J. P. BARTHOLOMEW.

BIT BRACE.

APPLICATION FILED MAY 16, 1908.

904,501.

Patented Nov. 24, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

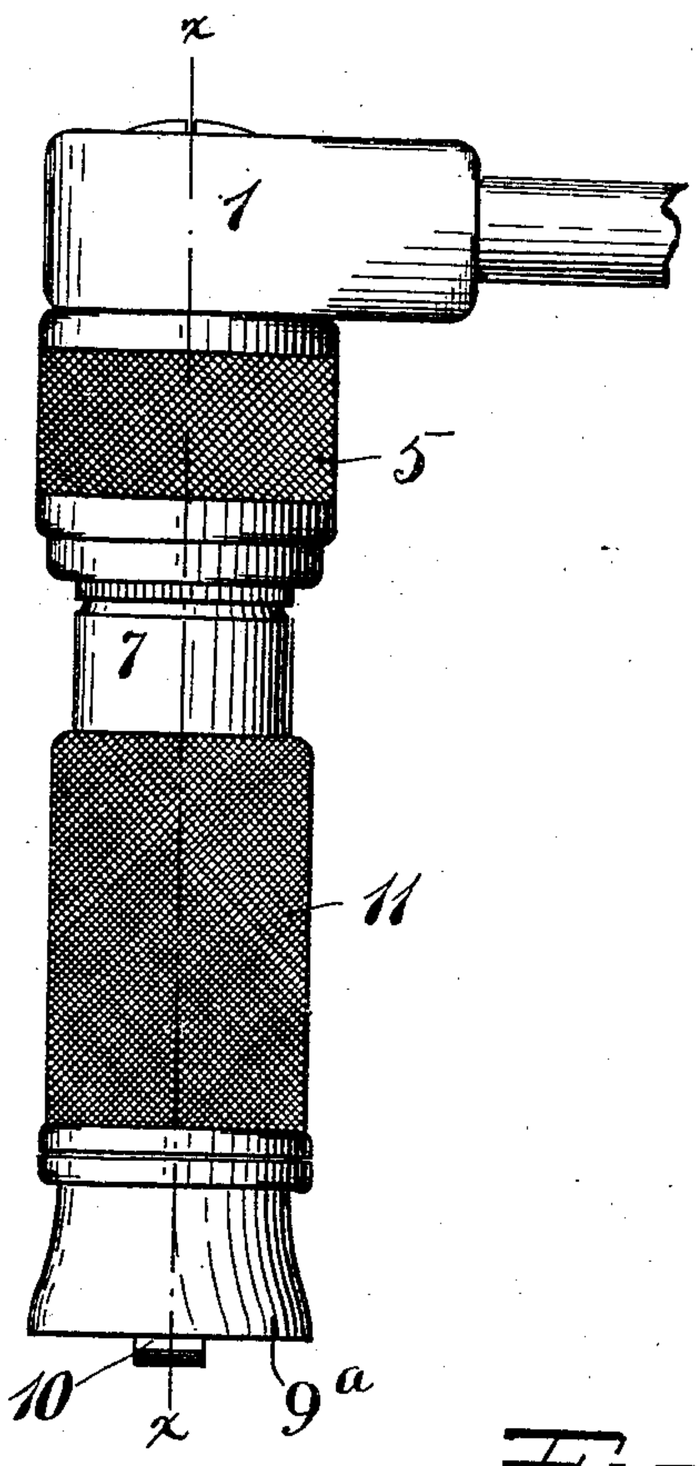


Fig. 2.

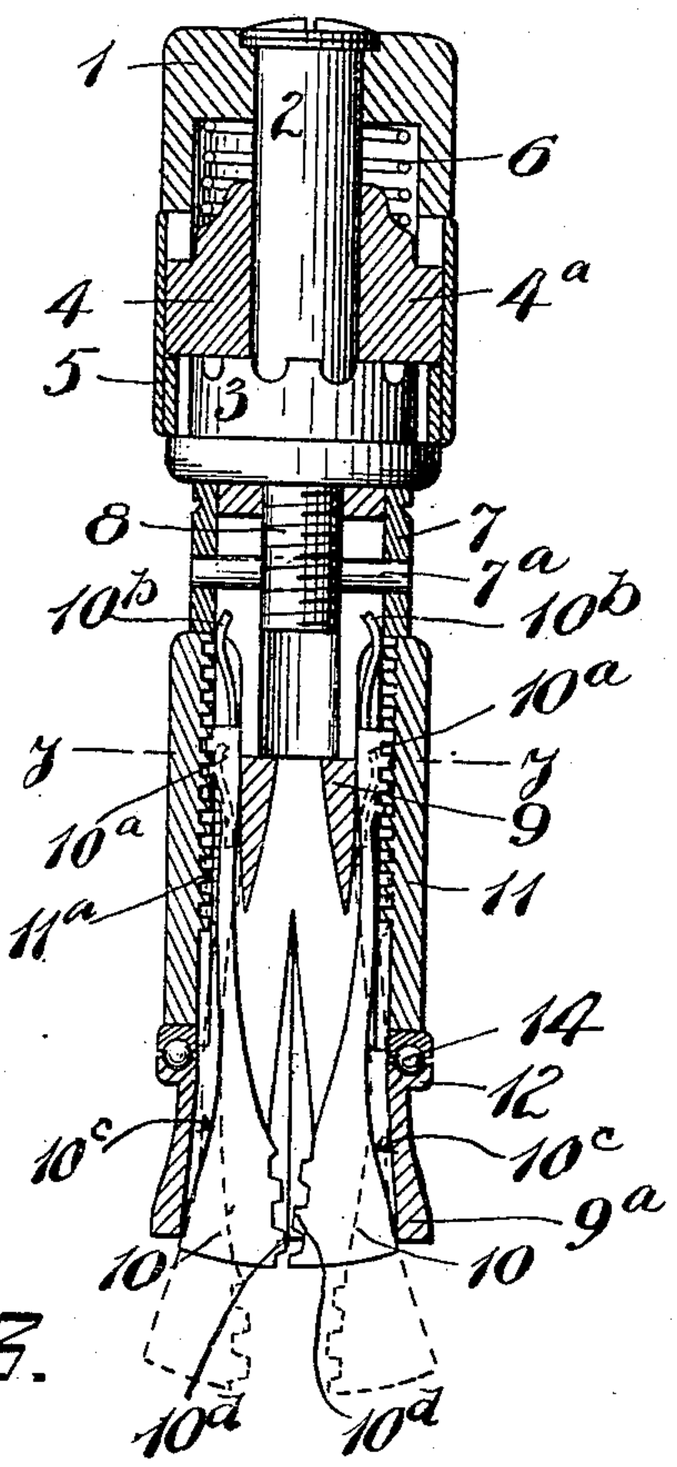
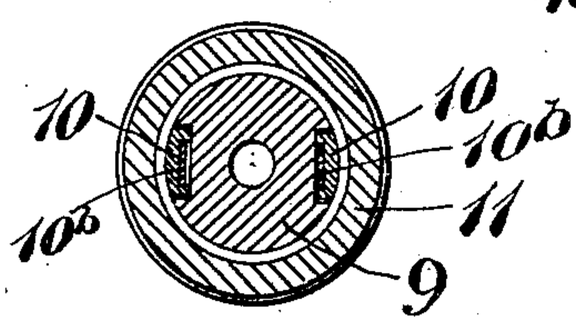


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 5.

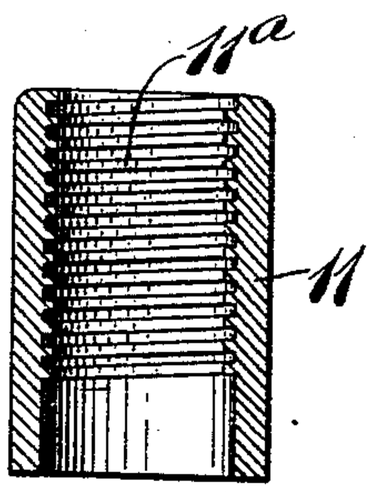


Fig. 4.

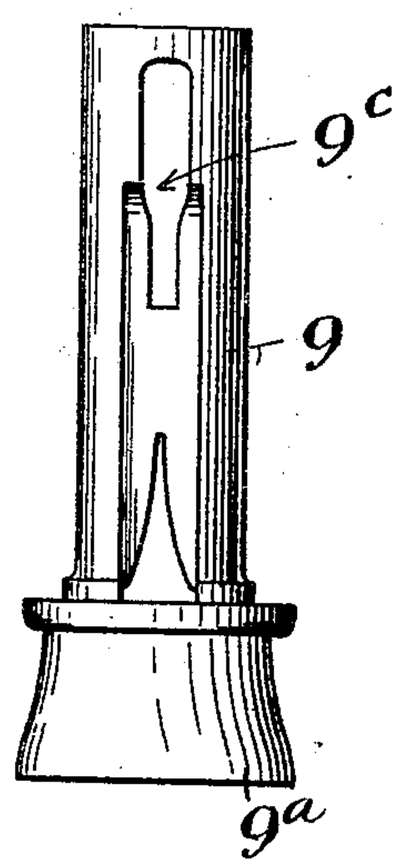


Fig. 6.

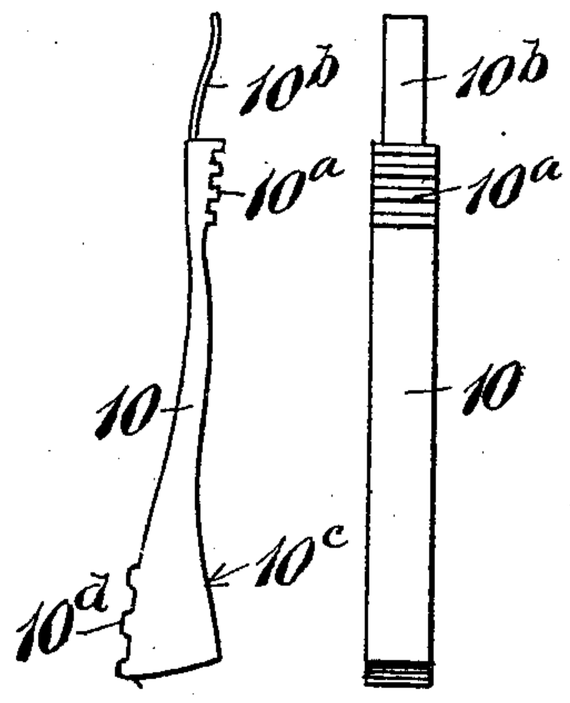
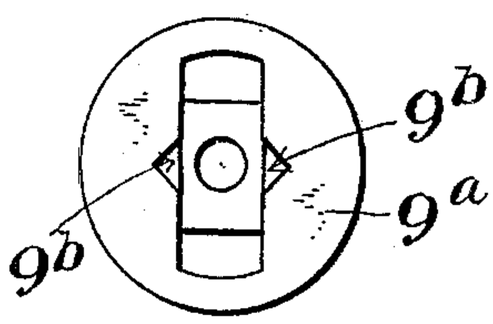


Fig. 7.



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BIT-BRACE.

No. 904,501. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed May 16, 1908. Serial No. 433,271.

To all whom it may concern:

Be it known that I, JOSEPH P. BARTHOLOMEW, a citizen of the United States, residing at Bristol, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Bit-Braces, of which the following is a full, clear, and exact description.

My invention relates to improvements in bit braces, the object of the invention being mainly to provide a simple and effective construction in a bit brace of the concealed ratchet type, said invention comprehending certain features of improvement relating to details.

In the drawings Figure 1 is a side elevation of my invention, the bow portion being broken away. Fig. 2 is in the main a sectional view in the plane of the line X—X Fig. 1. Fig. 3 is a cross section on the line Y—Y Fig. 2. Fig. 4 is a side view of the jaw carrier, detached, said view being taken on a plane at right angles to that of Fig. 2. Fig. 5 is a view of the jaw operating sleeve. Fig. 6 illustrates a side and edge elevation of one of the jaws. Fig. 7 is an end elevation of the lower end of Fig. 1.

1 represents a head.

2 represents a spindle rotatably mounted in the head 1. On the spindle 2 is a crown ratchet 3.

4—4ª are pawl members designed to alternately or simultaneously coact with the crown ratchet 3, said pawl members engaging the crown ratchet in opposite directions.

5 is a cam sleeve arranged to coöperate with the pawls 4—4ª to lift one or the other out of engagement with the crown ratchet 3 or release both to permit the same to simultaneously engage said crown ratchet.

6 is a follower spring arranged within the head 1 and pressing against the rear ends of the pawls 4—4ª to advance the same. The crown ratchet 3 is rigidly secured to a frame 7 of the chuck, as by the connector 8.

9 is what I term the jaw carrier, the body of which is slotted to receive the jaws 10—10, the forward ends of which emerge from the forward end of the carrier 9, as best seen in Figs. 1, 2 and 7. The frame 7 and jaw carrier 9 are held against rotation, as by a pin 7ª. The outer sides of the jaw carrier are grooved to receive the jaws and permit them to slide therein. 10ª is a screw-threaded portion of each jaw, the same being designed to receive the internal threads 11ª of a jaw-controlling sleeve 11. The extreme rear end of each jaw 10 is provided with a spring 10ᵇ, which always exerts a pressure in a direction to force the outer end of the jaw outwardly.

The jaw-controlling sleeve 11 is rotatably mounted upon the jaw carrier 9 and is held against endwise movement at the rear end by a shouldered portion of the frame 7 and at the opposite end by a shoulder 12, formed on the bell-like mouth 9ª of the jaw carrier. Between the shoulder 12 and the end of the jaw-controlling sleeve 11 is an anti-friction bearing 14, preferably of the ball type, the importance and value of which will later be seen.

Referring more particularly to Fig. 6, it will be seen that the rear side of each jaw member toward its outer end is provided with a cam incline 10ᶜ, while the opposite side is preferably provided with gripping teeth 10ᵈ, which serves to embrace the shank of a bit, while the tail of the bit, ordinarily somewhat enlarged and made angular, rests within a recessed portion of the jaw carrier 9 and between an intermediate portion of the jaws, which are cut back to afford the desired clearance, as best seen in Fig. 2. The bell-like mouth 9ª of the jaw carrier has an opening therein of a suitable shape to receive the jaws and to prevent the forward ends of the same from turning independently thereof. Clearance recesses or notches 9ᵇ (Fig. 7) are also provided for the enlarged tail of the bit (not shown). The spring 10ᵇ on each jaw passes through an opening 9ᶜ (Fig. 4), so as to always stand outside thereof during the full range of movement of the jaw. The outer end of the spring always rests upon the interior wall of the frame 7 or the top of the threads 11ª, the same being in substantially the same plane. These walls furnish an abutment against which the pressure of the spring is taken. The jaws swing or fulcrum upon the short threaded portions 10ª, they being suitably shaped and fitted to the threaded portion 11ª of the sleeve, so that a swinging movement is permitted.

As shown in solid lines, Fig. 2, the jaws 10 are drawn into approximately their most contracted position, although a slight further drawing-in movement is possible. As shown in dotted lines in Fig. 2, the jaws are

projected outwardly and are separated to permit of the introduction of a bit. The longitudinal movement of the jaws is secured wholly by the sleeve 11, while the expanding movement is secured by the springs 10^b, the contracting movement being secured by the cam shoulders 10^c riding down the adjacent wall of the bell-like mouth 9^a. If a bit is introduced when the jaws are in the position shown in dotted lines Fig. 2, said jaws may be drawn back by rotating the sleeve 11 in the proper direction. Simultaneously therewith the jaws 10—10 will approach each other to grip the bit, while the inner parts of the jaws being somewhat angular in form adjacent to the angular tail of the bit, will contract thereon so as to prevent rotation. The toothed or serrated faces 10^d of the jaws may be used to grip a plain drill, and a powerful clamping action may be secured even when hand power is employed. This is due to the introduction of anti-friction bearings between the shoulder 12 and the forward end of the sleeve 11. If no bearings were provided at this point, such a friction would be occasioned on the drawing back of the jaws 10—10 that a secure clamping action upon the side of a drill could not be attained. This friction being eliminated, however, by the use of an anti-friction bearing at this point, it is an easy matter to cause the jaws to so snugly embrace the side walls of the drill as to firmly hold the latter against independent rotation.

An important detail of improvement comprises forming the teeth 10^a—10^a on the jaws on inclines which converge outwardly, as best seen in Fig. 2, for by so doing each of the jaws will easily rock upon said threads as the fulcrum and jamming is prevented. In the preferred construction, the pin 7^a passes not only through the frame 7 and jaw carrier 9, but it also passes through the connector 8 of the crown ratchet, by which the ratchet mechanism is secured to the chuck or jaw mechanism. This, or an equivalent means, affords a permanent or positive connection between the parts, so that when the tool is employed, the direction of rotation imparted to the ratchet 3 from the head 1 will be correspondingly imparted to the chuck element. When both of the pawls 4—4^a are in engagement with the crown ratchet, the head 1^a will be locked with the chuck, so that no independent rotation is possible. When one of the jaws 4—4^a is withdrawn from the crown ratchet 3, the jaw may be intermittently actuated by a succession of partial rotations of the head 1 in one direction, the alternate reverse movements of the head 1 having no effect upon the chuck.

What I claim is:

1. In a bit brace, a head, a chuck carried thereby, including a jaw-carrier, a pair of jaws slidably mounted therein, a jaw-operating device mounted for rotation only upon said jaw-carrier, a thread at the inner side of said jaw-operating device, thread segments toward the rear end of each jaw coacting with the threads on the jaw-operating device, and an anti-friction bearing arranged to take the thrust of the jaw-operating device toward the gripping ends of the jaw members.

2. In a bit brace, a head, a chuck carried thereby, including a pair of swinging and longitudinally movable jaws, a jaw-carrier grooved longitudinally to receive said jaws, a jaw-shifting device rotatable on said jaw-carrier, means for holding the same against longitudinal movement, said jaws being fulcrumed within and in threaded engagement with said shifting device, and an anti-friction bearing for said friction device to take the end thrust thereof.

3. In a bit brace, a head, a chuck carried thereby including a jaw-carrier, a pair of swinging and longitudinally shiftable jaws, a rotatable jaw-shifting device mounted on the jaw-carrier, means for holding said shifting device against longitudinal displacement, including an anti-friction bearing, a thread on the inner wall of said shifting device, thread segments toward the rear end of each jaw meshing with the thread on the shifting device and held in engagement therewith by the jaw-carrier, said threaded connection constituting a fulcrum for each jaw, and means for yieldingly pressing the forward ends of said edges outwardly at the mouth of the carrier.

4. In a bit brace, a head, a chuck carried thereby including a jaw-carrier, a pair of swinging and longitudinally shiftable jaws, a rotatable jaw-shifting device mounted on the jaw-carrier, means for holding said shifting device against longitudinal displacement, including an anti-friction bearing, a thread on the inner wall of said shifting device, thread segments toward the rear end of each jaw meshing with the thread on the shifting device and held in engagement therewith by the jaw-carrier, said threaded connection constituting a fulcrum for each jaw, means for yieldingly pressing the forward ends of said edges outwardly at the mouth of the carrier, and a cam shoulder on the rear of each of said jaws toward their forward ends, said cam shoulder facing a fixed shoulder at the mouth of the jaw-carrier.

5. In a bit brace, a head, a chuck, a controllable ratchet connection between said head and chuck, said chuck including a jaw-carrier, a pair of swinging and longitudinally movable jaws carried thereby, a jaw-shifting device rotatably mounted on the

jaw-carrier, means for holding said shifting device against longitudinal movement, threaded connections between said shifting device and each of said jaws to move said jaws longitudinally by the rotation of said shifting device, and an inclined bearing between the back of each of the jaws and the jaw-carrier toward their exposed end to cause the exposed ends of said jaws to move toward each other as the same are drawn inwardly.

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Witnesses:

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