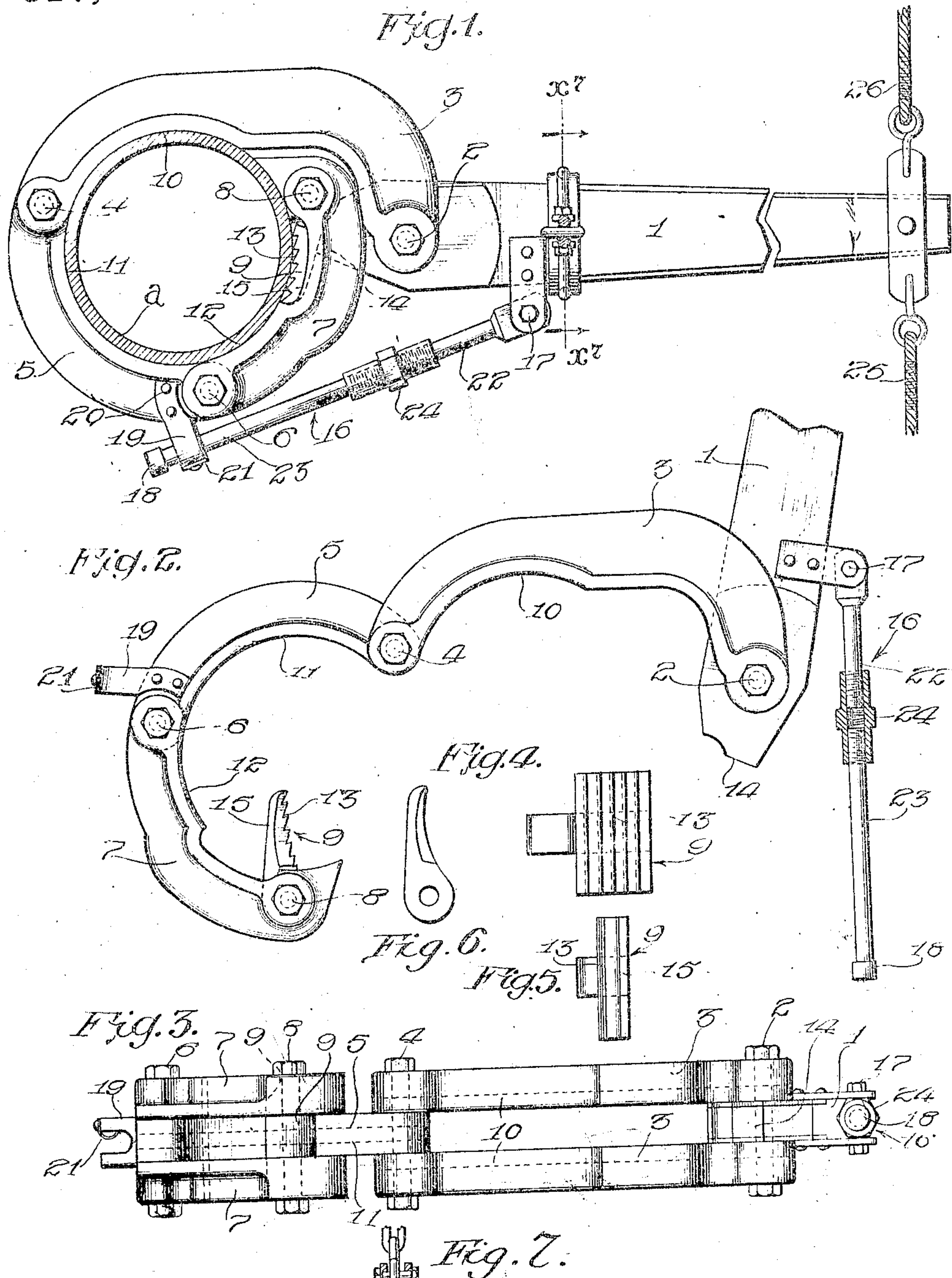


T. HUGHES.
 RATCHET CASING TONGS OR PIPE WRENCH.
 APPLICATION FILED JAN. 20, 1908.

Patented Apr. 6. 1909.

917,440.



Witnesses:
 C. J. Williams
 L. Belle Rice

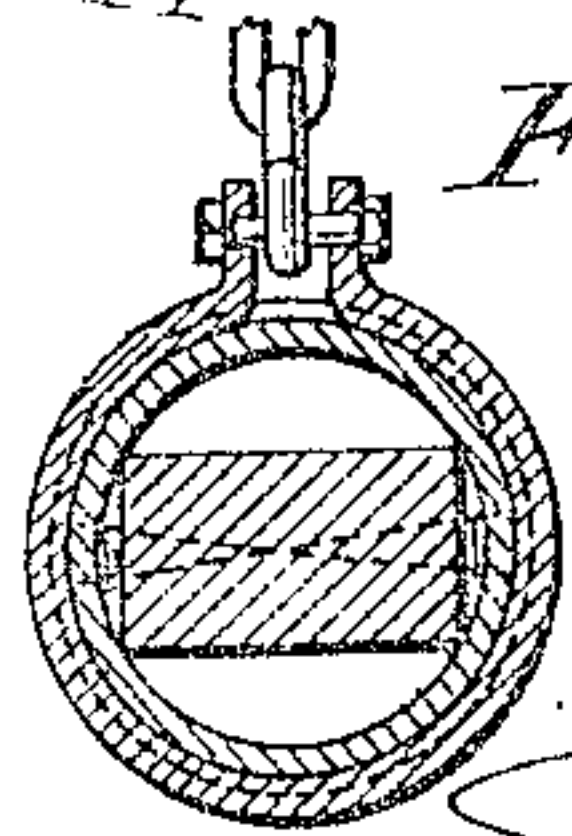


Fig. 7.

Inventor,
 Thomas Hughes.
 by James R. Townsend,
 his Atty.

UNITED STATES PATENT OFFICE.

THOMAS HUGHES, OF PALMS, CALIFORNIA.

RATCHET CASING-TONGS OR PIPE-WRENCH.

No. 917,440.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed January 20, 1908. Serial No. 411,763.

To all whom it may concern:

Be it known that I, THOMAS HUGHES, a citizen of the United States, residing at Palms, in the county of Los Angeles and State of California, have invented a new and useful Ratchet Casing-Tongs or Pipe-Wrench, of which the following is a specification.

This invention relates more particularly to that class of tongs designed for screwing and unscrewing well-casings of large diameter, in oil-wells or other deep wells in which great force is required in tightening the joint between the sections of casing. The invention is applicable, however, for use in screwing together any cylindrical pipes or other bodies.

An object of this invention is to provide a wrench that will clamp the well-casing in such a manner that it will not slip thereon and do this without any liability of crushing or indenting the same.

Another object is to provide simple and effective means whereby a tongs or pipe wrench of the character above-mentioned can be operated as a ratchet-wrench through a small arc for complete rotation of the casing.

An object of the invention is to provide a casing-tongs which can be readily operated in any well-rig, by a jerk-line and a return weight.

The principle of this invention is that a flexible band is provided to clasp and support the casing; the same being adapted to be drawn tightly onto the casing, and being provided with a dog or ratchet in the form of a friction block to engage the casing, and with a lever to force the dog against the casing when the wrench is being operated to turn the pipe; said dog being smooth in some instances and in others being notched or serrated to bite into the surface of the casing, the same having a gripping face of sufficient area to do away with all danger of indenting or crushing the casing where the same is engaged by the dog. The clasp or band is preferably formed of a number of members jointed together and adapted to fit around the outside of the casing or other body to be turned.

Another feature is a link to loosely connect the lever with the jointed band to hold the band from parting on the back stroke of the wrench.

The invention may be embodied in different forms and of various materials and I do not limit the same to any specific construction.

The accompanying drawings illustrate the invention in the form I at present deem most desirable.

Figure 1 is a plan of a casing tongs embodying this invention and applied to a well casing which is shown in cross section. Fig. 2 is a plan of the same tongs open and detached from the casing which is omitted from the view. Fig. 3 is a projection from Fig. 2 showing in side elevation, the open tongs detached. Fig. 4 is a face view of the ratchet dog or friction block. Fig. 5 is an end view of the same. Fig. 6 is an elevation of the dog detached, the same showing the smooth-faced form. Fig. 7 is a sectional elevation on line x^7-x^7 , Fig. 1. In Figs. 1 and 2 the lever is broken to contract the view.

1 is the tongs handle, the same being an iron or steel lever pivoted by a bolt 2 to duplicate lever-carrying links 3 that are pivoted by a bolt 4 to a connecting link 5 which is pivoted by a bolt 6 to duplicate dog-carrying links 7, in the ends of which is a bolt 8 that pivots a ratchet, detent friction block or dog 9 to said dog-carrying links 7. The clasp members 3, 5 and 7, are provided with smooth internal arc faces 10, 11, and 12, respectively, curved to correspond with the external face of the casing a or other cylindrical body to be operated upon, and adapted to completely encircle the same, and the inner face 13 of the ratchet 9 is in some instances smooth and in others may be serrated or otherwise formed and is designed to take tight hold upon the casing when forced into engagement therewith by the lever 1 which is provided with a tip or tongue 14 to engage the dog and force it inwardly when the wrench is in place on a well-casing or other cylindrical body, and the lever operated for the purpose of turning such body. In case the dog 9 has serrations or teeth the same are directed away from the pivot by which said dog is connected to the duplicate links 7 that carry it so as to slip when the wrench is turned to drag the dog, and to take hold on the reverse movement.

In order to place the wrench in position on a well-casing or other cylindrical body to be gripped, the free end of the dog is ad-

justed or swung toward the pivot 6 which pivots the dog-carrying links 7 to the connecting link 5, and the band comprising the members 3, 5 and 7 is then brought around the cylindrical body *a*, and then the lever 1 is swung into position to cause its tip or tongue 14 to engage the outer face 15 of the ratchet, dog or detent 9. Said outer face 15 of said dog is arranged aslant outward from its tip or free end toward the eye of said dog, so that when the tip 14 of the lever engages the outer face of the dog and is operated to force the dog toward the casing *a* or corresponding body, there will be also a tendency to force the free end of the duplicate links 7 toward the lever-carrying links 3, thus to tighten the clamp by the action of the tip or tongue 14 at the same time that the dog is thereby forced against the casing.

The engaging faces 10, 11, 12 and 13, may be constructed of any width that may to the constructor seem advisable to afford the proper support and friction. The serrations of the face 13 may extend across the face in parallelism with the axis from which the curvature of said face is inscribed.

16 designates an extensible, adjustable link pivoted by a pivot 17 to the lever 1, and provided at its free end with a head 18 to engage a retainer 19 in the form of two fingers fastened by rivets 20 to the connecting link 5. One of said fingers is preferably provided with a catch in the form of a spring 21 to resiliently hold the link 16 when the same has been pressed into place in the retainer. Said link is formed of two screw-threaded portions 22, 23, connected by a turnbuckle 24 screwing onto the threaded portions 22, 23, one of which is right and the other is left threaded so that by turning the turnbuckle the link may be lengthened or shortened, thus to give greater or less play for the lever in working backward and forward to operate the wrench as a ratchet-wrench.

25 designates a jerk-line for drawing the lever in one direction to turn the pipe, and 26 is a weighted line designed to pull in opposition to the jerk-line to make the back stroke of the wrench when the same is used as a ratchet-wrench.

In practical use the wrench may be applied to the casing by simply bending around the casing the jointed members 3, 5, and 7, which are rigid respectively, and jointed together as described, care being taken that the dog is bent inward toward the pivot 6, as shown in Fig. 1. Then the jerk-line 25 and the return line 26 which may be operated by a weight or a spring, not shown, will be adjusted, and the engine started into operation in the usual manner to jerk the jerk-line, whereupon the lever will be swung to and fro in a horizontal line, thus alternately causing the casing to be gripped and

released; the gripping taking place on the forward stroke, and the releasing occurring on the back stroke. To reverse the operation the wrench will be turned upside down and then operated in the usual way.

The wrench or casing tongs may be provided with a ring in which the lever may turn, and to which the sand-line or other line may be attached by any suitable means, to lift and handle the wrench by power. The adjustable link 16 may be lengthened or shortened to allow a greater or less loosening of the band on the back-stroke. The ratchet, detent, dog, friction block or device at 9 may be a member of any desirable form, pivoted to and movable relative to the other members of the band; a principle of the invention being that one member of the band is arranged in position to be engaged by the short arm of a lever fulcrumed to another member of the band and when said member is so engaged, and force applied to the lever, the same will move the frictional member inwardly against the object which is encircled by the band, whereby the use of a frictional block, dog, detent or ratchet having a frictional surface of large extent, to distribute the strain over a considerable area of the pipe is permitted; thus enabling the pipe to withstand the strain and yet allowing the pressure of the frictional block upon the pipe to be sufficiently forcible to prevent slipping even where the dog is provided with a broad polished face to frictionally engage a polished body. The use of a smooth faced dog of this character is especially desirable where polished, finished, painted or coated pipes or rods are to be gripped without marring. The detent 9 extends outwardly from the axis of the band toward the lever pivot to afford a purchase for the lever to tighten the band as well as to force the detent inwardly.

A feature of the invention is that the ends of the bands overlap, the detent extends along the inner face of the member to which it is pivoted and consequently along the inner face of the band while the outer face of the detent extends tangentially relatively to the band, and the end or head of the lever is adapted to move along said face toward the pivot of the detent, the detent serving not only in the nature of a friction block but also as a cam; the engagement between which and the lever is approximately in line between the axis of the band and the axis of the lever pivot so that maximum leverage and the wedging actions are simultaneously employed to tighten a grip upon the pipe or casing in the operation of turning the same.

I claim:—

1. A casing tongs comprising a flexible overlapping open band, a ratchet pivoted at one end of the band and extending along the

inner face thereof, and a lever pivoted at the other end of the band to simultaneously press the ratchet inward and to relatively move the pivots of the lever and ratchet apart.

2. A flexible band, a detent pivoted to one end of the band, and a lever pivoted to the other end of the band to engage the detent between its pivot and the middle of the band to press the detent inwardly.

3. A band adapted to encircle a cylinder, a detent pivoted to the band and adapted to fold inside the circle of said band to engage the encircled cylinder, and a lever pivoted to the band and adapted to slide along the detent toward the pivot thereof to force the detent inwardly.

4. A band, a detent connected therewith, and a lever pivoted to the band and adapted to engage the detent, said detent extending tangentially between the pivot of the lever and the inner face of the band to afford a cam-like purchase for the lever to tighten the band.

5. A band formed of a plurality of members pivoted together and provided with inwardly-curved faces to engage a cylinder, a detent pivoted to one of said members and extending along the inner face thereof to also engage the cylinder, and a lever pivoted to another of said members to engage the detent to simultaneously tighten the band on and force the detent into engagement with the object encircled by the band.

6. Three members pivoted together and provided with inwardly-curved faces to encircle a cylinder, a detent on and extending along the inner face of one of said members, a lever on another of said members to engage the detent and tighten the band, a retainer on another one of said members, and a link loosely connecting the lever with the retainer.

7. Three members pivoted together and provided with inwardly-curved faces and adapted to completely encircle a cylinder, a detent at one end of said pivoted members to fold within the circle formed by such members, a lever on another of said members to engage the detent thus folded and to tighten the band, a retainer on another of said members, and an adjustable link loosely connecting the lever with the retainer.

8. Three members pivoted together and provided with inwardly-curved faces to encircle a cylinder, a detent on one end of and extending along the inner face of one of said members, a lever on another of said members to engage the detent and tighten the band, a retainer on another one of said members, and a link pivoted to the lever and adapted to engage the retainer.

9. Three members pivoted together and provided with inwardly-curved faces and

adapted to completely encircle a cylinder, a detent pivoted to one end of one of said members to project inside the circle formed by such members, a lever on another of said members to engage the detent and tighten the band, a retainer on another of said members, and an adjustable link pivoted to the lever and adapted to engage the retainer.

10. A casing tongs comprising a link, duplicate members pivoted to one end of said link, a detent pivoted between the duplicate members, other duplicate members pivoted to the other end of said link, a lever pivoted between the other of said duplicate members and adapted to engage the detent to draw said members together and to force the detent inwardly.

11. A casing tongs comprising a link, duplicate members pivoted to one end of said link, a detent pivoted between the duplicate members, other duplicate members pivoted to the other end of said link, a lever pivoted between the other of said duplicate members and adapted to engage the detent to draw said members together and to force the detent inward, and means to loosely connect said lever with said link.

12. A casing tongs comprising three members pivoted together and adapted to form a band, a ratchet pivoted to one of said members and extending along the inner face thereof, and a lever pivoted to another of said members and adapted to engage the ratchet to tighten the band on and press the ratchet against the casing.

13. A casing tongs comprising three members pivoted together and adapted to form a band, a ratchet pivoted to and movable inwardly from the inner face of one of said members, a lever pivoted to another of said members and adapted to engage the ratchet to tighten the band on and press the ratchet against the casing, and a link loosely connecting the lever with the intermediate member.

14. A ratchet - casing - tongs comprising three members pivoted together to encircle the casing, and each provided with curved faces to fit the casing, a ratchet pivoted to and movable inwardly from one of said members and provided with teeth to engage the casing, a lever to engage the ratchet to simultaneously tighten the band formed by said members and to force the ratchet into engagement with the casing, and means loosely connecting the lever with one of said members to prevent the band from fully opening on the back-stroke.

15. A wrench comprising a plurality of members pivoted together and adapted to embrace a cylindrical body, one of said members being provided with a dog pivoted thereto and having a face inside the band, and another member being provided with a

lever having a head to engage said dog to tighten the band formed by the other member and to force the dog inwardly.

16. An overlapping band provided with a friction member and a lever connected with the band and adapted to simultaneously tighten the band and force the friction member inwardly relative to the band.

17. A tongs or wrench comprising members jointed together to form an overlapping

band, a friction member, and a lever to tighten the band and force the friction member inwardly relative to the band.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 15th day of January, 1908.

THOMAS HUGHES.

In presence of—

JAMES R. TOWNSEND,

JULIA TOWNSEND.