Sept. 27, 1927. 1,643,825

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CHAIN WRENCH

Filed Feb. 16, 1924

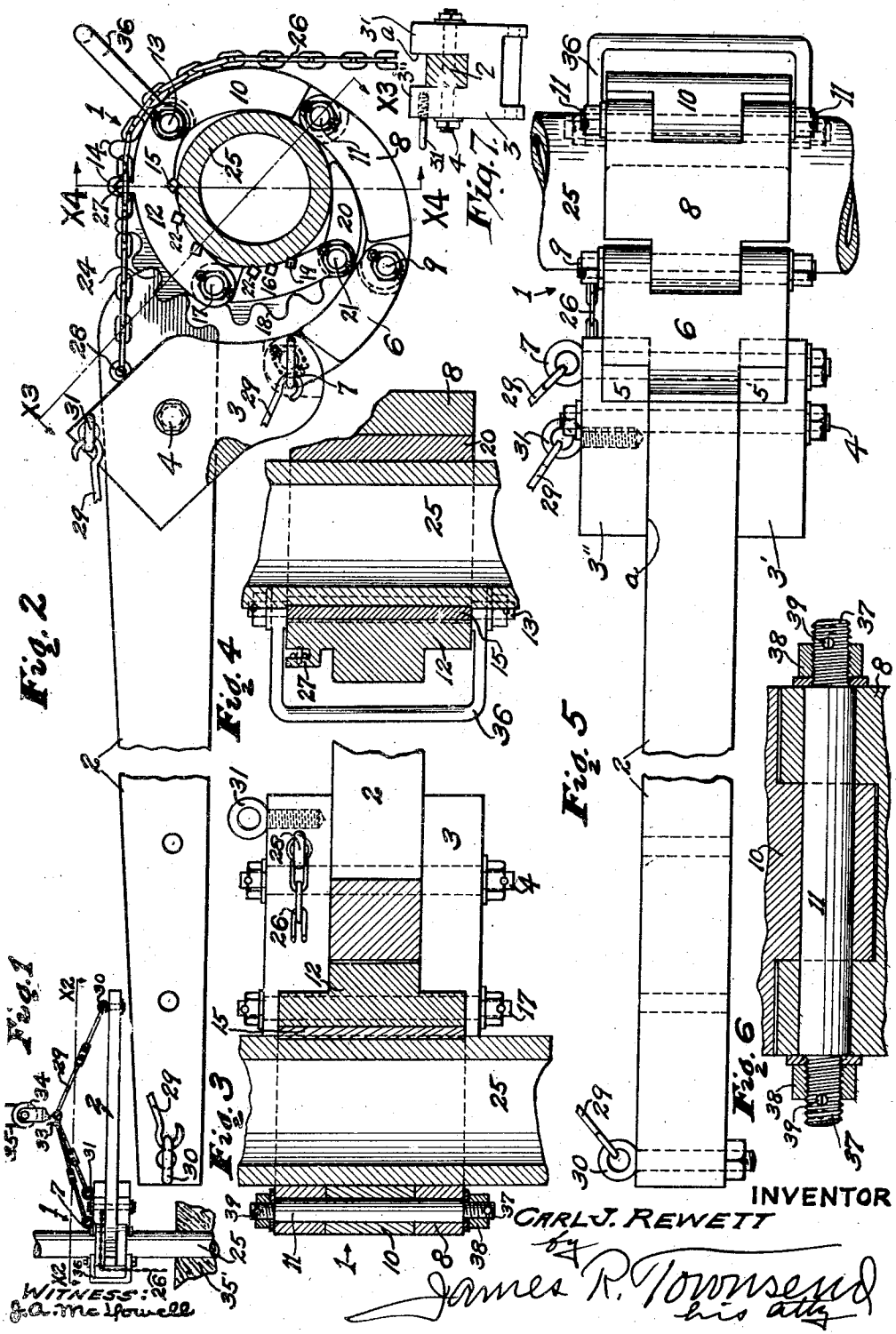


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

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Patented Sept. 27, 1927. 1,643,825

UNITED STATES PATENT OFFICE.

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CHAIN WRENCH.

Application filed February 16, 1924. Serial No. 693,230.

This invention particularly relates to chain wrenches adapted for screwing, unscrewing, and handling heavy well casing.

Such wrenches consist of a lever and a member pivoted to the lever and adapted to encircle the casing to be operated upon.

Such wrenches are operated by engine power and are required to have great strength and tight grip, and yet are required to hold the casing in such a manner that they will not crush, cut, or scar the casing.

In the operation of screwing the joints of casing together or unscrewing them apart the power is applied from an engine with tremendous force and with a jerk, and it is very dangerous for the wrench to slip on the casing for when such slipping occurs the lever is likely to cripple or kill the operator.

An object of this invention is to provide a chain wrench, which will not slip on the casing, and will not crush, cut, crimp, or scar the casing.

Such wrenches are swung from a block with chains that are fastened to one side of the lever. Chain wrenches will only take hold in one direction, and it is customary to hold one joint of the chain wrench while another joint of the casing is being screwed or unscrewed therefrom.

Sometimes, however, a casing may be put down or pulled when only one wrench is available, and then it becomes necessary to turn the wrench over and an object of this invention is to enable the operator to allow the wrench lever to remain with one edge or side up under all conditions and the change from right to left be accomplished by simply changing the chain or jointed member.

It also sometimes occurs that during operation the pins or pivot bolts that hinge together the joints of the chain will be broken, and it is then necessary to remove the broken pin and to replace it with new.

An object of this invention is to enable the operator to readily take out and replace any of the pins or bolts which hinge the members together and this I accomplish by constructing the pins with ends reduced to form shoulders that are flush with the sides of the members, through which the pin is inserted, and the outer radius ends of such pins are threaded to receive nuts that are supported by both the shoulder and the link of the chain when said nuts are tightly screwed home. By providing a threaded portion at each end of the bolt or pin it is possible to remove the pin in either direction from the wrench, thus in many instances facilitating the work.

A feature of invention is shown in the hinged tail or toe that is arranged at the end of the links so that it can be wedged between the links and a pipe when the wrench is in use.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

The accompanying drawing illustrates the invention.

Fig. 1 is a side elevation of the appliance on a small scale constructed in accordance with this invention; and showing it in use supported by a cable and lifting a well casing.

Fig. 2 is an enlarged fragmental sectional view on line x^2—x^2, Fig. 1 with the wrench turned opposite to its position shown in Fig. 1.

Fig. 3 is a fragmental section on line x^3—x^3, Fig. 2.

Fig. 4 is a fragmental section on line x^4—x^4, Fig. 2.

Fig. 5 is a fragmental side elevation of the pipe as arranged in Fig. 2.

Fig. 6 is an enlarged detailed view of one of the link bearing pins connecting two of the links, a fragment of which is shown in section.

Fig. 7 is a detailed view illustrating the rigid connection between the connecting block and lifting beam, with a fragment of the latter shown in section.

The wrench comprises a gripping member 1 to which a leverage lifting beam 2 is pivotally connected.

The leverage lifting beam 2 and the connecting block 3 of the gripping member 1 are rigidly connected together by a bearing pin 4.

The connecting block 3 is of unitary construction and bifurcated to provide a recess a and to form the arms 3′, 3″ which straddle the beam 2 and to which the beam is connected. The beam is snugly fitted into the recess a to form a rigid connection at 5, 5′ to receive the reduced end of the link 6 that is pivotally connected to the block 3 by the eye bolt 7.

The link 6 is pivotally connected to link 8 by a pin 9; and link 10 is connected to

link 8 by a pin 11; and these links are of greater width than length; and they are slightly curved so that their inner walls can be fitted to pipes of various diameter.

Link 10 is pivotally connected to a gear segment 12 by a pin 13; and this segment has on its outer wall the gear teeth 14 that are adapted to be engaged by teeth 24 on the fulcrumed end of beam 2 when the wrench is fitted to a pipe of intermediate or small diameter; and the inner curved wall of the segment is provided with the steel teeth 15 that are adapted to engage the outer wall of a pipe when the wrench is fitted thereto.

Another gear segment 16 is pivotally connected to the segment 12 by a pin 17; and segment 16 is provided with gear teeth 18 on its outer wall which also are adapted to be engaged by teeth 24 when the wrench is fitted to a pipe of large diameter; and the inner wall is provided with steel teeth 19 that are adapted to engage the outer wall of a pipe when the wrench is fitted thereto.

A tail or toe 20 is pivotally connected to the segment 16 by a pin 21; and this tail is curved and tapered to a point so that it can be easily wedged between the links 6, 8 or 10 and a pipe 25 to hold the wrench from slipping or sliding on a pipe when in use.

The segments 12, 16 are provided with sockets 22 in which the hardened steel teeth 15, 19 are seated; and the teeth are arranged so that a sharp edge of each extends slightly outward beyond the inner curved walls of the segments in position to engage and be embedded in the wall of a pipe when tension is applied to grip the segments thereto.

Tension is applied to grip the segments, links and tail around the pipe 25 by means of the beam 2 that has its fulcrum end provided with teeth 24 that as heretofore stated are adapted to engage the gear teeth 14 or 18; which, when so engaged and leverage is applied to the beam to force the chain of links, segments and tail toward and around a pipe, the wrench can be gripped thereto with great force without crushing the pipe so that it will hold and not slip or loosen when the pipe is handled.

After tension is applied to grip the wrench to the pipe 25 it is locked thereon by means of a chain 26 and dog 27.

The chain has one end thereof secured to an eye bolt 28 in the block 3; and the links thereof are formed to engage and be held by a dog 27 on the segment 12. That is, when tension is applied to the beam 2 to firmly engage the wrench with a pipe 25, a link of the chain 26 is caught over the dog 27 so that it holds the wrench securely locked to the pipe.

To facilitate the handling of the heavy wrench I provide suspending rods 29 that have their lower ends secured to the eye bolts 30, 31 and the upper ends of the rods are secured to a hook 33 swiveled to a pulley 34 that is raised and lowered by a derrick cable 35, a fragment of which is shown in Fig. 1. As seen therein the wrench is attached to a well casing 25 so that when the cable 35 is actuated upward by a derrick, not shown, the pipe will be drawn from the ground 35'.

By means of the foregoing support the wrench can be raised and lowered and swung to various positions by mechanical power.

Also to facilitate engaging the wrench with a pipe, a handle 36 is pivotally connected to the bearing pin 13 and arranged so that it can be used to move the links and segments on their bearing pins.

The pin 4, eye bolt 7 and pins 9, 11, 13, 17, 21 are preferably formed of tool steel so that they will easily resist shearing and breaking strains to which they are subjected in handling heavy casings.

The pins are preferably formed of a uniform diameter throughout the joints as shown in detail in Fig. 6; and they have threaded reduced ends 37 on which are fitted the retaining nuts 38 that are secured thereon by the cotter pins 39.

In operation, the wrench is preferably moved by mechanical power into position to engage a well casing to which it is to be attached; and at which time the links, segments and tail are in open position.

Then by manual means the links, segments and tail are moved on their pivot pins to encircle the casing, in which position the steel teeth 15, 19 of the segments 12, 16 engage the casing and the tail 20 is wedged between one of the links 6, 8 or 10 and the casing, and in this position the teeth 24 of beam 2 are in position to engage the teeth of either the segment 12 or 16 so that tension can be applied to grip the wrench to the casing so that it cannot slip or turn. It can then be locked to the casing as previously described.

By the construction, combination and arrangement of the various parts I provide a strong and durable wrench having a gripping surface of large area so that great force can be applied to secure it to a casing without crushing it.

I claim:

1. The wrench set forth comprising a leverage lifting beam having gear teeth on its fulcrumed end; and a gripping member adapted to grip a well casing, said member comprising a connecting block having arms straddling said beam and being connected thereto; links pivotally connected together and to said block; gear segments pivotally connected together and to said links and being provided on their inner surfaces with teeth to engage said casing and on their outer surfaces with gear teeth adapted to be

engaged by the teeth on said beam; and a toe at the free end of said gear segments adapted to be wedged between said links and well casing.

2. The wrench set forth comprising a leverage lifting beam having gear teeth on its fulcrumed end; and a gripping member adapted to grip a well casing, said member comprising a connecting block having arms straddling said beam and being connected thereto; links pivotally connected together and to said block; gear segments pivotally connected together and to said links and being provided on their inner surfaces with teeth to engage said casing and on their outer surfaces with gear teeth adapted to be engaged by the teeth on said beam; a toe at the free end of said gear segments adapted to be wedged between said links and well casing; and a chain secured to the gripping member and adapted for detachable connection to one of the gear segments for locking the wrench in position upon the casing.

3. The wrench set forth comprising a leverage lifting beam having gear teeth on its fulcrumed end; and a gripping member adapted to grip a well casing, said member comprising a connecting block having arms straddling said beam and connected thereto; links pivotally connected together and to said block; gear segments pivotally connected together and to said links, said gear segments being provided with teeth on their inner surfaces adapted for engagement with said casing and having gear teeth provided on their outer surfaces adapted to be engaged by the teeth on said beam; a toe element pivotally connected to the free end of one of said gear elements adapted to be wedged between one of said links and the well casing; an eye-bolt secured to said gripping member; a dog formed on one of the gear segments; and a chain connected at one end to said eye-bolt and having link engagement with said dog for holding the wrench in position upon the casing.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 2nd day of February, 1924.

CARL J. REWETT.