

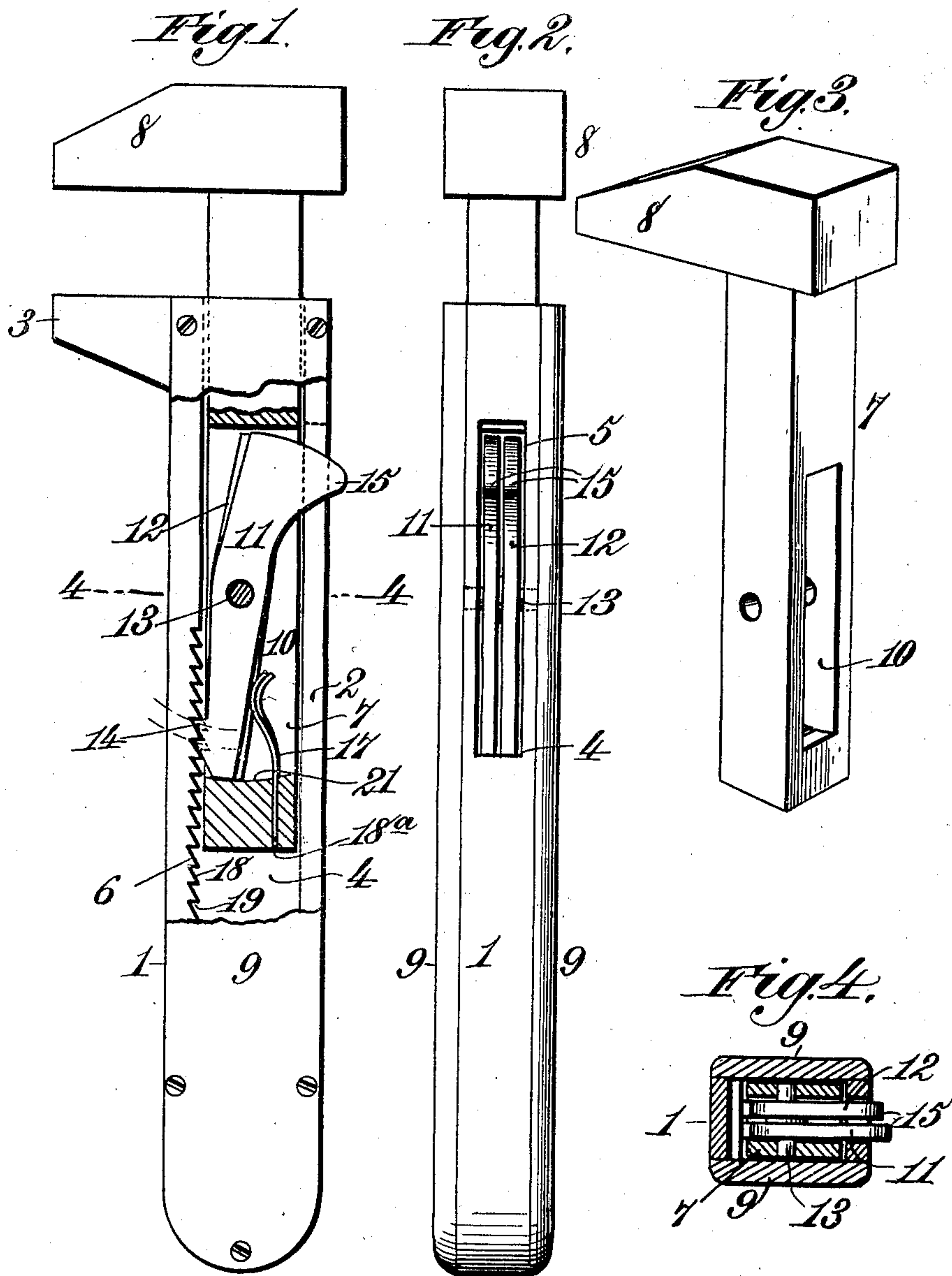
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Patented July 8, 1902.

E. L. UTLEY.  
WRENCH.

(Application filed Nov. 5, 1901.)

(No Model.)



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## WRENCH.

SPECIFICATION forming part of Letters Patent No. 704,407, dated July 8, 1902.

Application filed November 5, 1901. Serial No. 81,211. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD L. UTLEY, a citizen of the United States, residing at Fayetteville, in the county of Cumberland and State of North Carolina, have invented new and useful Improvements in Wrenches, of which the following is a specification.

This invention relates to wrenches, and particularly to that type of wrenches ordinarily termed "monkey-wrenches;" and it has for its object to provide a wrench of the class referred to which will be simple, strong, and inexpensive in construction and convenient and efficient in operation and wherein the jaws may be adjusted with great accuracy and with exceeding nicety or fineness of adjustment and in its adjustment will necessitate the use of but one hand of the artisan.

It also has for its object to improve and simplify and render more efficient and convenient this class of wrenches generally.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a sectional side elevation of my improved wrench. Fig. 2 is a rear edge view of the same. Fig. 3 is a detail perspective view of the movable jaw and its shank, and Fig. 4 is a cross-sectional view taken on the line 4 4 of Fig. 1.

My improved wrench comprises two principal parts consisting practically of a fixed and a movable part, the fixed part consisting of a hollow handle in which is adjustably fitted the movable part consisting of a sliding jaw.

Referring to the drawings, the numeral 1 indicates the fixed or handle portion consisting of a metallic bar or shank 2, provided at one end with an integral laterally-projecting jaw 3 and slotted or mortised on one side from its jaw end nearly to the opposite end, as at 4. The slot or mortise 4 is preferably rectangular in cross-section and forms a socket or guideway in which the shank of the movable jaw, presently to be described, is fitted and is adapted to move. In what I term the "upper" edge or side of the handle

1 is formed a longitudinal elongated slot 5, and formed on the inner lower wall of the slot 4 are rack-teeth 6.

The numeral 7 indicates the shank of the movable jaw, consisting of a metallic bar of a shape and size in cross-section to permit it to be movably fitted in the slotted handle, and it is provided at its outer end with an integral laterally-projecting jaw 8, constituting the movable jaw of the wrench. The shank 7 is fitted and is freely movable in the slot 4 of the handle and is held in place therein by a cover-plate 9, screwed or otherwise suitably secured to the side of the handle. The shank 7 is slotted or mortised out intermediate its ends, as at 10, said slot or mortise extending entirely through the shank from side to side, as shown, and in said slot or mortise are arranged two pawls 11 and 12, which are fulcrumed intermediate their ends on a pivot-pin 13, which passes through the shank 7. Each of said pawls is provided at its rear end with a tooth 14, one or more, which normally engages the ratchet 6, and at its other end is provided with an upwardly-projecting enlargement 15, forming a thumb-piece. The teeth of the pawls are normally held in engagement with the ratchet-teeth 6 by leaf-springs 17, which are fastened at their rear ends in slits or nicks 18<sup>a</sup>, formed in the rear ends of the shank 7, as shown, and at their forward or free ends bear on the upper edges of the pawls 10 above the teeth 14 and press the latter into engagement with the rack-teeth 6. One of the pawls, as 12, is made slightly longer than the other, whereby in adjusting the wrench if one of the pawls should fail to engage the proper rack-teeth to hold the movable jaw closely to its adjustment the other pawl will effectually do so. In other words, the teeth of the two pawls are offset relative to each other, whereby a very fine, close, and accurate adjustment of the wrench is rendered possible. The thumb-pieces 15 of the pawls project up through the slot 5 above the upper edge of the handle 1 in convenient position to be engaged by the thumb of the hand employed in holding the wrench.

As before stated, the springs 17 normally operate to hold the pawls in engagement with the rack-teeth 6 and lock the movable jaw in its adjusted position. When it is desired to



adjust the wrench to fit the article to be grasped or operated on, it is merely necessary to grasp the handle 1 in one hand and with the thumb of the same hand press on the thumb-pieces 15, thereby lifting the pawls out of engagement with the rack-teeth 6, and by pushing forward on the thumb-pieces 15 at the same time the latter will move the shank 7 of the movable jaw 8 from out the handle 1. When the desired adjustment has been effected in this manner, it is only necessary to remove the pressure from the thumb-pieces, when the springs 17 will immediately force the teeth 14 of the pawls into engagement with the rack-teeth 6 and lock the movable jaw in its adjusted position. As shown, each of the rack-teeth 6 has a beveled side 18 and a straight or vertical side 19, the beveled sides of the teeth being disposed toward the fixed jaw 3 of the handle. It follows, therefore, that in order to adjust the jaws 3 and 8 closer together it is merely necessary to thrust the shank 7 within the handle 1, the pawls at such time idly slipping over the beveled faces 18 of the rack-teeth. When the wrench is in actual use, the teeth 14 of the pawls engage the straight or vertical sides 19 of the rack-teeth 6 and hold the movable jaw against displacement.

An objection that has commonly been found in sliding-jaw wrenches employing pawls for holding them in their adjusted positions has consisted in the fact that the teeth of the pawls and racks have been so formed and the pawls have been pivoted relatively to the racks in such manner that in order to disengage the pawls from the racks it has been frequently necessary to give a slight backward movement to either the part carrying the pawls or the racks to enable the teeth of the pawls to swing clear of the teeth of the racks, and such arrangements have also prevented the jaws of the wrench from being locked tightly about the article grasped between them, owing to the slight lost motion between the pawl and rack teeth. In my improved wrench the abutting faces 20 of the pawl-teeth 14 are so formed relatively to the pawls and the latter are so fulcrumed relatively to the rack 6 that when the pawls are swung into and out of engagement with the rack the points of the pawl-teeth 14 will swing in the arc of a circle that is divergent from the abutting faces 19 of the rack-teeth, and hence no parts of the pawl-teeth will ever come in contact with the rack-teeth excepting at such times as when the pawl-teeth and rack-teeth are fully and completely intermeshed. This being true, the pawls may be freely swung into and out of engagement with the rack without the pawl-teeth interfering in any way during such swinging movement of the pawls with the rack-teeth. Hence to release the pawls it is not necessary to first give even the slightest movement to the movable jaw, and as there is absolutely no lost motion whatsoever between the teeth of the

pawls and the rack the movable jaw may be adjusted to tightly clamp an article between itself and the fixed jaw and locked in such adjusted position without sacrificing in any degree the tight clamping action of the jaws. By causing the thumb-pieces 15 to project through the slot 5 in the manner described they form stops that limit the movement of the movable jaw in both directions and prevent the entire withdrawal of the movable jaw from the handle 1. I have shown and described two differential pawls, and for the reasons stated such an arrangement is preferred; but it will be manifest that but a single pawl may be employed. It will also be manifest that each pawl may be provided with one or a plurality of teeth 14.

I prefer to make the rear end wall of the slot 4 concaved or curved on the arc of a circle having the pivot 13 as a center, as indicated at 21, and correspondingly curve the rear ends of the pawls 11 and 12 and arrange the rear ends of the pawls in proximity to said curved wall, so that when excessive strain is brought to bear on the jaws it will be transferred from the pivot 13 to the wall 21.

Having described my invention, what I claim is—

1. In a wrench, the combination with a hollow handle provided with a fixed jaw and provided internally with a toothed rack, of a movable jaw having a shank adjustably fitted in the hollow handle, a pawl carried by said shank, means for normally holding one end of the pawl in engagement with the rack, and a thumb-piece carried by the other end of pawl and projecting through an elongated slot formed in the side of the handle opposed to the rack, substantially as described.

2. In a wrench, the combination with a hollow handle provided with a fixed jaw and provided internally with a toothed rack, of a movable jaw having a shank movably fitted in the hollow handle and longitudinally slotted from side to side intermediate its ends, a pawl disposed in said slot and fulcrumed therein intermediate its ends, said pawl being provided at one end with a tooth adapted to engage the rack and at its other end with a thumb-piece projecting through an elongated slot formed in the hollow handle, and means for normally holding the pawl in engagement with the rack, substantially as described.

3. In a wrench, the combination with a hollow handle provided with a fixed jaw and provided internally with a toothed rack each tooth of the rack having a straight and an inclined face, the inclined faces of the teeth being disposed toward the fixed jaw, of a movable jaw having a shank movably fitted in the hollow handle and longitudinally slotted from side to side intermediate its ends, a pawl disposed in said slot and fulcrumed therein intermediate its ends, said pawl being provided at one end with a tooth adapted to engage the rack and at its other end with a



thumb-piece projecting through an elongated slot formed in the hollow handle, and a spring arranged to normally hold the pawl in engagement with the rack, substantially as described.

5 4. In a wrench the combination with a hollow handle provided with a fixed jaw and provided internally with a toothed rack, each tooth of the rack having a straight and an inclined face, the inclined faces of the teeth being disposed toward the fixed jaw, of a movable jaw having a shank movably fitted in the hollow handle and longitudinally slotted from side to side intermediate its ends, 10 two pawls of unequal length disposed in said slot and fulcrumed therein intermediate their ends, each of said pawls being provided at one end with a tooth adapted to engage the rack and at its other end with a thumb-piece 20 projecting through a slot formed in the hollow handle, and springs arranged to normally hold the pawls in engagement with the rack, substantially as described.

5 5. In a wrench, the combination with a hollow handle provided with a fixed jaw and

provided internally with a toothed rack, each tooth of the rack having a straight and an inclined face, the inclined faces of the teeth being disposed toward the fixed jaw, of a movable jaw having a shank movably fitted 30 in the hollow handle, a pivoted pawl carried by said shank and provided with a tooth adapted to engage the rack, the teeth of the rack and pawl being so constructed and arranged that when the pawl is swung into and 35 out of engagement with the rack the point of the pawl-tooth will move in the arc of a circle divergent from the adjacent abutting face of the corresponding rack-tooth and the beveled spaces of said teeth will clear one another without touching, substantially as described and for the purpose specified. 40

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD L. UTLEY.

Witnesses:

GEO. W. REA,

VINTON COOMBS.