No. 731,260. PATENTED JUNE 16, 1903.

H. S. WORDEN.

WRENCH.

APPLICATION FILED MAR. 10, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

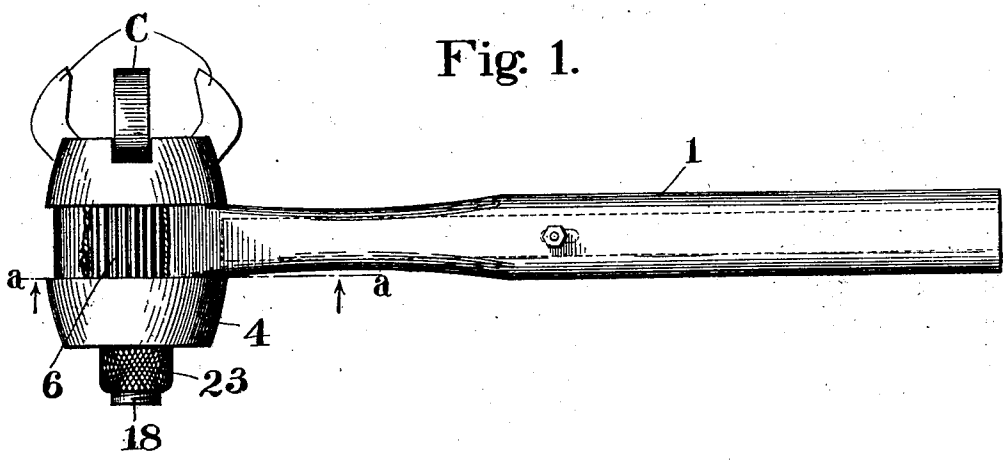
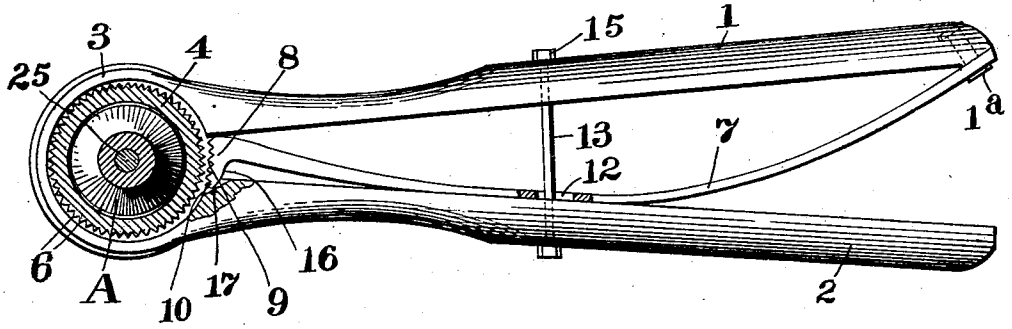


Fig. 2.



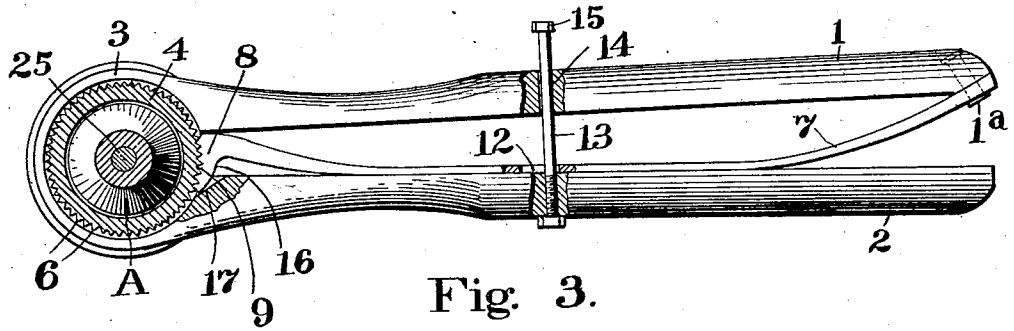


Fig. 3.

Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 6.

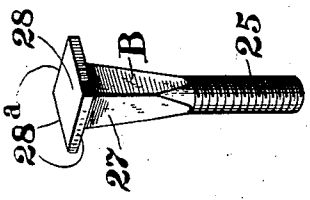


Fig. 5.

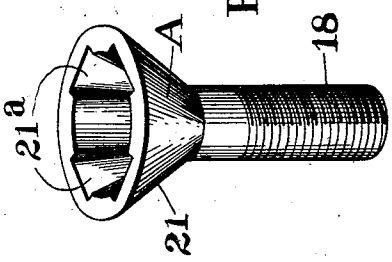


Fig. 4.

Witnesses

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No. 731,260. Patented June 16, 1903.

UNITED STATES PATENT OFFICE.

HIRAM S. WORDEN, OF NICHOLSON TOWNSHIP, PENNSYLVANIA.

WRENCH.

SPECIFICATION forming part of Letters Patent No. 731,260, dated June 16, 1903.

Application filed March 10, 1903. Serial No. 147,169. (No model.)

To all whom it may concern:

Be it known that I, HIRAM S. WORDEN, a citizen of the United States, residing in Nicholson township, in the county of Wyoming and State of Pennsylvania, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

The purpose of my invention is to provide in a wrench improved means for locking the head of the wrench to the handle for the purpose of turning the head in either direction and for automatically releasing the head from the handle to enable the latter to be turned relatively to the head, these operations of locking and releasing the head and handle being accomplished automatically when the handle is gripped and released by the operator.

The invention also includes improved means for holding and adjusting the jaws in the wrench-head.

In the accompanying drawings, which illustrate the invention, Figure 1 is a top plan view of the complete wrench, the strap or holder which encircles the head being partly broken away. Fig. 2 is a side view of the same, partly in section, on the line *a a* of Fig. 1, portions of the spring and one of the handle-arms being also shown in section and the parts being shown in their normal positions. Fig. 3 is a similar view with the parts shown in position for turning the head. Fig. 4 is a central longitudinal section through the wrench-head, showing also portions of the spring and one of the handle-arms and also the dog which grips the head; and Figs. 5 and 6 are perspective views showing the parts of the jaw holding and adjusting device.

Referring to the drawings, 1 and 2 indicate a pair of handle-arms, which are connected together by a circular metal band or holder 3, formed integrally with the handles, as shown, or otherwise suitably secured thereto. Within the band or holder is loosely arranged a rotatable wrench-head or chuck 4, consisting of a hollow cylinder having a peripheral groove 5, adapted to receive the circular band or holder. A series of teeth or serrations 6 extend around the periphery of the head in the bottom of the groove, these serrations, as shown, extending longitudinally of the head. Between the handle-arms is arranged a flat bow-spring 7, one end of which is suitably secured by a pin 1^a to the free end of the handle 1. The central portion of the spring rests against the inner face of the handle-arm 2, and a dog 8 is connected to the inner end of the spring. This dog, as shown, is located between the inner ends of the handle-arms, adjacent to the head 4, and has a curved serrated or toothed face 9 opposite the serrations on the head. One end 10 of the dog extends into a recess 11 in the handle-arm 2, and is thus held against lateral displacement. A longitudinal slot 12 is formed in the bow-spring near its central portion, and a stud or pin 13, secured to one of the handle-arms 2, extends through the slot 12 and through a perforation 14 in the opposing handle-arm. This stud forms a guide for the spring 7, preventing lateral displacement of the spring, and a nut or head 15 upon the stud forms a stop which limits the movement of the handle-arms.

The handle-arms are shown in their normal relation in Fig. 1. When it is desired to use the wrench, the compression of the handle-arms toward one another by the grip of the operator compresses the bow-spring between the arms, and as one end of the spring is firmly secured to the outer end of the arm 1 the opposite end of the spring is forced in the direction of the head of the wrench and the dog is forced against the head. The teeth upon the dog engage the teeth upon the head of the wrench, and as the dog is held between the handle-arms the head and handle become firmly locked together, as shown in Fig. 3. As the rear face of the dog is curved or inclined, as indicated by the numeral 16, and the bottom 17 of the slot is inclined in the same direction, forming coöperative cam-surfaces, it will be seen that the gripping of the dog between the handle-arms not only holds the dog against lateral and rearward movement, but forces it firmly against the head. Increased pressure upon the handle-arms increases the pressure of the dog against the head. The wrench-head, which carries the jaws, may therefore be turned in either direction by simply gripping and turning the handle. When the handle-arms are released,

they are returned to their normal position (shown in Fig. 2) by the relaxation of the spring 7 and the strap or holder 3. When the spring 7 is relaxed, the dog 8 is drawn out of engagement with the head of the wrench, as will be evident from an inspection of Figs. 2 and 3, and the handle may then be turned relatively to the head in either direction.

It is obvious that the mechanism described for turning the head may be used with wrenches having various forms of jaws and jaw-operating devices. The jaws and adjusting devices which I have provided are clearly shown in Figs. 4, 5, and 6. A longitudinally-adjustable jaw-holder is arranged within the interior of the head 4, this jaw-holder comprising the parts A and B. (Shown in said figures.) The part A consists of a shank 18, which extends through and is guided within an opening 19 in the end 20 of the wrench-head, and at the inner end of this shank is a part 21, preferably conical in form, which forms a guiding-piece for the inner end of the shank. This guiding-piece bears against the inner wall 22 of the wrench-head and serves as a bearing for the springs hereinafter mentioned. The outer end of the shank is threaded, and an adjusting-nut 23 is arranged upon said threaded portion. A threaded socket 24 extends longitudinally of the shank 18, and inclined guide-slots 21^a are formed in the guide-piece 21, said slots sloping toward the socket.

The part B, as shown, consists of a stud having a threaded end portion 25, which fits into the threaded socket 24 in the part A. The opposite end portion 27 is preferably angular, as shown, and an angular head 28 overhangs the angular portion of the stud, forming ledges 28^a. The form of the head and the number of angular faces upon the part 27 depend upon the number of jaws in the wrench, said parts being triangular, square, or pentagonal for three, four, or five jaws, respectively. The jaws C, which are alike in construction, are arranged in inclined grooves 29 in the walls of the wrench-head, and each jaw is provided near its inner end with a notch 30, which is engaged by one of the ledges 28^a. Each jaw is also provided with a flat spring 31, which is secured to the back of the jaw near the middle portion of the latter. The free ends of the springs extend into grooves 21^a in the part A. These springs tend to hold the notches 30 in engagement with the holding-ledges 28 and to spread the jaws.

When the adjusting-nut 23 is turned so as to draw the shank outward, the jaws are drawn into the head by the ledges 28, and the outer ends of the jaws are forced toward one another into position to grip a nut or other object which is to be turned. When the nut 23 is turned in the opposite direction, the springs cause the jaws to spread and move outwardly along the inclined grooves 29.

It will be obvious that the parts A and B may be variously formed, and I do not wish to confine myself to the exact design shown in the drawings.

Having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a wrench, a pair of relatively movable handle-arms, a circular holder connecting adjacent ends of said arms, a head rotatably held within said holder, jaws carried by said head, a dog arranged adjacent to the head, and means, operated by the handle-arms, for forcing said dog against the head when said arms are pressed toward one another.

2. In a wrench, a pair of relatively movable handle-arms, a circular strap or holder connecting adjacent ends of said arms, one of said arms having a cam-surface adjacent to its point of connection with the holder, a head rotatably held within said holder, jaws carried by said head, a dog arranged adjacent to said cam-surface and adapted to be forced thereby into engagement with the head when the handle-arms are pressed together, and a spring arranged to move said dog away from the head when the handle-arms are released.

3. In a wrench, a pair of relatively movable handle-arms, a circular holder connecting adjacent ends of said arms, a head rotatably held within said holder, jaws carried by said head, a dog between said arms adjacent to the head, and means, operated by the handle-arms, for forcing said dog against the head when said arms are pressed toward one another.

4. In a wrench, a pair of relatively movable handle-arms, a circular strap or holder connecting adjacent ends of said arms, a head rotatably held within said holder, jaws carried by said head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, and a dog at the opposite end of said spring adapted to be forced into and out of engagement with the head when the handle-arms are compressed and released, respectively.

5. In a wrench, a pair of relatively movable handle-arms, a circular strap or holder connecting adjacent ends of said arms, one of said arms having a groove on its inner face adjacent to its point of connection with the holder, a head rotatably held within said holder, jaws carried by said head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, and a dog at the opposite end of said spring, said dog extending partly into and being guided by the groove in the handle-arm.

6. In a wrench, a pair of relatively movable handle-arms, a circular holder connecting adjacent ends of said arms, a head rotatably held within said holder, jaws carried by said head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, said spring having a longitudinal slot in its central por-

tion, a dog at the opposite end of said spring adapted to be forced against the head by the spring when the handle-bars are pressed toward one another, and a guide-pin secured to one of said arms and extending through said slot.

7. In a wrench, a pair of relatively movable handle-arms, a circular holder connecting adjacent ends of said arms, a head rotatably held within said holder, jaws carried by said head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, said spring having a longitudinal slot in its central portion, a dog at the opposite end of said spring adapted to be forced against the head by the spring when the handle-bars are pressed toward one another, and a guide-pin secured to one of said arms and extending through said slot and through a perforation in the opposing handle-arm, said pin having a stop thereon for limiting the movement of the arms.

8. In a wrench, a pair of relatively movable handle-arms, a circular strap or holder connecting adjacent ends of said arms, a head rotatably held within said holder, said head having a circular series of teeth or serrations on its periphery, jaws carried by said head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, a dog at the opposite end of said spring, said dog having teeth or serrations adapted to engage the teeth or serrations on the head.

9. In a wrench, the combination with a head having an annular groove and jaws carried by said head, of a pair of relatively movable handle-arms, a strap or holder connecting adjacent ends of said arms and fitting within the groove in the head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, and a dog at the opposite end of said spring adapted to engage the wrench-head when the handle-arms are pressed toward one another.

10. In a wrench, the combination with a head having an annular groove and teeth or serrations in the bottom of said groove, and jaws carried by said head, of a pair of relatively movable handle-arms, a strap or holder connecting adjacent ends of said arms and fitting within the groove in the head, a bow-spring arranged between the arms and having one of its ends secured to the free end of one of said arms, and a toothed dog at the opposite end of said spring adapted to engage the teeth upon the head when the handle-arms are pressed toward one another.

11. In a wrench, a hollow cylindrical head and means for rotating the same, jaw holding and adjusting devices comprising a threaded shank extending through one end of the head and having a guide-piece at its inner end, an adjusting-nut upon said threaded portion, a stud connected to the shank and having laterally-projecting ledges, jaws having notches engaging said ledges, and springs attached to the backs of the jaws and bearing upon said guide-pieces.

12. In a wrench the combination of a hollow cylindrical head having longitudinal inclined grooves in its inner wall, means for rotating the head, jaw holding and adjusting devices comprising a threaded shank extending through one end of the head and having a laterally-projecting guide-piece at its inner end, an adjusting-nut upon said threaded portion, a stud connected to the shank and having laterally-projecting ledges, jaws arranged within said grooves in the head and having notches engaging said ledges, and springs attached to the backs of the jaws and bearing upon said guide-piece.

13. In a wrench, a hollow cylindrical head having longitudinal inclined grooves, means for rotating the head, jaw holding and adjusting devices comprising a threaded shank extending through one end of the head, said shank having a laterally-projecting guide-piece and inclined guide-grooves in said guide-piece, a stud secured to the shank and having laterally-projecting ledges, jaws arranged within the inclined grooves in the head, said jaws having notches engaging the ledges on the stud, and springs secured to the backs of the jaws and projecting into the grooves in the guide-piece.

In testimony whereof I affix my signature in presence of two witnesses.

HIRAM S. WORDEN.

Witnesses:
N. B. REYNOLDS,
R. H. REYNOLDS.