No. 626,446. Patented June 6, 1899.

T. E. STOCKFORD.

TIRE BOLT WRENCH.

(Application filed Jan. 13, 1899.)

(No Model.)

Fig. 1.

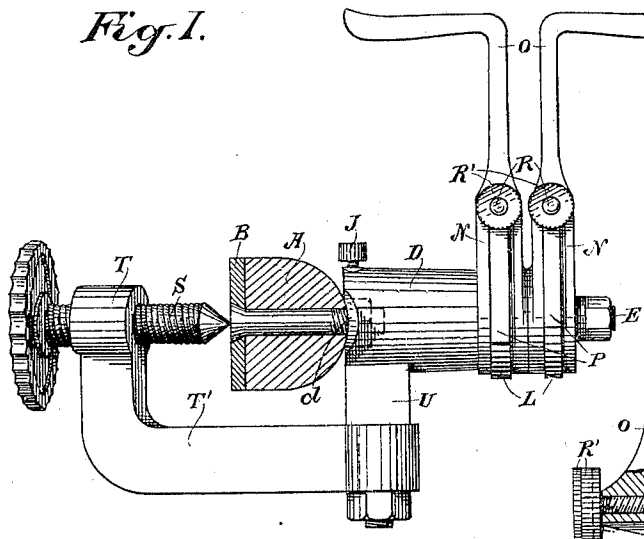


Fig. 2.

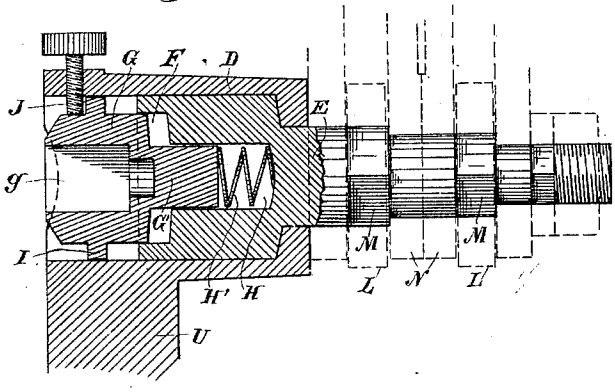


Fig. 3.

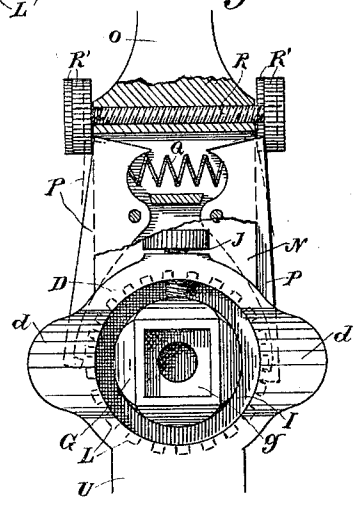


Fig. 5.

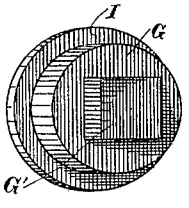
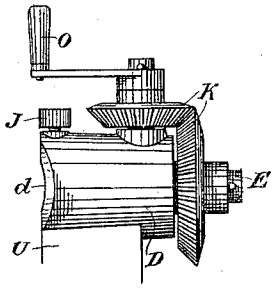


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TIRE-BOLT WRENCH.

SPECIFICATION forming part of Letters Patent No. 626,446, dated June 6, 1899.

Application filed January 13, 1899. Serial No. 702,025. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. STOCKFORD, a citizen of the United States, residing at Leesville, county of Colusa, State of California, have invented an Improvement in Reversible Tire-Bolt Wrenches; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which is especially designed for the securing and releasing of nuts upon tire and other bolts.

It consists in the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a view of my wrench. Fig. 2 is a longitudinal section of the same. Fig. 3 is a face view. Fig. 4 shows a modification for operating the wrench. Fig. 5 is a detail view of the nut-socket.

Bolts which are used about carriages, such as tire-bolts and those holding other parts of the ironwork together, are secured by nuts, which must screw on very tightly and be locked to prevent their being jarred off by the constant vibrations of the carriage.

The object of my invention is to provide an apparatus for applying or removing such nuts and a means for adjustably holding the device with relation to the direction of the nut and bolt and means for applying the power at points where it is difficult to conveniently operate an ordinary wrench.

In the present case I have illustrated my invention as applied to a device to be used for applying and removing nuts for tire-bolts.

In the drawings, A represents the felly of a wheel, and B the tire. The tire is held upon the felly by means of bolts C, which usually have a conical head fitting into a corresponding countersink in the outer periphery of the tire. The inner end of the bolt is screw-threaded and projects through the felly sufficiently to receive the nut, which must be screw-threaded to hold it in place. After it is screwed up tight the end of the bolt may be upset sufficiently to prevent the nut being jarred off. When it is desired to remove the nut after considerable use and when the bolt may have become rusted, it requires considerable power and a convenient means for applying it, so as to turn the nut upon the bolt.

D is a chambered head, and E is a shank extending through a hole made axially in the rear end of said head. The front end of this shank has a circular socket F formed in it of sufficient size to receive the correspondingly-shaped inner end of the nut-wrench G. The outer end of this wrench has a rectangular opening *g*, adapted to fit the nut to be turned.

The rear end of the wrench G has an extension G′, and a correspondingly-shaped hole H is made in the bottom of the socket F. Within this hole is a spring H′, which presses against the extension G′, and thus acts to press the wrench outwardly within its socket.

Around the periphery of the wrench is made a flange I, and a screw J passes through the side of the head D, so that its point enters the socket of said head just outside of the flange I. This screw-point prevents the spring from forcing the wrench G out of its socket, but allows it to be turned by the engagement of the square extension G′ with the socket H in the front of the shaft E.

The spring H′ allows the wrench to yield and move backwardly when pressure is brought upon the apparatus, so that while the socket *g* always embraces and fits the nut there is no direct pressure upon the nut by any locking of the apparatus to the place where it is to be used, which will be hereinafter described.

By retracting the screw J the wrench or socket-piece G can be easily removed from its place in the head D, and any other one may be introduced having the same exterior diameters, but having the interior socket *g* made of a size to suit any other nut, thus making the apparatus useful for nuts of various sizes within its province of application.

In order to turn the wrench-piece G, the shaft E is turned by any suitable mechanism. It may be turned by a beveled gear, as shown at K; but I have shown as a preferred method the double ratchets L L, each fitting upon a rectangular portion M of the shaft E, and there are intermediate circular portions of said shaft which are turnable within the arms or forks N of the hand-levers O, the ratchet-wheels fitting loosely between these forks, so that the levers may be turned about the cylindrical portions of the shaft, while the

ratchet-wheels remain fixed thereto by reason of the rectangular portion upon which they fit. In order to operate these ratchets L, I employ the pawls P, pivoted, as shown, and each having a point which may engage with the teeth of the ratchet L. These pawls are pivoted in pairs, one upon each side of the ratchet, so that one may be engaged with the ratchet upon one side while the other is disengaged therefrom, and vice versa. When engaged upon one side, the ratchet will be turned in one direction by the pawl which engages it, the other one being held out of contact. When it is desired to turn the shaft in the opposite direction, it is done by disengaging one pawl and engaging the other. This is effected as follows: Between the ends of the pawls, which are above the pivot or fulcrum pins, is a spring Q, which constantly presses against the inner ends of these pawl-levers and forces them apart, the tendency being to force both of them into contact with the ratchet and upon opposite sides.

R is a screw passing through the upper part of the fork in which the ratchet-wheels are turnable and having milled heads or other suitable turning device R′ upon the projecting ends. These milled heads are of such diameter that they will contact with either one or the other of the pawl-levers P at a point in line with the spring Q. When, therefore, the screw R is turned so that the upper end of one of the pawl-levers is pushed in, the point P of the pawl will be lifted out of the line of the teeth of the ratchet L, while the upper end of the other pawl-lever, being correspondingly relieved of pressure, will be forced outwardly by the spring Q and the point will be allowed to engage with the ratchet. It is thus only necessary to turn the screw R and advance it through the fork in one direction or the other to disengage one pawl and allow the other to engage with the ratchet, and the operation of the device is thus reversed. Then by moving the lever-arm O the pawl which engages the ratchet-teeth will act to revolve the ratchet and with it the shaft E, thus turning the nut-wrench and advancing the nut in either direction.

In order to make the operation as nearly continuous as possible, I have shown two of the ratchets L and two of the lever-arms O with the intermediate connections, so that one may be moved in one direction while the other is being moved in the opposite direction, and the rotation of the shaft and the nut-wrench is made nearly continuous.

In order to hold the bolt in proper line and retain it in place while the nut is being applied or removed, I employ a screw S, which passes through a head or support T, this head being secured to or a continuation of the arm T′, and this arm T′ is swiveled upon a standard U, which projects at right angles from the head D, as shown. The point of the screw S is thus brought in line with the head of the bolt C, and by turning the hand-wheel which operates the screw the point is caused to press upon the head of the bolt, forcing it firmly into its seat and locking it so that it will not turn by reason of the frictional contact, and when thus held it allows the nut to be turned upon the inner end by the mechanism previously described.

The object of swiveling the arm T′ is to allow the screw S to be brought into line with the bolt, the hole for which is often bored not exactly radial through the tire and felly, and the swivel allows the screw to be adjusted to suit the line of the bolt, which is important.

In order to protect the felly from being marred by the application of this device, I have shown that part of the head D which is brought in contact with the felly having extensions and a groove or depression *d* made in its face, which has a curvature approximately the same as the inner curvature of the felly, so that when the screw S is tightened up against the bolt the groove *d* in the head D will be pressed against the inner convex head of the felly and the device will be firmly held in position.

It will be manifest that this device may be applied to the reaches and at other points where there are bolts to be turned which are difficult of access.

As the levers work interior to the felly and between the spokes it allows of their being operated alternately and the nut turned in either direction with considerable rapidity.

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

1. A wrench and bolt-holder consisting of a hollow head adapted to fit over the inner end of the bolt, an arm swiveled to said head carrying a screw at the outer end and turnable to adjust said screw in the line of direction with the bolt, said screw being adapted to press against the head of the bolt and lock it in place, a nut-wrench turnable within the hollow head having a socket fitting the nut, a shaft axial in line with the nut with means for turning said shaft and a yielding connection whereby the motion of the shaft is transmitted to the nut-wrench.

2. In a wrench and bolt-holder, a hollow head, swiveled arm, and screw adapted to fit the part and hold the bolt, a shaft extending into the rear of the head having a rigid enlarged chambered head with a rectangular central socket, an independent nut-wrench fitting in the chambered head having a rectangular extension from the rear which fits and engages the corresponding socket in the shaft-chamber, and having a socket in front adapted to engage and turn the nut, a spring fitting the socket in the shaft-chamber acting to press the nut-wrench forward and a means engaging the nut-wrench to limit its forward motion.

3. In a wrench and bolt-holder, clamping and holding devices, a turnable shaft having a rigid chambered head provided with a

socket, an independent spring-pressed and flanged nut-wrench adapted to fit the chamber in the head and having a part to fit said socket, and a stop in the path of the flange on the wrench, for limiting the forward movement of said wrench.

4. In a wrench and bolt-holder of the character described, a head having transverse concaved extensions adapted to fit the inner periphery of a felly, an arm swiveled to said head and curved over the exterior of the tire, and a screw passing through the outer end of said arm and adjustable therewith to stand in line with and lock the bolt and at the same time clamp the device upon the wheel-rim.

5. In a wrench and bolt-holder of the character described, the head, swiveled yoke and locking-screw, the independent spring-pressed nut-wrench fitting in a chamber in the head, a socketed shaft fitting a corresponding projection upon the rear of the wrench and adapted to turn it, and a double pawl-and-ratchet mechanism whereby the shaft is advanced continuously by alternate movements of the ratchet-levers.

6. In a device of the character described, the wrench and bolt-holder having the nut-turning socket, a shaft and pawl-and-ratchet mechanism as shown, in combination with a spring acting upon the oppositely-placed pawls of each ratchet and the screw movable transversely and having heads which press upon either one or the other of the pawls to disengage it from the ratchet while allowing the opposite one to be engaged therewith.

7. In a bolt-holding wrench of the character described, a socket-wrench fitting the nut, a shaft with which the wrench is engaged and by the turning of which the nut is advanced upon the bolt, ratchet-wheels fixed upon the shaft, pivoted pawls, the points of which engage with opposite sides of the ratchet and a single spring acting to normally press both pawls into simultaneous engagement with the ratchet, in combination with a transversely-movable screw having heads upon the ends which alternately engage one or the other of the pawls and lift the point out of engagement with the ratchet and allow the other to remain in engagement therewith.

In witness whereof I have hereunto set my hand.

THOMAS E. STOCKFORD.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.