H. P. RICHARDS.

BIT BRACE CHUCK.

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960,402.

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Fig. 1.

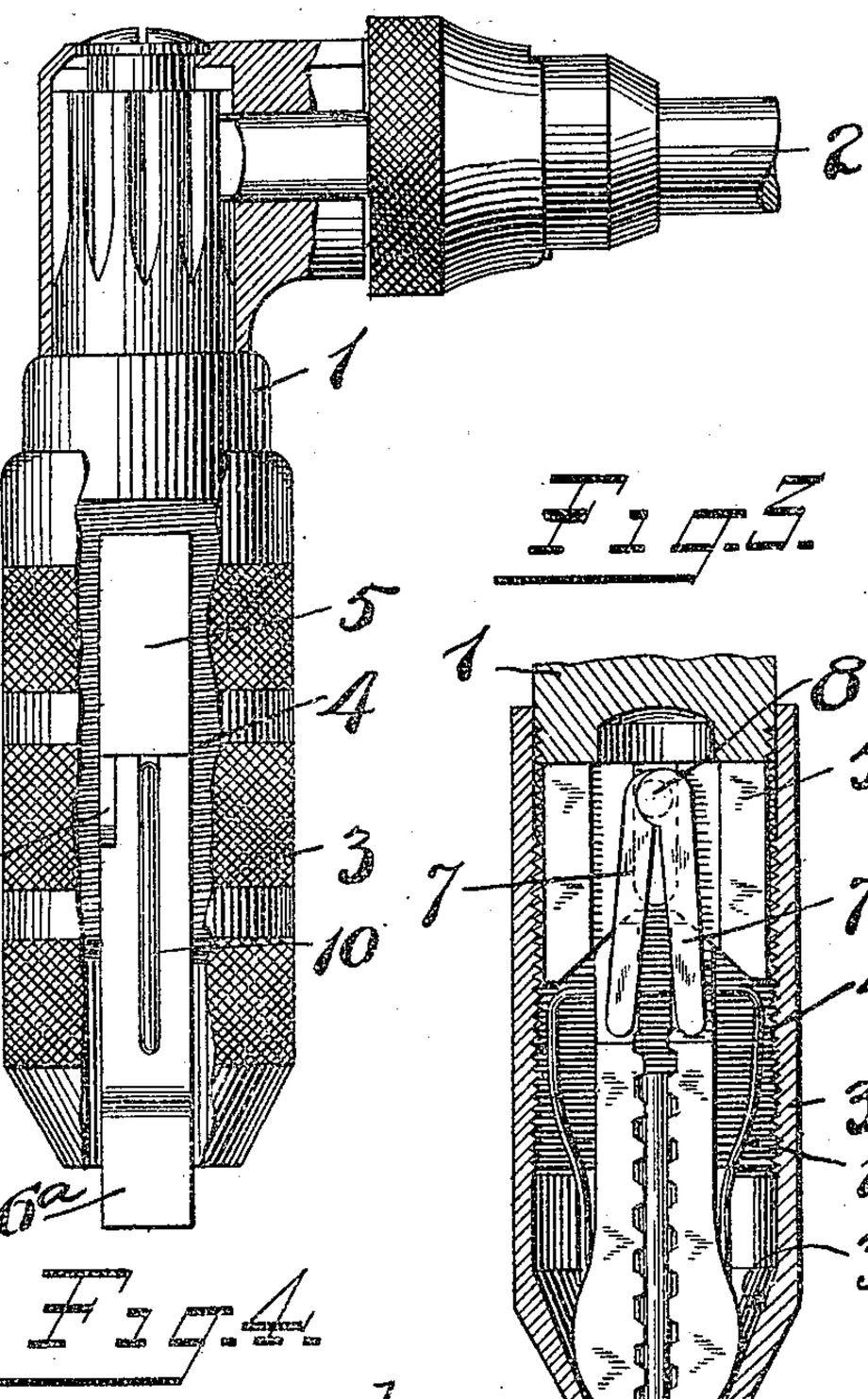



Fig. 2.

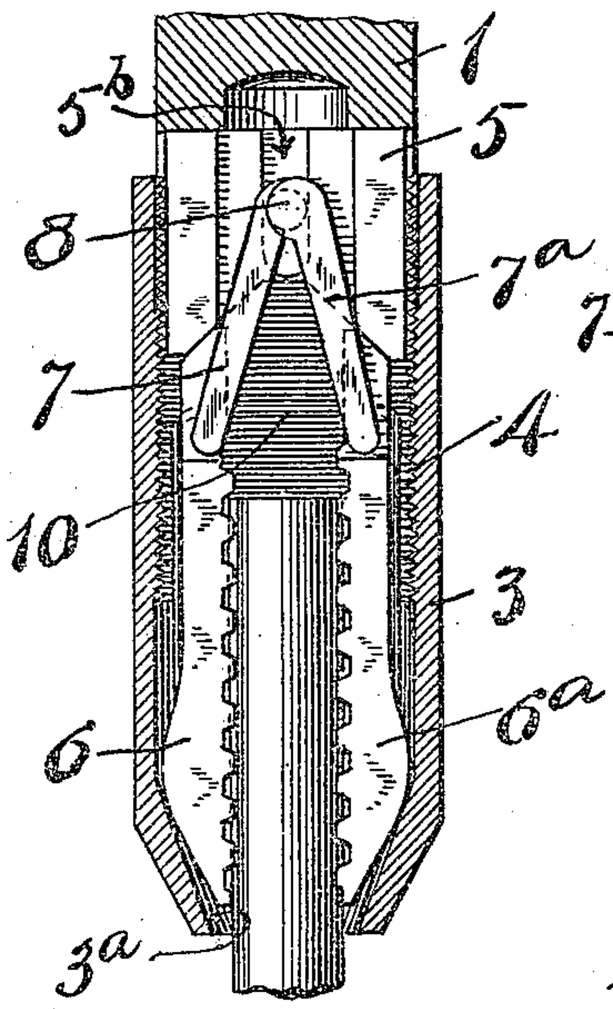



Fig. 3.




Fig. 4.

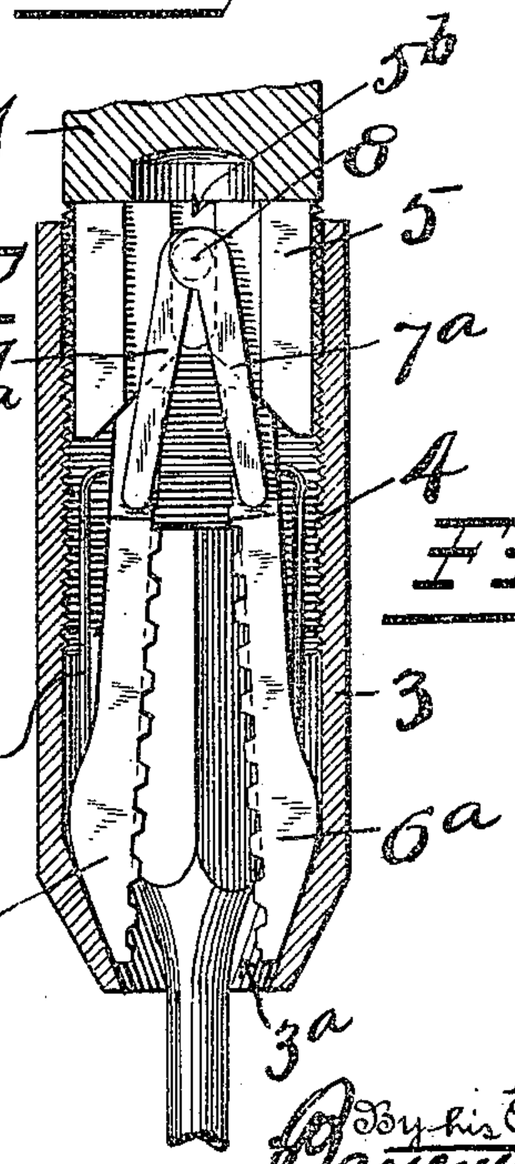



Fig. 5.

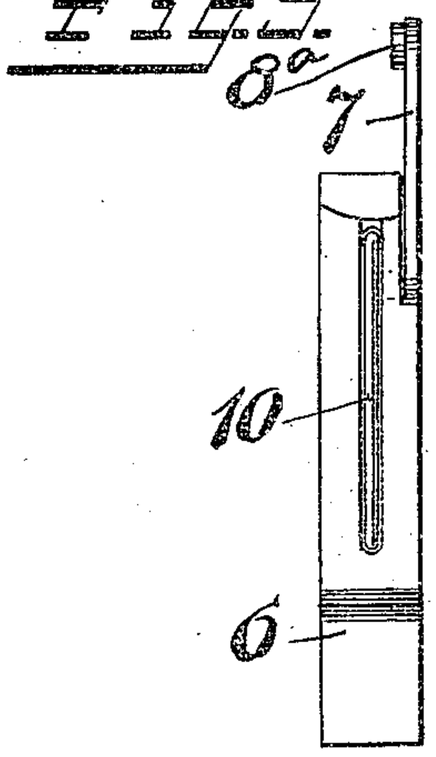
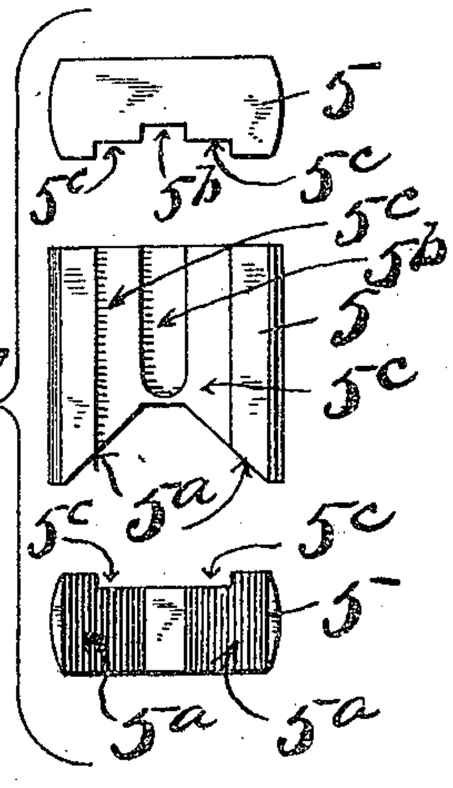



Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## BIT-BRACE CHUCK.

960,402. Specification of Letters Patent. **Patented June 7, 1910.**

Application filed February 7, 1910. Serial No. 542,517.

*To all whom it may concern:*

Be it known that I, HUBERT P. RICHARDS, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Bit-Brace Chucks, of which the following is a full, clear, and exact description.

My invention relates to chucks of that class particularly adapted for use in connection with a so-called bit brace, the object of the present invention being to provide an improved construction to control the jaw movement.

This invention is essentially an improvement upon the construction set forth in my former United States Letters Patent No. 817,936, dated April 17, 1906.

In the accompanying drawings Figure 1 illustrates the lower part of a bit brace provided with a chuck of my improved construction, said view being partly broken away; Fig. 2 is a central longitudinal sectional view of the chuck showing the jaws fully open to take a round drill shank of large size; Fig. 3 is a similar view showing the jaws partially contracted, and as they would appear when holding a round drill shank of smaller size; Fig. 4 is a view similar to Fig. 3 and showing the jaws in the position assumed when holding a tapered angular shank such as provided on the ordinary boring bit; Figs. 5, 6 and 7 are detail views.

In the particular form of my invention shown herein, 1 represents what I will term the driver or driving element. In this instance, the driver is adapted to be manually driven by an ordinary bit brace, a portion of the bow of which is indicated at 2. The driver includes an elongated round body having a longitudinal jaw-receiving slot in its lower end, the outer surface being screw-threaded to receive a corresponding screw-thread formed upon the inside of the jaw-operating member or shell 3. This screw-threaded connection is indicated at 4. 5 is a stationary or fixed abutment block arranged in the bottom of said recess and having its forward end cut back or recessed to provide the two inclines $5^a$ $5^a$, forming a fixed sloping abutment. The side surface of said block is provided with a longitudinally arranged groove or slot $5^b$ terminating preferably near the forward end of said block at a point close to and between the inclines $5^a$—$5^a$. $5^c$—$5^c$ are clearance recesses at each side of said groove $5^b$, the function of which will later be explained.

6—$6^a$ are jaws arranged in the slotted part of the driver. The forward or outer end of the shell 3 is tapered inwardly, as shown at $3^a$ to provide a sloping abutment arranged to coact with the tapered outer ends of the jaws 6—$6^a$.

7—$7^a$ are toggle links pivotally connected together at 8, one end of said pivot providing a laterally projecting stud $8^a$, as best seen in Fig. 5. The free ends of the links 7—$7^a$ are provided with lateral pin-like bearings 9—$9^a$ arranged respectively for pivotal connection with the tail ends of the jaws 6—$6^a$. The extreme tail end of each jaw is preferably beveled off to take a proper bearing against the fixed abutment inclines $5^a$—$5^a$ at the front of block 5.

10 is a spring suitably connected with the jaws 6—$6^a$ at points intermediate of their ends, said spring operating to move said jaws apart.

When the parts are assembled, as shown in the drawings, the bearing end of stud 8 stands in, and may partake of longitudinal movement in the groove $5^b$ in the block 5. The toggles 7—$7^a$ move freely in the clearance recesses $5^c$—$5^c$, while the pin-like bearings 9—$9^a$ pivotally engage the tails of the jaws 6—$6^a$.

Operation: Assuming the parts stand in the position indicated in Fig. 2, if a drill with a round shank of uniform diameter is inserted between the jaws 6—$6^a$ and the shell 3 is manually turned in a direction to carry it back on the driver 1, the movable abutment $3^a$ will engage the forward tapered ends of both jaws $6^a$ and move the jaws back upon the inclines $5^a$—$5^a$ of the fixed abutment block 5, said inclines coöperating to move said jaws toward each other in substantial parallelism, the pin 8 sliding freely rearwardly in the groove $5^b$ in the abutment block. This continues until the jaws firmly grip the round shank of the drill. The function of the toggle links 7—$7^a$ is two-fold; they prevent the independent longitudinal displacement of the jaws 6—$6^a$ and also cause the jaws to move to and fro in parallel planes. When the drill is to be released the shell 3 is rotated in a direction to move it outwardly upon the driver 1, whereupon the action of the spring 10 (by reason of the

locality of its connection with the jaws) operates to open said jaws in substantial parallelism, the rear ends moving apart upon the inclines 5ª—5ª to the same degree as the forward ends move apart upon the tapered abutment incline at the forward inner end of the shell 3. If it is desired to grip a tapered angular tool shank, for example as illustrated in Fig. 4, the drawing back of the shell 3 or the driver will tend to clamp the jaws 6—6ª down upon said tapered shank, said jaws then shifting out of parallelism and adapting themselves to the incline of said tapered shank. During this operation the toggle connections operate to cause the jaws to assume like positions of angularity relatively to a common center line through the chuck as well as parallel positions for round shank tools, all of which results not only in a most effective gripping of the tool itself, but also in causing said tool to line up correctly relatively to the center line of the chuck.

By reason of the simplicity of the construction and the fewness of parts, there is comparatively no friction tending to impede the free action of the jaws.

What I claim is:

1. In a chuck, in combination, a driver, a pair of jaws, two oppositely faced sloping abutments, one of which is movable, both abutments engaging the opposite ends of said jaws to move them toward each other when said abutments approach each other, a pair of toggle links hinged to each other at one end and pivoted to the jaws at their free ends, a laterally projecting bearing stud at the hinged end of said toggles and a guide slot in the side of one of said abutments for said bearing stud, said guide slot being coincident with the axis of said chuck.

2. In a chuck, in combination, a driver, a pair of jaws, two oppositely faced sloping abutments, one of which is movable, both abutments engaging the opposite ends of said jaws to move them toward each other when said abutments approach each other, a pair of toggle links hinged to each other at one end and pivoted to the jaws at their free ends, a laterally projecting bearing stud at the hinged end of said toggles and a guide slot in the side of one of said abutments for said bearing stud, said guide slot being coincident with the axis of said chuck, the free ends of said toggles engaging the rear ends of said jaws at the side of each.

3. In a chuck, in combination, a driver, a pair of jaws, two oppositely faced sloping abutments, one of which is movable, both abutments engaging the opposite ends of said jaws to move them toward each other when said abutments approach each other, a pair of toggle links hinged to each other at one end and pivoted to the jaws at their free ends, a laterally projecting bearing stud at the hinged end of said toggles and a guide slot in the side of one of said abutments for said bearing stud, said guide slot being coincident with the axis of said chuck, and a clearance recess in said abutment block at each side of said guide slot, said toggles standing in said clearance recesses.

4. In a chuck, in combination, a driver, a pair of jaws, two oppositely faced sloping abutments, one of which is movable, both abutments engaging the opposite ends of said jaws to move them toward each other when said abutments approach each other, a pair of toggle links hinged to each other at one end and pivoted to the jaws at their free ends, a laterally projecting bearing stud at the hinged end of said toggles and a guide slot in the side of one of said abutments for said bearing stud, said guide slot being coincident with the axis of said chuck, and a spring coöperating with said jaws and tending to move the same apart.

HUBERT P. RICHARDS.

Witnesses:
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