

Duralast[®]



Duralast 3/8in drive 72-ton standard ratchet

Technical Description

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9/27/2021

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Introduction:

The ratcheting wrench was patented by Robert Owen Jr. in 1913. His original design had two handles, one would rotate the same way today's ratchets work and the other would be held in place by the other. Robert Owen Jr. worked as a cutting machine operator; the machine was very unreliable since electricity had just become widespread. Repairs for that machine were very pricey. Owen figured the ideal tool to make these repairs would be a double acting wrench that doesn't require complete 360-degree rotations to loosen bolts. Owen got to drafting and applied for a patent in 1913. The patent never ended up being sold to anyone. (*US1072980a - double-acting wrench*. Google Patents)

Most ratchets found in stores contain the same elements. Many ratchets contain a male end known as a "driver" where sockets and extensions can mount. The key component is the actual ratcheting device. It works like the way a hand brake lever works or a bicycle free wheel. A little lever floats over a geared wheel that the wrench rotates around while the driver remains not spinning, when spinning in the opposite direction both the driver handle rotates. A ratchet is often used in replacement of a normal wrench for several reasons. The first reason is you aren't always able to rotate a wrench a full 360 degrees, whereas with a socket wrench you can rotate the handle as little as 15 degrees and get a bolt fully tightened. The second reason is torque, since ratchets often have longer and beefier handles, they can both apply more force and handle more stress (for those times consumers slide a 3-foot pipe on a 10-inch ratchet and press on it with their foot).

Duralast History:

Duralast [Figure 1] was introduced in 1986 by the automotive parts wholesaler "Auto Shack" which a year later was renamed to AutoZone [Figure 2]. Duralast is AutoZone's private label being the brand under which AutoZone sells its aftermarket parts, tools, car batteries and automotive accessories. Prior to the massive range of products that Duralast offers today, Duralast began only had a line of alternators and starters. In 2003 Duralast introduced 120 products including ratchets, wrenches, sockets and screwdrivers. Today Duralast offers over 500

hand tools that offer the same professional grade and durability that any other brand offers, (AutoZone inc. *Our Timeline*, 2021).

The logo for Duralast, featuring the word "Duralast" in a bold, blue, italicized sans-serif font with a registered trademark symbol.

[Figure 1] Duralast logo, (2021)

The logo for AutoZone, featuring a stylized orange and white striped graphic to the left of the word "AutoZone" in a bold, red, italicized sans-serif font with a registered trademark symbol.

[Figure 2] AutoZone logo. (2021)

About the Ratchet:

Function: This ratchet is a 3/8in drive meaning it accepts sockets, extensions, bend joints and adapters with a 3/8 female end. The ratcheting system contains 72-teeth allowing for 5 degrees of a ratcheting arc. This allows for the tool to be used in tighter spaces, which is the key reason why they are used by nearly every trade. It only takes an opening that allows you to rotate the wrench 5 degrees and consumers will be able to undo whatever bolt they need to. In case that isn't an option the 3/8in drive allows consumer to use a variety of bend joints, extensions, and sockets with varying depth to get their job done. To put on and remove sockets the wrench has a button that extends and hides a small knob that prevents a socket from falling off the ratchet. Right below the button is a small lever to regulate the direction in which the ratchet will apply force when rotating. The ratchet is constructed of forged alloy steel to ensure durability and protection of the ratcheting system inside the head. The ratchet is finished in a polished chrome that makes it easy to wipe off any grease or dirt consumers might get on their ratchet (*AutoZone 2021*).

Specifications:

Weight- 0.75lbs

Application- 3/8 in. Drive

Length- 8.39in

Deg. of engagement- 5 degrees

Tooth count- 72

Components:

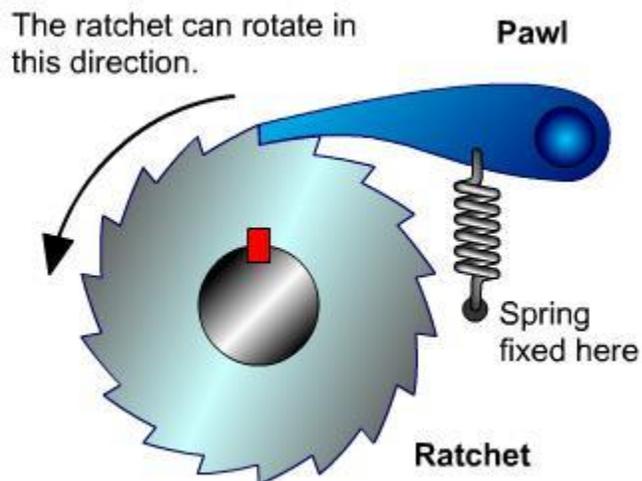
Handle: The handle is made from the same material as the ratchet head, the handle featured cutouts along the bottom to ensure the user had a good grip. The handle is $\approx 3/4$ in in diameter.[Figure 4]

Ratchet: the ratchet consists of a small arm, and a 72-tooth gear that allows for tightening in spaces that allow as little as 5 degrees of rotation [Figure 3].

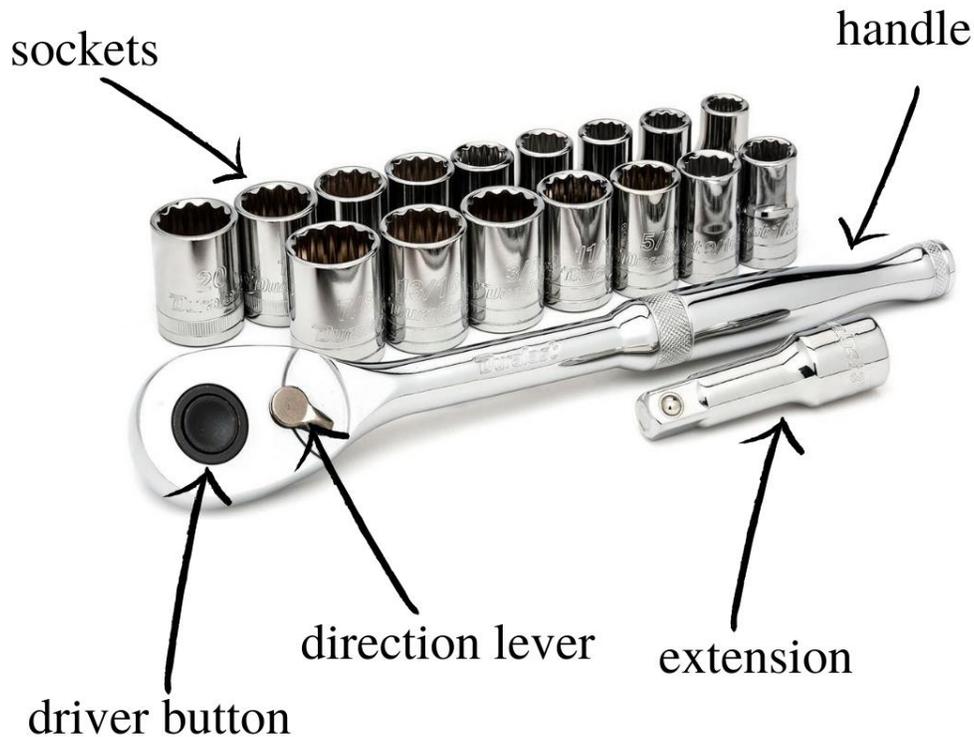
Driver: The driver is $3/8$ in with chamfered corners to allow the easy mounting and removal of sockets and other adapters.

Driver button: The driver button is made from plastic; it is used to extend and retract a little knob that prevents the socket from falling off the driver. [Figure 4]

Switch lever: The metal switch lever is used to change rotational direction. [Figure 4]



[Figure 3] Ratcheting mechanism (Notes and Sketches co., 2021)



[Figure 4] image used graphic (AutoZone, 2021)

Adapters and Attachments:

Duralast offers a wide range of sockets extensions and bend joints in order for consumers to get the most out of their ratchet wrench. Duralast offers both standard and metric socket sets as well as single sockets [4]. Duralast offers both deep and shallow sockets, often times when a nut is on a stud it requires a deeper socket to be able to reach the nut. Extensions [5] are also something that is commonly used with this ratchet. Reason being many bolts in something like an engine bay are often accessible just in a tight surrounding. An extension allows you to access bolts/nuts without having to mess around with trying to fit an 8.4” wrench in a 9” opening. Another attachment often used with a ratchet wrench is a bend joint [7]. There are instances where an extension won't achieve the right angle to reach a bolt, or simply you just need the ratchet slanted in order to spin a bolt. This is when a bend joint comes into play. All extensions, sockets, and joints are made from the same durable and easy to clean metal that the handle is made of.



[Figure 5] Socket set



[Figure 6] Extensions



[Figure 7] Bend Joints

[Figure 5],[Figure 6],[Figure 7] (AutoZone, 2021)

How to use:

To use this ratchet wrench, the ratchet itself a set of 3/8th inch drive sockets are required [Figure 5]. The right size socket must be chosen to loosen/tighten a bolt. A socket must fit with little wiggle room onto a bolt. If the socket chosen is too large it can potentially round off the bolt head. Once the correct socket is chosen, attach the socket to the wrench itself. This is done by pressing the button on the back of the ratchet and sliding the socket onto the male end of the wrench. After mating the socket to the wrench, the small lever on the back of the wrench needs to be set to either the tightening or loosening side. Sliding the lever to the left will set the wrench to loosen, when the lever is to the right the wrench will tighten. [Figure 4]

Conclusion:

The ratchet wrench is a versatile tool that allows consumers to access hardware in hard-to-reach places without having to fidget around with a regular wrench. Users can use a variety of joints, extensions and sockets with varying depth to access whatever hardware they need to, much quicker than they would have they had to use a normal wrench. The ratcheting system allows for consumers to tighten and loosen hardware faster and with less effort thanks to the 8.4-in handle and not having to make full rotations with the wrench. The steel alloy and chrome finish ensure the tools durability as well making it easy to clean. Duralast tools aren't anything out of this world, they are focused on durability and versatility. The ratchet wrench is a rather simple tool that fixes many complex situations where hardware is in places a normal wrench won't fit in, let alone made a full rotation.

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[4-7] Photographs by AutoZone inc. 2021

[4] <https://contentinfo.autozone.com/znetcs/additional-prod-images/en/US/atg/61-200/2/image/1/>

[5] https://www.autozone.com/ratchets-sockets-and-wrenches/socket-set/p/duralast-3-8in-drive-metric-socket-set-10-piece/569683_0_0?cmpid=LIA:US:EN:AD:NL:1000000:TLS:8367255572&gclid=CjwKC_AjwhaaKBhBcEiwA8acsHFb6m4MTMuBmhr9mrtiRp35sZZp_ZGdwxNPTw1qcJm7QY0QNxJP0NRoCDYoQAvD_BwE&gclsrc=aw.ds

[6] https://www.autozone.com/ratchets-sockets-and-wrenches/ratchet-extension/p/duralast-locking-extension-set-3-piece/595333_0_0

[7] https://www.autozone.com/ratchets-sockets-and-wrenches/universal-joint-socket/p/duralast-u-joint-socket-set-3-piece/914055_0_0