, or either pawl may be drawn back as desired, while the opposite one is in engagement.

From the foregoing it will be seen that a simple, strong and durable ratchet mechanism for braces, drills and the like, has been provided having no exposed parts, that a minimum number of parts are employed to secure the desired result in a ratchet brace or drill, and that the same may be manufactured at a low cost.

What is claimed is:

1. In a ratchet mechanism employing double pawls and wherein both the ratchet and pawls are inclosed within the tool head socket, the combination of said socket having an angular extension to receive a brace arm and provided on each side of the extension with substantially cylindrical bores extending into the chamber for the ratchet and there terminating with the outer walls of said bores at a tangent to the walls of said chamber, spring-actuated substantially cylindrical pawls in said bores, said pawls each having its inner end shaped on one side to fit the ratchet teeth and the opposite side fitting and having bearing against the outer wall of the bore and ratchet chamber, each pawl having intermediate its ends a recess with an inner longitudinal flat face and an end shoulder, a pawl-operating block mounted in the tool-head socket between the flat faces of said recesses at all times to prevent the pawls from turning, said block being cut away to form shoulders on each side, said shoulders engaging the shoulders of the pawls in such manner as to allow both pawls to be in engagement with the ratchet, or to draw either pawl back as desired while the opposite one is in engagement, and means whereby the block may be turned from the outside of the tool-head.

2. A ratchet mechanism comprising a tool-head socket having a substantially circular ratchet chamber and a right-angle extension for connection to a brace crank, a tool-head mounted for rotation within the socket and provided with a circumferential series of ratchet teeth operating within said chamber, said extension having an intermediate vertical socket formed in the top surface thereof, and said extension being wider at

the end where connected to the crank and tapering toward and merging with the tool-head socket and having a pair of spaced cylindrical bores lengthwise of the extension and at an angle to its longitudinal center line, said bores intersecting said intermediate vertical socket and communicating at their ends with the said ratchet chamber, cylindrical pawls mounted in the bores and having substantially semi-circular teeth at their outer ends for engagement with the ratchet teeth, said pawls having bearing against the wall of the ratchet chamber where engaging the ratchet, springs at their inner ends for forcing such engagement, said pawls having intermediate recesses coinciding with said vertical socket, a pawl-

shifting block mounted for rotation within said vertical socket and having a cut-out portion to provide shoulders which overlap the pawls and extend into the recesses thereof to alternately force the same back away from the ratchet when the block is rotated, and an actuating handle carried by the block and having means for holding the same in the desired position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

ADDISON B. CARLL.

Witnesses:

JOHN A. DAVISON,
S. LOUISE GEE.