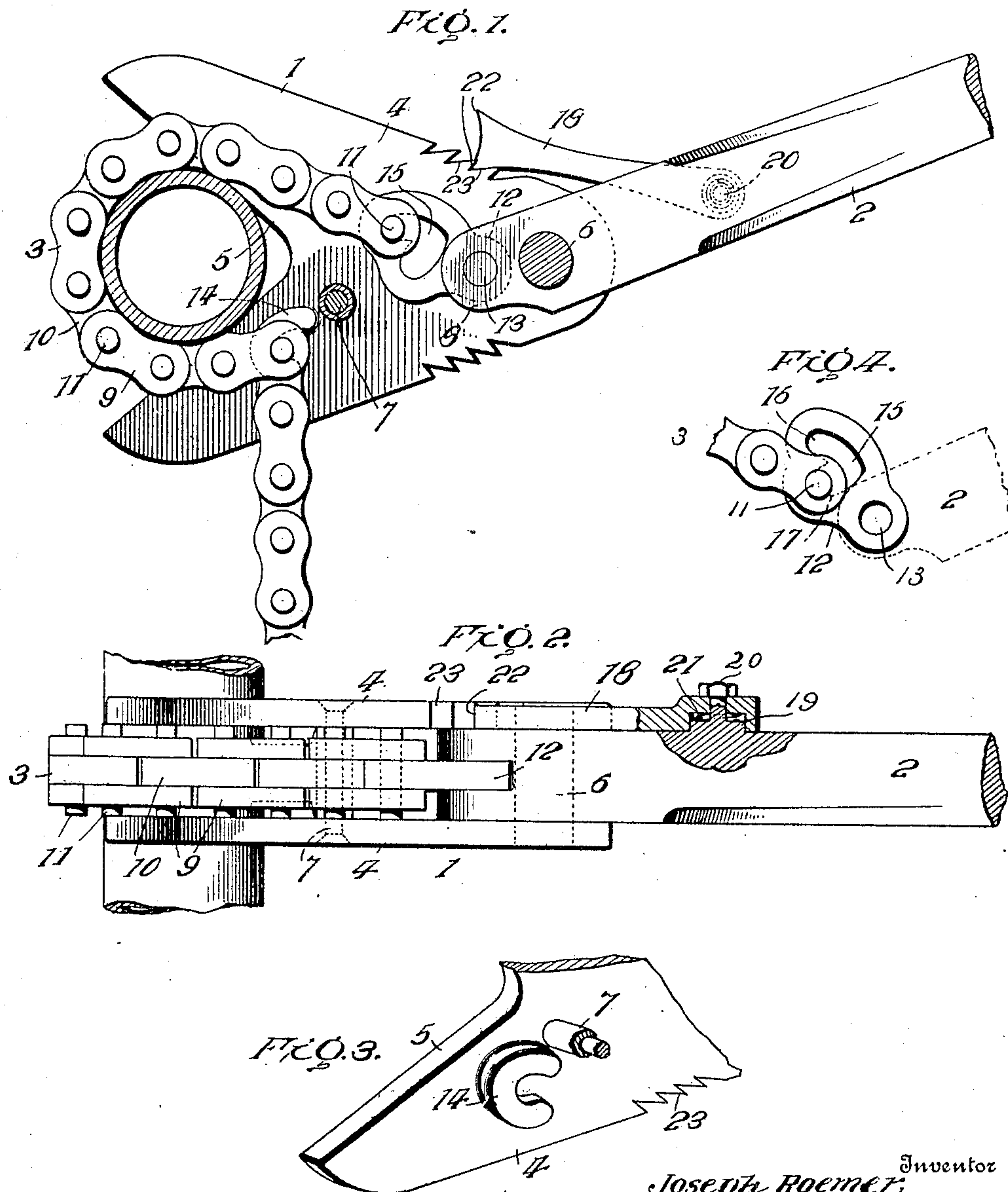


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PATENTED NOV. 26, 1907.

J. ROEMER.
PIPE WRENCH.

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PIPE-WRENCH.

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To all whom it may concern:

Be it known that I, JOSEPH ROEMER, citizen of the United States, residing at Santa Maria, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Pipe-Wrenches, of which the following is a specification.

My invention contemplates certain new and useful improvements in that class of wrenches that are particularly designed for use in connection with pipes, casings, shafts or the like and which embody a flexible gripping member, a head designed to engage the work and arranged for the adjustable connection thereto of the flexible member so as to accommodate work of varying diameters and a handle pivotally connected to the head and adapted to oscillate thereon, the flexible gripping member being connected at one end to the handle in advance of its pivot so that the handle may be rocked or oscillated back and forth and secure substantially a ratchet movement on the work.

One of the objects of my invention is to provide in a wrench of this character, improvements in the connection between the flexible gripping member and the other parts of the wrench whereby a maximum degree of adjustment may be obtained by a flexible gripping member of the chain or pivot link type. And a further object of the invention is to provide an improved wrench of this nature embodying a novel chain and pipe protecting device, by which the gripping action upon the work may be adjusted to a nicety so that when any predetermined strain has been reached the grip of the wrench upon the work may be automatically released so as to prevent a too severe action which might tend to crush the work. This feature is especially important if the device is to be used in connection with tubes or casings that are comparatively thin and liable to be crushed or indented.

With these and other objects in view as will more fully appear as the description proceeds, my invention consists in certain constructions, arrangements and combinations of the parts, hereinafter fully described and claimed.

For a full description of the invention and the merits thereof, and also to acquire a knowledge of the details of construction of the means for effecting the result, reference

is to be had to the following description and accompanying drawings, in which

Figure 1 is a longitudinal sectional view illustrating my invention, parts being shown in side elevation. Fig. 2 is a top plan view thereof. Fig. 3 is a detail perspective view of a portion of the head of the device. Fig. 4 is a detail view illustrating one end of the flexible gripping member and the means for adjusting it.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings, by the same reference characters.

Referring to the drawings the numeral 1 designates the head of my improved wrench, 2 the handle thereof, and 3 the flexible gripping member.

In the present instance the head 1 comprises two corresponding plates 4 that are provided in one edge with angular recesses 5 constituting jaws to receive the work to be operated upon. The plates 4 are held in spaced and parallel relation to each other and in a pivotal relation to the handle 2 by means of a pivot stud 6 passing through the two plates and through the handle near the front end thereof as illustrated in the drawings. To secure sufficient rigidity to the two plates and maintain them in their proper relation to each other, they are also preferably connected in advance of the stud 6 by means of a stud 7.

The handle 2 is provided in advance of its pivot with a lip 8 to which one end of the flexible gripping member 3 is pivotally connected. The said gripping member is of the link belt or chain type and is composed of pairs of spaced apart plates 9 connected together by means of interposed plates 10 and pivot studs 11 which preferably project at each end, as shown. The link 12 at one end of the chain like gripping member 3 is directly connected to the lip 8 of the handle 2 in advance of the pivot stud 6 by means of a stud 13 passed therethrough and through an aperture formed in the lip to receive it. The free end of the flexible gripping member 3 may be secured to the plates 4 at the desired adjustment to properly encircle and bind upon the work by means of lugs 14 that are formed upon or secured to the inner face of the plates 4 at transversely registering points and which are provided with inwardly facing sockets to receive the project-

ing ends of any one of the pivot studs 11, so as to securely hold that end of the chain to the head of the wrench at the desired adjustment. In order to increase the degree of adjustment, the link 12 of the flexible gripping member 3 is preferably constituted by a solid plate pivotally connected to the lip 8 as before described and formed with an angular slot 15 the angular portion of which produces two sockets 16 and 17 one in advance of the other. The stud 11 of the next adjacent link of the chain is received and held in said slot 15, the side plates of said link embracing the adjacent end of the link 12. By this arrangement it is obvious that the said stud 11 may be moved into either one of the sockets 16 or 17, which will produce a longitudinal adjustment of the chain at that end, and in the preferred embodiment of the invention the two sockets 16 and 17 are located one in advance of the other a distance approximately equal to one-half the length of a link. Hence it will be seen that not only may an adjustment equal to an entire link be effected by engaging any one of the pivot studs 11 with the lugs 14 of the plates 4 of the head, but that an additional and finer adjustment may be effected by changing the relation of the link 12 to the next adjacent link by shifting the pivot stud 11 of the latter from the socket 16 to the socket 17 or vice versa.

In addition to the features of adjustment before described, my present invention comprehends improved means for automatically releasing the pressure of the flexible gripping member upon the work at any predetermined degree, so that all liability of crushing the work by undue strain may be precluded. This means, in the present instance, comprises a tappet arm 18 which is pivotally mounted at one end upon an apertured boss 19 projected from one side of the handle 2 in the rear of its pivot 6. A pin 20 is inserted through said arm 18 and into the aperture in the boss 19 to secure the tappet arm thereon, and means are provided for holding the arm 18 at an angle with respect to the handle 2. For instance to accomplish this adjustment of the arm 18, a spring washer 21 may be employed, so as to produce sufficient friction to hold the arm 18 in any position where it is placed by hand. The tappet arm 18 is provided at its free end with two projections 22, and the head 1 is provided on the opposite edges of its plates 4 with two series of notches 23 designed to be engaged by one of the projections 22, according as the arm 18 is swung and adjusted to one side of the handle or the other.

In the practical operation of my improved wrench, after the wrench head has been applied to the work and the flexible gripping member adjusted around the same to bind the work sufficiently, the wrench may be turned in one direction or the other by a

back and forth movement or oscillation of the handle 2 on its pivot 6. It is obvious that as the handle 2 is turned with respect to the head, it will draw upon the flexible gripping member 3 and cause the same to effectively bind the work to turn the same. By working the handle back and forth, a ratchet effect may be secured, as the handle will first grip and draw tightly upon one end of the flexible gripping member to cause it to bind the work and will then upon the return movement allow the gripping member to relax. The tappet arm 18 is provided to automatically release the strain of the gripping member upon the work at any predetermined point, so that liability of crushing the work will be precluded, and in operation it is adjusted to one side or the other of the handle 2 according as the ratchet action is to be one direction or the other. When the tappet arm 18 is swung to the required side of the handle 2 it may be adjusted, according to the judgment of the operator, at different inclinations with respect to the handle so that one of the projections 22 will engage with any one of the notches 23 on that side of the head. Then when the handle is swung free to bind the gripping member to the work as before described, it is manifest that as soon as the handle shall have reached a point where the projection 22 will engage with one of the notches 23 the relative movement or oscillation of the handle with respect to the head will be at once arrested and further tightening of the gripping member will be prevented. It is to be understood that the tappet arm 18 is to be adjusted so that it will strike the first notch or the second notch and so on in the oscillation of the handle 2 according to the known or calculated strength of the tube or casing that is being operated upon.

From the foregoing description in connection with the accompanying drawings it will be seen that I have provided an improved wrench of this character, which embodies a maximum degree of adjustment without weakening the flexible gripping member and which also embodies the important requisite of a successful pipe wrench of an automatic release for a flexible gripping member upon the work, which insures that the binding action of the gripping member may be stopped at any predetermined point. Not only is undue strain upon the work prevented by means of this invention but it is obvious also that the chain itself is protected from undue strain, so that the device is especially desirable for use where steam pressure is applied to the handle or lever. As the tappet arm 18 may be held rigidly at any angular adjustment with respect to the handle 2, the engagement thereof with the same notch at each back and forth movement of the handle is insured.

It is noted that the jaws are wholly devoid of teeth and this is of advantage since it obviates marring the work and denting comparatively thin piping or tubing. Moreover it obviates the expense of continually sharpening the teeth which is necessary on tongs as heretofore generally constructed. It has been found that the links of the chain constituting the work gripping member are sufficient to make positive engagement with the work so as to obviate slipping. The tool may be successfully used in connection with any form of pipe or work whether round, flat, square or octagon in shape, this being attributal in a great measure to the flexible gripping member.

The peculiar connections between the gripping member 3 and the head and handle comprising the working elements of the tool may be embodied in adapting the invention to other forms of tools or conditions as the exigencies of the case may require.

Having thus described the invention what is claimed as new is:

1. A device of the character described, comprising a head provided with a work receiving jaw, a lever or handle pivotally connected to said head, and a flexible gripping member connected at one end to said handle and arranged for adjustable connection to the head, connection between one end of said chain and the handle consisting of a plate formed with an angular slot producing two sockets one in advance of the other, and a connecting stud mounted in said slot and adapted to be held in either one of said sockets.

2. A device of the character described, comprising the head, the lever or handle connected to said head, a flexible gripping member embodying links arranged for adjustable connection to the head and also adjustably connected to the lever, one of said connections embodying a slotted plate and means for securing the adjacent link of the chain to said plate at different longitudinal positions with respect to the latter.

3. A device of the character described, comprising a head, a handle connected to said head, and a flexible gripping member adapted to encircle the work, said flexible gripping member embodying a slotted connecting link 12 formed with an angular slot, the two portions of said slot producing sockets one in advance of the other, and said gripping member also embodying links provided with connecting studs one of which is received in said slot and is adapted to be held in either one of said sockets, as and for the purpose set forth.

4. A device of the character described, comprising a head embodying two spaced apart plates provided with recesses constituting a work receiving jaw, a handle pivotally connected to said plates at one end and

mounted between the same, and a flexible gripping member embodying a series of spaced apart plates, a single intermediate plate and studs pivotally connecting the same, and also embodying one link in the form of a slotted plate connected to the handle in advance of the pivot point of the latter, the said last named plate being received between the two spaced apart plates of the next adjacent portion of the gripping member, and the slot of said plate being angular and producing two sockets one in advance of the other, said slot receiving the adjacent pivot stud, and the latter being adapted for engagement in either one of said sockets.

5. A device of the character described, comprising a head, a lever pivotally connected to the head, a flexible gripping member adapted to encircle the work, said gripping member being arranged for connection to the head and also connected to the handle, and means for limiting the relative movement of the pivot handle with respect to the head at different predetermined points, as and for the purpose set forth.

6. In a device of the character described, the combination of a head, a flexible gripping member adapted to encircle the work and arranged for connection to the head, a handle connected to said head and arranged for a relative oscillating movement with respect to the same, the gripping member being connected to said handle whereby a back and forth motion of the latter will effect an alternate binding and loosening of the gripping member on the work, and means for limiting the relative movement of the handle with respect to the head and for varying the limit of said movement.

7. In a device of the character described, the combination of a head, a flexible gripping member adapted to encircle the work and arranged for connection to said head, and a handle pivotally connected to said head and connected to said gripping member and arranged to draw upon one end of said gripping member by a relative movement of the handle with respect to the head, and a tappet arm adapted to limit the relative movement of the handle with respect to the head.

8. In a device of the character described, the combination of a head, a gripping member adapted to encircle the work and arranged for connection to said head, a handle connected to said head and having a relative movement with respect to the same, one end of said handle being connected to the gripping member for the purpose specified, and an adjustable tappet arm carried by the handle and adapted to contact with the head at different points, whereby to limit the movement of the handle with respect to the head.

9. In a device of the character described the combination of a head, a flexible gripping member adapted to encircle the work, and ar-

5 ranged for connection to said head, a handle pivotally connected to the head, the head being provided with a series of notches, and a tappet arm carried by the handle and arranged to engage in any one of said notches, as and for the purpose set forth.

10 10. In a device of the character described the combination of a head, a flexible gripping member adapted to encircle the work, and arranged for connection to said head, a handle pivotally connected to the head, the head being provided with a series of notches, a tappet arm carried by the handle and adapted to engage in said notches as the handle is moved
15 with respect to the head, and means for holding said tappet arm at different inclinations with respect to the handle whereby its engagement with any of said notches may be regulated.

20 11. In a device of the character described the combination of a head, a flexible gripping member, adapted to encircle the work, and arranged for connection to said head the head being provided at its sides with notches, a

handle pivotally connected to said head and 25 connected to said gripping member and a pivoted tappet arm carried by said handle and arranged for engagement with either set of notches as and for the purpose set forth.

12. A device of the character specified 30 comprising a head a handle connected to the head to receive an oscillatory movement and a work gripping member having adjustable connection with both the head and handle.

13. A device of the character described, 35 comprising a head, provided with a work gripping member, a handle having a pivotal or loose connection with the head for actuating the work gripping member, and means for limiting the relative play or movement of 40 the handle.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH ROEMER. [L. s.]

Witnesses:

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