United States Patent

[11] 3,603,181

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[54] **WRENCH**
6 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **81/90,** 81/120, 81/185
[51] **Int. Cl.** **B25b13/00,** B25b 13/02, B25b 13/56
[50] **Field of Search** ..... 81/90, 120, 121, 180 C, 185, 125

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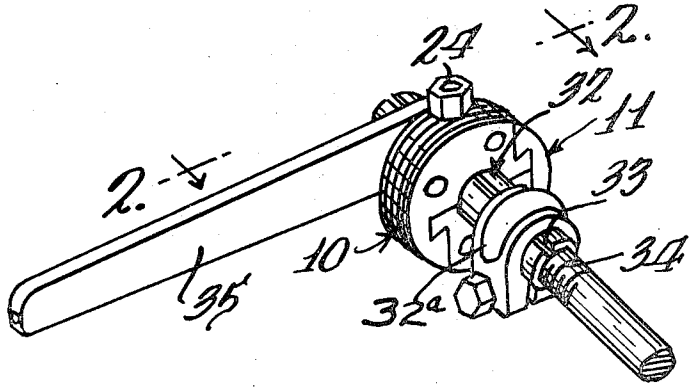
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ABSTRACT: A wrench having its work-engaging area enclosed by a collar having a pair of sections operatively assembled along interengaging tenon and recess means through displacement in a plane extending axially of the turning axis of an article of work in said work-engaging area, and a wedge blade is adjustably supported on one of said sections for movement toward and away from a selected position within said work-receiving area.



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Fig. 1.

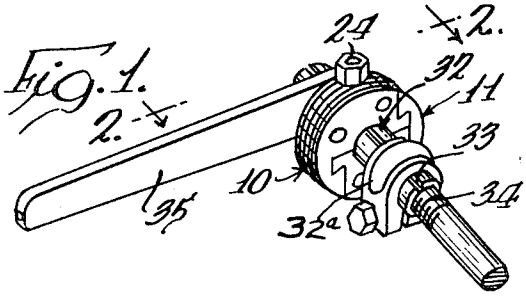


Fig. 2.

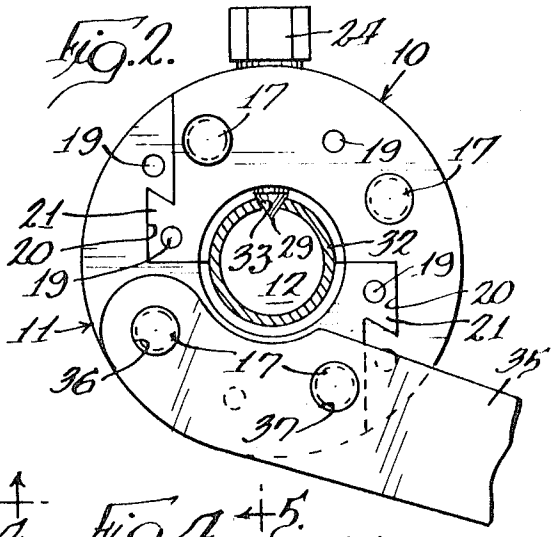


Fig. 3.

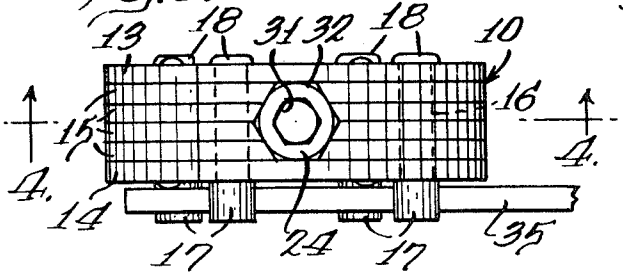


Fig. 4.

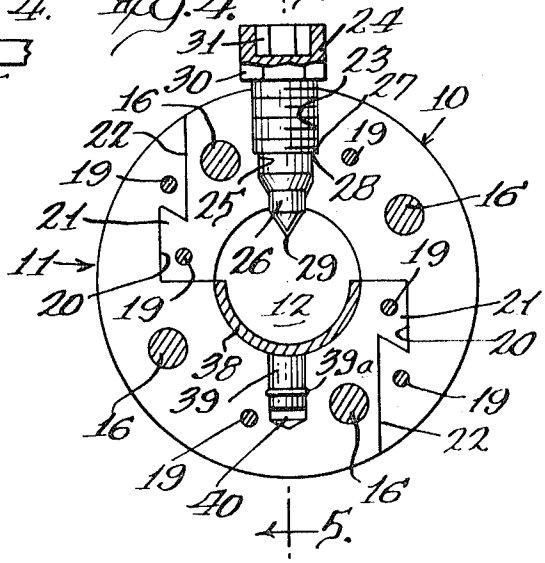


Fig. 5.

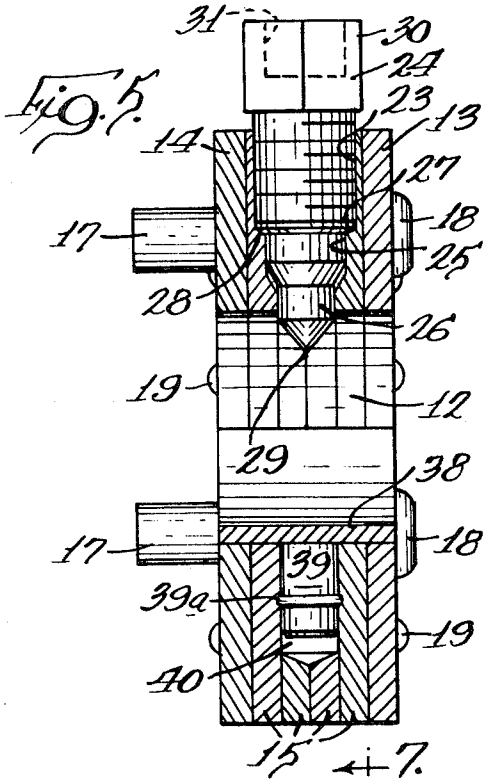


Fig. 6.

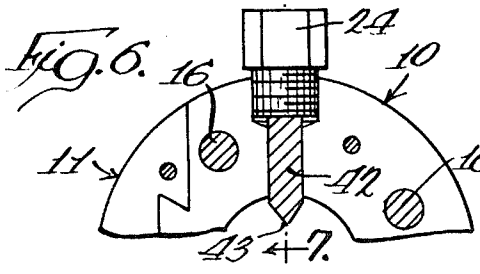
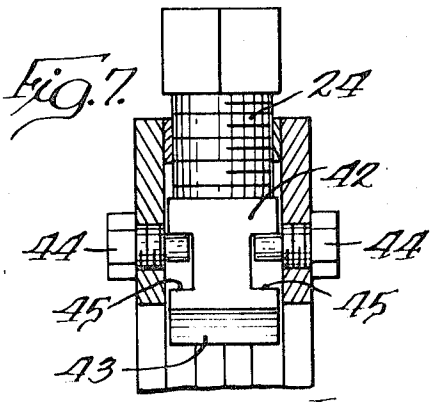


Fig. 7.



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WRENCH

The present invention relates to improvements in wrenches.

It is an object of this invention to provide a wrench which is especially effective in loosening a turnbuckle sleeve having threads which have become rusted into locked relation with the threads of the tie rod of a motor vehicle steering linkage wherein the sleeve is of cylindrical tubular construction with a slot extending inwardly from opposite ends of said sleeve in which a blade provided on said wrench has wedging fit.

Still another object is to provide a device of the above type which is strong, simple, compact, easily adjustable, readily disassembled and assembled and cheaply and easily manufactured.

Other objects and advantages will become evident during the course of the following description in connection with the accompanying drawings, in which:

FIG. 1 is a top perspective view of a wrench according to the present invention and showing said wrench operatively applied to a motor vehicle tie rod sleeve.

FIG. 2 is an enlarged side view taken in the direction of the arrows 2—2 in FIG. 1.

FIG. 3 is a top plan view of the wrench as shown in FIG. 2.

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3.

FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 4.

FIG. 6 is a fragmentary section of a wrench having a modified form of wedge blade.

FIG. 7 is an enlarged fragmentary section taken along line 7—7 of FIG. 6.

Referring more particularly to the drawings, a wrench incorporating the features of the present invention includes a pair of symmetrical C-shaped frame sections **10** and **11** each having interengaging means to provide a rigid head forming a continuous collar about a work-receiving area **12**. In the wrench shown in the drawings, opposite outer faces of each section **10** and **11** are defined by a pair of metal strips **13** and **14** and the area between said strips contains four or more intermediate strips **15** to form a laminated structure. The strips **13**, **14** and **15** of each section are secured in fixed assembly by means of a pair of rods **16** having shank portions which pass through aligned openings provided in the strips secured thereby. The rods **16** are so located that when the sections **10** and **11** are operatively assembled, said rods occupy positions at 90° apart circumferentially of the work-receiving area **12**. Each rod **16** is provided with an enlarged axial extension **17** whereby a shoulder at the junction of each shank portion of the rod and said extension engages the surface of the outer strip bordering the opening containing said shank portion of the rod while the opposite end of each rod **16** is peened over as at **18** to engage the surface of the other outer strip bordering the opening containing said shank portion of the rod. Rivets **19** passed through aligned openings in areas of the frame sections **10** and **11** between the positions occupied by the rods **16** provide additional means for securing the strips **13**, **14** and **15** of each section in rigid assembly.

Opposite ends of each section **10** and **11** terminate in flat edge portions perpendicular to the faces of the sections in such zigzag configuration as to define a recess **20** in section **10** and a corresponding tenon **21** in section **11** and a similar recess **20** in section **11** and a corresponding tenon **21** in section **10**. The ends of sections **10** and **11**, when reversed, have interengagement via the tenon **21** and recess **20**, whereby the two sections **10** and **11** are coupled by displacement thereof in a plane perpendicular to the faces of the sections. While the sections **10** and **11** are accordingly joined along the meeting edges of the tenon and the recess confronting said tenon, the sections are also joined along an edge portion **22** which extends along a plane in intersecting relation to the outer perimeter of the section containing said edge portion **22** and joining an edge portion of the tenon.

Section **10** is provided with an internally threaded bore **23** which is threadedly engaged with a pressure screw **24** for establishing movement of said screw along a line of travel straddled by the strips **13** and **14** and bisecting the work-receiving area **12**. A reduced extension **25** of the bore intersects the wall of section **10** facing the work-receiving area **12** to provide a passageway in which a blade member **26** has guided movement toward and away from said work-receiving area in alignment with the line of travel of the screw **24**. A shoulder **27** at the junction between said threaded bore **23** and said passageway **25** provides a stop with which an enlarged end portion **28** of the blade member **26** has engagement to limit movement of the blade member in the direction of said work-receiving area. The leading end of the screw **24** has engagement with the surface of the blade member **26** facing the screw to propel the blade member toward said work-receiving area subject to the limit of movement of the blade member as established by the shoulder **27** in conjunction with the end portion **28** of the blade member. The end of the blade member which extends into the work-receiving area is of conical shape to provide a pointed penetrating tip **29**. The exposed outer end of the screw **24** is shaped to provide a head **30** to which a wrench may be applied to turn the screw. A socket **31** is also formed in the head **30** to accommodate a conventional socket wrench for turning the screw when the use of such a wrench is desired.

While the wrench of this invention is applicable to a wide variety of conditions of service and repair work, it is especially useful in loosening and adjusting a motor vehicle steering linkage tie rod sleeve of the tubular type having a slot extending inwardly from opposite ends of said sleeve. Preparatory to applying the wrench to a tie rod sleeve **32**, as shown in FIG. 1, a clamp **32***a* is adjusted to free the sleeve **32**. When the wrench is thereupon applied to the sleeve **32**, the tip **29** of the blade member is arranged in alignment with the slot **33** and thereafter is progressively advanced into the slot **33** of the tie rod sleeve under force applied by the turning of the pressure screw **24** whereupon the edges of the slot **33** are gradually spread apart to thereby break the rust locking the threads of the sleeve from the threads of the rod **34** contained therein so as to allow turning of the sleeve under force exerted by turning the collar defined by the operatively coupled sections **10** and **11**, about an axis coinciding with the longitudinal axis of the sleeve. Such turning action is accomplished with the aid of a demountable handle **35** provided with openings **36** and **37** which have a center-to-center spacing corresponding to the center-to-center spacing of the rods **16** and of such size as to accept the axial extensions **17** of the rods. The handle **35** when thus engaged with said extensions **17** via the openings **36** and **37** functions as a lever for operating the sections **10** and **11** to turn in either direction without disengaging the wrench from the work.

In order to accommodate sleeves **32** of smaller diameter in the work-receiving area **12**, the inner surface of section **11** is fitted with a filler shoe **38** which occupies a fixed position bordering the work-receiving area **12** with the aid of a stem **39** mounted on shoe **38** and engaged in a socket **40** formed in the section **11** in alignment with the line of travel of the blade member **26**.

FIGS. **6** and **7** of the drawing illustrate a modified form of wrench wherein the blade member has the form of a rectangular block **42** and an open area formed in the strips **15** extending the full distance between the outer strips **13** and **14** of section **10** provides a passageway in which said blade member **42** has guided movement along a line of travel in alignment with the line of travel of the pressure screw **24** in the same manner that the blade member shown in FIGS. **1** to **5** inclusive, has guided movement toward and away from the work-receiving area **12**. The end of the blade member **42** which extends into the work-receiving area is provided with a pair of inclined faces which meet in a line of convergence extending perpendicular to the opposite faces of the sections **10** and **11** to provide a wedge having a biting edge **43**. The edge **43** of blade

member 42, like the tip 29 of blade member 26, is adapted to be progressively advanced into the slot of a tie rod sleeve under force applied by turning of the pressure screw 24 to effect gradual spreading apart of the opposite edges of the slot in the sleeve so as to loosen the threads of the sleeve from the threads of the rod contained therein and accordingly enable the sleeve to be turned under corresponding force applied by the collar defined by sections 10 and 11. Screws 44 operating in threaded openings provided in the areas of the strips 13 and 14 opposite the passageway containing the blade member 42 project into notches 45 formed in the blade member 42 facing the strips 13 and 14 so as to limit the length of travel of the blade member 42 relative to the work-receiving area 12.

While the wrench forming the subject of this invention provides a solid construction for maximum rigidity and strength as needed for performing its work and for its durability, it will be recognized also that it incorporates a design which allows its use in relatively close and inaccessible quarters. After the work to which the wrench is applied is initially freed through operation of the wrench with the aid of the handle 35, the wrench may be turned by hand without the handle. To provide desired gripping surface for thus turning the wrench without the use of the handle, the surface of the collar is knurled as indicated by axially extending score lines shown in FIG. 3 of the drawings.

What is claimed is:

1. A tie rod wrench having symmetrical, generally C-shaped first and second sections, means releasably joining said sections to form a continuous enclosure about a work-receiving area, said means including a tenon and a recess at opposite ends of each symmetrical section which provides for interengagement of the recess in each section with the tenon of the other section by displacement in a plane perpendicular to the faces of said sections, a wedge blade adjustably supported on one of said sections for movement between selected advanced and retracted positions relative to said work-receiving area along a line of travel bisecting said work-receiving area, means adjustably supporting said wedge blade, including a passageway with which said blade has slidable engagement radially and a screw having threaded engagement with a threaded bore in alignment with said passageway is operable to propel the blade radially in the direction of the work-receiving area to define a work-engaging edge in alignment with the axis of turning movement of the wrench when said wrench and said article of work within said work-receiving area are turning as a unit in either direction circumferentially of said work-receiving are, and each of said sections is provided with axially extended rods which occupy positions at 90° apart circumferentially of the work-receiving area when said sections are operatively assembled, and a handle having a pair of openings for accepting said rods, a pair at a time, provides a lever for operating the sections to turn in either direction without disengaging the wrench from an article of work in said work-receiving area.

2. A wrench according to claim 1 wherein a shoulder at the junction between said threaded bore and said passageway provides a stop with which an enlarged end portion of said blade has engagement to limit movement of said blade in the direction of said work-receiving area.

3. A wrench according to claim 1 wherein the converging faces of said blade define a conical penetrating tip.

4. A wrench according to claim 1 wherein means demountably secured to the inner face of one of said sections provides for reduction of the work-receiving area to accommodate a workpiece of corresponding reduced dimension, said means comprising a filler shoe which occupies a fixed position bordering said work-receiving area, a socket formed in said section in alignment with the line of travel of said blade, a stem mounted on said shoe and engaged in said socket to retain said shoe in said fixed position, said shoe having contact with only one of said sections when in place in said fixed position.

5. A wrench according to claim 2 wherein means demountably secured to the inner face of one of said sections provides for reduction of the work-receiving area to accommodate a workpiece of corresponding reduced dimension, said means comprising a filler shoe which occupies a fixed position bordering said work-receiving area, a socket formed in said section in alignment with the line of travel of said blade, a stem mounted on said shoe and engaged in said socket to retain said shoe in said fixed position, said shoe having contact with only one of said sections when in place in said fixed position.

6. A wrench according to claim 3 wherein means demountably secured to the inner face of one of said sections provides for reduction of the work-receiving area to accommodate a workpiece of corresponding reduced dimension, said means comprising a filler shoe which occupies a fixed position bordering said work-receiving area, a socket formed in said section in alignment with the line of travel of said blade, a stem mounted on said shoe and engaged in said socket to retain said shoe in a said fixed position, said shoe having contact with only one of said sections when in place in said fixed position.