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MULTIPLE-SLIDABLE PAWL, REVERSIBLE RATCHET WRENCH

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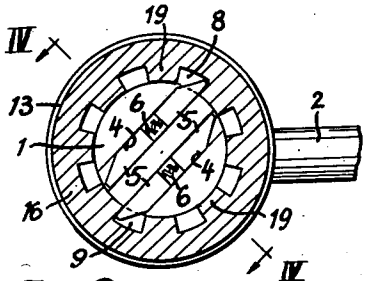


Fig. 2

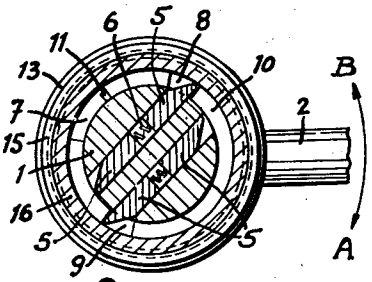


Fig. 3

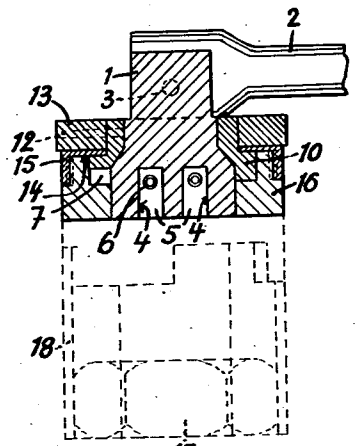


Fig. 4

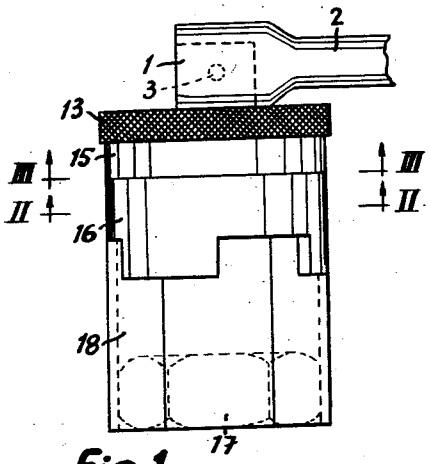


Fig. 1

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MULTIPLE-SLIDABLE PAWL, REVERSIBLE RATCHET WRENCH

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3 Claims. (Cl. 81—60)

The invention relates to a reversible ratchet wrench with a head surrounding the screw, nut, or the like, and a handle acting in conjunction with the head of the wrench. It is an important feature of a wrench of this kind that the wrench head and the handle can be turned from one engaging position to another, while they remain in a definite relation to each other, without the wrench head being completely separated from the handle, or the wrench head having to be separated from the screw, nut, or the like, in order to obtain a new engaging position. It is therefore the purpose of the present invention to create a wrench of this kind, which enables this problem to be solved. This is achieved according to the invention mainly by making the wrench so that it surrounds a central part, resembling a pin and provided with pawls, which can be rotated in a sleeve or the like, provided with means of engagement, such as teeth, and where the pawls are made and arranged in such a way that when the central part is rotated in one direction, the sleeve engages with the central part and is moved with it while rotation of the central part in the opposite direction will release this part from the sleeve. The use of pawls working in conjunction with engaging devices arranged in the sleeve enables a comparatively cheap and simple ratchet drive to be achieved.

It is advantageous to control the pawls by means of a control device, for instance, a ring, so that rotation of the ring about the central part will change the position of the pawls and thus change the direction of rotation of the sleeve. Th pawls can be accommodated in slots arranged in the central part, where two pawls accommodated in one slot can be connected together by means of a compression spring so that rotation of the ring about the central part will push one pawl out of the slot into a recess arranged in the ring and thus between teeth provided in the sleeve. In order to ensure that the pawls engage diametrally with the sleeve, two pairs of pawls can be used, one in each of the parallel slots, while the ring can be made with two recesses, through which two pawls one from each slot, can be pushed by rotating the ring about the central part. The central part can be equipped with a pin engaging with a recess arranged in the ring to limit the rotation of the ring. A threaded ring can be arranged so that it can be rotated about the pawls, in order to keep the sleeve and the central part together. The handle can be provided with a pin, to connect it to the central part, and the sleeve can be made with a known type of engaging member so that it can engage with the screw, nut, or the like.

In order that the invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:

Figure 1 is a side view of a reversible ratchet wrench;

Figure 2 is a cross-section through the wrench along the line II—II of Figure 1;

Figure 3 is a cross-section through the wrench along the line III—III of Figure 1; and

Figure 4 is a longitudinal section through the wrench along the line IV—IV of Figure 2.

In the drawings, 1 denotes a central pin-like part connected to a handle 2, by means of which the central part can be turned. The handle swivels about a spring-loaded ball 3 partly sunk into the central part, which engages with a recess in the handle, not shown in the drawing, so that the handle can be swivelled about the ball in order to assume different positions in turning the central part. The central part is equipped at its opposite side with two parallel slots 4, in which two pairs of pawls are slidably arranged, and connected in pairs by means of compression springs 6, which keep the two pawls in one slot at a distance, so that they can be pushed together. A ring 10 provided with three recesses 7, 8, 9 is arranged round the central part 1, so that it can be turned about this part to control the pawls. The central part is equipped with a pin 11 engaging with a recess 7, so that the ring can be turned into given positions about the central part, and two pawls moving in different slots can be pushed into the recesses 8 and 9 respectively of the ring. In order to enable the ring 10 to be turned about the central part, the ring is fixed by means of a pin 12 in the ring 13. The rings 10 and 13 are arranged in such a way that they form a groove 14 accommodating a threaded ring 15, which can rotate in the groove and is connected to a sleeve 16, intended to retain a nut 17 either directly or, as shown in the drawing, through an adaptor sleeve 18. The sleeve 16 is equipped on its inside with means of engagement having the shape of teeth 19, between which the pawls engage, as shown in Figure 2.

The reversible ratchet wrench acts as follows:

The reversible ratchet wrench is placed with an adaptor sleeve 18 above a nut 17. According to the direction in which the nut is to be rotated, the ring 10 is turned about the central part 1 into, for instance, the position shown in Figure 3, so that the nut can be turned in the clockwise direction, the direction of the arrow A, due to the fact that two pawls 5, each from one slot 4, engage with the teeth 8 and 9, as shown in Figure 2, and thus drive the sleeve 16, the adaptor sleeve 18, and the nut 17. When turning the handle 2 in the opposite direction B of the arrow, the pawls 5 projecting from the ring 10 into the central part are displaced, so that the central part 1 can be turned without impediment in the sleeve 16. The said displacement of the pawls is facilitated by these pawls being bevelled, as shown in the drawing. If the nut is to be turned to the left, the ring 10 is displaced to the right or clockwise, so that the pawls projecting from the ring, as shown in the drawing, are pushed back into the slots and the other two pawls move into the recesses 8 and 9 respectively, thus enabling the sleeve 16 and the nut 17 to be driven in an anticlockwise direction. The disengagement of the sleeve is effected in this case by turning the handle 2 in the direction A of the arrow.

The invention discloses therefore a reversible ratchet wrench with a comparatively simple ratchet drive, which enables the handle, and thus the central part, to be moved from one position in which it is engaged with the sleeve to another one. It is obvious that the ratchet drive can be utilised also for other tools where required.

The embodiment of the present invention herein illustrated and described is only an example, and it will be evident to those skilled in the art that various modifications may be made in the details of the new device without departing from the principles herein set forth.

I claim:

1. A reversible ratchet wrench comprising a central part, means operatively connected to the central part to rotate the same, means defining two spaced apart parallel slots extending throughout the central part, a rotatable

ring surrounding the central part and having recesses therein, a pair of diametrically opposed pawls disposed in each slot, spring means positioned between each pair of pawls normally urging the pawls apart, a sleeve adapted to carry a nut disposed below the ring and surrounding the central part, and teeth on the inner face of the sleeve so that when the ring is rotated in one direction, one of the pawls in one slot is urged by the spring means through one of recesses in the ring into engagement with the sleeve between adjacent teeth with the other pawl in said slot engaging the diametrically opposed tooth while the pawl in the other slot adjacent the pawl engaging between adjacent teeth engages a tooth of the sleeve with the other pawl in said other slot engaging the sleeve between adjacent diametrically opposed teeth whereby rotation of the central part simultaneously rotates the sleeve.

2. A reversible ratchet wrench as defined in claim 1 wherein a pin on the central part cooperates with the end

walls of an arcuate slot in the ring to limit the rotation of the ring with respect to the said central part.

3. A reversible ratchet wrench as defined in claim 2 wherein said sleeve is carried by a further ring surrounding the central part immediately below the rotatable ring.

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