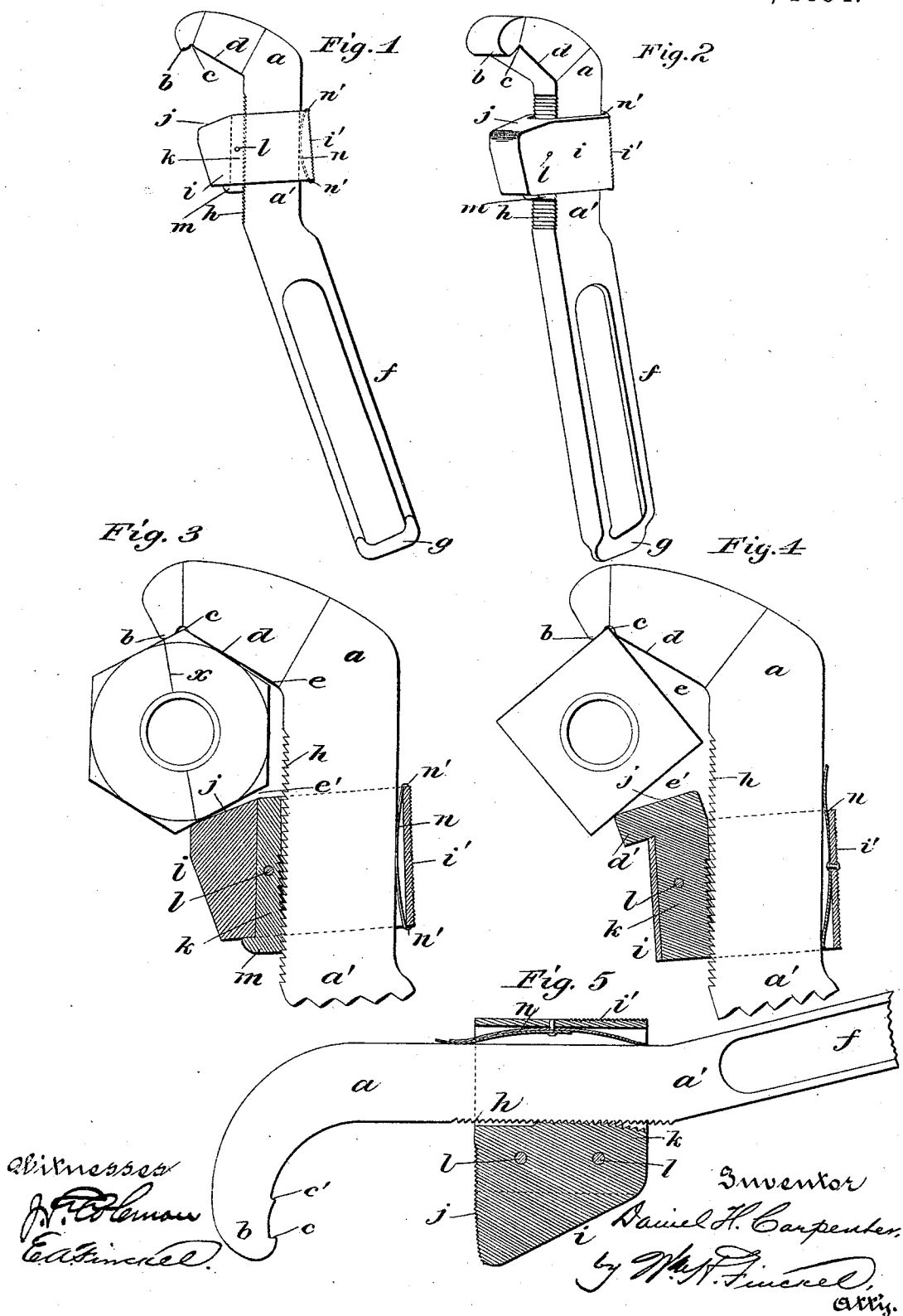


(No Model.)

D. H. CARPENTER.
WRENCH.

No. 515,070.

Patented Feb. 20, 1894.



UNITED STATES PATENT OFFICE.

DANIEL H. CARPENTER, OF ORLANDO, FLORIDA.

WRENCH.

SPECIFICATION forming part of Letters Patent No. 515,070, dated February 20, 1894.

Application filed December 1, 1893. Serial No. 492,487. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. CARPENTER, a citizen of the United States, residing at Orlando, in the county of Orange and State of Florida, have invented a certain new and useful Improvement in Wrenches, of which the following is a full, clear, and exact description.

This invention relates to the class of wrenches represented in and by my Letters-Patent No. 446,324, dated February 10, 1891, and others, and while the invention is capable of exemplification in a pipe wrench, still its primary object is to supply a convenient and easily operated wrench for use on nuts and other angular objects.

In this invention, the outer jaw is made a fixed part of or integral with the handle or handle-bar, and the inner jaw is made slidable upon the handle-bar, and is adapted to be secured in adjusted position by a ratchet and double-acting spring; the said inner jaw being mathematically adjustable with relation to the outer jaw so as to be capable of instantaneous adjustment to all sizes of standard nuts in their best position for manipulation. The jaws have grasping or gripping faces that fall in planes diverging from a center or centers in the rear of the wrench so as to engage the sides or flats of the angular object obliquely or diagonally as opposed to diametrically, or in parallelism; and, moreover, the angles of inclination of these faces of the jaws are such as to leave spaces between the said faces and the sides or flats of the angular object sufficient to afford clearance for the wrench in moving or ratcheting it around such object in order to get a fresh hold on such object without removing the wrench from such object; and in furtherance of this operation of ratcheting the wrench about the object, I construct the slidable jaw with a certain amount of play upon the handle-bar within the limitations of the double-acting spring and the socket in the jaw, whereby it may have a rocking motion upon such bar without losing its grip upon the object. The outer end of the fixed jaw is made with the transverse groove or notch, as in my former inventions, in order to take in the corner or angle of the nut, &c., and protect it from being worn or rounded off by the wrench, and to throw the grip upon adjacent sides or flats

of such corner or angle. The handle and jaws are arranged at obtuse angles to the handle-bar, so as to enable the use of the wrench with a greater sweep in corners or other narrow limits. The handle-bar is provided with a reduced end to constitute the blade of a screw-driver; and while this feature is a valuable adjunct in the smaller sizes of wrenches, such as those designed to be carried upon the person or in a cyclist's tool bag, it may be omitted, and preferably will be omitted in the larger and more unwieldy wrenches.

Having thus stated the principle of my invention, I will proceed now to set forth the best mode in which I have contemplated applying that principle and then will particularly point out and distinctly claim the part, combination or improvement which I claim as my invention.

In the accompanying drawings illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation and Fig. 2 a perspective view of my wrench for the use of cyclers and to be carried on the person. Fig. 3 is a sectional elevation of the same wrench head, on a larger scale, applied to a hexagonal nut. Fig. 4 is a similar view of a wrench head showing a slight modification in the inner jaw and the double-acting spring, and applied to a square nut. Fig. 5 is a sectional elevation of a pipe wrench embodying the principle of this invention.

The outer and fixed jaw *a* is made with the hook-end *b* and transverse groove or notch *c*, and, as shown more in detail in Figs. 3 and 4, this hook-end is rounded. The groove *c* takes the corner or angle of the nut or other object within itself so that there shall be no strain, wear or pressure put upon such corner or angle in the operation of the nut or other object,—it being a well-known and serious fault in most wrenches that unless very carefully used they will wear or round off the corners or angles of the nuts and thereby render them less serviceable. The hook-end of the outer jaw is the gripping member, while the face *d* is a rest or support and this face instead of being in a plane parallel with the plane of the sides or flats of the nuts, falls in a plane of a different angle and so leaves the clear-

ance space e between the nut and jaw. The jaw a is integral with the handle-bar a' and handle f ; and the handle f is reduced and pointed at its lower end to form the blade of a screw-driver g . The jaw, handle-bar and handle may be drop-forged or otherwise produced of steel or other metal.

The face of the handle-bar a' is provided with the ratchet teeth h , and I have found that twenty seven and fifty hundredths ($27\frac{50}{100}$) teeth to the inch will adapt the wrench to the various sizes of standard nuts, both square and hexagonal.

The inner or slidable jaw is composed of a loop i or socketed block adapted to encompass and to be slid longitudinally of and upon the handle-bar. One end of this loop is provided with a face j which lies in a plane diverging from the plane of the outer jaw; and the angles of inclination of these jaws may vary from one another in about the proportions shown in the drawings, but in any event the clearance space e in the outer jaw and a like space e' in the inner jaw always will be provided for in the most approved constructions. The inner jaw is provided with a separable ratchet block k the teeth of which engage with the ratchet h . This ratchet block is toothed for a portion only of its length, in the preferred construction. The ratchet block may be secured in the loop by a transverse pin or screws l and lip m , and the face of the said loop is made solid to afford a backing and resistance for the ratchet block. Between the rear wall i' of the loop and the handle-bar, is interposed a double-acting spring n , which is shown in Figs. 1 and 3 as a bow of flat spring metal held in place by its ends n' being bent over the ends of the rear wall i' . The tendency of this spring is to draw the ratchet block into engagement with the ratchet teeth of the handle-bar and so support the inner jaw at whatever position it may be placed; at the same time, since the spring is in the form of a bow, it forms a sort of pivot or fulcrum upon which the inner jaw may rock or roll. To disengage the ratchet block from the ratchet h sufficient pressure upon the back-wall i' of the loop in the direction of the jaws will be exerted to overcome the spring, and then the inner jaw may be slid longitudinally of and upon the handle-bar at pleasure. Obviously, the inner jaw may be moved toward the outer jaw by upward pressure from below upon any part of the inner jaw; and hence, if the jaw be moved bodily so as to separate the jaws farther than is necessary to fit the nut, by releasing the ratchets, then the ratchets may be re-engaged and such upward pressure may be applied to the front of the inner jaw to move it tooth by tooth until an accurate adjustment of the jaws with relation to the nut is attained. Thus, it will be seen, the slidable jaw may be very readily adjusted to an object.

The inner slidable jaw just described, may be drop-forged; but as shown in Fig. 4, the

loop may be a section of rectangular tubing, or be made as a rectangular tube, and the ratchet block may be made integral with the inner jaw face d' . In this figure I have shown also a reversely bowed spring riveted to the rear wall of the loop and having its ends projecting outwardly from the loop a considerable distance at both ends; and a third modification of the spring is shown in Fig. 5 where such spring is made up of two or more leaves or plates.

In Fig. 5 I have shown my invention applied in a pipe wrench, and this differs from the wrenches shown in the other figures in having its outer jaw curved and provided with two transverse notches c, c' .

The ratchet block may be made to form the front of the loop, and its face may be toothed and described on an arc of a circle eccentric with relation to the outer jaw; and in order to give a greater degree of rocking motion to the jaw, its ratchet block is curved, but so as always to permit three or more teeth to be in engagement with the ratchet h .

In order to facilitate the moving of the slidable jaw, its rear wall may be milled or knurled as indicated.

Various mechanical changes may be made in my wrench without departing from the principle of my invention, and hence, I do not wish to be understood as restricting my invention to details other than as hereinafter claimed.

The operation suggests itself from the foregoing, but it needs to be said that the jaws grasp the object not diametrically or in parallel planes, but, as it were, diagonally or obliquely, the line of draft on a hexagonal nut being essentially that indicated by the line x in Fig. 3. The strain is thrown upon the handle-bar therefore, and at a point where it is most able to sustain it. The wrench may be freely rotated about the nut to obtain a new grasp upon it without the necessity of removing the wrench from such nut. In so moving the wrench, its jaws must clear the corners or angles of the nut in order to get the fresh hold, and to this end the clearance spaces and the yielding or rocking capacity of the inner jaw are availed of. In the case of the pipe wrench, the rocking motion of the movable jaw is availed of to obtain a bite upon a pipe or other round object as well as to facilitate ratcheting around the object.

The off-setting of the handle enables the user to operate upon objects in very narrow limits.

In the case of the wrench shown in the original drawings Figs. 1 and 2, full and natural size, I am able, by my invention, to produce a wrench of about three ounces weight, and readily carried in the vest or coat pocket. Such a wrench I specially design for the use of travelers on bicycles and in other vehicles.

While I prefer making the outer jaw and

handle integral, the inner jaw and handle may be made integral instead.

What I claim is—

1. A wrench having jaws, diverging from one another the outer jaw being integral with the handle-bar and handle, and terminating in a hook-end and an adjacent transverse groove and the inner jaw being slidable upon the handle-bar, combined with a ratchet connection between the outer and inner jaws, and a spring interposed between the backs of the outer and inner jaws and adapted to permit rocking motion of the inner jaw upon the handle-bar, substantially as described.

2. A wrench having diverging jaws of greater inclination than the object to be acted upon, the outer jaw having a hook-end and an adjacent transverse groove, and the inner and slidable jaw having a ratchet to engage a complementary ratchet upon the handle-bar of the outer jaw, a spring interposed between the backs of the inner and outer jaws, and a handle, substantially as described.

3. A wrench having an outer jaw, a handle-bar and a handle made integral, the handle being set at an obtuse angle to the handle-bar, and the jaw likewise standing off from such handle-bar in a plane which is at an obtuse angle thereto, and terminating in a hook-end and an adjacent transverse notch and a

slidable inner diverging jaw adjustable upon the handle-bar, substantially as described.

4. A wrench having an outer jaw, a handle-bar and a handle, the said jaw terminating in a hook-end and an adjacent transverse groove or notch, and standing off from such handle-bar in a plane which is at an obtuse angle to the handle-bar, and a movable inner jaw diverging from the outer jaw, substantially as described.

5. A wrench having a fixed and a movable jaw, the former terminating in a hook-end and an adjacent transverse notch or groove, and the latter having a plane surface, and adapted to yield away from the handle-bar the two jaws diverging from one another in planes of greater inclination than the object to be acted upon and adapted to grasp the object obliquely or diagonally in contradistinction to diametrically or on parallel sides, and to be ratcheted around the object to get a fresh hold thereon without removing the wrench from such object, substantially as described.

In testimony whereof I have hereunto set my hand this 1st day of December, A. D. 1893.

DANIEL H. CARPENTER.

Witnesses:

HARRY Y. DAVIS,
WM. H. FINCKEL.