

March 6, 1945.

A. BOYNTON

2,370,837

WRENCH

Original Filed April 8, 1939

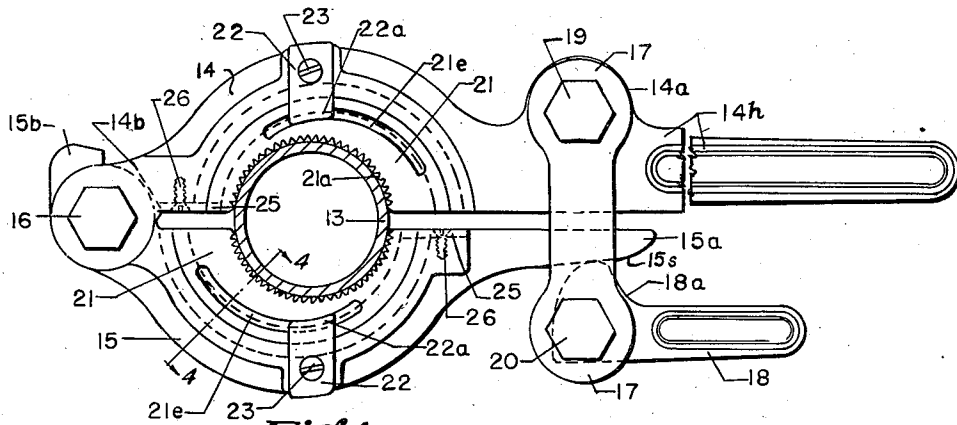


Fig. 1.

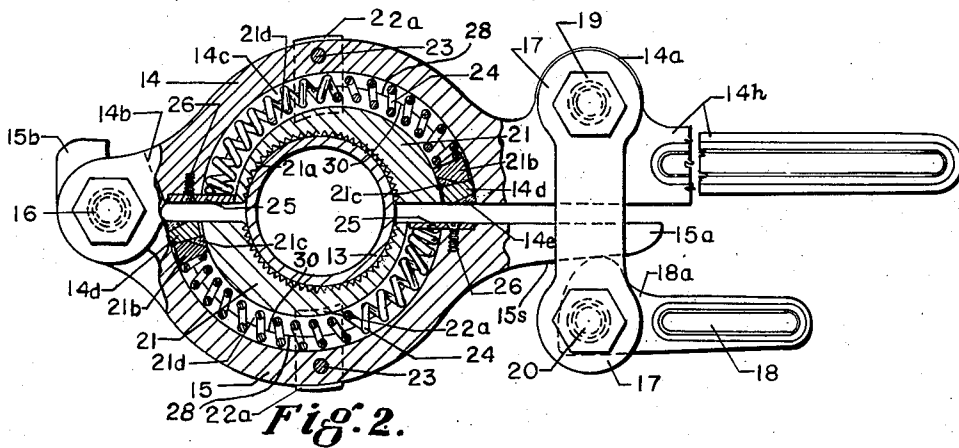


Fig. 2.

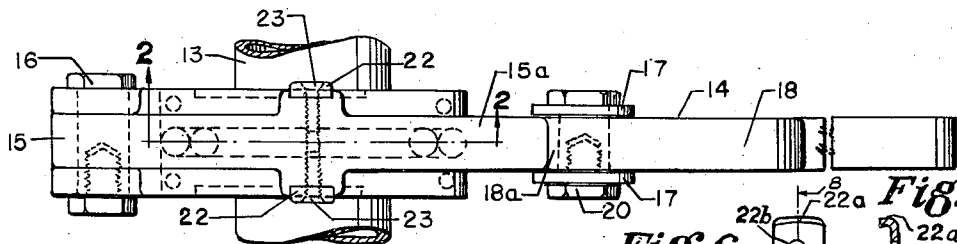


Fig. 3.

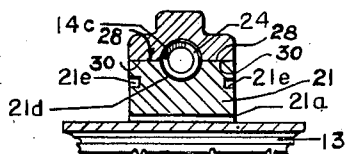


Fig. 4.

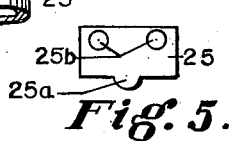


Fig. 5.

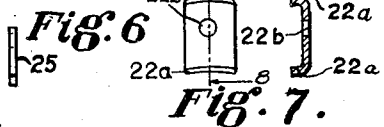


Fig. 6.

ALEXANDER BOYNTON
INVENTOR

BY Akel M. Pedersen
ATTORNEY

UNITED STATES PATENT OFFICE

2,370,837

WRENCH

Alexander Boynton, San Antonio, Tex.; Sida S. Martin executrix of said Alexander Boynton, deceased

Original application April 8, 1939; Serial No. 266,759. Divided and this application October 26, 1942, Serial No. 463,400

1 Claim. (Cl. 81-179)

This application is a division of my pending application, Serial No. 266,759, filed April 8, 1939, and issued as Patent No. 2,330,201 of Sept. 28, 1943.

My invention relates to wrenches, particularly to pipe wrenches.

The objects are to provide a wrench that (1) will not mash the pipe, (2) will not deeply score the pipe, (3) will close evenly upon a substantially complete circumferential surface of the pipe, (4) will grip the pipe with uniformly increasing force as increasing force is applied to operate it, and (5) will automatically return the pipe gripping dogs to their starting position each time the wrench is removed from the pipe.

I attain the foregoing objects by means of two shells or jaws, each shell or jaw being hinged or pivoted on the other shell or jaw, one shell or jaw being connected to the wrench handle and the other shell or jaw being operated upon by an arm and roller or cam member connected to the handle so as to permit urging the jaws together upon the pipe, as will more clearly appear from the accompanying drawing, in which:

Fig. 1 is a top view of the invention;

Fig. 2 is a top or plan view, partly in section, taken on the section line 2-2 of Fig. 3;

Fig. 3 is a view in elevation of the assembly shown in Fig. 1;

Fig. 4 is a fragmentary sectional view taken on the section line 4-4 of Fig. 1, and turned in the reverse position, up-side down;

Fig. 5 is a front view of the plate portion 25 of Fig. 1;

Fig. 6 is an end view of the plate portion shown in Fig. 5;

Fig. 7 is a plan view of the upper holder plate shown in Fig. 2; and

Fig. 8 is a sectional view taken on the section line 8-8 of Fig. 7.

Similar reference characters refer to similar parts throughout the several views.

In the embodiment of the invention illustrated in the drawing, the handle member 14h and the jaw member 14 connected thereto are hinged or pivoted to the jaw member 15 by means of the hinge bolt or pivot 16. An arm member or yoke 17 is hinged or pivoted to the handle member 14h by means of a hinge bolt or pivot 19 which passes through a boss 14a of the handle member. An eccentric lever or bell crank lever 18 is pivoted in such a manner as to engage the other clamp jaw 15 on movement of the handle member 14h and the eccentric lever or bell crank lever 18 in a pipe engaging direction, being pref-

erably hinged or pivoted at one end of the yoke or arm member 17 by means of a hinge bolt 20. The arm portion 18a of the bell crank lever 18 is preferably in the form of an eccentric or cam adapted to operate upon the forward surface portion 15s of the arm member 15a connected to the shell or jaw member 15 in such a manner as to urge the eccentric pipe-gripper dogs 21, having cam surfaces thereon, toward the pipe 13 as the lever arm 18 is moved in a direction toward the handle member 14h, or in a pipe engaging direction, as will be apparent from Figs. 1 and 2 of the drawing.

A spring member 24 is mounted for compression adjacent the outer surface of each of the gripper dogs 21, and in the form of the invention illustrated in the drawing above referred to, each of the coiled springs 24 is housed within two semi-circular grooves 14c and 21d, together forming a circular trough within which each of the springs 24 is compressible by the stop members or lips 25a of the plates or plate portions 25 (Figs. 5 and 6), one of these plates 25 being secured to the jaw member 14, by means of screws 26, for example, and the other plate portion 25 being secured upon the other jaw member 15 by similar fastening means 26 passing through openings 25b in the plate portions 25.

In order to limit the movements of the spring members 24, circular dog stops 14d are secured within the semi-circular troughs 14c of the jaws by means of welds 14e, for example. The circular spring stops 21b are secured within the semi-circular trough 21d to the corresponding gripper dogs 21 by means of welds 21c, for example.

Each of the lip portions 25a (Fig. 5) has free sliding clearance within the circular troughs or grooves 14c of the jaws and 21d (Fig. 4) of the dogs. Since one of the dog stops 14d is fastened to the corresponding jaw member 14, to which the handle 14h is connected, by means of the weld portion 14e, and the other dog stop 14d is fastened within and upon the other jaw member 15 by means of another weld portion 14e, and since the spring stop members 21b are fastened to the gripper dogs 21 by means of weld portions 21c, it is apparent that the eccentric or cam gripper dogs 21 will be stopped in the positions shown in Fig. 2 by the landing of stops 21b upon the dog stops 14d by the expansive force of the coiled springs 24, which are confined or stopped at the other ends by means of the plates 25 or plate portions 25a. The spring members 24 are installed under sufficient compression to

accomplish such landing of the spring stops 21b upon the dog stops 14d and to permit the full travel of the pipe gripper dogs 21 without having the springs fully compressed.

The cam-surfaced or eccentric pipe gripper dogs 21, with their partially contained springs 24, are held assembled within the jaw members 14 and 15 by means of flanged holder plates 22 (Figs. 1 and 2) which are held in place by means of screws 23 (Fig. 1) which pass through openings 22b (Figs. 7 and 8) in each of the plate members. The inner flange 22a of each of the plates 22 (Fig. 1) is received into or within one of the grooves 21e of the gripper dogs 21 (Fig. 4) in which the flanges are slidable. The other or outer flange 22a fits closely over the outside of the jaw members 14 and 15, each of the plates 22 being attached to the corresponding jaw members by means of the screws 23 which pass into and are secured in threaded openings in the jaw members.

In order to apply the wrench as illustrated in the drawing to a pipe which is engaged, the bell crank lever 18 is first turned in a clockwise direction until it is approximately in a position so that the longer arm is substantially at right angles to the handle member 14h. The cam or eccentric 18a will then release the arm 15a connected to the jaw member 15. The bell crank lever 18 and the arm member 17 are then moved outwardly in a counter-clockwise direction until the arm 15a is free of the cam 18a and the yoke or arm member 17. The jaw members may then be opened by swinging the jaw member 15 in a clockwise direction, for example, and the pipe 13 may then be inserted in place against the inner curved surface of the jaw member 14. For operating convenience, the bumper extension 15b is provided in such a position on the jaw member 15 that in the opening of the jaws it will engage the surface 14b on the corresponding end of the jaw member 14 after the wrench has been opened wide enough to admit the pipe 13. The pipe may then be gripped by returning the arm 15a, the yoke member 17, and the lever 18, by which movement the eccentric or cam 18a will engage the arm 15a in the position shown in Fig. 1 of the drawing. It will be understood that by forcing the lever 18 in a counter-clockwise direction toward the handle member 14h, the pipe gripper dogs will be further urged together until the pipe 13 is securely held between them. A clockwise movement of the members 18 and 14h will then cause the inner flanges 22a to move clockwise along the grooves to a more central or inward position within the grooves 21e, and simultaneously the lip members 25a on the plates 25 will move with the

jaw members forwardly with respect to the spring members 24, causing a compression of the springs, the throw or movement of the pipe gripper dogs 21 being sufficient to completely embed the teeth 21a upon the pipe 13 before the flanges 22a have reached the limit of their travel in grooves 21e and before the springs 24 have been completely compressed by the lip members 25a. In other words, by the clockwise movement of the wrench jaws around the gripper dogs 21, the inner contacting surfaces 28 (Fig. 4) of the jaw members 14 and 15 move on the cam surfaces 30 on the upper surfaces of the gripper dogs to a higher position on the said cam surfaces 30, thereby forcing the gripper dogs 21 inwardly during the said clockwise movement of the wrench.

When the wrench is released from the pipe, the springs 24 will return the dogs 21 to their initial position as shown in Fig. 2 of the drawing. It will be understood, of course, that the terms "clockwise" and "counter-clockwise" are used by way of illustration in reference to the figures discussed and that these terms become reversed as the position of the wrench is reversed in its operation.

It is obvious that mechanical changes, substitutions and adaptations may be made in the structure, and that equivalents may be substituted for the parts shown; and I reserve the right to make such mechanical changes, substitutions, and adaptations within the scope of the invention as comprehended by the stated objects and appended claim.

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

A pipe wrench comprising: two jaw members pivoted together at one end and provided with means to hold the members in pipe engaging position, each of said jaw members having eccentrically disposed semicircular grooves; eccentric pipe gripper dogs each having a semicircular groove to cooperate with an adjacent one of said semicircular grooves of said jaw members; a plate secured to each jaw member and having a lip to enter the semicircular groove of the adjacent dog; a spring stop secured to each dog at the end thereof remote from said plate, said dogs having eccentrically disposed curved grooves in their sides; coil springs in said grooves and engaging respectively said plates and said spring stops; holder plates secured to said jaw members and having flanges to ride in said side grooves and thereby retain said dogs against lateral displacement and avoid lateral pressure on said springs.

ALEXANDER BOYNTON.