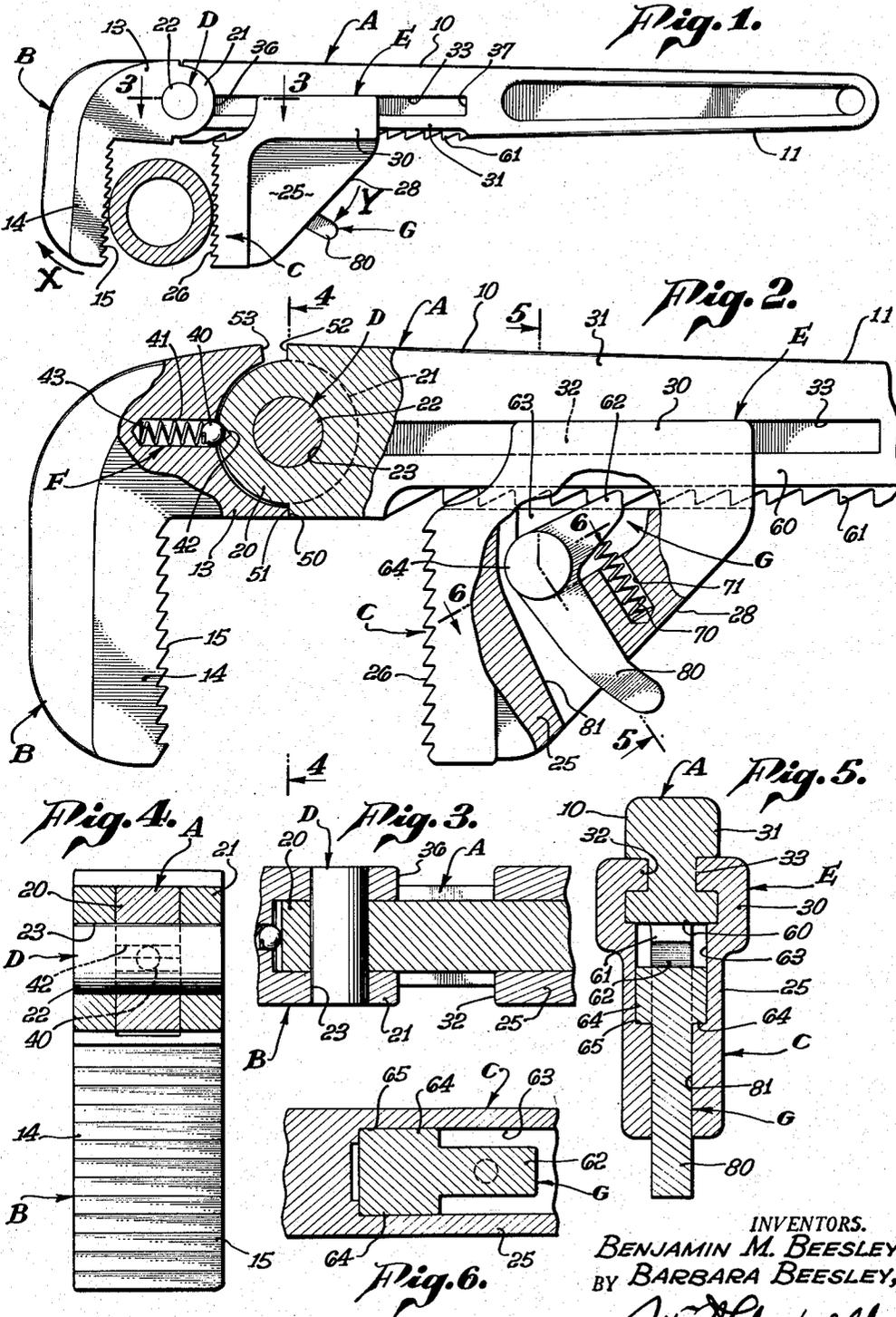


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B. M. BEESLEY ET AL
SLIDABLE INNER JAW WRENCH HAVING
A PIVOTED RACK CATCH
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INVENTORS.
BENJAMIN M. BEESLEY,
BY BARBARA BEESLEY,

W. H. McNeill
ATTORNEY.

UNITED STATES PATENT OFFICE

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SLIDABLE INNER JAW WRENCH HAVING A PIVOTED RACK CATCH

Benjamin M. Beesley and Barbara Beesley,
Ventura, Calif.

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1

This invention has to do with a wrench and it is a general object of the present invention to provide a simplified, improved, and easily operated wrench practical for handling pipes, rods, or other like objects.

Various constructions have been proposed for devices known as pipe wrenches and although some of these may be satisfactory the construction ordinarily employed in pipe wrenches is cumbersome and slow to operate, mainly because it is characterized by a screw adjustment and the parts are such that they are subject to becoming clogged, distorted, or otherwise rendered difficult to operate or even completely inoperative.

It is a general object of the present invention to provide a pipe wrench which is very simple and inexpensive of construction and which is simple and convenient to operate. In the construction of the present invention there are two cooperating jaws, one of which is pivoted while the other slides and the sliding jaw is provided with setting means that can be easily and quickly operated. The construction of the present invention is free of screws or like devices that are tedious to operate or are subject to becoming fouled.

It is a further object of the present invention to provide a wrench of the character mentioned involving various features of construction which make the device exceedingly simple and inexpensive of manufacture and yet practical and durable. The device of the present invention involves few simple working parts and is such that the several parts can be readily assembled or placed together and in the final assembly the several parts are all permanently joined or held assembled by the application of a single pivot pin which serves as the means for coupling the shank of the tool with one of the jaws.

The various objects and features of our invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of the wrench showing it applied to a pipe. Fig. 2 is an enlarged view of the wrench showing the body construction with parts broken away to show the details of construction. Fig. 3 is an enlarged detailed sectional view taken as indicated by line 3—3 on Fig. 1. Fig. 4 is a detailed sectional view taken as indicated by line 4—4 on Fig. 2. Fig. 5 is a detailed sectional view taken as indicated by line

2

5—5 on Fig. 2 and Fig. 6 is a detailed sectional view taken as indicated by line 6—6 on Fig. 2.

The device of the present invention involves, generally, a body A carrying a pair of jaws, one a pivoted jaw B, the other a sliding jaw C, means D pivotally connecting jaw B to the body, means E slidably connecting the jaw C to the body, detent means F normally yieldingly holding the jaw B in normal working position and ratchet means G acting to releasably set the jaw C on the body A.

The body A is an elongate element characterized by two parts, a shank 10 and a handle 11. The shank and handle are preferably integrally connected or joined end to end and are preferably in alignment with each other, as shown in the drawings.

The jaw B is the outer jaw, in that it is connected to the outer end of shank 10, and in its preferred form it is an L-shaped part involving a mounting arm 13 and a gripping arm 14. The gripping arm 14 has a suitably shaped and finished gripping face 15 and the parts are normally arranged and related so that the face 15 normally extends in a direction generally lateral to the longitudinal axis of the body A and faces inward or toward the inner jaw C.

The mounting arm 13 of jaw B is angularly related to the gripping arm and may extend at right angles thereto, as shown in the drawings, it being arranged to extend from the jaw 14 toward the outer end of the body A.

The means D serves to pivotally connect the jaw B with the body A and involves, generally, a hinge connection between the jaw and the body, the axis of which is transverse of the longitudinal axis of the body. In practice the construction and formation of means D may vary widely. In the case illustrated the means D involves, generally, meshing parts on the body and jaw, for instance meshing flanges 20 and 21 joined by a simple pivot pin 22. In the case illustrated there is a single central flange 20 projecting from the forward or outer end of the shank 10 of body A and there is a pair of spaced flanges 21 on the end of mounting arm 13 of jaw B. The flange 20 extends or enters between the flanges 21. The flanges 20 and 21 have openings 23 which register when the flanges are properly engaged and the pin 22 is carried in the openings 23, the axis of the openings and pin being transverse to the longitudinal axis of the body A. In practice the pin may be made secure or fast in any suitable manner. For example it may be made to have a press-fit either into flange 20 or into the flanges

21, in which case it will remain in place unless deliberately dislodged, there being no tendency for it to become dislodged in normal operation of the tool.

The inner jaw C is in the nature of an adjustable abutment member or block. As shown in the drawings the jaw C may include a body 25 having a forward gripping face 26 which is disposed to oppose the face 15 of the jaw B. In the preferred arrangement the face 26 is normal to or at right angles to the longitudinal axis of the body A and it is formed or finished to have the desired gripping action. It is to be understood that in practice the gripping faces 15 and 26 of the jaws may be shaped, formed, or finished to have suitable gripping action and, in practice, we may follow constructions found in devices of this kind. For example, if desired these faces may be on parts known as inserts which are applied to the jaws rather than being formed directly on the jaws as we have shown in the drawings. In the form of jaw body 25 shown in the drawings the body has an inner side of substantial length opposing or adjoining the shank 10 of body A while the rear outer portion is beveled away as at 28.

The means E slidably connecting the inner jaw C and the shank preferably involves cheek plates 30 projecting from the body 25 of jaw C to overlie the sides 31 of the shank 10 and ribs 32 on the inner sides of the cheek plates extending parallel with the shank 10 and slidably engaged in guideways 33 extending lengthwise in the sides 31 of the shank 10. In accordance with our invention the cheek plates 30 are rigidly formed or joined with the body 25 of jaw C to be an integral continuation of the jaw and the ribs 30 are integrally formed on the inner sides of the plates.

In accordance with our invention we extend the guideways 33 to occur opposite each other in the outer sides 31 of the shank 10 to the forward end of the shank 10 where they are open so that the jaw C can be assembled onto the shank when the pin 22 is removed and the jaw B is not in place. When the jaw B is in place and the pin 22 is in operating position the edge portions 36 of flanges 21 close the forward ends of the guideways 33 and thus positively prevent displacement of the jaw C from the shank. At the inner end portion of the shank the guideways terminate at end walls 37 which positively prevent displacement of the jaw C from the inner end of the shank.

The means F is a detent means provided to normally yieldingly hold the jaw B on the end of shank 10 so that the arm 14 of the jaw extends laterally of the shank causing the gripping face 15 to face the gripping face 26 of the jaw C. The detent means may vary widely in practice. However, in the preferred form of our invention it involves merely a detent ball 40 carried in a socket 41 in the jaw B to cooperate with a notch 42 in the outer end portion of flange 20. The socket 41 is deep enough to accommodate and hold an helical compression spring 43 which seats in the bottom of the socket and bears on the ball 40 to normally yieldingly urge the ball outward in the socket. The notch 42 in the flange 20 has divergent or beveled side walls which act to wedge the ball 40 back or into the socket 41 against the resistance of spring 43 when sufficient pressure is applied tending to turn the jaw B.

In the construction that we have shown the ends of the shank 10 and the arm 13 of jaw B cooperates to form stops to limit pivotal move-

ment of the jaw B on or relative to the shank. We may proportion or relate the parts so that when the jaw B is in the normal position where it is held by the detent means F shoulders 50 and 51 on the arm 13 and shank 10, respectively, cooperate to positively stop movement of the jaw B toward the jaw C. Shoulders 52 and 53 on the shank 10 and arm 13, respectively, are apart when the jaw B is positioned as just described but serve to positively stop or limit movement of the jaw B in the direction indicated by the arrow X in Fig. 1.

The ratchet means G is provided as a means for releasably setting the jaw C in the desired position opposing the jaw B and in the form that we have provided it is an easily operated means providing quick convenient means for adjusting the jaw C along the shank A.

In accordance with our present construction the means G involves, generally, a rack on the shank 10 and a pawl carried by the jaw C cooperating with the rack. In the construction shown a rib 60 projects from the edge of the jaw shank 10 which faces jaw C and a plurality of ratchet teeth 61 are provided on the rib, the teeth being in the form of ratchet teeth faced toward the outer end of the shank. A pawl 62 is carried in a recess 63 provided in the body 25 of jaw C from the side opposing the shank 10 of body A. In the construction illustrated the pawl is pivotally supported so that its active or outer end is movable into and out of engagement with the ratchet teeth 61. We have shown trunnions 64 projecting from opposite sides of the pawl 62 and rotatably held in bearing sockets 65 provided at the inner portion of the recess 63. The recess 63 and the socket 65 are shaped and related so that the trunnions are effectively rotatably supported in the sockets in a manner to support the pawl so that its outer end can be moved into and out of engagement with the teeth 61.

A spring 70, preferably a helical compression spring, normally yieldingly urges the pawl 62 into active position where it engages teeth of the rack. In the arrangement illustrated we show the spring 70 carried in a recess or socket 71 provided in the body 25 of the jaw C so that it carries the spring in a manner to bear on the top of the pawl.

The pawl 62 is provided with a projection in the form of a finger 80 which projects from the pawl outward through an extension 81 of recess 63. The extension 81 of the recess opens at the inclined back corner 28 of the body 25 and the finger 80 is proportioned to project somewhat outward from or beyond the recess extension 81 so that it projects from the exterior of the jaw C in the manner illustrated in Figs. 1 and 2 of the drawings. The recess extension 81 is proportioned to allow movement of the finger 80 so that it can be swung in the direction indicated by the arrow Y in Fig. 1, causing the pawl 62 to be moved so that it is lifted out of engagement with the teeth 61.

It will be apparent that with the construction just described the ratchet mechanism is such that the jaw C can be rapidly and easily slid forward on the shank 10 to any desired position for operation and through the action of the spring 70 the pawl immediately sets itself or engages a tooth 61 setting the jaw C in position on the shank 10. To release or move the jaw back along the shank or toward the inner end of the shank it is merely necessary to swing the finger 80 in the direction indicated by the arrow Y in Fig. 1,

5

whereupon the jaw is freed and can be slid to any desired position along the shank.

It is to be observed that the recess 63 in the body 25 of jaw C is widened to facilitate entrance of the trunnions into the bearing sockets 65 and through the construction that we have provided the pawl with its operating finger 80 can be arranged and positioned in the body 25 of the jaw only from the inner side of the jaw, that is, only from the side of the jaw opposing the body shank 10, and when the jaw C is in place on the shank 10 as shown throughout the drawings the shank 10 positively prevents displacement of the pawl from its operating position in the body 25 of jaw C.

Through the construction that we have provided the tool is assembled by placing the pawl in the body 25 of jaw C from the inner side of the body with a spring 70 behind the pawl and then sliding the jaw C onto the shank 10 while the finger 80 is depressed, causing the pawl to be out of engagement with the teeth of the rack on the shank. When the jaw C is in place the jaw B is arranged in place and the pin 22 applied, which operation completes assembly of the tool and with the application of the pin 22 all parts of the tool are assembled and coupled without the aid of any other fastening means. It is to be understood, of course, that as the jaw B is applied the detent spring and ball are applied so that the detent means is in place when the final assembly is made.

From the foregoing description and from the drawings it will be apparent that the tool that we have provided operates substantially the same as the usual type of pipe wrench in that it provides flexibility between the jaws enabling the wrench to be ratcheted around a pipe or rod. However, it is to be noted that through our construction the adjustable jaw, that is the jaw C, is so mounted and related to the means G that the operator can very quickly slide the body into the desired position, and whenever he wishes the jaw C can be easily released by simply manipulating the finger 80 as above described.

Having described only a typical preferred form and application of our invention, we do not wish

6

to be limited or restricted to the specific details herein set forth, but wish to reserve to ourselves any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claim.

Having described our invention, we claim:

A wrench including an elongate shank, an outer jaw, means pivotally connecting the said jaw and the outer end portion of the shank, means normally yieldingly holding the outer jaw in a predetermined rotative position relative to the shank, an inner jaw having a recess in its inner side facing the shank and an opening in its outer side communicating with the recess and opening away from the shank, means slidably mounting the inner jaw on the shank including opposed ribs on the jaw and longitudinally disposed guideways in opposite sides of the shank slidably carrying the ribs, the guideways being open only at the forward end of the shank and being closed by the other jaw on the forward end of the shank, and ratchet means holding the inner jaw in position on the shank including a rack on the shank, and a pawl held in the recess in the inner jaw, and having a handle projection extending through said opening, the pawl having trunnions projecting from it and rotatably supported in sockets in the sides of the recess.

BENJAMIN M. BEESLEY.
BARBARA BEESLEY.

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