Feb. 7, 1933. F. L. COOK 1,896,699

CHAIN PIPE WRENCH

Filed June 15, 1931

FIG. 1.

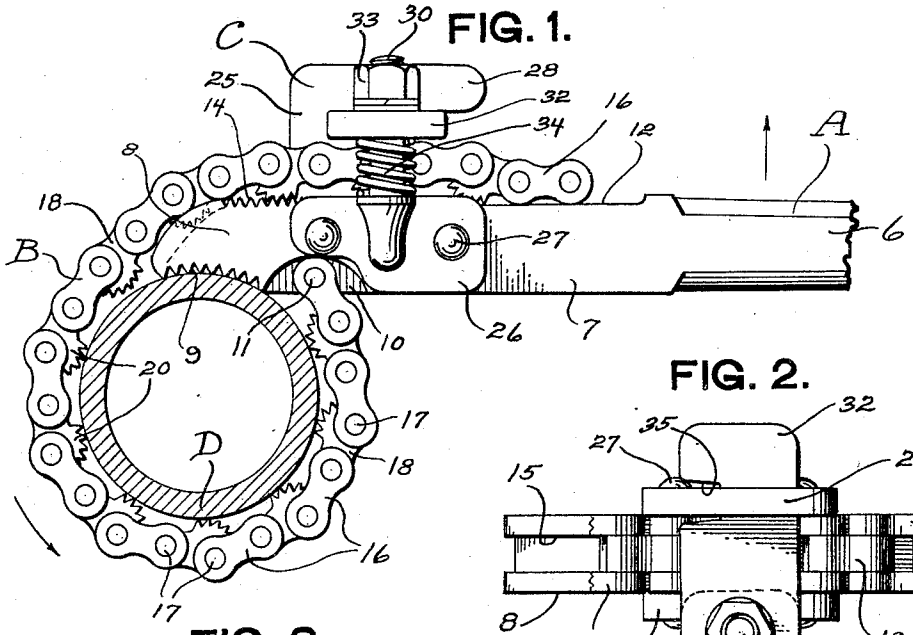


FIG. 2.

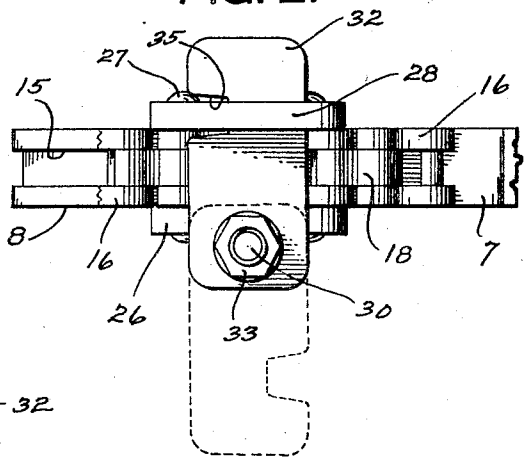


FIG. 3.

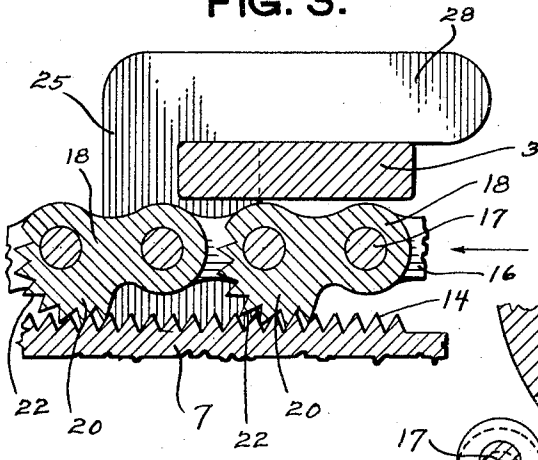


FIG. 5.

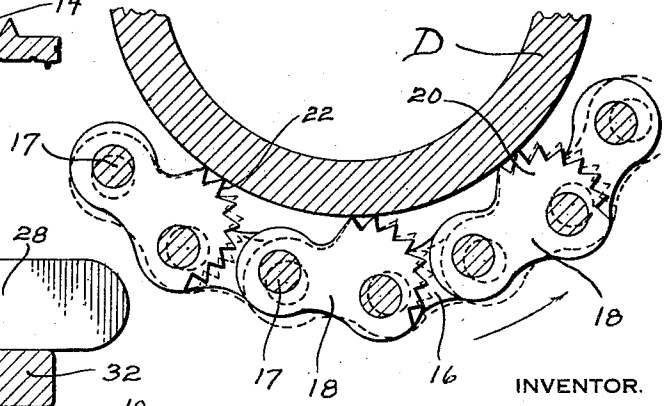
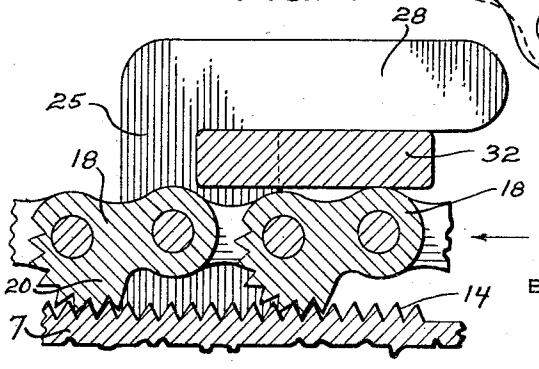


FIG. 4.



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CHAIN PIPE WRENCH

Application filed June 15, 1931. Serial No. 544,639.

The present invention relates to wrenches and more particularly to an improved form of chain wrench and the primary object of the invention is to provide a novel type of chain pipe wrench having improved means for detachably connecting the loose or free end of the chain to the wrench handle.

A further object resides in the novel arrangement whereby the loose end of the chain remains connected to the wrench handle regardless of the position of the wrench in use and yet allowing for ready and quick release of the loose end of the link when removing the chain from its position about a pipe or the like.

A further object resides in the novel arrangement whereby the teeth on the chain for gripping engagement with the pipe also coact with a series of teeth provided on the head of the wrench handle for releasably connecting the loose end of the chain to the handle.

A further object resides in the specific construction of the chain whereby little or no lost motion is formed thru contracting of the chain into gripping engagement with the pipe, and the arrangement whereby a gripping action will be formed substantially throughout the entire circumference of the pipe so as to prevent possible crushing or denting of the pipe.

A still further object resides in the provision of a chain wrench having a chain provided with gripping links of novel construction adapted to have rolling contact with a cam-like action upon the circumference of the pipe.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawing forming a part of this specification and in which drawing:

Figure 1 is a side elevation of the improved chain wrench shown applied to a pipe, a portion of the handle being broken away.

Figure 2 is a fragmentary top plan view of the head end of the operating lever and showing a fragmentary portion of the chain.

Figures 3 and 4 are enlarged fragmentary sections showing the manner in which the loose or free end of the chain is connected to the head portion of the operating lever, Figure 3 showing a loose position of the chain and Figure 4 the position during operation of the wrench.

Figure 5 is a fragmentary sectional view taken longitudinally thru the chain and showing the manner in which the grip links are rocked when a pull is exerted upon the operating lever.

In the drawing, and wherein similar reference characters designate corresponding parts thruout the several views, the letter A designates an operating lever having attached at its forward portion one end of a grip chain B the loose or free end of which is adapted for detachable connection to the handle by the improved coupling or holding means C.

The operating lever A may be formed from a bar of steel and comprises a handle portion 6 provided at its forward end with an elongated straight head portion 7 which is substantially square-shaped in cross section. Formed at the forward end of the head 7 is a jaw 8 provided in its under side with an arcuately concaved serrated jaw face 9 the teeth of which extend transversely of the head. Just rearward of the jaw face 9 the head 7 is formed with a web 10 provided by cutting out portions at each side of the head and this web serves for connecting one end of the grip chain B to the head as by a suitable coupling pin 11. The upper face 12 of the wrench head 7 is provided with a series of transversely extending teeth 14 forming a rack extending longitudinally of the head at the coupling means C. The forward end of the jaw 8 is rounded off and provided with a groove 15 extending from the forward end of the teeth 14 to the forward end of the concaved jaw face 9.

The chain B is constructed of a series of coupling link plates 16 pivotally connecting as by the coupling pins 17, a series of grip links 18. The grip links 18 are arranged at their ends between pairs of the coupling link plates 16.

The grip links 18, considering the direc-

tion of gripping action of the chain about the pipe D as in the direction of the arrow shown in Figure 1, are each provided at their forward ends with an inwardly projecting grip portion or cam projection 20 provided with transversely extending teeth providing a cam face 22 for gripping engagement with the circumferential face of the pipe D. The teeth of the cam faces 22 extend transversely of the grip links and are preferably V or saw toothed to conform with the teeth 14 provided along the head 7. This arrangement is to permit slight rocking movement of the grip links having connection with the head 7, as well as the grip links contacting the pipe D. When a pull is exerted upwardly upon the handle 6 in the direction of the arrow in Figure 1, the grip links contacting the pipe D will have a slight longitudinal rocking movement imparted thereto and this rocking movement alters the position of the axes of the coupling pins 17 with respect to the surface of the pipe.

Referring now to the holder B for releasably connecting the loose or free end of the chain C to the lever head 7, the same embodies latch and pivot members 25 and 26 respectively adapted for connection at opposite sides of the head 7 as by suitable rivets 27. The latch member 25 is provided at its upper end with a rearwardly extending arm 28 having its lower edge spaced above the upper face 12 of the head 7 as clearly shown in Figure 1. The pivot member 26 is provided with an upstanding cylindrical stem or shank portion 30 for pivotal mounting of a keeper plate 32 adapted to have swinging movement across the upper head face 12 and catch below the arm 28. The upper end of the stem 30 is threaded for receiving a nut 33 and an expansion coil spring 34 encircles the stem below the plate 32 for normally urging the plate upwardly on the stem. One side edge of the keeper plate 32 may be notched as at 35 to allow the plate to swing to a position transversely of the head 7 when in latched relation to the latch member 25. The keeper plate 32 is formed flat and has a width greater than the distance between the axes of the coupling pins 17 whereby the rear end of one of the grip links 18 will have engagement with the under side of the latch plate regardless of the position of the free end of the grip chain along the head 7. As will be observed in Figure 3, the spacing between the lower side of the keeper plate 32 and upper face 12 of the head 7 is such as to allow the grip chain to loosely fit below the keeper plate when no strain is placed upon the chain and this allows for ready and easy swinging of the keeper plate to a holding position across the chain. By observing Figure 2, it will be seen that when the keeper plate 32 is in its open position as shown in dotted lines, that the free end of the chain may be readily placed between the latch member 25 and the stem 30.

In applying the wrench for use, the keeper plate 32 is swung to an open position and the jaw 8 is placed with its concaved face resting upon the pipe as in Figure 1. The chain B is then drawn about the pipe and the free or loose end of the chain placed between the latch member 25 and stem 30 with the teeth of the grip portions 20 of certain of the grip links engaging the teeth 14 as shown in Figure 3. The keeper plate 32 is then swung to a closed position across the free end of the chain and connects the free end of the chain to the head 7. With the grip chain thus connected about the pipe, when an upward pull is exerted upon the handle plate, the chain will be drawn in the direction of the arrows as shown in each of Figures 1, 3, 4 and 5. This direction of pull upon the chain causes the grip links 18 to be rocked longitudinally thru engagement of the cam faces 22 with the pipe surface and this rocking movement causes the rear end of the grip links to swing away from the pipe surface as shown by dotted lines in Figure 5. Outward swinging of the rear ends of the grip links 18 takes up the small amount of slack in the chain and causes the teeth of the cam faces 22 to firmly grip the pipe, and cause rotation thereof. Considering Figure 1, when the handle 6 is swung downwardly, the grip chain will be loosened thru reverse rocking movement of the grip links and permit the chain to slip about the pipe for obtaining a new grip for further rotation of the pipe.

When the chain tightens for rotating the pipe, it will be seen that the loose end of the chain will be drawn forwardly along the head 7 and this direction of pull upon the loose end of the chain causes the grip links engaging the teeth 14 to be rocked upwardly as in Figure 4 and this upward rocking of the rear ends of the links into engagement with the keeper plate 32 forces the teeth of the grip links into firm contact with the teeth 14. Thus the rocking engagement of the grip links with the teeth 14 causes the links to grip the lever head 7 with increased force as the strain is placed upon the links. It will be noted from Figure 1, that the groove 15 as clearly shown in Figure 2 serves to accommodate the cam projections 20 and allows the link plates 16 to contact with the arcuate forward end of the jaw 8.

Thus it will be seen that a novel arrangement has been shown whereby the cam action of certain of the chain links causes the chain to firmly grip the pipe with no sliding movement of the chain circumferentially of the pipe. It will also be apparent that a novel arrangement has been disclosed whereby the teeth of the grip links for gripping engagement with the pipe also co-act with the series of teeth provided in the head portion of the

handle for releasably connecting the free end of the chain to the head. The novel type of chain holding means also insures positive gripping of the chain with the head portion 7 and yet allows for a new grip to be had upon the pipe without the chain becoming disconnected from the head.

Changes in detail may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A chain wrench comprising a lever having a head at one end thereof provided with teeth along its upper face, a chain including grip links having grip portions projecting from one side thereof, said grip portions having toothed arcuate faces, latch and pivot members carried by opposite sides of the head, and a keeper plate pivotally carried by the pivot member for retaining the free end of the chain longitudinally of the upper face of the head with the teeth on said grip portions engaging the teeth on the head.

2. A chain wrench comprising a lever having an elongated head formed at one end thereof, said head having a series of teeth provided along its upper side, a jaw formed at the forward end of the head having a concaved lower gripping face, a chain connected at one end to the lower side of the head rearwardly of the jaw, said chain having a series of projections along one side provided with gripping teeth, a latch member secured to one side of the head and having a rearwardly projecting arm, a pivot member secured to the other side of the head including a cylindrical stem, and a keeper plate pivoted on the stem for swinging movement beneath said latch member arm whereby the free end of the chain is held longitudinally of the head with the teeth on the projections thereof engaging the teeth on said head.

3. In a chain wrench, a lever portion having a head provided at one end thereof, a chain connected to the lower side of the head having toothed gripping projections along one side thereof, a series of teeth provided along the upper side of the head for receiving the teeth of the gripping projections at the free end of the chain, and means for releasably connecting the free end of the chain longitudinally of the head including a latch member secured to one side of the head and having a rearwardly projecting arm, a pivot member secured to the opposite side of the head and having an upstanding stem portion, and a flat keeper plate pivoted at one end upon the stem to extend across the free end of the chain and engage beneath said arm whereby the teeth on the gripping projections are held in engagement with the teeth on the head.

4. In a chain wrench, a lever including an elongated head portion provided along its upper face with a series of teeth, a chain connected at one end to the lower side of the head having arcuate projections provided with teeth for engaging the teeth on said head, a latch plate extending upwardly at one side of the head and having a rearwardly extending arm at its upper end, a stem projecting upwardly from the opposite side of the head in transverse alignment with the latch plate, a keeper plate pivoted at one end upon the stem to extend across the chain and engage beneath said arm, means for limiting upward movement of the keeper plate on the stem, and a coil spring encircling the stem and acting upon the under side of the keeper plate for normally urging the keeper plate upwardly.

5. In a chain wrench, a lever having an elongated head at one end thereof, teeth provided along the upper side of the head, a link chain connected at one end to the lower side of the head and including connecting and grip links, said grip links each having a cam projection at one end thereof provided with teeth on their cam surfaces adapted to engage in the teeth on said head, and means for releasably coupling the loose end of the chain longitudinally of the upper side of the head including a flat pivoted keeper plate adapted to swing across the chain for retaining the grip links in rocking engagement with the head.

6. In a chain wrench, a lever including an elongated head provided with teeth along its upper side, a link chain for connection with one end of the head and having toothed cam projections along one side thereof adapted to mesh with the teeth on said head, and means for detachably securing the free end of the chain to the head including a pivoted keeper plate of greater width than the length of the links and adapted to be swung into a position transversely of the head above the plain side of the chain in closely spaced relation thereto.

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