No. 661,418. Patented Nov. 6, 1900.

S. McCLELLAN.

UNIVERSAL BRACE AND DRILL.

(Application filed Feb. 24, 1900.)

(No Model.) 3 Sheets—Sheet 1.

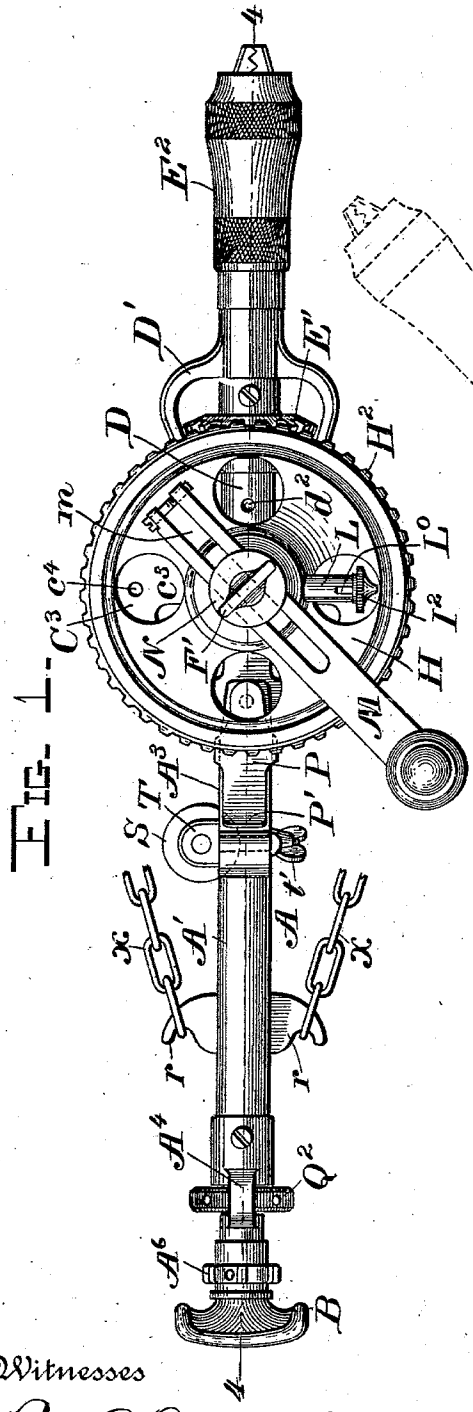

FIG. 1.

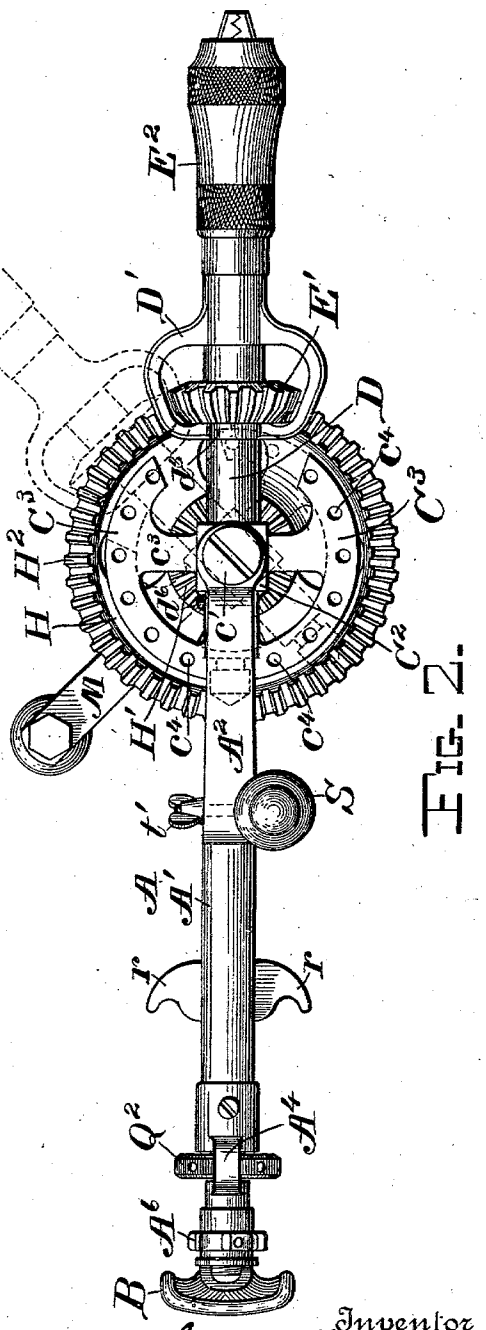

FIG. 2.

Witnesses
Percy C. Bowen
John Chalmers Wilson.

Inventor
Stephen McClellan
by Wilkinson & Fosbin
Attorneys

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(No Model.) 3 Sheets—Sheet 2.

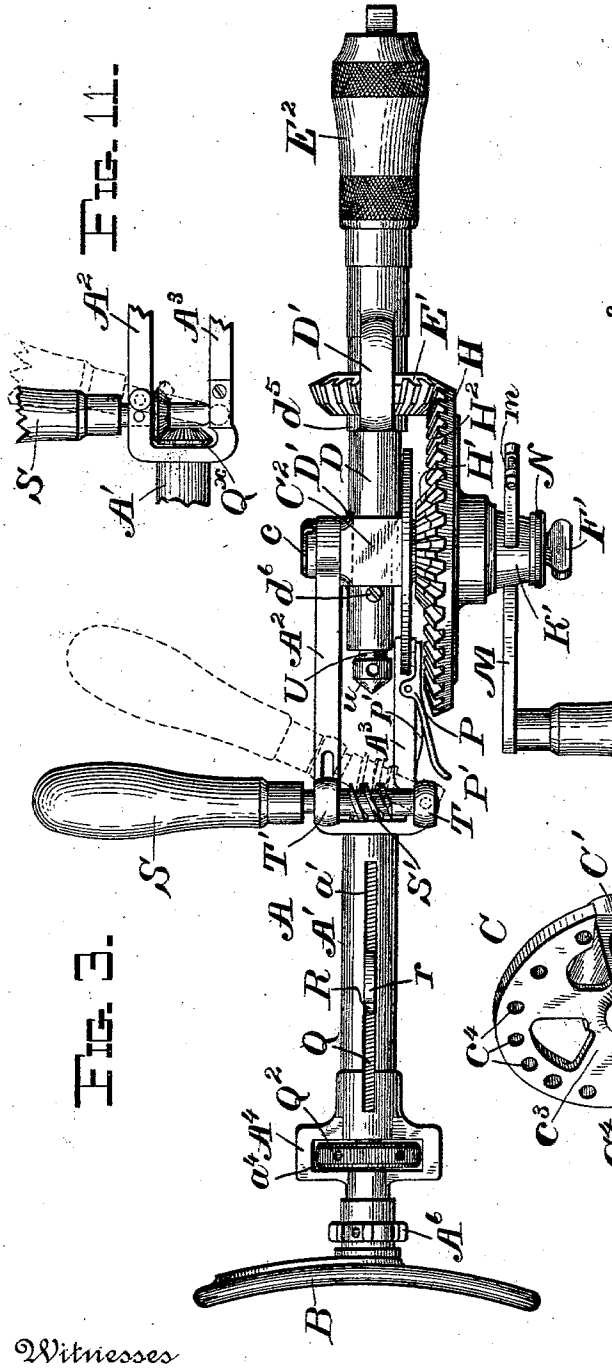

Fig. 3.

Fig. 11.

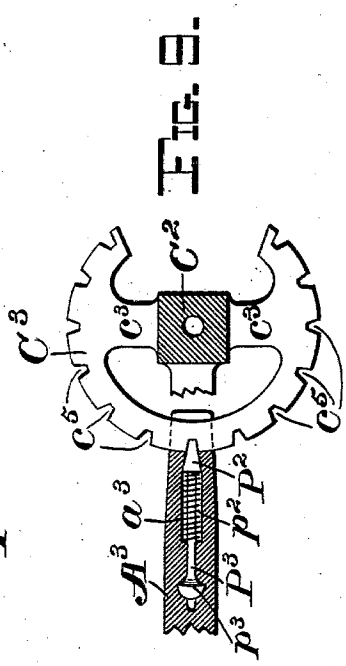

Fig. 9.

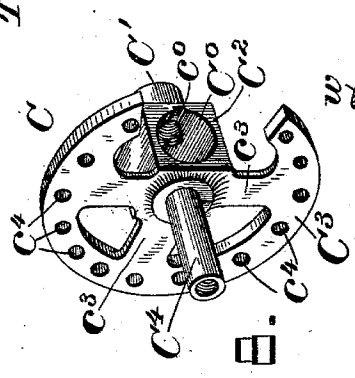

Fig. 8.

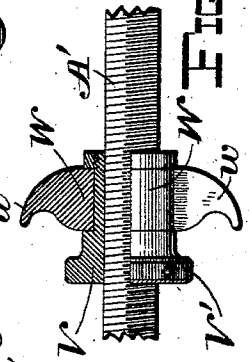

Fig. 10.

Witnesses

Percy C. Bowen.

John Malcolm Wilson

Inventor

Stephen McClellan

by Wilkinson & Fuller

Attorneys.

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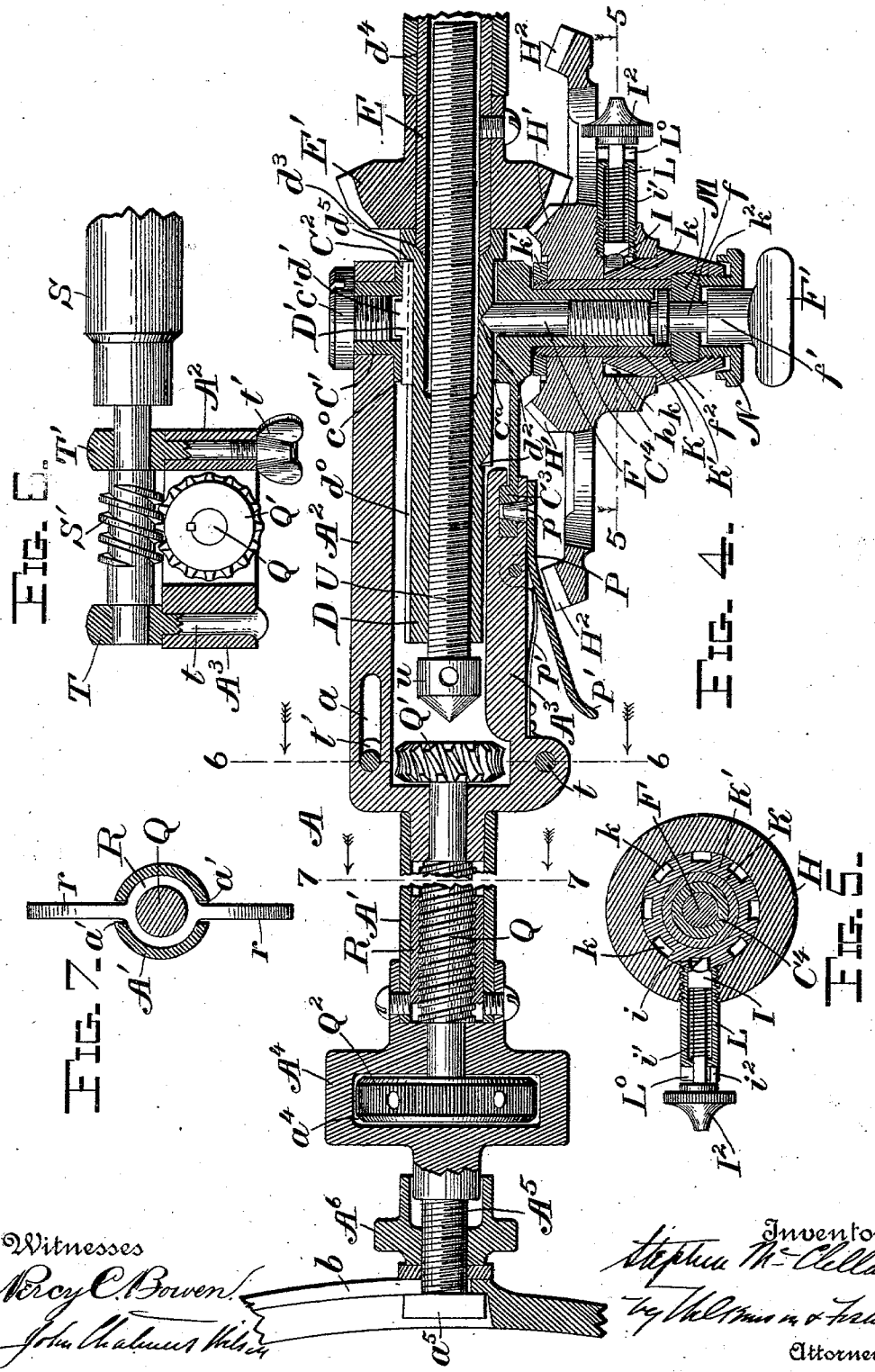
S. McCLELLAN.

UNIVERSAL BRACE AND DRILL.

(Application filed Feb. 24, 1900.)

(No Model.) 3 Sheets—Sheet 3.



Witnesses
Percy C. Bowen.
John Chalmers Wilson

Inventor
Stephen McClellan
by Wilkinson & Wilson
Attorneys.

UNITED STATES PATENT OFFICE.

STEPHEN McCLELLAN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO DENNIS NUNAN, OF SAME PLACE.

UNIVERSAL BRACE AND DRILL.

SPECIFICATION forming part of Letters Patent No. 661,418, dated November 6, 1900.

Application filed February 24, 1900. Serial No. 6,385. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN McCLELLAN, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Universal Braces and Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in hand-drills and bit-braces combined; and it consists in an improved form of brace and drill constructed as will be hereinafter fully described and claimed.

Reference is had to the accompanying drawings, in which the same parts are designated by the same letters of reference throughout the several views.

Figure 1 represents a side elevation of my improved brace and drill, the gearing being arranged to cause the drill-spindle to rotate at a higher speed than the operating-handle. Fig. 2 represents a similar view looking at the other side of the device. Fig. 3 represents a plan view of the same. Fig. 4 represents a central horizontal section of the device, taken along the line 4 4 in Fig. 1 and showing the gearing arranged to cause the drill-spindle to rotate at the same speed as the operating-handle. Fig. 5 represents a section through the ratchet mechanism, taken along the line 5 5 in Fig. 4. Fig. 6 is a transverse sectional view showing a part of the feeding device and taken along the line 6 6 in Fig. 4. Fig. 7 is a similar view taken along the line 7 7 in Fig. 4. Fig. 8 is a perspective view of the casting for holding and allowing the proper adjustments of the drill stock and spindle. Fig. 9 represents a detail sectional view of a modified device for locking the said frame and drill stock and spindle at the proper angle. Fig. 10 represents a detail view, partly in section, of a modified form of feeding device; and Fig. 11 is a view of another modification.

The several operating parts of the device are mounted in a frame A, consisting of the tubular portion A′, to which is attached the forward forked portion having a long prong A^2 and a shorter prong A^3. To the opposite end of the tubular portion A′ is secured a frame or yoke A^4, having a rectangular slot a^4 and terminating in a screw A^5, which latter passes through a slot *b* in the breast-piece B and is secured therein by means of a fixed head a^5 and a nut A^6, as shown in Fig. 4. The long prong A^2 is perforated at its end to form a bearing for the journal C′ of the frame C, which journal is secured in the said bearing by the screw *c*′ or in any other suitable manner which will allow the said journal to turn in the said bearing.

The body C^2 of the casting C is perforated, as at C^0, to receive the stock D, which carries the drill-spindle E. A keyway c^0 is formed in the perforation C^0, and a corresponding keyway d^0 is formed in the stock D. A key D′ is secured in the keyway c^0, as by a lug d', projecting into a recess in the body C^2, and the said key enters the keyway d^0 in the stock D to prevent the latter from turning in the body C^2, while allowing it to slide freely therethrough. From the side of the body C^2 opposite to the journal C′ projects a sleeve C^4 in line with the axis of the said journal, and the said sleeve is interiorly screw-threaded to receive a pin F, which is adapted to pass through the said sleeve and impinge against the stock D, which is indented, as at d^2, at the proper places to receive it.

The stock D has near its forward end a frame or yoke D′, which extends around the bevel-pinion E′, secured to the drill-spindle E. This drill-spindle E has bearings in the stock on each side of the said bevel-pinion E′, as at d^3 and d^4, and carries at its forward end the chuck E^2, which may be of any suitable construction.

H designates a bevel gear-wheel having two sets of teeth, the set H′ being of the same size as the pinion E′ and the set H^2 being considerably larger. Each set is adapted to mesh with the said pinion E′ at different times.

The hub of the gear-wheel H is fitted to rotate upon a sleeve K, to the outer end of which is rigidly secured a head K′, which extends a short distance within the hub of the gear-wheel H, the opening in which is enlarged, as at *h*, to receive it. The inner end of the head K′ is provided with notches

k to receive the pawl I, which is arranged to slide in a sleeve L, secured to the gear-wheel H, and is provided with a spring i', arranged to press the said pawl into the said notches k. One side of the pawl is beveled, as at i, (see Fig. 5,) and when in the position shown it will be seen that the head K′ may be rotated one way without turning the gear-wheel H; but if rotated in the opposite direction the gear-wheel will be turned with it. The outer end of the pawl I is provided with a milled head I^2, having a pin i^2, which projects into slots L^0, cut in the outer end of the sleeve L. By lifting the pawl (by means of the milled head I^2) until the pin i^2 is clear of the slots L^0 the said pawl may be turned in the sleeve to allow the ratchet to operate in either direction. This is accomplished by turning the pawl one-half way around. By turning it one-quarter way around from the position shown the head K′ and hub of the wheel H may be locked, so as to turn together in either direction.

The sleeve K is retained in the hub of the wheel H by means of a nut k' upon its inner end, and this sleeve K is arranged to rotate upon the sleeve C^4, forming a part of the frame C.

The head K′ is provided with a transverse opening near its outer ends through which the handle-bar M is adapted to pass, and the said head has an enlarged threaded opening k^2 at its outer end to receive a nut N, which may be screwed down firmly upon the handle-bar M to retain the latter in position.

The handle M is slotted, as at m, through which slot passes the portion f of the pin F, this pin having a collar f^2 below the handle and a thumb-piece F′, having a hub f', which extends into the nut N nearly to the handle-bar M.

By inspection of Fig. 4 it will be seen that when the handle-bar M is in the head K′ the pin F, although free to rotate, cannot be moved either in or out of the head K′. When the parts are assembled, the pin F enters the sleeve C^4 of the frame C, and the sleeve K slips on the outside of the sleeve C^4. As the pin is screwed into the latter sleeve the sleeve K, and with it the gear-wheel H, is pushed toward the body portion C^2 of the frame C, through which the drill-stock D passes, until the point of the pin F rests in one of the notches d^2 in the said drill-stock. The several parts are so proportioned that when the point of the pin F rests in one of the notches in the stock D one of the sets of teeth on the gear-wheel H will be in engagement with the pinion E′ on the drill-spindle, and rotation of the handle-bar M will, through the medium of the head K′ and the gear-wheel H, rotate the said drill-spindle.

When it is desired to change the speed of the drill-spindle with relation to the gear-wheel H, the pin F is unscrewed for a short distance, releasing the drill-stock, and by reason of the collar f^2 impinging against the handle-bar M, moving the gear-wheel H away from the pinion E′ on the drill-spindle, when the teeth on the gear-wheel are clear of the teeth on the pinion the stock D may be moved either forward or backward to bring the pinion E′ in position to engage with either set of teeth on the gear-wheel, the movement of the said stock being limited in one direction by the shoulder d^5 and in the other direction by the stop-screw d^6, so that the pinion will be stopped in the proper position to mesh with one or the other of the sets of teeth on the gear-wheel H. When the desired adjustment has been made, the pin F is screwed in, bringing the gear-wheel H in engagement with the pinion and finally entering one of the notches d^2 on the drill-stock to lock the latter firmly in position.

The frame C is provided with a mutilated wheel C^3, the rim of which is somewhat thicker than the arms c^3 and which wheel passes through an opening in the end of the shorter prong A^3 of the frame A. The rim C^3 is also perforated, as at c^4, to receive a pin p, attached to a pivoted catch P and arranged to enter through a hole in the side of the prong A^3 into the perforations in the rim C^3. A spring p' is arranged to hold said catch in position to keep the pin p in the said perforations. By pressing upon the end P′ of the catch P the pin p my be lifted clear of the perforations in the rim C^3, and the casting C, together with the drill stock and spindle, may be turned to set the said drill-spindle at any desired angle within the scope of the mutilated wheel C^3, such as the position shown by dotted lines in Fig. 2.

Within the tubular portion A′ of the frame A is housed a screw Q, extending at its forward end through the base of the forked portion of the frame A and having rigidly secured to its forward end a worm-wheel Q′ or bevel-gear $Q^\times$, situated between the two prongs A^2 and A^3. The rear end of this screw Q passes into the yoke A^4 and has rigidly fixed thereto a milled wheel Q^2, by means of which the screw Q may be turned by hand. This screw Q passes through a sleeve R, arranged to slide in the tubular portion A′ and having hooks r projecting from its surface in opposite directions and extending through slots a' in opposite sides of the said tubular portion A′. In boring into hard substances when desirable a chain x may be placed around the object to be operated upon and hooked on the hooks r, as shown in Fig. 1. The drill may be then fed forward by turning the screw Q by means of the milled wheel Q^2 or the worm-wheel Q′ or beveled gear $Q^\times$. In order to turn the latter, I provide a handle S, journaled in journal-blocks T and T′ and having a worm S′ or beveled gear in position to engage the teeth on the worm-wheel Q′ or beveled gear $Q^\times$. The journal-block T is pivoted at the base of the shorter arm A^3, as at t, and the journal-block T′ is pivoted in a slot a in the longer arm A^2 and held in position

by a thumb-screw l'. By loosening this screw l' the journal-block T' is allowed to slide in the slot a, and the handle S may be moved to the position shown in dotted lines in Fig. 3, at which time the worm S' or beveled gear will be out of engagement with the worm-wheel Q' or beveled gear $Q^{\times}$, and the screw Q may be turned by hand by means of the milled wheel Q^2. This is especially advantageous when it is desired to run the hooks back to begin another hole, as the screw can be turned faster by the milled wheel Q^2 than by the worm or beveled gearing aforesaid. It will be obvious that, should it be desirable to do so, either the milled wheel or the worm or beveled gearing may be dispensed with, leaving only one means for turning the feed-screw. The handle S serves also as a means for holding the tool when in use, and should the worm or beveled gearing be dispensed with the said handle may be fastened to the frame A in any suitable manner. I also provide a feed-screw U, which extends some distance into the stock D and may be used when the stock is at an angle with the frame A and a suitable abutment for the head u to bear against is available. The drill stock and spindle being made hollow, the feed-screw U may be made considerably longer than those now in general use.

In Fig. 9 I have shown a modification of the catch used for holding the drill-stock at any desired angle with the frame A. In this form the mutilated wheel C^3 instead of being perforated from the side is notched around its periphery, as shown at c, and a pawl or detent P^2 is arranged to slide in an opening a^3 in the prong A^3 and enter the said notches, as shown. A spring p^2 is arranged within the opening a^3 to press the said pawl into the notches c^5. The pawl P^2 is provided with a stem P^3, which extends out of the side of the prong A^3 and is provided with a finger-piece p^3, by means of which the pawl may be pulled back out of engagement with the mutilated wheel when it is desired to change the adjustment.

In Fig. 10 I have shown a modification of the feeding device, which consists in cutting screw-threads upon the tubular portion A' and having a sleeve V to screw thereon. This sleeve V passes through and is free to turn in a sleeve W, to which are attached the hooks w for holding the chain.

A milled head V' is provided for turning the sleeve V.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A bit-brace and drill comprising a frame, a perforated body mounted in the said frame, and having a sleeve projecting therefrom, a stock mounted to slide in the said perforated body, a drill-spindle mounted in the said stock, a pinion secured to the said drill-spindle, a gear-wheel mounted on the said sleeve and having two sets of teeth adapted to mesh with the said pinion, a pin threaded in the said sleeve and adapted to lock the said stock with the pinion in engagement with either of the said sets of teeth, and means for turning the said gear-wheel, substantially as described.

2. A bit-brace and drill comprising a frame, a body mounted to turn in the said frame, a stock mounted in the said body, a drill-spindle mounted in the said stock, a pinion secured to the said drill-spindle, a gear-wheel mounted on the said body and adapted to mesh with the said pinion, means for turning the said gear-wheel, and means for locking the said body from turning, substantially as described.

3. A bit-brace and drill comprising a frame having two prongs, a body journaled in one of the said prongs, a stock mounted in the said body, a drill-spindle mounted in the said stock, a pinion upon the said spindle, a gear-wheel mounted on the said body and meshing with the said spindle, and means for turning the said gear-wheel, a mutilated wheel on the said body, a guide in one of the prongs of the said frame, in which the mutilated wheel is adapted to turn, and means for locking the said mutilated wheel at any desired adjustment with relation to the frame, substantially as described.

4. A bit-brace and drill comprising a frame having two prongs, a body journaled in one of the said prongs, a stock mounted in the said body, a drill-spindle mounted in the said stock, a pinion upon the said spindle, a gear-wheel mounted on the said body and meshing with the said spindle, and a handle for turning the said gear-wheel, a mutilated wheel on the said body, a guide in one of the prongs of the said frame in which the mutilated wheel is adapted to turn, and a spring-catch for locking the said mutilated wheel at any desired adjusment with relation to the said frame, substantially as described.

5. A bit-brace and drill comprising a frame, a body mounted in the said frame, and having a sleeve projecting therefrom, a second sleeve mounted to rotate upon the first sleeve a head upon the second sleeve and a handle secured to the said head, a gear-wheel mounted to rotate upon the second sleeve, and means for locking the said gear-wheel to the head on the second sleeve, a stock mounted in the said body, a drill-spindle mounted in the said stock, and a pinion on the said drill-spindle meshing with the said gear-wheel, substantially as described.

6. A bit-brace and drill comprising a frame, a body mounted in the said frame, and having a sleeve projecting therefrom, a second sleeve mounted to rotate upon the first sleeve a head upon the second sleeve and a handle secured to the said head, a pin mounted to rotate in the head of the second sleeve, and adapted to screw into the first sleeve, a gear-wheel mounted to rotate upon the second sleeve, and means for locking the said gear-wheel to the head on the second sleeve, a stock mounted in the said body, a drill-spin-

dle mounted in the said stock, and a pinion on the said drill-spindle meshing with the said gear-wheel, substantially as described.

7. A bit-brace and drill comprising a frame, a body mounted in the said frame and having a sleeve projecting therefrom, a stock mounted to slide in the said body, a drill-spindle mounted in the said stock, a pinion on the said drill-spindle, a second sleeve mounted to rotate on the first sleeve, a head on the second sleeve and a handle secured to the said head, a pin mounted to rotate in the said head and sleeve and adapted to screw into the first sleeve and bear against the said stock, a gear-wheel mounted to rotate on the second sleeve, and arranged to mesh with the said pinion, and a pawl-and-ratchet connection between the said head of the second sleeve and the said gear-wheel; substantially as described.

8. A bit-brace and drill comprising a frame, a body mounted in the said frame and having a sleeve projecting therefrom, a stock mounted to slide in the said body, a drill-spindle mounted in the said stock, a pinion on the said drill-spindle, a second sleeve mounted to rotate on the first sleeve, a head on the second sleeve, a slotted handle passing through the said head and means for securing the said handle therein, a pin passing through the slot in the said handle, collars on the said pin on each side of the said handle, a gear-wheel mounted to rotate on the second sleeve and adapted to mesh with the said pinion, a ratchet connection between the said gear-wheel and the head on the second sleeve, the said pin being adapted to screw into the first sleeve and press against the said stock, and lock the several parts in their proper relative positions; substantially as described.

9. In a bit-brace and drill, the combination with a frame, a body mounted to turn in the said frame, and means for locking the said body to the said frame, a stock mounted in the said body, a drill-spindle mounted in the said stock, and means for turning the said drill-spindle; of a feed-screw threaded in the said stock, and adapted to be run out the rear end thereof, substantially as described.

10. In a bit-brace and drill, the combination with a frame, a body mounted to turn in the said frame, and means for locking the said body to the said frame, a stock mounted in the said body, a drill-spindle mounted in the said stock, and means for turning the said drill-spindle; of a feed-screw threaded in the said stock and extending into the said drill-spindle and adapted to be run out the rear end of the said stock, substantially as described.

11. In a bit-brace and drill the combination with a frame having a tubular slotted rearward extension terminating in a rest or handle; a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular extension, a sleeve threaded upon the said screw and inclosed by said tubular extension, hooks upon the said sleeve projecting through the said slots holding said sleeve against turning and adapted to engage a suitable abutment, and means for turning the said feed-screw; substantially as described.

12. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting through the said slots and adapted to engage a suitable abutment, a gear secured to the said feed-screw, a gear mounted in the said frame and meshing with the said gear and a handle for turning the said gear; substantially as described.

13. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting through the said slots and adapted to engage a suitable abutment, a gear secured to the said feed-screw, a gear mounted in movable bearings upon the said frame, and adapted to be moved out of engagement with the said gear, and a handle for turning the said gear; substantially as described.

14. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting through the said slots and adapted to engage a suitable abutment, a milled wheel secured to one end of the said feed-screw and a gear secured to the other end of the same, a gear mounted in bearings upon the said frame, and meshing with the said wheel-gear, and a handle for turning the said gear; substantially as described.

15. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting through the said slots and adapted to engage a suitable abutment, a worm-gear secured to the said feed-screw, a worm mounted in the said frame and meshing with the said worm-gear, and a handle for turning the said worm; substantially as described.

16. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting

through the said slots and adapted to engage a suitable abutment, a worm-gear secured to the said feed-screw, a worm mounted in movable bearings upon the said frame, and adapted to be moved out of engagement with the said worm-gear and a handle for turning the said worm; substantially as described.

17. In a bit-brace and drill the combination with a frame having a tubular slotted portion, a drill-spindle mounted in the said frame, and means for turning the said drill-spindle; of a feed-screw mounted in the said tubular portion, a sleeve threaded upon the said screw, hooks upon the said sleeve projecting through the said slots and adapted to engage a suitable abutment, a milled wheel secured to one end of the said feed-screw and a worm-gear secured to the other end of the same, a worm mounted in bearings upon the said frame, and meshing with the said worm-gear, and a handle for turning the said worm; substantially as described.

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

STEPHEN McCLELLAN.

Witnesses:

DWIGHT HILLIARD,

A. HILLIARD.