RATCHET MECHANISM

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8 Claims. (Cl. 192—43.2)

This invention pertains to tools, and more particularly to what is termed a ratchet handle for use in connection with wrench sockets, screw drivers, bits, and the like, wherein reversible, intermittent rotary movement is desired.

Conventional ratchet handles at the present time employ either manually operable dogs carried by the handle, or a shiftable tool shank for obtaining reverse action on the tool. This requires an extremely bulky and cumbersome structure, which is objectionable inasmuch as handles of this type may be used frequently in confined, restricted spaces.

It is therefore primarily the object of the present invention to overcome the foregoing objections by the provision of an exceedingly compact, inexpensive and durable ratchet handle, in which a pair of opposed shiftable dogs are constantly engaged with the ratchet and manipulated by means rotatably carried on a dog retaining member.

Incidental to the foregoing, a more specific object resides in the provision of a handle having an internal ratchet, constantly engaged by a pair of oppositely disposed dogs carried by a tool shank rotatably associated with the handle, said dogs being manipulated by means rotatably mounted on the tool shank.

A further object resides in the novel unitary means provided for both urging the dogs into engagement with the ratchet and retaining them in adjusted position.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawing is illustrated one complete example of the physical embodiment of the present invention constructed to the best mode so far devised for the practical application of the principles thereof.

In the drawing:

Figure 1 is a longitudinal section through a portion of a ratchet handle constructed in accordance with the present invention.

Figure 2 is a section taken on the line 2—2 of Figure 4.

Figure 3 is a similar section taken on the line 3—3 of Figure 4.

Figure 4 is a transverse section taken on the line 4—4 of Figure 1, and

Figure 5 is a top plan view of the handle.

While the present invention has been illustrated and will be explained in connection with a ratchet handle particularly designed for wrench sockets, it is to be understood that the principle of the invention has various and numerous applications to tools of many types, and other devices, wherein it is desired to impart reversible, intermittent, rotary movement.

Referring now more particularly to the accompanying drawing, the numeral 1 designates a handle provided with an annular head 2 having internal ratchet teeth 3. Rotatably associated with the head 2 is a tool receiving shank 4, which, in the present instance, is designed for reception of conventional wrench sockets (not shown), the same being detachably secured on the shank by means of the spring plunger 5.

The shank 4 is provided with an annular flange 6 positioned within the shouldered recess 7 provided in the head 2, and extending inwardly from the flange 6 is a head 8 provided with spaced parallel grooves 9 disposed upon opposite sides of the axis of the head. Slidably mounted within the grooves 9 are opposed dogs 10 adapted to selectively engage the ratchet teeth 3, upon either side of a transverse diametrical line through the head 2.

As best shown in Figure 1, the dogs 10 are urged into engagement with the ratchet teeth 3 by means of an expansible member 11, which comprises a plunger 12 engaged with one of the dogs and telescopically carried in the sleeve 13 which engages the opposite dog. An expansible spring 14 serves to urge the plunger and sleeve to projected position.

As best shown in Figure 4, the head 8 is provided with a central projection 15 terminating in a threaded shank 16. The projection 15 is provided with a transverse slot 17 in which the expansible member is retained. Due to the fact that the slot 17 is cut out on opposite sides of the projection 15, as shown in Figure 1, it will be obvious that the expansible member 11 may be rotated about the axis of the head to permit engagement of the dogs with the ratchet teeth in their adjusted position within the head 8.

In order to rotatably retain the head 8 within the head 2, a retainer plate 18 is mounted on the threaded stud 16 and held against rotation by a pin 19 which projects into the central extension 15. The retainer plate 18 is positioned within the shouldered recess 20, and, as best shown in
Figure 4, cooperates with the flange 6 to retain the head 8 in assembled position within the handle. Secured upon the outer end of the threaded shank 16 is an actuating plate 21 having its outer face knurled or serrated at 22 to facilitate manual rotation of the same. The plate 21, which abuts the retaining plate 18, is locked upon the stud 16 by means of a nut 23, which, as illustrated in Figure 5, may be upset to prevent undesired detachment of the plate 21.

The plate 18, as best shown in Figure 2, is provided with oppositely disposed arcuate slots 24 for reception of the pins 25 carried by the transverse slots 26, which also receive the pins 25. Thus, as the disc 21 is oscillated on the stud 15, the pins 25, engaged in the slots 26 in the tops of the dogs 10, will cause the latter to be shifted transversely in the head 8, and obviously the same will be retained in their shifted position by means of the expansible member 11, which also urges the dogs into operative engagement with the ratchet teeth 3.

In operation, with the dogs 10 in engagement with ratchet teeth 3 as shown in Figs. 1 and 3, clockwise movement of the handle 1 will result in a similar movement being imparted to the tool receiving shank 4. Reverse or anti-clockwise movement of the shank 1 will result in the dogs 10 being moved inwardly against the tension of the spring 14, thereby causing the engaged ends of the dogs to slip or ride over the ratchet teeth 3.

From the foregoing explanation taken in connection with the accompanying drawing, it will be readily seen that an extremely simple and compact ratchet handle has been provided, which materially reduces the bulk and size of conventional ratchet handles, thus permitting the same to be utilized in an exceedingly restricted space.

A further advantage of the present invention results from the fact that two opposed dogs are continuously engaged with the ratchet teeth, thus materially increasing the rigidity of the structure and equalizing another one in operative engagement, the dogs being disposed upon opposite sides of the axis of the ratchet.

Furthermore, it will be readily seen that an extremely simple method of reversing operative engagement of the handle has been provided, in that it is merely necessary to rotate the disc 21 to effect movement of the dogs in a reverse direction. This operation is readily accomplished in that the shouldered nut 23 prevents any bind between the disc 21 and the retaining plate 18. Therefore, it is merely necessary to overcome the tension of the expansible member 11, until such time as the same is shifted past one which then causes the dogs to be snapped into operative engagement with the ratchet teeth 3 for actuation of the tool shank in the opposite direction.

While the accompanying drawing illustrates the ratchet member serving as the handle, and the dog-carrying shank as a tool receiving member, it is to be understood that the shank 4 may serve as the handle, and the head 2 as the tool-receiving member, without departing from the invention, which resides essentially in the construction of the dogs and means for manipulating the same.

Furthermore, while an even number of ratchet teeth are illustrated in the drawing, with both dogs engaged, it will be understood that where a shorter bite is desired, it is merely necessary to vary the relative position of the dogs so that when one dog is engaged the opposite dog will be positioned intermediate a pair of ratchet teeth.

We claim:

1. A ratchet mechanism comprising a ratchet member, a shank rotatably associated with the ratchet member, a pair of opposed spring-urged dogs carried by said shank and simultaneously secured upon the ratchet member, and rotatable means for shifting said dogs to simultaneously reverse the operative engagement between both of said dogs and the ratchet member.

2. A ratchet mechanism including an annular head provided with internal ratchet teeth, a tool shank rotatably connected with said head, a pair of opposed dogs slidably mounted in said tool shank, an expansible member urging said dogs into simultaneous operative engagement in the same arcuate direction with said ratchet teeth, and means rotatably connected with said tool shank for shifting both of said dogs to simultaneously reverse their operative engagement with said ratchet teeth.

3. A ratchet mechanism comprising a head having internal ratchet teeth, a tool shank rotatably connected to said head and provided with spaced parallel grooves, a dog slidably mounted in each of said grooves for engagement with said ratchet teeth at either end of the groove, resilient means for urging the dogs into operative engagement with said ratchet teeth, and means for shifting said dogs in said grooves to reverse their operative engagement with said ratchet teeth.

4. A ratchet mechanism comprising a head having internal ratchet teeth, a tool shank rotatably connected to said head and provided with spaced parallel grooves, a dog slidably mounted in each of said grooves for engagement with said ratchet teeth at either end of the groove, resilient means for urging the dogs into operative engagement with said ratchet teeth, and a disc rotatably mounted on to said tool shank for shifting said dogs in said grooves.

5. A ratchet mechanism comprising a head having internal ratchet teeth, a tool shank rotatably connected to said head and provided with spaced parallel grooves, a dog slidably mounted in each of said grooves for engagement with said ratchet teeth at either end of the groove, means for shifting said dogs in said grooves to reverse their operative engagement with said ratchet teeth, comprising a plate stationarily connected with said tool shank and provided with arcuate slots for engagement with said dogs to shift the same in their grooves.

6. A ratchet mechanism comprising a head, a tool shank rotatably connected thereto, one of said members being provided with a single set of ratchet teeth, a spring-urged dog carried by the other of said members, and movable means carried by said head and engaging said dog carrying member for longitudinally shifting said dog to engage its opposite ends in different portions of the ratchet to reverse the operative engagement between said dog and ratchet.

7. A ratchet mechanism comprising a head, a tool shank rotatably connected thereto, one of said members being provided with a single set of ratchet teeth, a spring-urged dog shiftably carried by the other of said members and provided at its opposite ends with opposed working faces,
and movable means associated with the dog for longitudinally shifting the same to engage different portions of said ratchet.

8. A ratchet mechanism comprising a head, a tool shank rotatably connected thereto, one of said members being provided with a single set of ratchet teeth, a shiftable dog carried by the other of said members, and oscillatory means carried by the head and engaging said dog for longitudinally shifting the latter to engage its opposite ends in different portions of said ratchet.

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