Jan. 2, 1951 W. J. HALPERIN 2,536,172

RATCHET WRENCH FOR TURNBUCKLES

Filed Oct. 26, 1944

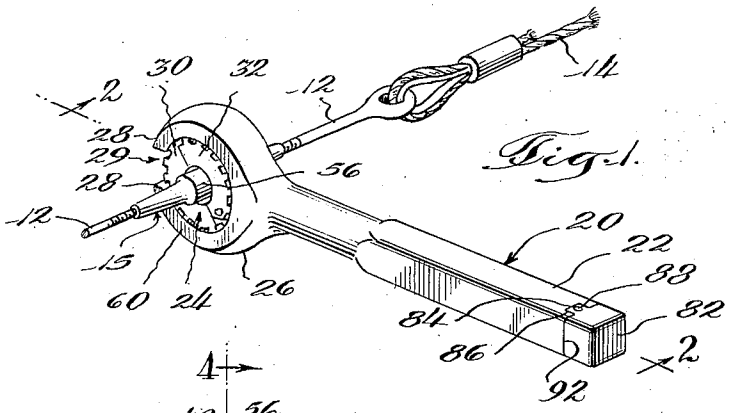


Fig. 1.

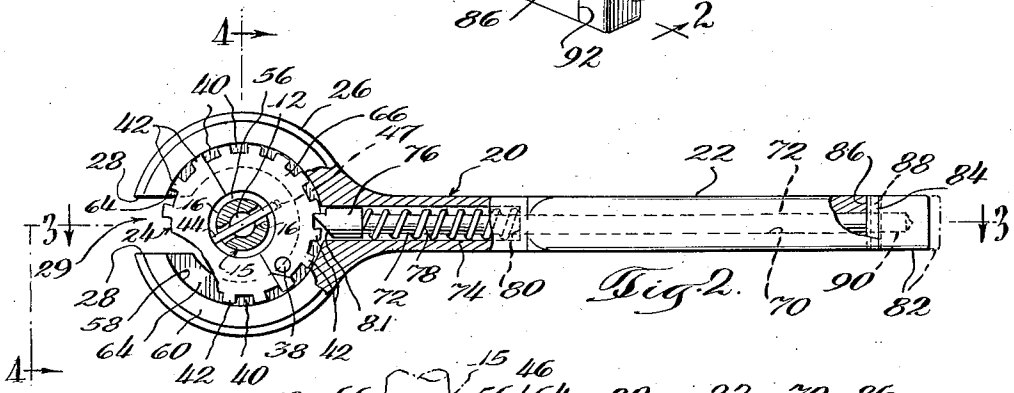


Fig. 2.

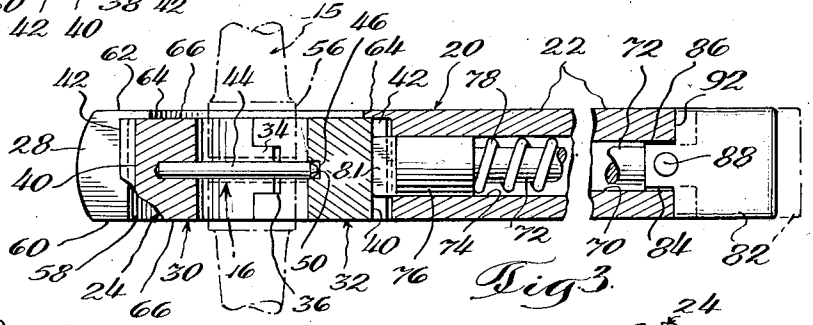


Fig. 3.

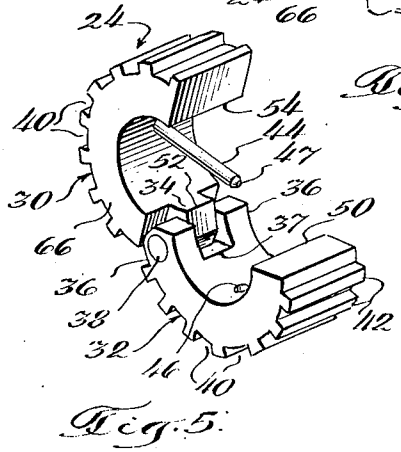


Fig. 5.

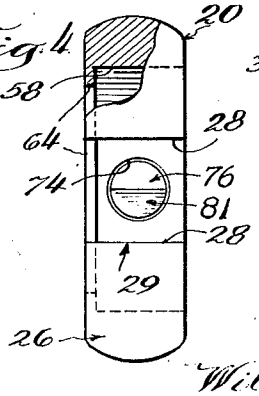


Fig. 4.

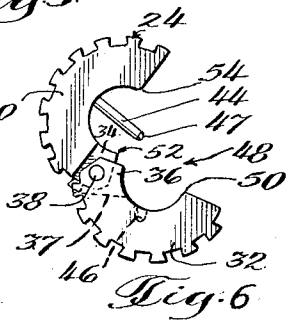


Fig. 6.

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RATCHET WRENCH FOR TURNBUCKLES

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5 Claims. (Cl. 81—60)

1

This invention relates to wrenches and is more particularly concerned with those of the turnbuckle ratchet type.

When the wrench engaging portion of a turnbuckle is so close to an obstruction as to prevent a wrench from turning a complete revolution, as is true in aircraft, for example—where turnbuckles are used to connect cables—it is common to extend a nail through the usual transverse hole in the turnbuckle and use the nail as a wrench for rotating the turnbuckle. This is obviously a rather crude and inefficient expedient. A ratchet wrench would be useful in such circumstances, but those heretofore known have not been constructed so as to be readily, if at all, positioned in operative relation to the turnbuckle, or have been found unsatisfactory for other reasons.

It is accordingly an object of my invention to provide a ratchet wrench for use in connection with turnbuckles, whereby a part of the wrench may be readily introduced into the hole in the turnbuckle to positively interlock the turnbuckle therewith.

It is another object to provide, in a ratchet wrench, a separable driven element which is adapted to be wrapped about and interlocked with a turnbuckle independently of the driving or handle part of the wrench, and which is adapted thereafter to be detachably connected to the driving element of the wrench in such manner as to be prevented from becoming unwrapped.

An additional object is to provide a turnbuckle wrench including a driven element of split ringlike form adapted to be opened and slipped onto a turnbuckle and thereafter to be closed in interlocked relation to the turnbuckle, together with a driving member adapted to be detachably connected to the driven member in such relation as to prevent reopening of the driven member.

A further object is to provide, in a ratchet wrench, means controllable by the hand manipulating the wrench, for selectively reversing or rendering inoperative the driving connection.

Further objects and advantages of the invention will appear as the description proceeds.

The invention will be better understood upon reference to the following description and the accompanying drawing, in which:

Fig. 1 is a perspective view of a wrench embodying my invention in association with a turnbuckle.

Fig. 2 is a view of the wrench, partly in section and partly in elevation, taken as indicated by the line 2—2 in Fig. 1.

2

Fig. 3 is an enlarged fragmentary view, partly in section and partly in elevation, taken as indicated by the line 3—3 in Fig. 2.

Fig. 4 is a view, partly in section and partly in elevation, taken as indicated by the line 4—4 in Fig. 2.

Fig. 5 is an enlarged perspective view of the turnbuckle-engaging element of my wrench in open condition.

Fig. 6 is a side elevation of said element in open condition.

Referring now more particularly to the drawing, there is shown by way of example a pair of cable terminal eye bolts 12, whose eyes are adapted to be anchored to cables of which one is shown at 14, said bolts being oppositely threaded to a turnbuckle 15 having the usual diametral holes 16 adapted to receive an element by means of which the turnbuckle may be rotated in one direction or the other, according as it is desired to increase or decrease the tension in the cables.

A wrench embodying features of my invention is shown generally at 20 and comprises a handle or driving member 22 and a driven member or gear 24 adapted to be detachably interlocked with the driving member and with the turnbuckle 15. The driving member may be in any desired shape, and is here illustrated as generally T-shaped, with a C-shaped head or yoke 26 having a keyhole shaped slot, notch, gap or other opening and having ends 28 spaced apart sufficiently to receive in the space or restriction 29 therebetween cable terminal bolts 12 of various diameters, for a reason which will appear.

The driven member 24 is ringlike when closed and may comprise substantially semi-circular elements 30 and 32, one having a tongue 34, and the other being forked at 36, providing an intervening slot or notch 37 to receive the tongue, the two being pivoted together thereat as by a pin 38. The semi-circular elements are formed peripherally with transverse grooves 40 extending the full width thereof, leaving therebetween teeth 42 which, when the two halves are closed together, are in an endless circular series, like a gear. Integral with or secured to and projecting substantially radially inward from one of the semi-circular parts is a pin 44 adapted to extend in diametral relation to the driven member or gear 24 when the semi-circular parts are closed together, the other semi-circular part being preferably recessed at 46 for the recep-

tion of the preferably tapered free end 47 of the pin 44. The semi-circular parts 30 and 32 are capable of opening movement as indicated in Figs. 4 and 5, affording a space 48 between the edge 50 of the part 32 and the end 47 of the pin 44 at least as great as the space between the edges 52 and 54 of the part 30, to accommodate the largest diameter turnbuckle which will pass between said edges 52 and 54, and enable the pin 44 to be lined up with the holes 16 in the turnbuckle 15. Preferably the parts are limited in their opening movements to the relation shown in Figs. 5 and 6. The parts are then moved shut, the pin entering said holes in the central or wrench portion 56 of the turnbuckle, and the end 47 of the pin coming to rest in the recess 46 in the semi-circular part 32, so as to imprison the turnbuckle in interlocked relation with the pin 44 and gear 24.

The yoke 26 has a cylindrical inner wall 58 and thus serves as a bearing race to freely receive the gear 24 at one side 60, and is restricted at the other side 62 by an inwardly directed flange 64 which is adapted to abut either face 66 of the gear.

With the side 60 of the head 26 spaced from but facing the gear 24, the handle 22 is moved transversely relative to the turnbuckle 15 or eye bolts 12 so as to allow passage of the turnbuckle or the shank of an eye bolt through the space 29 in the head 26 until the gear and head are coaxial, and then the head is moved in an axial direction toward the gear until the gear is located within the head and substantially in abutment with the flange 64. It is preferred that both ends of the pin 44 be engaged by the gear parts when shut, so that both parts will exert a torque on the pin. However, if desired the pin could be shorter and still operate satisfactorily.

The handle or arm shank 22 has a bore 70 in which is movably received a rod 72. Adjacent the head 26, the arm is counterbored at 74 to accommodate an enlargement in the form of a pawl 76 formed on or secured to the rod 72, a spring 78 being interposed between a shoulder 80 in the arm and the pawl 76 so as to constantly urge the pawl toward the axis of the head 26. The pawl 76 has a cam face 81 adapted to ride or slip over the teeth 42 of the gear 24 so that a one-way drive is provided. A block 82 having a key 84 adapted to be received in a corresponding keyway 86 in the outer end of the arm 22 is secured as by a pin 88 to the other end 90 of the rod 72. The block 82 can be pulled against the resistance of the spring 78 until the key 84 is free of the keyway 86, rotated 180°, and then released to reseat the key in the keyway, thereby reversing the position of the pawl 76, thus reversing the direction of the drive of the gear 24. The pawl may be placed in a neutral position by the expedient of withdrawing the key 84 from the keyway 86 and turning the block 82 90° so that its key rests on the end face 92 of the arm.

It will be observed that so long as the gear 24 is disposed in the claw or head 26 the gear is maintained in circular form so as to be at all times drivingly interlocked with the turnbuckle 15. It will be noted further that the gear 24 is not limited to service with a single size turnbuckle, but will accommodate all turnbuckles up to substantially the interior diameter of the gear when closed, the clearance between the free edge 50 of the semi-circular member 32 and the free end 47 of the locking pin 44 being preferably chosen to be at least equal to said diameter so as to allow the largest turnbuckle capable of accommodation by the gear to pass thereinto.

Various modifications coming within the spirit of my invention may suggest themselves to those skilled in the art, and hence I do not wish to be limited to the specific form shown or uses mentioned, except to the extent indicated in the appended claims, which are to be interpreted as broadly as the state of the art will permit.

I claim:

1. In a turnbuckle ratchet wrench including a pawl for rotating a turnbuckle-driving ratchet and also including a handle terminating in a one-piece yoke adapted to closely surround more than 180° but substantially less than 360° of the ratchet, so that the yoke may be placed in substantially surrounding relation to a turnbuckle pursuant to movement of the yoke first transversely to the turnbuckle axis until they are substantially coaxial and then longitudinally until the yoke telescopically receives the ratchet previously assembled with the turnbuckle: a split ring-like turnbuckle driving ratchet comprising a pair of complemental relatively movable substantially semi-circular externally toothed members, a pin mounted on and projecting substantially radially inward from one of said members to an extent exceeding the inner diameter of said ratchet, the other member having an opening positioned to receive and of a size to substantially engage circumferentially opposite sides of the free end of said pin when said members are closed, said members being capable of being opened to an extent allowing a turnbuckle of substantially the same diameter as the interior of the ratchet to pass said free end of said pin and enter the ratchet, said pin, pursuant to closing of said members, being passable completely through the wrench-hole in the turnbuckle and thence into said opening in said other member, whereby, upon rotation of said ratchet, said pin will rotate the turnbuckle.

2. In a turnbuckle ratchet wrench including a pawl for rotating a turnbuckle-driving ratchet and also including a handle terminating in a one-piece yoke adapted to closely surround more than 180° but substantially less than 360° of the ratchet, so that the yoke may be placed in substantially surrounding relation to a turnbuckle pursuant to movement of the yoke first transversely to the turnbuckle axis until they are substantially coaxial and then longitudinally until the yoke telescopically receives the ratchet previously assembled with the turnbuckle: a split ring-like turnbuckle driving ratchet comprising a pair of complemental relatively movable substantially semi-circular externally toothed members, a pin mounted on and projecting substantially radially inward from one of said members, the other member having means positioned to receive and of a size to substantially engage circumferentially opposite sides of the free end of said pin when said members are closed, said members being capable of being opened to an extent allowing a turnbuckle of substantially the same diameter as the interior of the ratchet to pass said free end of said pin and enter the ratchet, said pin, pursuant to closing of said members, being passable completely through the wrench-hole in the turnbuckle and thence into said means, whereby, upon rotation of said ratchet, said pin will rotate the turnbuckle.

3. In a turnbuckle ratchet wrench including a pawl for rotating a turnbuckle-driving ratchet and also including a handle terminating in a

one-piece yoke adapted to closely surround more than 180° but substantially less than 360° of the ratchet, so that the yoke may be placed in substantially surrounding relation to a turnbuckle pursuant to movement of the yoke first transversely to the turnbuckle axis until they are substantially coaxial and then longitudinally until the yoke telescopically receives the ratchet previously assembled with the turnbuckle: a split ring-like turnbuckle driving ratchet comprising a pair of pivotally connected complemental, substantially semi-circular, externally toothed members, a pin mounted on and projecting substantially radially inward from one of said members to an extent exceeding the inner diameter of said ratchet, the other member having an opening positioned to receive and of a size to substantially engage circumferentially opposite sides of the free end of said pin when said members are closed, said members being capable of being opened to an extent allowing a turnbuckle of substantially the same diameter as the interior of the ratchet to pass said free end of said pin and enter the ratchet, said pin, pursuant to closing of said members, being passable completely through the wrench-hole in the turnbuckle and into said opening in said other member, whereby, upon rotation of said ratchet, said pin will rotate the turnbuckle.

4. In a turnbuckle ratchet wrench including a pawl for rotating a turnbuckle-driving ratchet and also including a handle terminating in a one-piece yoke adapted to closely surround more than 180° but substantially less than 360° of the ratchet, so that the yoke may be placed in substantially surrounding relation to a turnbuckle pursuant to movement of the yoke first transversely to the turnbuckle axis until they are substantially coaxial and then longitudinally until the yoke telescopically receives the ratchet previously assembled with the turnbuckle: a split ring-like turnbuckle driving ratchet comprising a pair of pivotally connected complemental substantially semi-circular externally toothed members, a pin mounted on and projecting substantially radially inward from one of said members, the other member having means positioned to receive and of a size to substantially engage circumferentially opposite sides of the free end of said pin when said members are closed, said members being capable of being opened to an extent allowing a turnbuckle of substantially the same diameter as the interior of the ratchet to pass said free end of said pin and enter the ratchet, said pin, pursuant to closing of said members, being passable completely through the wrench-hole in the turnbuckle and into said means, whereby, upon rotation of said ratchet, said pin will rotate the turnbuckle.

5. In a turnbuckle ratchet wrench including a pawl for rotating a turnbuckle-driving ratchet and also including a handle terminating in a one-piece yoke adapted to closely surround more than 180° but substantially less than 360° of the ratchet, so that the yoke may be placed in substantially surrounding relation to a turnbuckle pursuant to movement of the yoke first transversely to the turnbuckle axis until they are substantially coaxial and then longitudinally until the yoke telescopically receives the ratchet previously assembled with the turnbuckle: a split ring-like turnbuckle driving ratchet comprising a pair of pivotally connected complemental substantially semi-circular externally toothed members, a pin mounted on and projecting substantially radially inward from one of said members and having a tapered free end, the other member having means substantially engaging circumferentially opposite sides of said pin adjacent said free end when said members are closed, said members being capable of being opened to an extent allowing a turnbuckle to pass said free end of said pin and enter the ratchet, said pin, pursuant to closing of said members, being passable through the wrench-hole in the turnbuckle and into engagement with said means, whereby, upon rotation of said ratchet, said pin will rotate the turnbuckle.

WILLIAM J. HALPERIN.

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