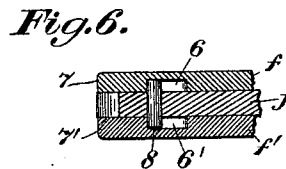
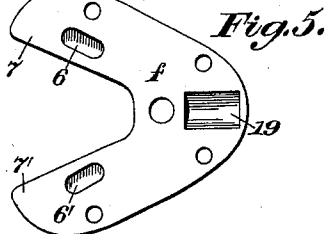
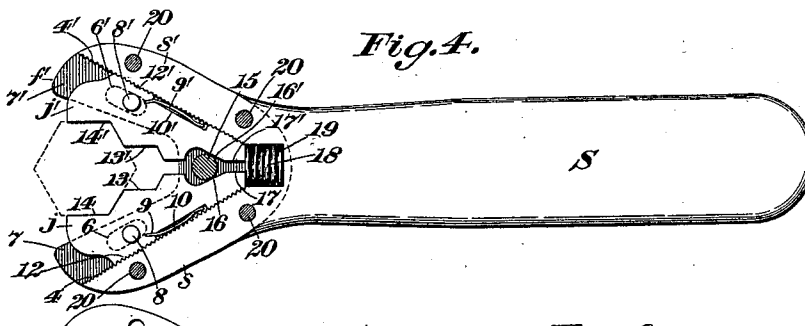
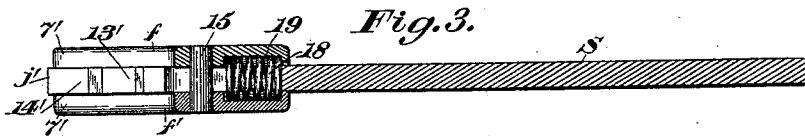
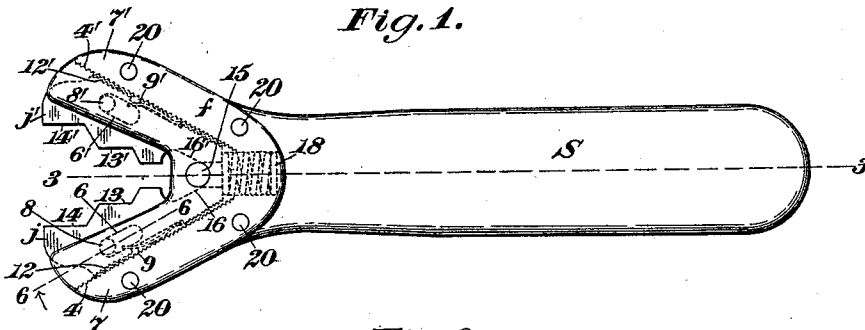


(No Model)

K. GERHARDT.
WRENCH.

No. 583,741.

Patented June 1, 1897.



Witnesses:
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UNITED STATES PATENT OFFICE.

KARL GERHARDT, OF HARTFORD, CONNECTICUT.

WRENCH.

SPECIFICATION forming part of Letters Patent No. 583,741, dated June 1, 1897.

Application filed February 15, 1897. Serial No. 623,387. (No model.)

To all whom it may concern:

Be it known that I, KARL GERHARDT, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

This invention relates to wrenches; and it has for its main object the provision of a nut-wrench that will automatically adapt itself to the size of the nut or bolt upon which it may be operating, it being understood that I include within the term "nut-wrench" any wrench, spanner, or similar tool usually employed for turning nuts, bolts, and similar parts.

In carrying out my invention I provide, in connection with a wrench having one or more suitable fixed jaws, one or more automatically-adjustable jaws adapted to be operated by means of the nut, bolt, or other part that the wrench is intended to turn, the automatically-adjustable jaw or jaws being so constructed and organized relatively to the other parts of the wrench as to engage the sides of the nut or other part to be turned and to hold the same firmly when the tool is brought to its working position. I prefer to employ a wrench having two such automatically-adjustable jaws forming complementary members, both of which may be moved by the nut which they are intended to engage, the two jaws being advantageously substantially similar in all respects and having corresponding movements, in order that when they are brought into engagement with different parts of a nut or bolt-head they may be moved through substantially equal distances and exert substantially the same pressure upon opposite sides of the nut or bolt-head to grip the same firmly.

In order that the adjustable jaw or jaws may remain in an adjustable position when brought into engagement with the part to be turned, I also deem it desirable to make use of locking means which will prevent slipping of the adjustable jaw or jaws relatively to the nut or bolt when a firm grip has been obtained upon the latter. Also, for the purpose of returning the parts to their normal positions, I deem it advisable to employ a spring or its equivalent for returning the adjustable jaw

or jaws to a wide-open position and holding it or them therein.

In the drawings accompanying and forming part of this specification, Figure 1 is a side elevation of a nut-wrench constructed in accordance with my invention. Fig. 2 is an edge elevation of the same. Fig. 3 is a longitudinal section thereof, the section being taken in line 3 3, Fig. 1. Fig. 4 is a sectional side elevation of the wrench, the view being taken in line 4 4, Fig. 2. Fig. 5 is a detail side elevation, viewed from the inner side thereof, of a face-plate for covering the several operative parts of the head of the wrench; and Fig. 6 is a detail sectional view illustrating the manner in which one of the adjustable jaws is supported by a fixed jaw of the wrench, the view being taken in line 6 6, Fig. 1, looking in the direction of the arrow.

Similar characters designate like parts in all the figures of the drawings.

As to the body portion thereof, my improved nut-wrench may be of any suitable construction; but in the present instance I have illustrated a light bicycle-wrench having a handle or shank S, terminating at the working end thereof in a pair of resistance-jaws or fixed jaws, (designated herein by s and s', respectively.) These fixed jaws will in this case be formed in one piece with the handle S by drop-forging, and will be of sufficient thickness to sustain a considerable thrust or pressure, while the parts which do not receive this thrust directly may be in the form of face-plates covering the working parts.

It will be noticed that the two resistance-jaws of the wrench converge toward the handle or shank of the tool, and that they have convergent jaw-supporting faces 4 and 4', against which the adjustable jaws of the tool are intended to bear. It will be noticed, further, that each of these faces is serrated, the serrations being intended to permit the adjustable jaws to obtain a firm grip upon the resistance-jaws when the parts are brought to bear upon the nut or bolt-head, the object being to make the adjustable jaws self-locking and to prevent slipping of the parts at the time when the nut or bolt is to be turned.

As before stated, the wrench is provided with one or more automatically-adjustable

jaws, each of which is intended to adapt itself to the size of the nut or bolt-head to be operated upon and to engage the same without requiring any manual adjustment whatever, such as is ordinarily necessary in bringing the jaws of a wrench into engagement with the sides of the part to be operated upon. It will be apparent that in order to operate in this manner the automatically-adjustable jaw should be capable of movement toward one extreme position when brought into engagement with a nut or bolt-head and to or toward another extreme or normal position when released from such part. Moreover, I find it advantageous to employ an automatically-adjustable jaw that will exert a wedging action upon a nut or other part to grip and bind the same between two resistance members, and hence I have illustrated in the drawings of the present application an adjustable jaw movable longitudinally of one of the resistance-jaws hereinbefore described, so that the holding-face of the adjustable jaw will be brought nearer to or carried farther away from the corresponding face of the other resistance-jaw, according to the direction in which the adjustable jaw is moved.

In the present case I prefer to make use of two complementary automatically-adjustable jaws—such, for example, as those shown herein at j and j' . Preferably these two parts will be of substantially similar construction, and a description of one will therefore be sufficient for both, appropriate prime-marks being applied to those corresponding parts of the second adjustable jaw to which reference is not herein particularly made.

The jaw j is carried by the resistance-jaw s , it being secured thereto preferably by means of a pin-and-slot connection at one end thereof, which serves to hold the adjustable jaw in its proper position and limit the movement thereof and also in this case permit a slight transverse movement of the adjustable jaw at the outer end thereof relatively to the fixed jaw. This connection is illustrated clearly in detail in Fig. 6, in which slots or recesses are illustrated at 6 and 6' in the inner sides of each of the end portions 7 and 7' of a pair of face-plates (designated in a general way by f and f') for covering the working parts, and the adjustable jaw has a pin 8 disposed transversely thereto and projecting into these slots, the pin being of such length as to just reach the bottom walls of the slots.

It will be noticed by referring to Figs. 1 and 4 that the pins 8 and 8' are of somewhat less width than the widths of the respective slots in which they work, and that these slots are disposed at such distances from the rows of serrations 4 and 4' of the two resistance-jaws s and s' , respectively, as to permit the outer end of each adjustable jaw to be moved from the position shown in Fig. 1 to that illustrated in Fig. 4, and vice versa, to bring the outer edge of the adjustable jaw into engagement with the serrated face of the resistance-

jaw or carry it away therefrom. In the preferred construction the outer face of each adjustable jaw will of course be serrated also, as shown at 12, to correspond with the serrations of its respective resistance-jaw, it being obvious that these serrations are provided in order to permit each adjustable jaw to be locked firmly in engagement with its respective fixed jaw when the tool is brought to bear upon a nut, bolt-head, or similar part, and that the slight transverse movement of each adjustable jaw is provided for the purpose of permitting the unlocking of the adjustable jaw from the fixed jaw when the tool is removed from the part upon which it is operating.

In order to facilitate the release or unlocking of the adjustable jaw, I prefer to provide a spring—such, for example, as that illustrated at 9—for the purpose of separating the fixed and movable jaws. This spring may be carried by either one of these parts, but in the present case is secured to the adjustable jaw and works in a cut-away portion 10 of the rear edge thereof, the spring bearing at or near its center against the serrations of the fixed jaw to normally hold the adjustable jaw away from the fixed jaw.

The inner edge of the jaw j' is stepped, as shown at 13 and 14, these faces being, as will be evident, shaped so as to correspond to the contour of the nut or bolt-head which is to be turned by the wrench.

It will be obvious that in the construction illustrated the wrench is intended to engage hexagonal pieces; but it will be clear that square-headed bolts or nuts might also be manipulated thereby. In order to adapt the jaws for other shapes of nuts or bolt-heads, the contour of the inner edge of this jaw may be varied at will.

For the purpose of properly guiding the inner end of each of the jaws j and j' I may make use of a stud or pin, such as 15, in position to cooperate with both of the adjustable jaws. In the construction shown herein the adjustable jaws have the extreme inner ends of their inner edges so shaped as to be guided by this pin 15, while at the same time a slight transverse movement of each of the inner ends of the adjustable jaws is permitted. It will be noticed that these jaws have faces 16 and 16', substantially parallel with the convergent serrated faces of the fixed jaws, respectively, and faces 17 and 17', which lie within the respective faces 16 and 16'.

As before stated, the adjustable jaws of my improved wrench should be capable of movement automatically both toward their working positions and toward their normal positions, and for the purpose of returning each of the adjustable jaws to its normal position after the tool is released from engagement with a nut or other member I prefer to make use of a spring or its equivalent. In the present instance I have shown a strong coiled spring 18 seated in an opening 19, formed by

complementary recesses in the head of the wrench adjacent to the point of connection of the fixed jaws with the handle of the wrench and in the inner end of the inner side of the face-plate f and f' . (See Fig. 5.) This spring is in position to engage the inner ends of the adjustable jaws of the wrench and to be put under compression thereby, as shown in Fig. 4, when a nut or other part is being manipulated, while when the tool is released from such part the expansion of the spring will force the adjustable jaws back to their normal positions, (shown in Fig. 1,) it being understood, of course, that the two springs and $9'$ must have first released the adjustable jaws from engagement with the serrations of the fixed jaws. Hence the jaws j and j' are self locking and unlocking jaws, as neither the adjustment thereof to grip the nut or bolt-head nor the release thereof from such part requires any manipulation by the operator.

The face-plates will usually be secured to the head of the main member of the wrench by means of rivets, as shown at 20, Figs. 1 and 4, so as to inclose all of the working parts and protect the same from injury. These face-plates and the complementary portion of the main member of the wrench are cut away, as indicated in the drawings, to permit the wrench to be applied to a nut or other part from either side of the tool.

As the complementary adjustable jaws of the wrench-head are movable longitudinally along the convergent fixed faces of the wrench, it will be clear that this longitudinal movement of the adjustable jaws will also cause them to be actuated transversely toward and from each other, to thereby bring the faces 13 and 13' thereof into position to engage nuts or bolt-heads of different sizes. Moreover, by providing a series of such faces 13 and 13' and 14 and 14' it will be obvious that a series of complementary nut-engaging members will be formed, including between them spaces of graduated sizes, these walls being, as will be obvious, capable of engaging nuts and bolt-heads of varying sizes within wide limits.

Having described my invention, I claim—

1. A nut-wrench having a resistance-jaw and a self locking and unlocking automatically-adjustable jaw.

2. A nut-wrench having a pair of resistance-jaws and a pair of self-locking complementary jaws automatically adjustable in op-

posite directions and carried, respectively, by said resistance-jaws.

3. A nut-wrench having a pair of convergent resistance-jaws and a pair of self-locking complementary jaws carried, respectively, by said resistance-jaws and automatically adjustable in opposite directions longitudinally of such resistance-jaws toward and from each other.

4. In a nut-wrench, the combination of a serrated resistance-jaw and a jaw automatically adjustable in opposite directions and having a serrated jaw coacting with the serrated resistance-jaw.

5. In a nut-wrench, the combination of a serrated resistance-jaw; an automatically-adjustable jaw having a serrated edge coacting with the serrated resistance-jaw; and a spring carried by one of said jaws, for normally separating said jaws.

6. In a nut-wrench, the combination of a resistance-jaw; a self-locking jaw automatically adjustable in opposite directions between two extreme positions; and a spring for returning said adjustable jaw to one of said extreme positions.

7. In a nut-wrench, the combination of a serrated resistance-jaw and an automatically-adjustable jaw having a serrated edge coacting with the serrated resistance-jaw, one of said jaws having a slot substantially parallel with its serrated edge, and the other jaw having a pin of less width than the width of said slot and in position to permit engagement and disengagement of the serrated edges of the jaws.

8. A nut-wrench having a resistance-jaw; a self-locking jaw automatically adjustable in opposite directions; and means for guiding both ends of the adjustable jaw.

9. A nut-wrench having a pair of resistance-jaws and a pair of complementary jaws carried, respectively, by said resistance-jaws and having their holding-faces stepped to form a series of complementary nut-engaging members, and automatically adjustable toward and from each other to decrease and increase the distance between said jaws and thereby the sizes of the nut-receiving openings.

KARL GERHARDT.

Witnesses:

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