

[54] **RATCHET WRENCH**

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**Related U.S. Application Data**

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abandoned.

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[51] Int. Cl. .... **B25b 13/46**

[58] Field of Search ..... 81/61, 62, 63, 63.1,  
81/63.2, 57.3

[56]

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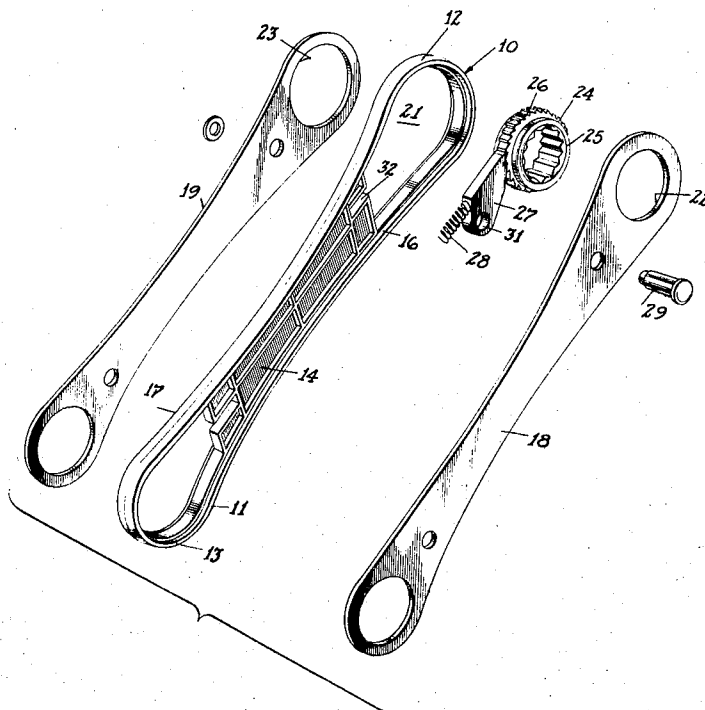
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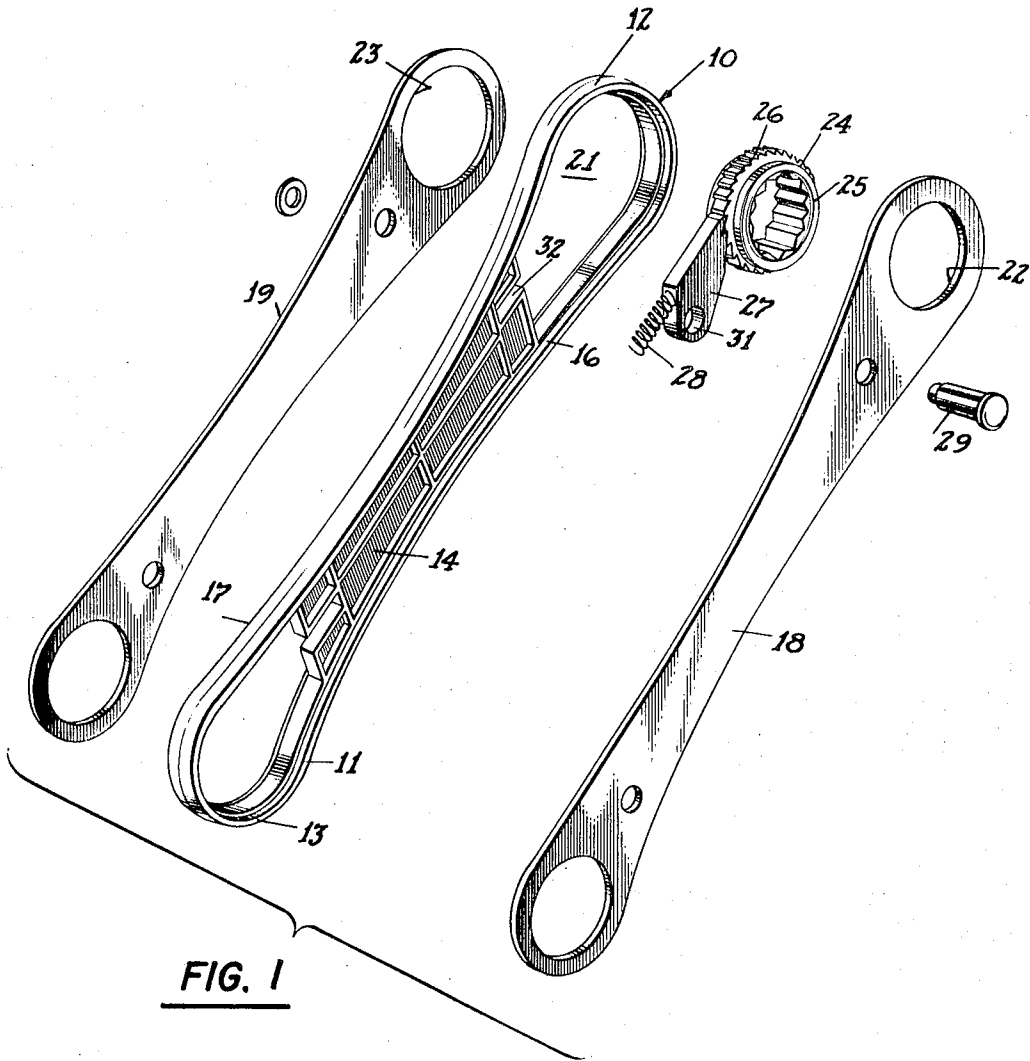
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**ABSTRACT**

This invention relates to a ratchet wrench and, more particularly, to a double-ended wrench having ratchet-operated sockets of different sizes at the ends and having a main body formed of injection molded plastic.

**4 Claims, 5 Drawing Figures**





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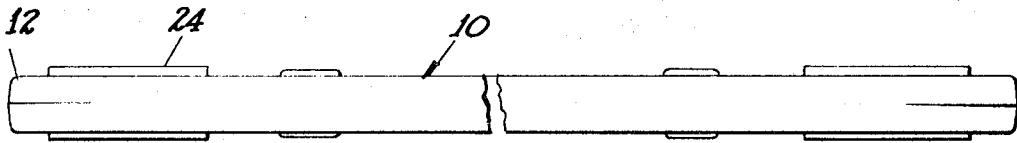


FIG. 3

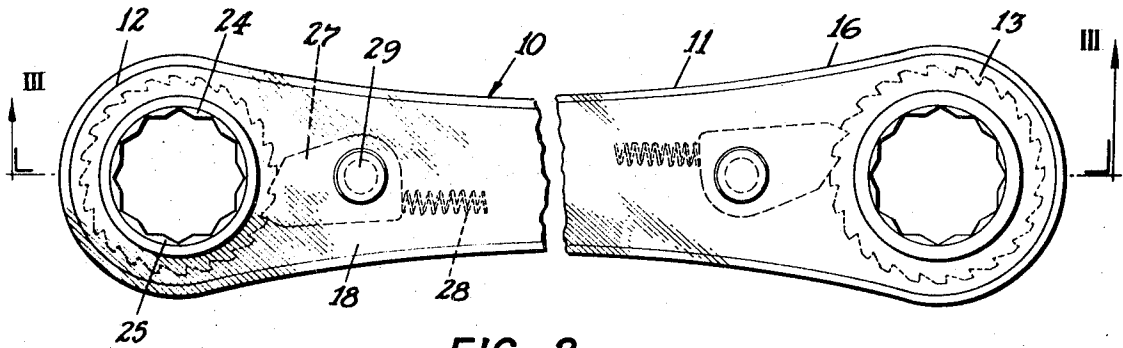


FIG. 2

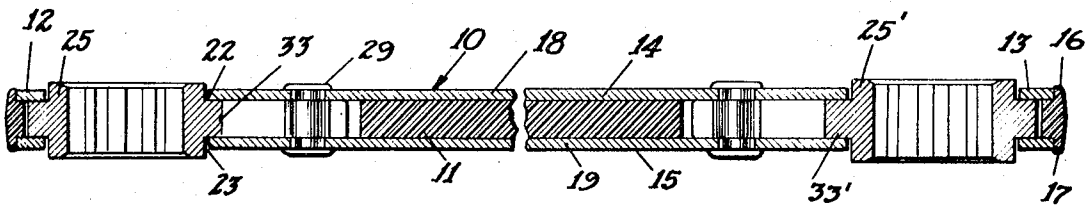


FIG. 4

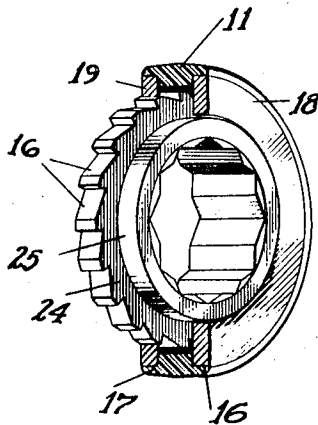


FIG. 5

**RATCHET WRENCH**

This is a continuation of application, Ser. No. 83,463 filed 23 Oct. 70, now abandoned.

**BACKGROUND OF THE INVENTION**

In the manufacture of box wrenches of the ratchet type, a number of problems have always existed. One aspect of box wrenches is that, although they are a very useful tool, it requires a rather intricate main body forging or casting to produce them and this makes the wrench quite expensive. On the other hand, because any given double-ended box wrench has only two sizes of sockets, it is necessary to have a complete set of wrenches in order to handle all sizes of nuts and bolts. If the individual wrench is expensive, it is, of course, even more expensive to have a complete set. There is also a tendency, under present living conditions, to favor tools which absorb noise, instead of producing it, and a large set of entirely metallic tools does produce an undercurrent of noise in a working area. The metal tools also have a tendency to scratch surfaces with which they come into contact, especially when they slip during working and strike elements of the workpiece. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a socket wrench of inexpensive construction which is, nevertheless, durable and strong.

Another object of this invention is the provision of a socket wrench in which the main body is formed of an injection molded plastic.

A further object of the present invention is the provision of a socket wrench which has a sound-absorbing quality and does not produce a ring or noise when struck.

It is another object of the instant invention to provide a socket wrench which will not scratch or scar surfaces with which it comes into contact.

A still further object of the invention is the provision of a socket wrench of such simple and inexpensive construction that it is possible to manufacture a complete set of various sizes without the cost becoming exorbitant.

It is a further object of the invention to provide a wrench of such construction that the range of cost between the simple wrench and the ratchet wrench is reduced because some of the materials used in the manufacture of the ratchet wrench are less expensive as raw materials, and less expensive to form and shape than those of a conventional ratchet wrench.

It is a still further object of the present invention to provide a ratchet wrench which needs no elements for changing the direction of ratcheting.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

**SUMMARY OF THE INVENTION**

In general, the present invention consists of a ratchet wrench having an elongated framework formed of a rigid plastic material with an enlarged portion at one end. The framework has two opposite parallel faces from each of which extends a peripheral flange. A plate associated with each face of the framework fits snugly within its respective flange and a mechanism, including

a socket member having a ratchet and a multiple-toothed pawl is located in the said enlarged portion of the framework and is located between the two plates.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective exploded view of a ratchet wrench incorporating the principles of the present invention,

FIG. 2 is a plan view of the wrench,

FIG. 3 is a side elevational view of the invention,

FIG. 4 is a sectional view of the invention, taken on the line III—III of FIG. 2, and

FIG. 5 is a perspective view with portions removed of a part of the wrench.

**DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring first to FIG. 1, which best shows the general features of the invention, the wrench, indicated generally by the reference numeral 10, is shown as being of the double-ended type with a ratchet-operated socket at each end. The wrench is provided with a main body 11 formed of a rigid plastic material, such as LEXAN, having an enlarged portion 12 and 13 at each end. The body or framework has two opposite parallel faces 14 and 15 from which extends peripheral flanges 16 and 17, respectively. The plate 18 is associated with the face 14 and fits snugly within the enclosure formed by the flange 13. Similarly, a plate 19 lies against the other surface of the body 11 in the flange 17. The body 11 is provided with an opening 21 at one end and the plates 18 and 19 are provided with circular apertures 22 and 23, respectively, located more or less centrally of the opening 21. The plates 18 and 19 form with the opening 21 an enclosure in which lies a mechanism 24 including a socket member 25 formed on its exterior surface with ratchet teeth 26 engaged by a pawl 27 which is urged into operative relationship to the ratchet teeth by a coil spring 28. A similar mechanism is provided at the other end of the body 11 and held in place by the plates 18 and 19. The body 11 and the plates 18 and 19 are held together to lock the ratchet mechanisms in place by means of fasteners, such as a rivet 29 passing through suitable apertures in the plates 18 and 19. The rivet also passes through a bore 31 in the pawl 27 and acts as its pivot. The body 11 is provided with a slot 32 extending from the opening 21 for enclosing the spring 28 in cooperation, of course, with the inner surfaces of the plates 18 and 19.

FIGS. 2, 3, 4, and 5 show various other aspects of the invention. FIG. 2 shows that the socket member 25 has a slightly different size than the one at the other enlarged end 13 of the wrench. Both have their own pawls and springs and the pawls are of the multiple-tooth type to give optimum gripping action between the ratchet and the pawl in each case. In a set of such wrenches the wrench bodies are of a commensurate size, that is to say, small socket sizes would have small socket bodies, and vice versa, since the torque requirements on various bolt and nut sizes vary inversely with the size.

It is evident in FIG. 3 that the flanges 16 and 17 extend beyond the outer surfaces of the plates 18 and 19 and, therefore, act as a protection against these plates being touched by other tools.

FIGS. 4 and 5 particularly show how the socket member 25 and the corresponding socket member 25' at the other end of the wrench are locked between the plates 18 and 19 for rotation. The teeth 26 are mounted on a central radial flange 33 and 33', respectively. This locks the socket in place but allows rotation. The ends of the socket member 25, for instance, extend through the apertures 22 and 23 formed in the plates 18 and 19, respectively.

It can be seen, then, that a wrench manufactured in the manner described above can be quite inexpensive. The main elements necessary to the wrench are provided by the body 11 which is injection molded from a very strong, rigid plastic. The enclosure plates 18 and 19 are simple stampings, while the socket member 25 and the pawl 27 are castings or are formed by powder metallurgy methods. The design of the elements is readily extrapolated to smaller and larger sizes without difficulty to provide a wide range of wrenches. The body 11, because of the extension of its flanges 16 and 17, not only provides plastic surface all around the periphery, but also on the faces where the flanges extend slightly beyond the plates 18 and 19. The wrenches, therefore, even in a large group, will have a muffled sound and will not make too much noise. Furthermore, when the wrench slips during work, if it strikes another object, it will not scratch it because the likelihood of a metal part of the wrench striking anything is remote; the likelihood is that the outer periphery of the wrench, which is plastic, will strike another object, if anything.

Finally, the use of plastic in a wrench gives it a warm comfortable feeling to the hand, which can be very desirable, particularly when working in a cold area. The use of the double-toothed pawl provides a conjugate action which is accumulative in effect and is distributed along the length of the profile of conjugation and along the breadth of the interlocking teeth. It also induces positive, full-depth feeding of the follower teeth of the pawl. Because the body 11 is injection molded, it can be formed with a high degree of precision, so that no further machining is necessary. The plates 18 and 19 can be very accurately produced by stamping and will not present an expensive machining operation. The same thing is true of the elements making up the ratchet mechanism. The plastic framework or body is so formed that it can accomplish in conjunction with its face plates and pawl three functions relative to the socket member:

1. It acts as a housing bearing and raceway to limit and confine the rotation of the pawl about the socket and ratchet as well as the rotation of the socket or ratchet member within the planar embrace of the frame,

2. when the socket embraces an item, such as a bolt head nut and so forth, the framework acts as a handle

to rotate the captive pawl through a slip movement about the ratchet to a selected locked position on the teeth of the ratchet, and

3. while the pawl holds the ratchet in locked position, it acts as a lever to rotate the socket member enough to twist tight or loosen the item held fixed in the grip of the socket.

In addition, the construction used in this invention assures that the chamber containing the ratchet-and-pawl mechanism is free of dust and other foreign matter.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. A ratchet wrench, comprising:

a. an elongated framework formed of rigid plastic material with an enlarged portion at one end, the framework having two opposite, parallel faces from each of which extends a flange, extending entirely around the periphery of the face,

b. a plate formed of a relatively rigid metal material associated with each face of the framework and fitted snugly within its respective flange, and

c. a mechanism including a socket member having a ratchet and a pawl located in the said enlarged portion of the framework and located between the two plates, the other end of the framework also having an enlarged portion, there being another socket member with ratchet and pawl located in that said other end, the said flanges extend from their respective faces a distance greater than the thickness of the plates, so that the outer edges of the flanges extend beyond the outer faces of the plates.

2. A ratchet wrench as recited in claim 1, wherein the framework is provided with an opening in which the socket member lies and wherein the plates are provided with apertures from which the ends of the socket extend, the socket member having a radial central flange which engages and is guided by the inner surfaces of the plates, which flange carries the ratchet teeth.

3. A ratchet wrench as recited in claim 2, wherein a slot extends from the opening in the framework, which slot forms with the inner surfaces of the plates a chamber for retaining a coil spring which engages the pawl.

4. A ratchet wrench as recited in claim 1, wherein the plastic selected for the framework is strong and durable, will not scratch metal surfaces against which it comes into contact, and has a sound deadening quality.

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