Sept. 21, 1954 E. M. CHAPPELL, JR 2,689,496

JAW-LOCKING MECHANISM FOR PIPE WRENCHES

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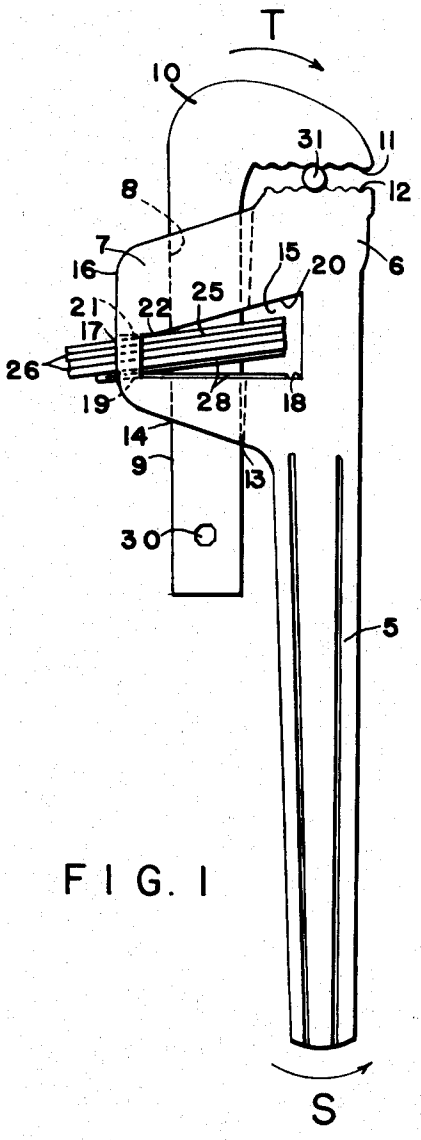

FIG. 1

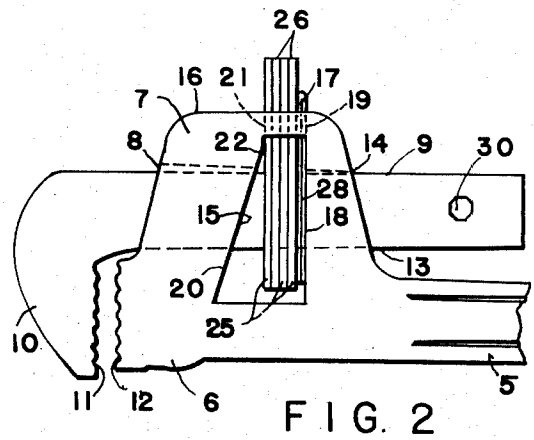

FIG. 2

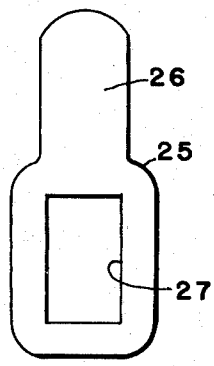

FIG. 3

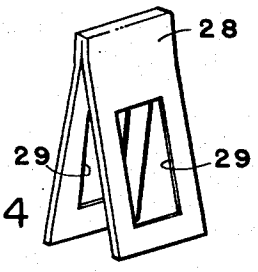

FIG. 4

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JAW-LOCKING MECHANISM FOR PIPE WRENCHES

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1 Claim. (Cl. 81—100)

1

This invention relates to pipe wrenches and more particularly to mechanism for releasing, holding, and adjusting the movable jaw of a pipe wrench.

It is characteristic of pipe wrenches that they are designed to rock with a ratchet action about a cylindrical object such as a pipe, increasing the tightness of their grip upon such an object when moved rotatively in one direction and relaxing their grip when moved in the opposite direction. To accomplish this purpose, pipe wrenches have one jaw which is not only movable longitudinally relatively to the other jaw but also has limited angular movement relatively to the other jaw, the angle between the opposed jaw faces changing very slightly as the angle between the jaw shanks changes. Relative angular movement of the jaw shanks is usually provided for by having the guide passage or sleeve through which one shank slide pivoted to the handle or otherwise enabled to tilt.

It is an object of this invention to provide a pipe wrench which may be set for any desired jaw-spread without the use of worm-screws to move it.

A further object of my invention is to provide a pipe wrench which may be closed to a desired jaw-spread by simply pushing one jaw relatively to the other in a closing direction, and which then will remain at the set spread—with allowance for the previously mentioned ratchet action—until it is intentionally released, and which then may be released by finger-pressure on a simple locking device.

Still another object of my invention is to provide a pipe wrench having a locking device which itself receives very little strain but which effects a lock by binding, one upon another, parts of the wrench which are necessarily strong for the purposes of the wrench and which can therefore undergo the locking strain without injury.

In the accompanying drawing, illustrative of a typical embodiment of my invention, Fig. 1 is a side view of my improved pipe-wrench, showing the wrench clamped and locked;

Fig. 2 is a fragmentary view from the opposite side, showing the wrench unlocked;

Fig. 3 is an elevational view, drawn on an enlarged scale, of a locking plate used in my wrench; and

Fig. 4 is a perspective view, drawn on an enlarged scale, of a spring for actuating the locking plate.

Having reference to the details of the drawing, I have shown a wrench having a handle 5, and a

2

jaw 6 integral with the handle and generally referred to as the fixed jaw of such a wrench because it has no movement relative to the handle. A sleeve 7, also integral with the handle 5, has a passage 8 for slidingly receiving the shank 9 of a movable L-shaped jaw 10, the serrated jaw-face 11 of the jaw 10 being opposed to the serrated jaw-face 12 on the end of the jaw 6 in planes substantially normal to the handle 5. It will be seen that the sleeve 7 is not pivoted upon the handle 5 in the manner of the well-known "Stillson" wrench, but permits rocking movement of the jaw 10 by virtue of having the passage 8 tapered in the direction of angular movement of the jaw 10 so as to closely embrace the shank 9 at the end of the passage 8 distant from jaw face 12, and being expanded at the end of the passage 8 adjacent the jaw-face 12. It will seem that the jaw tends to rock upon the shoulders 13 and 14 at the margins of the narrower end of the passage 8.

The sleeve 7 also has a transverse opening or passage 15 which extends into the jaw 6 and intersects the passage 8. The passage 15 communicates with the outer surface 16 of the sleeve 7 through an opening 17. The wall 18 of the passage 15 remote from the jaw-face 12 and the wall 19 of the opening 17 in continuation thereof are in alignment normal to the passage 8; the opposite wall 20 of the passage 15 is inclined so that the passage 15 widens as it enters the jaw 6, the wall 20 joining the wall 21 of the opening 17 at a position slightly inwardly from the opening 17 but outwardly from the passage 8. The wall 21 is normal to the passage 8, like its opposite wall 19, and consequently there is formed at the junction of the walls 20 and 21 a shoulder 22, on the side of the passage 15 nearest the jaws 6 and 10.

A plurality of plates 25, shown individually in Fig. 3 and contained as a group in the passage 15 have stems 26 which extend through the opening 17 and apertures 27 arranged to be aligned with the passage 8 and to receive the shank 9 of the jaw 10. The apertures 27 are of sufficient size in the longitudinal direction of the plates 25 to permit the shank 9 to slide freely through them when the plates are normal to the shank as shown in Fig. 2, but to cause the plates to bind upon the shank when slightly inclined at acute angles to the shank as shown in Fig. 1. A leaf spring 28, having openings 29 to receive the shank 9, is mounted behind the plates 25 and urges them to assume the inclined position shown in Fig. 1.

A sufficient number of plates **25** are used so that in combination with the spring **28** they substantially fill the opening **17**. One plate of requisite thickness may be used in place of the group of plates.

The shank **9** of the jaw **10** may be provided with a stud **30**, which by contact with the sleeve **7** prevents the jaw **10** from being entirely removed from the sleeve.

It will now be seen that the effect of the leaf spring **28** is to cause the plates **25** to pivot or tilt upon the shoulder **22** and that forward pressure, towards the jaws of the wrench, upon the stems **26** will cause the plates **25** to assume the position normal to the shank **9** illustrated in Fig. 2, the spring **28** being then compressed, and that release of such pressure permits the spring to move the plates pivotally upon the shoulder **22** to the acute angle position relative to the shank **9**. In the position shown in Fig. 2, the jaw **10** may be moved freely in either longitudinal direction, the shank **9** sliding through the passage **8** and through the apertures **27** of the plates **25**. But in their inclined position the plates **25** bind with light pressure upon the shank **9** and tend to pivot the jaw **10** upon the marginal shoulder **13**, causing the shank **9** to frictionally engage the wall of the passage **8** remote from the jaw **6**. In these circumstances the jaw **10** may be moved longitudinally only with great difficulty.

When the jaw faces **11** and **12** engage an object such as indicated at **31**, and the handle **5** is swung as usual in the direction of the arrow S, torque is applied to cause the jaw **10** to move in the direction of the arrow T relatively to the jaw **6**, this movement tightening the jaws upon the object **31**. The same movement of course tends to pivot the shank **9** upon the shoulder **13** towards the jaw **6**. This pivotal movement of the shank **9** tends to increase the relative inclination of the shank **9** and plates **25**, but this inclination is already at the permitted maximum. The plates will slide upon the spring **28** and on the fulcrum shoulder **22**, to follow the shank **9**, but will bind ever more tightly upon the shank **9** and increase the pressure of the shank against the passage margin **14**.

The jaw **10** is now held firmly against longitudinal movement but will relax its grip upon the object **31** the instant that torque upon the handle **5** is reversed.

To release the wrench entirely from the object **31**, the stems **26** are pushed toward the wrench head to bring the plates **25** normal to the shank **9**.

Practically no torque or bending strain is applied to the plates **25**, the strain upon them being

largely longitudinal, and such bending strain as occurs takes place at the area in contact with the fulcrum shoulder **22** where the plates have the greatest unbroken width and strength between the stems **26** and the apertures **27**. The forces which hold the jaw **10** are applied through the plates **25** in small part to the fulcrum shoulder **22** and in large part first to the shoulder **13** at the narrow end of the passage **8** and then to the opposite shoulder **14**. The further the jaw **10** is extended relatively to the jaw **6**—and then, not infrequently, the greater power is required to turn a larger object—the greater the binding pressure upon the shoulder **14** becomes, the object **31** then becoming the moving force, the shoulder **14** being the fulcrum, and the resistance of the plates **25** to longitudinal extension of the apertures **27** being the resistance of a leverage system.

I claim:

A wrench comprising: a fixed jaw; a handle integral with said fixed jaw; a movable jaw; said jaws having jaw faces opposed in planes substantially normal to said handle; a shank on said movable jaw substantially normal to the jaw-face thereof; a sleeve on said fixed jaw having a first passage for slidingly engaging said shank; said passage having marginal shoulders closely embracing said shank at the end of said passage distant from said jaws and being expanded at its opposite end to permit rocking movement of said shank within said passage upon said marginal shoulders as fulcrums; said sleeve having a second passage intersecting said first passage and having a shoulder within said second passage disposed outwardly from said first passage and on the side of said second passage toward said jaws; a plate contained in said second passage having an aperture aligned with said first passage through which said shank may slide when said plate lies perpendicular to a longitudinal axis of said shank and being tiltable about said last mentioned shoulder to lie at an angle with respect to said axis of said shank so that margins of said aperture bind upon said shank, the angle of tilt increasing when said shank is rocked so as to bring said jaws closer together; and means resiliently urging said plate to assume said tilted angle.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
552,795	Thompson	Jan. 7, 1896
589,046	Terry	Aug. 31, 1897
2,391,143	Ertner	Dec. 18, 1945