Dec. 15, 1925. 1,565,338

W. O. THEWES

WRENCH

Filed Sept. 20, 1923 2 Sheets-Sheet 1

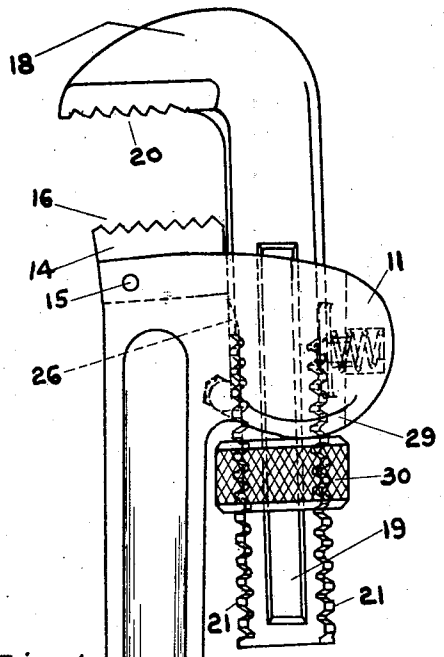


Fig. 1

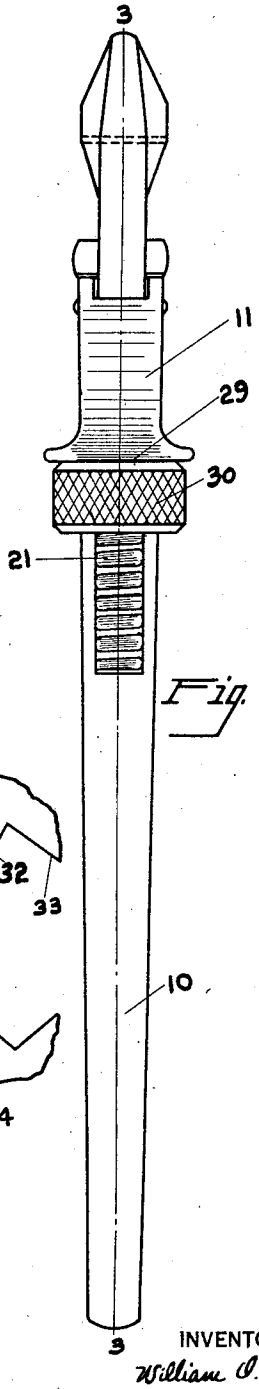


Fig. 2

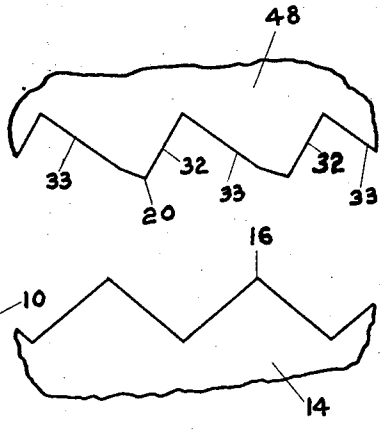


Fig. 5



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BY
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HIS ATTORNEYS

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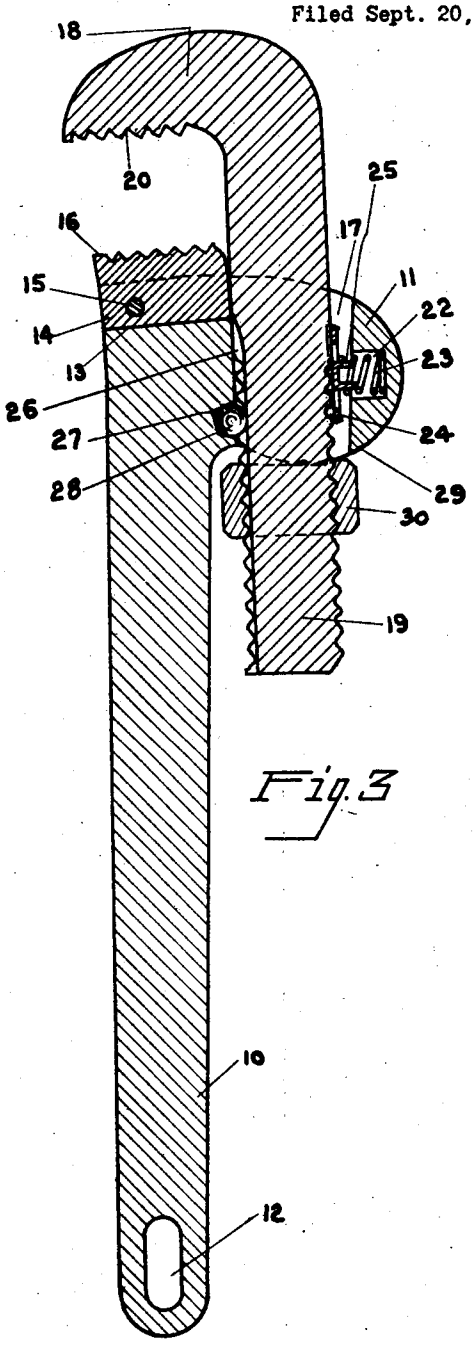


Fig. 3

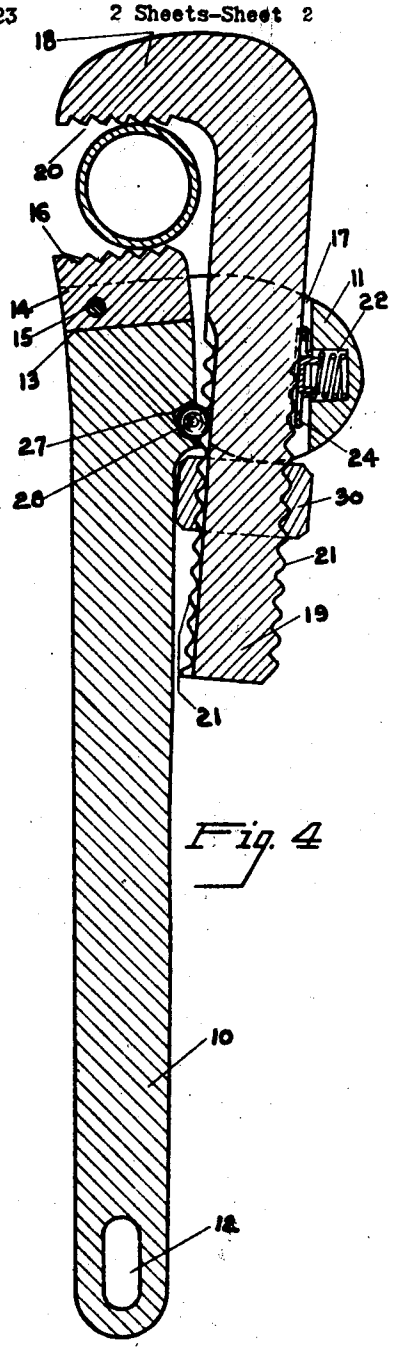


Fig. 4

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Patented Dec. 15, 1925. 1,565,338

UNITED STATES PATENT OFFICE.

WILLIAM O. THEWES, OF NORTH RIDGEVILLE, OHIO, ASSIGNOR TO THE RIDGE TOOL COMPANY, OF NORTH RIDGEVILLE, OHIO, A CORPORATION OF OHIO.

WRENCH.

Application filed September 20, 1923. Serial No. 663,741.

To all whom it may concern:

Be it known that I, WILLIAM O. THEWES, a citizen of the United States, residing at North Ridgeville, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

This invention relates to wrenches, and more particularly to pipe wrenches wherein a jaw carrying shank is slidably mounted adjacent a stationary jaw carried by a handle shank.

An object of my invention resides in constructing a wrench wherein a sliding jaw carrying shank is pivotally mounted relative to a stationary jaw carrying shank.

Another object of my invention resides in constructing a wrench to provide an antifriction bearing for a slidable jaw carrying shank.

Another object of my invention is to construct a wrench with a bearing against which a slidable jaw carrying shank bears when being adjusted longitudinally, and which bearing serves as a pivot for the slidable shank when moved to adjust the angular relation of the jaws in clamping work.

Still another object of my invention is to provide a wrench which includes a jaw carrying shank slidably mounted through a channel in a housing which is formed integrally with a stationary jaw carrying shank, and a ball which protrudes into the channel and engages a runway provided in the slidable shank, the slidable shank being resiliently maintained in contact with the ball bearing.

To accomplish the foregoing and other useful ends, my invention makes use of means hereinafter more fully set forth and claimed.

Referring to the drawings which illustrate an embodiment of my invention—

Fig. 1 is a side elevation of a wrench having my invention associated therewith;

Fig. 2 is a rear elevation of the same;

Fig. 3 is a section taken on line 3—3 of Fig. 2 showing the ball bearing and its relation with the jaw carrying shanks, the wrench being in normal inoperative position;

Fig. 4 is a view similar to Fig. 3 of the wrench when in operative position, and

Fig. 5 is a fragmentary view illustrating the form of the teeth of the two wrench jaws.

Referring more in detail to the drawings by characters of reference, 10 represents a relatively stationary metal shank which is substantially in the form of an I-beam, affording a sturdy, operating lever when in operation. A housing or casing 11 extends transversely from the rear side of the handle and is preferably formed integrally therewith. The opposite end of the handle is slotted at 12, providing means by which the wrench can be hung up when not being used.

The end of the handle, adjacent the housing, is slotted transversely at 13, and a central depending tongue of a hardened jaw 14 is mounted therein and secured by a pin 15. The work engaging face of the stationary jaw is provided with suitable teeth 16. A rectangular channel 17 extends longitudinally through the housing 11, adjacent to and substantially parallel with the handle 10.

A sliding jaw 18 extends outwardly from a shank 19 and extends substantially parallel to and above the stationary jaw 14. The working face of the sliding jaw is provided with teeth 20 which face the teeth 16 on the stationary jaw.

The stationary and sliding jaws are formed of relatively low carbon steel, and are case hardened, giving the work engaging teeth strength and toughness to resist the maximum strains to which they are subjected in gripping and turning pipes. The teeth on each jaw are formed so that they be rugged, strong and not liable to breakage when under maximum strains. The stationary jaw in use serves principally as a pushing member against the work and the teeth on this jaw are not subjected to the shearing or transverse strains which the teeth on the movable jaw are subjected to. It is necessary, however, to provide strong teeth on the stationary jaw, and I find that blunt teeth formed with the sides of equal angles, the angular outline being of substantially one hundred degrees, are most suitable for such purposes. In forming the teeth for the slidable jaw, which are subjected to severe lateral, as well as longitudinal stresses, I find by widening the body of the

teeth on the side which is behind and adjacent the work engaging edge, the teeth are reinforced and the cutting edges will stand greater lateral stresses, than when the angle of the faces on each side of the teeth are the same. By forming one face 32 of the teeth 20 at an angle of thirty degrees, and the other face 33 at a compound angle, the outer portion forming the working edge being 70 degrees and the base portion being 50 degrees, the teeth will have the increased body desirable to withstand the severe stresses to which the work engaging edge is subjected without breaking. There will be sufficient body behind each working edge of the teeth, to materially reinforce the strength of the engaging edge. Such reinforced face or side could be formed in an irregular shape and produce substantially the same results, as long as the body adjacent the working edge is greater than on the opposite side.

The shank 19 is provided on two opposite sides with threads 21, the outer edges of which are arcuate in form. The shank is rectangular and somewhat smaller than the channel 17, in the housing, through which the threaded end is slidably mounted. An internally threaded nut 30 is mounted to be freely rotated upon the threaded end of the shank protruding from the housing, and is retained thereon by upsetting the lower thread on the shank.

The casing is provided with a transversely extending recess 22 which opens into the channel 17. A coil spring 23 is seated within the recess and extends therefrom and bears against a shoe 24. The shoe is arcuate in shape to conform to the face of the threads on the movable shank which it engages, and two lugs 25 are punched from the shoe and project into the coil spring to maintain the shoe in position with the coil spring.

The opposite edge of the shank 19, which is adjacent the handle, is provided with an arcuate groove 26 which extends longitudinally and is cut centrally in the threads. A recess 27 is provided in the wall of the channel 17 near the lower edge of the channel and is of sufficient size and suitable shape to receive and enclose a substantial part of a ball 28. The ball is seated in the recess 27 and is arranged so that it will slide in the groove 26 in the movable shank, serving as a bearing between the shank and the wall of the channel against which the shank is pressed by the shoe 24 and the coil spring 23. The spring creates sufficient pressure against the movable shank to prevent sliding movement thereof under normal circumstances.

The ball protruding from the wall of the channel provides a single point of contact for the front edge of the slidable shank, thereby serving as a pivot upon which the shank is moved after the jaws have been positioned upon a pipe and are being drawn into tight clamping position. The ball is hardened, and is removable from its seat, being dropped into operative position before the end of the slidable shank is projected through the lower part of the channel.

When it is desired to decrease the distance between the jaws, the nut 30 which is unrestricted, is spun by the operator and travels of its own accord toward the end of the threaded movable shank, and the operator then slides the movable jaw to desired position, where it is maintained by the spring pressed shoe. The nut is then spun back into engagement with the convex face of the flange 29 surrounding the bottom of the channel 17 and formed as a part of the housing. In this manner the jaws are caused to engage the pipe, and by their manually continuing the rotation of the nut against the flange, the shank is moved longitudinally and away from the front of the housing, rocking on the ball as a pivot, tightly clamping the pipe between the jaws which are now in angular relation as shown in Fig. 4. The nut will prevent longitudinal displacement of the sliding jaw, and the straight face of the nut engaging the convex face of the flange 29 allows lateral tilting movement of the slidable shank within the channel 17, thereby permitting an increased purchase upon the pipe engaged between the jaws. The grooved runway and the ball prevent the sliding shank from binding against the wall of the channel, and the ball also provides a hardened bearing for the shank to bear against when being moved laterally to provide the increased purchase upon the work.

When it is desired to decrease the distance between the jaws, the movable jaw and its shank are moved toward the stationary jaw, without any operation of the nut, where it is automatically held by the friction member. The operator then spins the nut up on the threaded shank until its face engages the convex face of the curved flange 29. The nut is then turned further, to draw the movable jaw sufficiently to tightly clamp the work betwen the jaws, the movable shank and its jaw functioning in the same manner as described above.

The described adjustment can be made quickly, but the jaws can be adjusted in the usual manner with the nut always bearing against the flange 29, if desired.

The ball provides a hardened bearing which serves to reduce the friction and consequent resistance when moving slidable shank, thereby requiring a minimum effort on the part of the operator, and also, providing a hardened surface between the shanks which is desirable to prevent mutilation of the casing caused by extreme force which is necessarily applied during some operations

of a wrench, in which case the movable shank presses against the wall of the channel.

Various changes in the details of construction can be made without departing from the spirit of the invention, and the scope of the claims.

What I claim is:—

1. A wrench comprising a stationary shank having a handle portion, a channeled housing extending from said shank, said housing having a recess therein opening into the channel, a slidable shank extending through said housing, jaws carried by said shanks, a shoe engaging said movable shank within the channel in said housing, said shoe having lugs protruding therefrom, a coil spring seated within the recess in said housing and bearing against said shoe, said spring surrounding the lugs on said shoe, and means to secure said movable shank in desired operative position relative to said stationary shank.

2. A wrench comprising a stationary shank having a handle portion, a channeled housing carried by the said shank, said housing having a recess therein opening into the channel, a movable shank slidably mounted through the channel in said housing and having a runway therein, jaws carried by said shanks, a shoe engaging said movable shank within the channel in the housing, a coil spring seated within the recess in said housing and bearing against the shoe, means to secure said movable shank in desired operative position relative to said stationary shank, and a movable bearing carried by said housing and engaging the runway in said shank.

3. A wrench comprising a stationary shank having a handle portion, a channeled housing carried by the said shank, said housing having a recess therein opening into the channel, a movable shank slidably mounted through the channel in said housing and having a runway therein, jaws carried by said shanks, a shoe engaging said movable shank within the channel in the housing, said shoe having lugs protruding therefrom, a coil spring seated within the recess in said housing and bearing against the shoe, said spring surrounding said lugs on said shoe, means to secure said movable shank in desired operative position relative to said stationary shank, and a movable bearing carried by said housing and engaging the runway in said shank.

4. A wrench comprising a stationary shank having a handle portion, a channeled housing carried by the said shank, said housing having a recess therein opening into the channel, a movable shank slidably mounted through the channel in said housing and having a runway therein, jaws carried by said shanks, a shoe engaging said movable shank within the channel in the housing, a coil spring seated within the recess in said housing and bearing against the shoe, means to secure said movable shank in desired operative position relative to said stationary shank, and a ball bearing protruding into the channel in said housing and engaging the runway in said shank, said ball being rotatably retained in the wall of said channel, said spring maintaining said shoe in engagement with said sliding shank and said sliding shank in engagement with said ball bearing.

In testimony whereof I hereunto affix my signature this 17th day of September, 1923.

WILLIAM O. THEWES.