

UNITED STATES PATENT OFFICE.

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BIT-BRACE.

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To all whom it may concern:

Be it known that I, ANDREW KNUDSEN, of Tucson, in the county of Pima and Territory of Arizona, have invented a new and Improved Bit-Brace, of which the following is a full, clear, and exact description.

My invention relates to improvements in bit-braces; and its object is to produce a bit-brace having the knob attached in such a way that all dust or dirt will be excluded and the bearing made very easy; to provide means for easily attaching and detaching the knob; to produce an extensible and adjustable crank, so that a single brace may take the place of several braces of different sizes; to provide a convenient, nicely-finished, and easy handle for the brace; to improve the ratchet connection between the brace-crank and the bit-shank; to construct a new and efficient means of fastening bits of various sizes to the brace; to improve the construction of the bit-holding jaws, and in general to improve the entire construction of the brace, to the end that it may be easily adjusted, efficiently operated, and nicely and strongly finished.

To this end my invention consists in certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is an elevation of the bit-brace with the crank-arms and handle in section. Fig. 2 is an enlarged detail longitudinal section of the knob. Fig. 3 is a cross-section through the crank-arm on the lines 3 3 in Fig. 1. Fig. 4 is a cross-section through the handle on the lines 4 4 in Fig. 1. Fig. 5 is a detail front elevation of the slide-bolt mechanism for holding the knob-tube. Fig. 6 is a detail side elevation of the cup or nipple held within the knob. Fig. 7 is an elevation of the brace, but with the bit holding and adjusting mechanism in section on the lines 7 7 in Fig. 9. Fig. 8 is an enlarged longitudinal section of the jaw holding and adjusting mechanism on the lines 8 8 in Figs. 7 and 9. Fig. 9 is a sectional plan of the ratchet mechanism on the lines 9 9 in Figs. 7 and 8. Fig. 10 is a cross-section on the lines 10 10 in Figs.

7 and 8. Fig. 11 is a detail perspective view of the bit-holding jaws, showing them separated. Fig. 12 is a side elevation of the eccentric or cam bolt used in connection with the ratchet-pawls, and Fig. 13 is a plan of the same.

The brace 10 is provided at one end with a bearing-knob 11, this knob being socketed on the inner side and screwed to the reduced end 13 of a screw cup or nipple 12, and this nipple or cup has on its inner side and at its smaller end a socket 14 to receive the bearing-cone of the brace-stem, as described below, and the cup has also through its smaller end a hole 15, through which the bearing may be oiled. The larger portion of the cup 12, which projects from the inner face of the knob 11, has screwed to it a nut 16, the outer end of which abuts with the inner face of the knob, and the nut has a shoulder 16^a, which abuts with the inner end of the cup 12. A tube 17 is held in the nut 16, the outer end of the tube being screw-threaded, as shown at 18, and this is screwed into the cup 12.

The bearing-stem 19 of the brace is formed on one of the crank-arms and extends longitudinally through the tube 17, the outer end of the stem having reduced and graduated screw-threaded portions 20 and 21, these different-sized threaded portions being held in nuts 22 and 23, as shown in Fig. 2, and these hold the stem 19 and cone 24 in place. If desired, a washer may be used instead of the nut 22 with the same effect. The outer end of the stem 19 terminates in a bearing-cone 24, which is held within the socket 14 of the knob. It will be seen that the entire bearing thus comes on the small cone 24 and that the nut 16 and the connected parts 17 and 12 effectually shut out all dirt and the connections described enable all lost motion to be taken up.

At the lower end of the tube 17 is a slide-bolt 25, which is adapted to slide within the tube and which registers with a slot or notch 26 at the lower end of the tube. The slide-bolt has a shank 27 arranged within the tube 17, and this terminates in a washer 28, held to slide on the stem 19, and the washer is normally pressed downwardly by a spiral spring 29, which is coiled around the stem 19, the tube 17 being enlarged for this purpose, and

the pressure of the spring 29 holds the slide-bolt out of engagement with the notch 26. When the knob is to be removed, however, the slide-bolt is pushed into the notch against the pressure of the spring, and the tube 17 will thus be held from turning and the knob may be easily unscrewed.

The brace is provided with the usual crank 30 to enable sufficient leverage to be obtained to turn the bit, and the crank is provided with extensible arms, so that it may be adjusted and more or less leverage obtained, as required.

The crank-arms comprise the grooved members 31, formed on the ends of the crank 30 and the hollow members 32 and 32^a, which are of similar construction, the member 32 terminating in the stem 19, which is substantially parallel with the crank 30, and the member 32^a being fixed at its lower end to the bit-holding cylinder, as hereinafter described. The members 32 and 32^a are each provided with projections 33 on their inner sides, which enter grooves 34, produced longitudinally in the members 31, and the parts 31 and 32 are held together by thumb-screws 35, which project through the members 32 and 32^a and impinge on the members 31. It will be seen from the foregoing description that the members 31 may be pushed well into the members 32 and 32^a, so that the brace may be turned in a small space, and where but little power is necessary, and by pulling out the members 31 greater leverage may be obtained.

The crank 30 is provided with a handle 36, which has an inner two-part tube 37, the parts being hinged together at 38, as shown in Fig. 4, and the tube is covered with wood, rubber, or other suitable material 39 to enable the handle to be easy to the hand and to be handsomely finished. The handle bears upon the crank at the ends only, at which points the inner tube 37 is held to turn on annular flanges 40, produced on the crank, and owing to the small bearing the handle may be easily turned.

Within the tube 37 and near the ends are springs 41, which are fixed to one member of the tube, and the free ends of the springs terminate in pins 42, which project through the overlapping parts of the tube, as shown in Fig. 4, and thus hold the two parts of the handle together. The exterior portion 39 of the handle is recessed opposite the pins, as shown at 43, and when the handle is to be removed the pins are pushed inward and the parts swung open. The lower end of the member 32^a of one of the crank-arms terminates in a cylinder 44, which is held to turn on the ratchet-head 45, this head being formed integral with the bit-holding shank 46.

At the upper end of the ratchet-head 45 is a ratchet-wheel 47, having its teeth of uniform size and inclined similarly on both sides, this ratchet-wheel being formed integral with the ratchet-head 45. Opposite the ratchet-wheel and in a recess 48, produced transversely in the member 32^a of the crank-arm,

is a pair of similar elbow-pawls 49, these having overlapping elbows 50, which are pivoted on a common pivot 51. Each pawl has an outwardly-projecting prong 52, which serves as a thumb-piece and enables the pawl to be adjusted, and it has also a projecting prong or tooth 53, which is adapted to engage one of the teeth of the ratchet-wheel. The teeth 53 of the pawls are held normally in engagement with the ratchet-wheels by springs 54, which are secured to the cylinder 44, the free ends of the springs being held to press against the teeth of the pawls.

Extending transversely through the member 32^a of the crank-arm and adjacent and parallel with the pivot-pin 51 of the pawls is an eccentric or cam shaft 55, having its lower end formed into a thumb-piece 56, by which it may be turned, and the shaft is provided with an annular groove 57 near one end, which is adapted to receive a fastening-pin, which holds it in place within the member 32^a. The shaft 55 is provided with a cam 58, which when forced into the angle formed between the two arms 52 of the pawls will lock both pawls in engagement with the ratchet-wheel 47, so that the shank 46 may be rotated in either direction.

When used as a ratchet-brace, the cam shaft or spindle is first turned so as to throw the cam 58 out of engagement with the pawl-arms 52, and then either arm is pressed to throw the inner arm 53 of the pawl out of engagement with the ratchet, and then the spring 54 will engage the end of the said arm 53 and hold it retracted, as shown in dotted lines, Fig. 9. The shank 46 of the brace extends downward from the ratchet-head 45 and is open on two sides, the shank being thickened and flattened in the middle, as shown at 46^a in Fig. 10, and this construction prevents the jaws 59 from turning in the shank, and also enables them to be easily inserted and removed, as described presently. The pair of jaws 59 is held in the shank 46, the jaws being reversible and having notched ends 60, adapted to be clamped to the square end of a bit. Each jaw has on one side and near the middle a central bearing-piece 61, one-half of which projects beyond the inner straight edge of the jaw, and the bearing-piece has on its outer portion an inwardly-extending flange 62, which is produced so as to extend at right angles to the side bearing-piece 61, and is adapted to rest within the recess or socket 63 of the opposite jaw. The socket 63 is of semicircular shape and is produced in one side of the jaw and directly opposite the bearing-piece 61. The two jaws will thus fit snugly together, as shown in Figs. 7 and 10, and each jaw is made straight across the back opposite the bearing parts 61 and 63, so as to be firmly retained between the flat surfaces 46^a of the shank 46, as shown in Fig. 10. On the inner sides of the shank 46 and immediately beneath the bearing parts of the jaws are ledges 64, (see Fig. 8,) which serve as supports for the bearings of the jaws,

and as the jaws may oscillate in relation to each other on the bearings in the center they will be fulcrumed at this point, so that when their inner ends are forced apart their outer 5 or lower ends will be forced together, and the jaws may be turned together end for end upon these ledges 64 to reverse them, the shutters having been first swung out, as shown in dotted lines, Fig. 7. A screw 65 extends longitudinally through the ratchet-head 45 and is held to turn therein, the screw extending, also, through a screw-cap 66 at the top of the cylinder 44, and the upper end of the cylinder terminates in a turning-knob 67, 15 while the lower end terminates in a cone 68, adapted to enter between the upper or inner ends of the jaws 59, and by turning the screw in or out the outer ends of the jaws may be forced together or allowed to spread, and this construction enables the jaws to be clasped 20 firmly to a bit and also to be very quickly adjusted. It will be understood that each end of the jaws will fit several sizes of bits and that by reversing the jaws they may be made to fit many sizes; but several pairs of jaws 25 may be provided for each brace, if desired.

The open sides of the shank 46 are closed by shutters 69, which are normally pressed outward by springs 70, held to the shutters and adapted to press upon the jaws 59. The 30 lower ends of the shutters are provided with inwardly-extending lugs 71, (see Fig. 7,) which are pivoted together, as shown at 72, the pivot-pins being secured to the lower end of the shank 46. The shutters 69 are held closed by a ring-nut 73, although a slip-ring may be employed, if desired, which is screwed to a threaded portion 74 of the shank 46, and which 35 may be screwed down or up, so as to engage or disengage the shutters.

If desired, a slip-ring may be substituted for the nut, and in either case the shutters may be held tightly to the shank, so as to prevent any accidental displacement of the 40 jaws 59.

To adjust a bit in the shank, the screw 65 is turned up and the bit thrust between the lower or outer ends of the jaws 59, as shown by dotted lines in Fig. 7, and the screw 65 is 50 then turned in, so as to force the jaws upon the bit. The pawls 49 may then be adjusted so that the bit may be turned in either direction desired, and the brace is operated in the usual way.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a bit-brace, the combination, with the outer crank-arm, which terminates in a bearing-stem, of a knob having a threaded cup with a socket to fit the end of the bearing-stem, a nut screwed to the outer portion of the cup, and a tube journaled on the crank-arm and screwed within the cup, substantially 60 as described.

2. The combination, with the crank-arm

having a terminal stem which ends in a bearing-cone, of the knob having a screw-cup with a socket therein to fit the cone, a nut screwed to the exterior portion to fit the cup, a sleeve 70 held upon the bearing-stem and journaled to the crank-arm, and adjusting-nuts held within the cup and screwed upon the bearing-stem, substantially as described.

3. The combination, with the crank-arm 75 having a terminal bearing-stem ending in a cone, of the knob, the screw-cup held within the knob and having a socket to fit the bearing-cone and an oil-hole at its inner end, a nut screwed to the outer portion of the cup, and 80 a sleeve journaled on the crank-arm and extending through the nut and into the knob-cup, substantially as described.

4. The combination, with the crank-arm, the tube journaled to the arm, and the knob 85 having a screw connection with the tube, of a spring-pressed slide-bolt mounted on the arm and adapted to engage a notch in the tube, substantially as described.

5. The combination, with the brace-crank, 90 of the two-part handle journaled thereon, the parts of the handle being hinged together and having overlapping portions, and spring-pressed pins held within the handle and adapted to project through the overlapping 95 parts thereof, substantially as described.

6. In a bit-brace, the combination, with the crank and the bit-holder journaled in one of the crank-arms, of a ratchet-wheel formed at one end of the bit-holder, oppositely-extending 100 elbow pawls pivoted at their angles on the same pivot in an arm of the crank, and springs 54, engaging the outer sides or extremities of the arms 53 to hold either one in or out of engagement with the ratchet-wheel, and a cam 105 journaled in the crank-arm and adapted to press upon the pawls in the angle formed between the outwardly-projecting arms 52 to lock both pawls in engagement with the ratchet, substantially as described. 110

7. The combination, with the jaw-holding shank and the oscillating jaws pivoted together and reversible end for end in the shank, of a screw held to turn in the shank and having a tapering end to enter between the jaws, 115 substantially as described.

8. The combination, with the jaw-holding shank and the removable jaws held therein, of oppositely-swinging shutters hinged to the lower or outer end of the shank and a fastening 120 device to hold the shutters against the shank, substantially as described.

9. The combination of the jaw-holding shank, the removable jaws mounted therein, the oscillating spring-pressed shutters held to swing outward from the shank, and a fastening-ring to hold the shutters against the shank, 125 substantially as described.

10. The combination, with the jaw-holding shank having a bearing-ledge therein, of oscillating jaws fulcrumed and reversible end for 130 end on the ledge and a screw mechanism

for adjusting the jaws, substantially as described.

11. The combination, with the jaw-holding shank having bearing-ledges on its inner walls, of the oscillating jaws, each jaw having centrally on one side a projecting bearing-piece and on the opposite side a socket to receive the bearing-piece of the opposite jaw, the

bearing-pieces fulcruming on said ledges to permit the jaws to be reversed end for end thereon, substantially as described.

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Witnesses:

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