(No Model.) 3 Sheets—Sheet 1.

W. C. MARR & A. J. MAUGHLIN.

BIT STOCK.

No. 305,090. Patented Sept. 16, 1884.

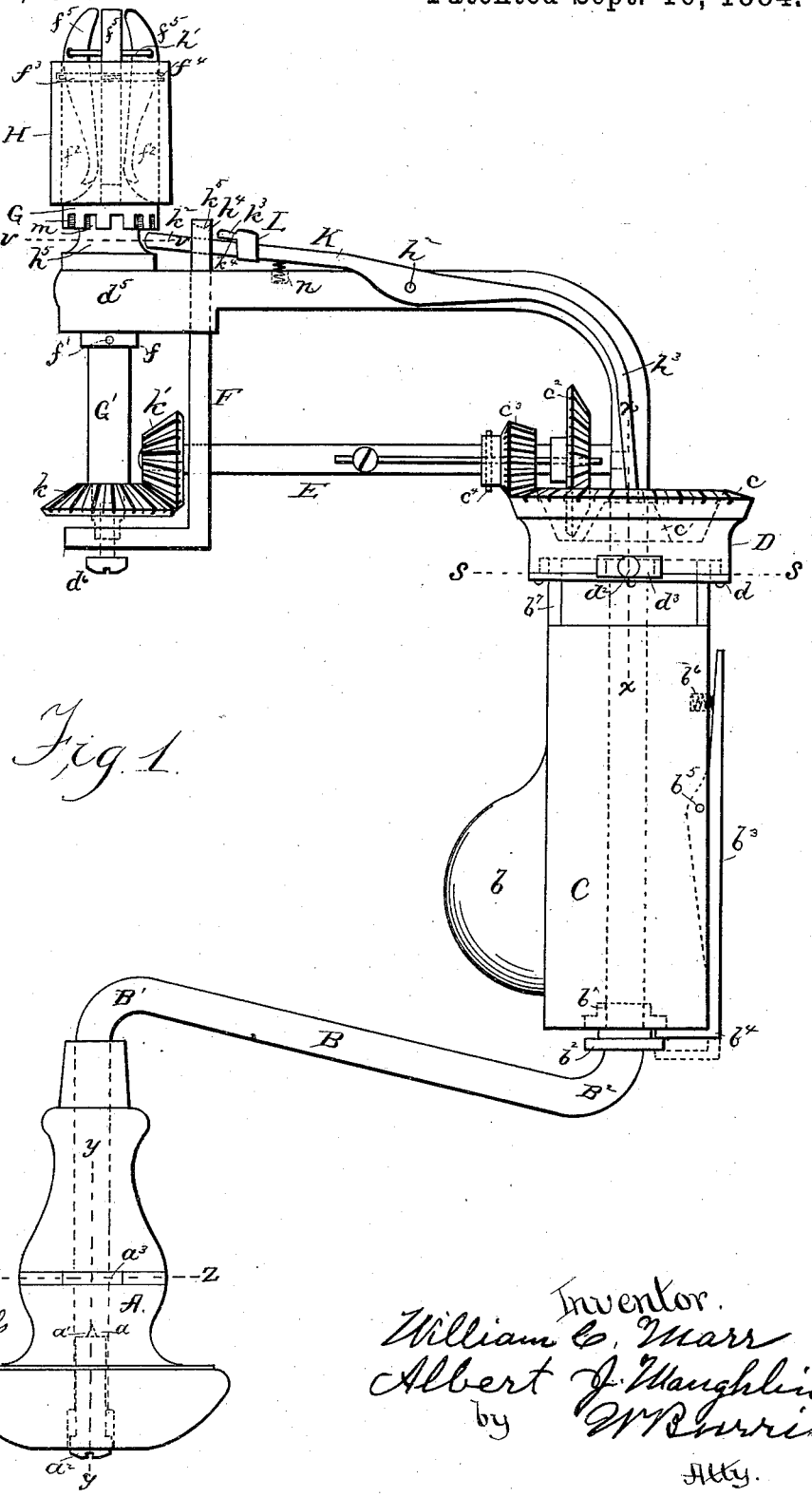

Fig. 1.

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W. C. MARR & A. J. MAUGHLIN.

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Fig. 2.

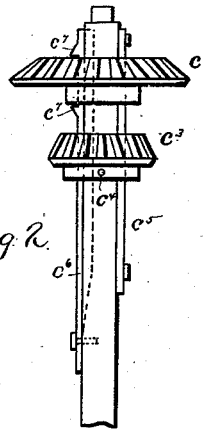


Fig. 3.

Fig. 4.

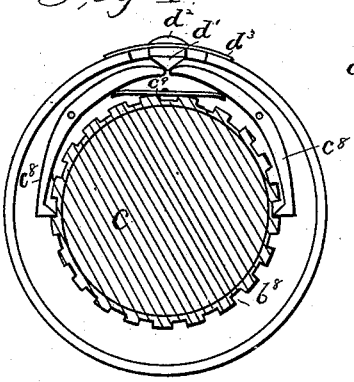


Fig. 5.

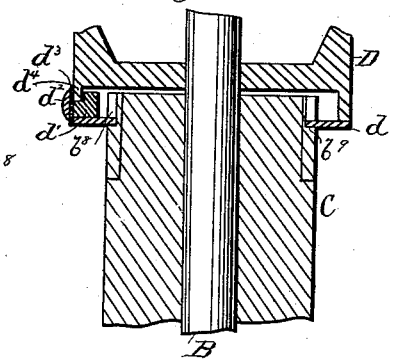


Fig. 6.

Fig. 7.

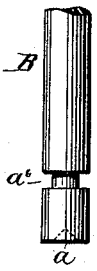


Fig. 8.

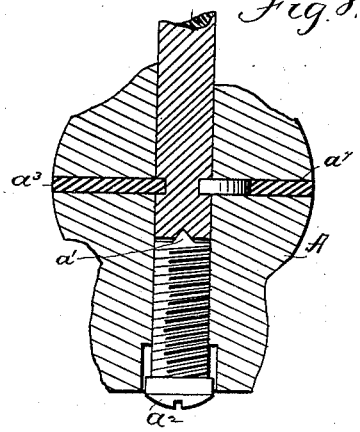


Fig. 9.

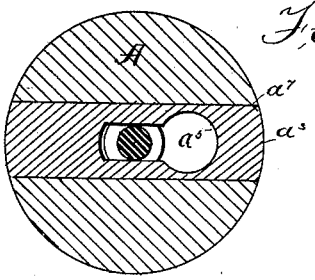
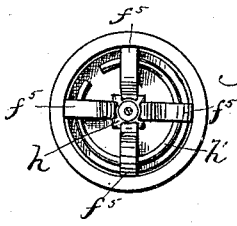


Fig. 10.



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W. C. MARR & A. J. MAUGHLIN.

BIT STOCK.

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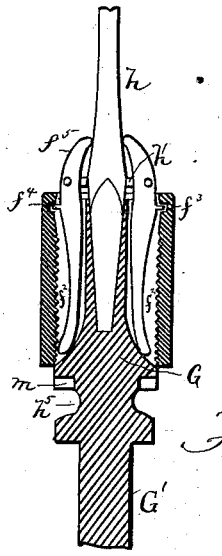


Fig 11

Fig 12.

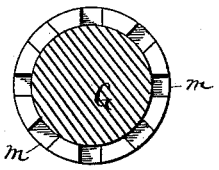


Fig 13.

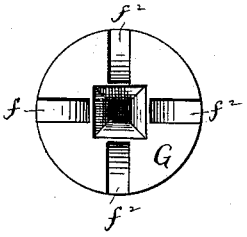


Fig 14.

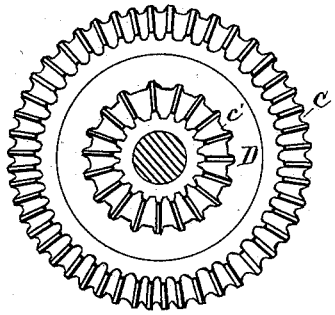
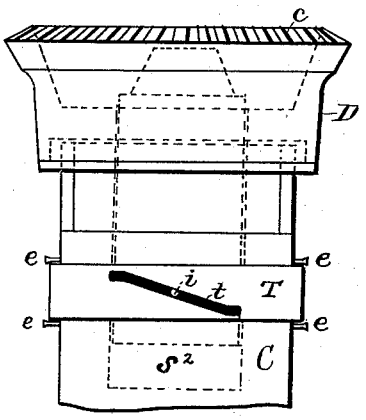


Fig 15



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM C. MARR AND ALBERT J. MAUGHLIN, OF ONAWA, IOWA.

BIT-STOCK.

SPECIFICATION forming part of Letters Patent No. 305,090, dated September 16, 1884.

Application filed May 21, 1884. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. MARR and ALBERT J. MAUGHLIN, citizens of the United States of America, residing at Onawa, in the county of Monona and State of Iowa, have invented certain new and useful Improvements in Hand-Braces, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to carpenters' hand-braces; and it consists of the novel construction of such a brace, and of devices constructed, arranged, and combined with the brace-handle, by means of which the speed of the motion of the bit may be readily increased and diminished by the manipulation of the handle, and the devices may be readily thrown out of gear, and the tool may be used as an ordinary brace, all as hereinafter fully set forth.

In the drawings, Figure 1 is a side elevation of the improved brace provided with the devices for changing the speed of the motion of the bit. Fig. 2 is a side view of a portion of the bevel-wheel shaft, showing the manner of securing and adjusting its bevel-wheels. Fig. 3 is a top view of the locking-bar detached. Fig. 4 is a cross-section on line *s s* of Fig. 1, with the washer removed, showing the ratchet devices. Fig. 5 is a section on line *x x* of Fig. 1, with the washer in place, showing the manner of securing the bevel-wheel head to the handle and the sliding button to the wheel-head by which the pawls are adjusted. Fig. 6 is a plan of the slotted key. Fig. 7 is a side view of the upper portion of the stock. Fig. 8 is a section, on line *y y* of Fig. 1, through the swivel-head. Fig. 9 is a cross-section, on line *z z* of Fig. 1, through the swiveled head. Fig. 10 is an end view of the bit-holder with the bit inserted. Fig. 11 is a vertical section of the bit-holder. Fig. 12 is a cross-section of the bit-holder body on line *v v* of Fig. 1. Fig. 13 is an end view of the bit-holder body detached from the sleeve and clamping-jaws. Fig. 14 is a face view of the bevel driving-wheels. Fig. 15 is a side elevation of a modification of the bevel-wheel head.

A designates the swivel-head and bearing-knob of the handle.

B is the handle-stock, the upper end of which is provided with a recess, *a*, to receive the point *a'* on the inner end of the set-screw a^2. The head is secured upon the stock by means of a key, a^3, provided with a slot, a^4, enlarged at a^5 to receive the end of the stock, which is provided near its end with an annular groove, a^6, to receive the inner edges of the key. Extending entirely through the head is a slot, a^7, through which the key is inserted. In attaching the head to the stock, the end of the key having the enlarged part a^5 of the slot is inserted far enough only in the slot a^7 to place that part a^5 in position to allow the end of the stock to be extended through the key far enough to place the annular groove a^6 in range with the inner edges of the key, which is then extended through the head, thus securing the head to the handle. All unnecessary play and wear of the key in the groove a^6 are taken up by the screw a^2.

C designates the handle of the brace, provided with a longitudinal central hole to receive loosely and revolve freely upon the stock. This handle is provided with a projection, *b*, formed on or fastened to the handle, to aid the workman in grasping the handle firmly and holding it from turning in the hand. The upper end of the handle is provided with a recess, *b'*, to receive the flange b^2, which is formed on the stock, as hereinafter fully explained. A lever, b^3, provided with the hooked end b^4, is pivoted at b^5 in a slot in the handle, which is provided with the spring b^6, to force the end b^4 under or over the flange b^2, for the purposes hereinafter fully described. The lower end of the handle C is provided with a ferrule, b^7, having ratchet-notches b^8 and an annular groove, b^9, for the purpose hereinafter stated.

D designates a cylindrical head, provided with a central hole to receive and revolve freely upon the extension of the handle portion of the stock, upon which head are formed the bevel-wheels *c c'*, which are constructed to gear with the bevel-wheels c^2 c^3, mounted upon the shaft E, having its bearings at one end in the extended stock B and at the other end in the support-bar F, rigidly attached to the stock, as shown. The wheel c^3 is secured to the shaft E by means of a pin, c^4, and the wheel c^2 is held from revolving upon the shaft by the spline c^5, and is adjustable longitudi-

nally upon the shaft, and held in the required position by means of the spring-spline c^6, having stop-lugs c^7. The upper end of the head D is recessed to receive the pivoted pawls c^8 and the spring c^9. The head D is attached to the handle C by means of the washer-plate d, made in two parts the proper thickness, and having the central opening the proper diameter to fit neatly, but loosely, in the annular groove b^9 around the handle. On the side of the upper portion of the head D a recess is formed to receive the inwardly-projecting end d' of the button d^2, which button and inward point are formed on or rigidly fastened to a plate, d^3, made large enough to cover the recess in the head, to exclude dirt from the recess. The button and plate are held in place by means of a tongue, d^4, on the head, extended into a groove in the side of the inner portion of the button. The recess in the head is in position to allow the point d' of the button to be placed between the ends of the pawls, as shown in Fig. 4, so that both pawls will catch in the notches of the ferrule when required, and thus prevent the head from being turned either way, and the recess extends each way sufficiently to allow the button to be moved to either side, so that either one of the pawls may be disengaged and the other allowed to catch in the notches, so that the head may be turned in one direction only for the purpose of using the tool as a ratchet brace or drill.

G is the body of the bit-holder, having the stem G′ extended through and having bearing in the enlarged end d^5 of the brace-stock, the end of the stem being provided with a socket to receive the end of the set-screw d^6. A collar, f, is fastened by a pin, f', upon the stem G′ in position to hold the stem vertically and form a bearing against the stock. The vertical wear and play of the stem are taken up by means of the set-screw d^6. The body G of the bit-holder is provided with screw-threads to receive the threads on the inner surface of the threaded sleeve H, and this head is provided with longitudinal slots f^2, having their inner surfaces inclined outwardly at their upper ends, as shown. The sleeve H is provided with the annular groove f^3, to receive the tongues f^4, formed upon the clutch-fingers f^5, constructed to fit and slide loosely in the slots. The fingers have their inner ends curved outward and their outer ends curved inward in position to clutch and hold in place the bit h. A spring-wire, h', is inserted through holes in the upper portion of the fingers, which spring-wire presses the jaws outward against the inner surface of the sleeve, keeping the tongues f^4 pressed into the annular groove in the sleeve, by means of which the fingers are moved vertically with the sleeve as it is screwed up and down on the body of the bit-holder. The lower end of the stem G′ of the bit-holder is provided with a bevel-wheel, k, constructed and located to gear with the bevel-wheel k', mounted on the end of the shaft E.

K designates a bifurcated lock-bar, pivoted at h^2 to the stock B. The bifurcated portion h^3 of this bar is curved to conform to the curve and extend on each side of the stock to the end of the beveled wheel c'. The other end, k^2, of the bar K extends through the yoke h^4, formed on the upper portion of the bar F, into an annular groove, h^5, in the body G of the bit-holder.

L designates a key clipped to slide not too easily upon the bar K, and its extended or key portion k^3 is provided on the top with a depression, k^4, to receive the lug k^5, formed on the interior of the upper portion of the yoke, to hold in place the key when required.

Opening into the annular groove h^5 of the bit-holder body G are the notches m, formed the required width and depth to receive the end k^2 of the bar K, for the purpose of locking the bit-holder. A spring, n, is attached to the stock in position to force the end of the bar K outward into the notches m.

The stock-iron B is bent, as shown at B′ B², so as to place the handle C as nearly opposite as possible to the swivel-head A, and as far as possible from the bit-holder, for the purpose of lessening the lateral strain upon the bit, as shown in Fig. 1 of the drawings.

When it is desired to use the tool as an ordinary brace, the handle C is moved upward, so as to disconnect the gear-wheels c c^3, and the gear-wheel c^2 is moved on the shaft E away from the gear-wheel c'. In this position of the handle the flange b^2 extends into the recess b', and the hooked end b^4 springs over the flange b^2 and holds the handle in the raised position.

When it is desired to increase the speed of the motion of the bit, the end b^4 of the lever is released from the flange b^2 by pressure upon the other end of the lever, and the handle is moved downward, throwing into gear the bevel-wheels c c^3. It is readily understood that the degree of the increase of the speed of the bit depends upon the relative sizes of the wheels c and c^3 and k k'. When it may be desirable to diminish the speed of the motion of the bit, the handle C is moved upward and fastened in the raised position, as before described, and the bevel-wheel c^2 is moved along the shaft E and stopped by the lugs c^7 in position to gear with the bevel-wheel c', which, it will be seen, is smaller than wheel c^2.

It is evident that the diminution of the speed of the bit will depend upon and may be regulated as required by changing the relative sizes of these bevel-wheels.

The bevel-wheel c^2 may be rigidly attached to its shaft, and the bevel-wheel c' may be formed on a block constructed to fit and slide vertically in a socket in the head D and handle C, as shown in Fig. 15, in which T designates a ferrule constructed to fit over and oscillate on the handle C, being held in place vertically by the pins e or by any other suitable bearings. This ferrule is provided with a diagonal slot, t,

to receive a pin, *i*, which is rigidly attached to the sliding block of pinion *c'*.

The operation of this form of construction is as follows: To obtain the fast motion of the bit, the ferrule is turned to the left as far as the pin *i* will permit, which movement of the ferrule causes the pin *i*, sliding in the slot *t*, to move the pinion-block *c'* upward into the recess *s'* in the handle, thus throwing bevel-wheels *c'* and c^2 out of gear. The handle is then placed in position shown in Fig. 1, which places bevel-wheels *c* and c^3 in gear. To obtain the slow motion, the handle is placed in the position shown by the dotted lines in Fig. 1, with the hook b^4 on the flange b^2, which disconnects the bevel-wheels *c* c^3. The ferrule is then turned to the right, which, by means of the slot and pin, moves the bevel-wheels *c'* c^2 into gear. By thus constructing the bevel-wheel *c'* all the changes required for increasing and diminishing the speed of the bit and for throwing the devices entirely out of gear with the brace may be readily accomplished by the manipulation of the handle and the devices immediately attached thereto. It will be seen that the bifurcated end of the lock-bar extends to and bears upon the end of the shaft or block of the bevel-wheel *c'* when either this bevel-wheel or the bevel-wheel *c* is in gear with the bevel-wheels c^2 or c^3, by means of which bearing the end k^2 of the lock-bar is held out of the notches in the bit-stock head, thus allowing free motion to the bit-holder. The upward movement of the handle, by which the bevel-wheels are thrown out of gear, allows the ends k^3 of the lock-bar to move upward and the end k^2 to be forced by the spring *n* into one of the notches *m* in the bit-holder head, thus locking the bit-holder and allowing the tool to be used as an ordinary hand-brace.

The ratchet devices are adapted to allow the tool to be used as a ratchet brace or drill, when required, as in boring or drilling in corners or other positions where there is not room for the handle to sweep entirely around, and these ratchet devices may be used with the devices which produce either the increased or diminished motions of the bit, or without either of such devices when the tool is used as an ordinary hand-brace.

The improvement in the bit-holder consists of the construction of the devices as set forth, so that the clutching-fingers are moved vertically with the threaded sleeve at the same time that they are caused to clutch the bit, thus causing the double action by the fingers of clutching the bit and forcing it upward tightly into the socket of the holder.

Having described our invention, we claim—

1. In a hand boring-brace, the combination, with the brace-stock B, provided with the recess *a* and the annular groove a^6, of the swivel-head A, provided with the slot a^7, the set-screw a^2, and the slotted key a^3, substantially as and for the purposes described.

2. In a hand boring-brace, the handle C, provided with the enlarged portion *b*, constructed to aid in grasping and holding the handle firmly, substantially as and for the purpose described.

3. In a hand boring-brace, the combination, with the handle C, of the revolving head D, provided with the bevel-wheels *c c'*, substantially as and for the purpose described.

4. In a hand boring-brace, the combination of the stock B, provided with the flange b^2, the handle C, the pivoted lever b^3, provided with the hooked end b^4, and the spring b^6, substantially as and for the purpose described.

5. In a hand boring-brace, the combination, with the handle C and means for adjusting it vertically upon the stock, of the head D, shaft E, and bevel-wheels *c c'* c^2 c^3, substantially as and for the purposes described.

6. In a hand boring-brace, the combination, with the handle C and means for adjusting it vertically upon the stock, of the head D, bevel-wheels *c c'*, pivoted bar K, spring *n*, shaft E, stem G', bevel-wheels *c c'* c^2 c^3 *k k'*, and the grooved and notched bit-holder head G, substantially as and for the purposes described.

7. In a hand boring-brace, the combination, with the yoke h^4, and the lock-bar K, of the key L, constructed to slide upon the bar, and adapted to hold the bar out of the notches of the bit-holder head, substantially as and for the purposes described.

8. In a hand boring-brace, the combination, with the handle C and notched ferrule b^7 and the recessed bevel-wheel head D, of the double pawls c^8 and adjusting-button d^2, substantially as and for the purpose described.

9. In a hand boring-brace, the combination, with the threaded and slotted bit-holder body G, of the threaded sleeve H, provided with the annular groove f^3, the fingers f^5, provided with the lugs f^4, and the spring-wire *h'*, the fingers being adapted to move vertically with the sleeve in their inclined slots, substantially as and for the purposes described.

10. In a hand boring-brace, the brace-stock B, bent at B' B^2 in position to place the handle as far as possible from the bit-holder, substantially as and for the purpose described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

WILLIAM C. MARR.
ALBERT J. MAUGHLIN.

Witnesses:
J. S. MAUGHLIN,
S. B. MARTIN.