May 22, 1928. 1,670,547

S. C. NORTH

BALL SOCKET RATCHET WRENCH

Filed Nov. 3, 1925

Fig. 1.

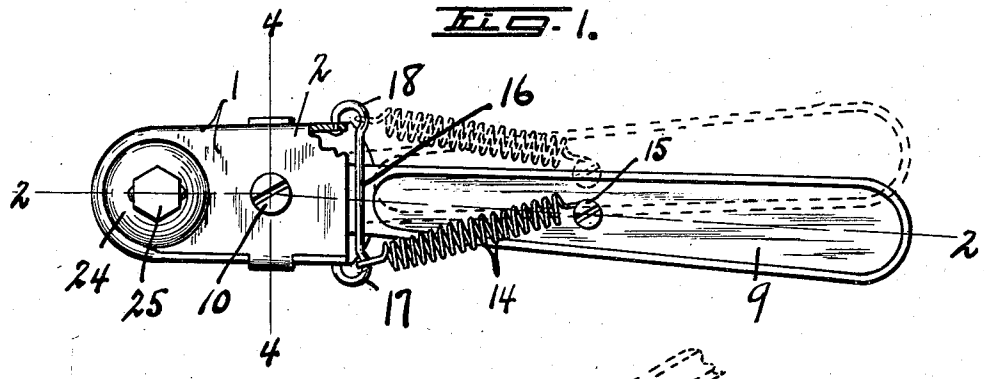



Fig. 2.

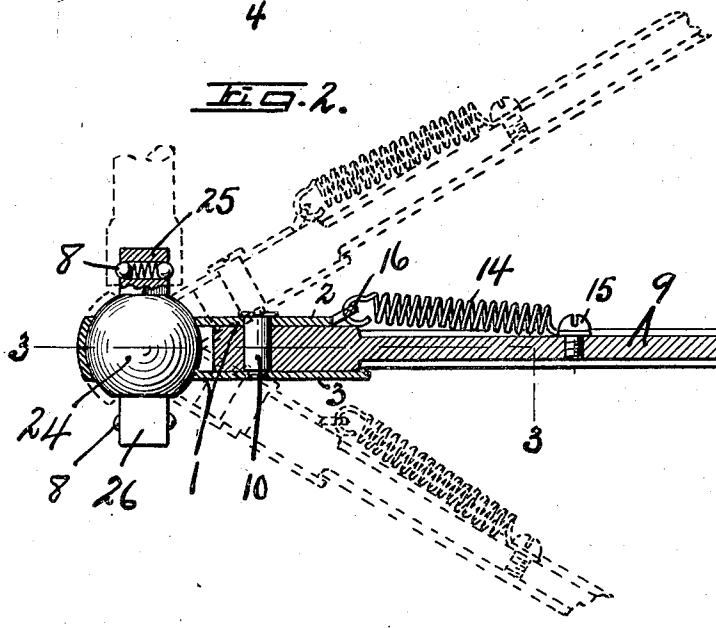



Fig. 3.

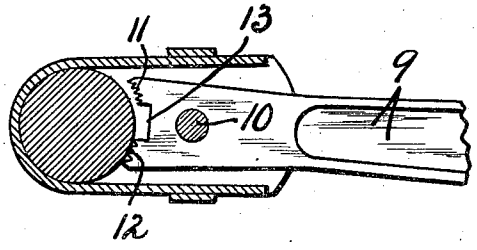
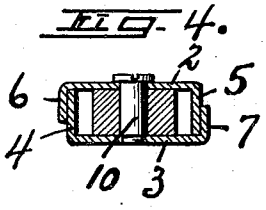



Fig. 4.




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# UNITED STATES PATENT OFFICE.

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## BALL-SOCKET RATCHET WRENCH.

Application filed November 3, 1925. Serial No. 66,500.

This invention relates to certain improvements in ball socket ratchet wrenches. The main object of the invention is the production of a ball socket ratchet wrench of improved construction and character, positive in its operation in both directions and readily operated and easily released.

Other objects and advantages relate to the details of the structure, all as will more fully appear from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is an elevation of a wrench of this invention.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a section on line 3—3, Figure 2.

Figure 4 is a section on line 4—4, Figure 1.

The ball socket ratchet wrench here illustrated comprises a casing —1— which may as here shown, be formed of a single piece of sheet metal bent into the form illustrated, or a similar one, and provided with a pair of registering substantially circular openings in its opposite side walls —2— and —3—. The casing as shown is of substantially rectangular form and its upper and lower walls are formed by flanges —4— and —5— on the side walls —3— and —2— respectively locked to the opposite side wall by lugs —6— and —7— formed on the side walls —2— and —3— respectively.

This casing —1— is adapted to receive and retain a ball —24— which has segmental portions projecting outwardly from the side walls through the respective openings, and for the purpose of retaining the ball in the casing, the openings in the side walls are made of slightly less diameter than the ball, and the side walls as shown are spaced apart a distance considerably less than the diameter of the ball so that substantial portions of the ball project outwardly from opposite sides of the casing for a purpose and to permit the operation hereinafter described.

Each of the segments of the ball that project from the casing has studs —25— and —26— respectively projecting outwardly therefrom and adapted to receive the rear end of a wrench, such as an ordinary socket wrench of any suitable form. One of these studs as —26— may be square in cross-section, whereas the other stud —25— may be hexagonal, if desired, for the purpose of seating in different shaped wrench sockets and in order to frictionally hold the wrench socket in place, the studs may have transverse openings in which the spring pressed balls —8— are positioned. The forward end of the casing —1— is preferably as shown of spherical form on a radius substantially equal to the radius of the ball 24.

It will be obvious that the ball is capable of a universal movement within the socket formed in the casing —1— so as to permit operation at various and different angles and automatic adjustment to the most suitable angle when the wrench is in place.

A handle or lever —9— is provided having a portion projecting into the rear open end of the casing —1— and preferably the handle is of a thickness substantially the same as the distance between the side walls —2— and —3— of the casing so as to effect a re-enforcement of the casing. This lever —9— is pivoted to the casing by means of a pivot pin or screw —10— extending through one side as —2— of the casing, through the lever —9— and threaded into the opposite side as —3— of the casing.

The lever —9— is of a width less than the distance between walls —4— and —5— so as to permit limited rocking movement of the lever about the pivot —10— without contact with the upper and lower walls —4— and —5— respectively. For the purpose of rotating the ball —24— in either direction desired, the forward end of the lever —9— in front of the pivot —10— is formed with a pair of spaced oppositely inclined corrugations or roughened surfaces —11— and —12— respectively separated by an intermediate recess —13—. These corrugated surfaces incline inwardly and rearwardly toward each other so as to conform somewhat to the curved adjacent surface of the ball —24— and these corrugated surfaces are in effect pawls mounted upon a common axis, and are designed for rotating the ball in opposite directions, and for effective and positive operation, the ball —24— is formed of a somewhat softer material than the pawls so that at each operation, the respective pawl bites into and produces indentations in the surface of the ball whereby a respectively positive engagement is effected.

It will be obvious that by shifting the handle —9— about pivot —10—, one of these pawls will be brought into cooperative engagement with the ball so that no relative

movement of the ball is permitted with respect to the handle and the wrench then operates as a rigid body.

For the purpose of holding the wrench in position for operation by the desired one of the pawls or corrugated surfaces 11 and 12, a spring 14 is provided which has one end secured to the lever —9— as by screw —15—, and its opposite end shiftably engaged with a bar 16 having recesses 17 and 18 at its opposite ends, which recesses bow toward the screw —15— and provide a means for normally holding the adjacent end of the spring in the respective recess in which it may be placed.

The ends of the bar —16— are returned bent and secured to the casing —1— at its rear portion, the bar being spaced from the casing to provide space in which the end of the spring engaged by the bar may slide to and from the respective recesses 17 and 18.

Altho I have shown and described a specific construction as illustrative of an embodiment of my invention, I do not desire to restrict myself to the particular form or arrangement of the parts, as various changes may be made within the scope of the appended claims.

I claim:

1. In a device of the class described, the combination with a casing having a socket and a ball in said socket freely rotatable therein in any direction and having oppositely projecting portions, each of said projecting portions including a wrench part, of a lever pivoted to the casing and having a roughened part formed of material harder than the ball, and adapted to engage the ball irrespective of the position of the ball in the socket.

2. In a device of the class described, the combination with a casing having a socket and a ball in said socket freely rotatable therein in any direction and having oppositely projecting portions, each of said projecting portions including a wrench part, of a lever pivoted to the casing and having opposed pawl parts formed of material harder than the ball and adapted to engage the ball irrespective of the position of the ball in the socket.

3. In a device of the class described, the combination with a casing having a socket and a ball in said socket freely rotatable therein in any direction and having oppositely projecting portions, each of said projecting portions including a wrench part, of a lever pivoted to the casing and having oppositely inclined spaced pawl parts formed of material harder than the ball and adapted to engage the ball irrespective of the position of the ball in the socket.

4. In a device of the class described, the combination with a casing having a socket and a ball in said socket freely rotatable therein and having oppositely projecting portions, each of said projecting portions including a wrench part, of a lever pivoted to the casing and having oppositely inclined spaced pawl parts formed of material harder than the ball and adapted to engage the ball, and spring means tending to hold either of said pawl parts in engagement with the ball.

5. In a device of the class described, the combination with a casing having a socket and a ball in said socket freely rotatable therein and having oppositely projecting portions, each of said projecting portions including a wrench part, of a lever pivoted to the casing and having oppositely inclined spaced pawl parts formed of material harder than the ball and adapted to engage the ball, a bar at the rear of the casing and having spaced recesses, a spring having one end connected to the lever and its opposite end adapted to seat in either of said recesses for holding either of said pawl parts in engagement with the ball.

In witness whereof I have hereunto set my hand this 21 day of October, 1925.

STANLEY C. NORTH.