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| [21] | Appl. No. | 23,417 |
| [22] | Filed | Mar. 27, 1970 |
| [45] | Patented | Sept. 14, 1971 |
| [73] | Assignee | Cooper Industries, Inc.
Houston, Tex. |

[56] **References Cited**

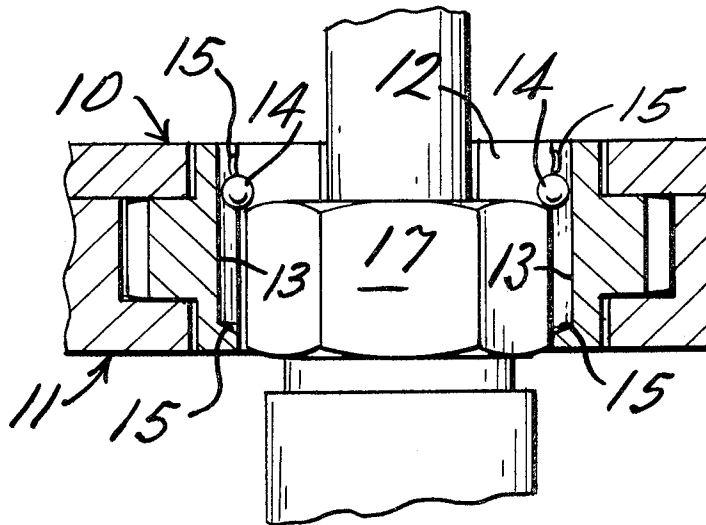
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1,157,427	10/1915	Sievert	81/58.2
1,711,694	5/1929	Saffold	81/121 R

Primary Examiner—James L. Jones, Jr.
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- [54] **FASTENER RETAINER**
5 Claims, 6 Drawing Figs.
- [52] **U.S. Cl.**..... **29/526,**
81/58.2, 81/119, 81/121
- [51] **Int. Cl.**..... **B25b 13/00,**
B25b 13/02
- [50] **Field of Search**..... 29/428,
559, 526; 81/119, 90-93, 124.1, 185, 186, 57.39,
125, 58.2, 121 R, 121 A, 121 B, 57.3, 58, 59.1, 60,
61

ABSTRACT: A fastener retainer for positioning open-socketed wrenches and the like upon a fastener. The retainer includes captive grooves extending across the width of the interior surface of a wrench-gripping member. Each groove retains for longitudinal movement between two slide-limit stops a bearing which protrudes from the open face of the groove inwardly from the interior surface of the wrench-gripping member. When a fastener is received axially from either side of the wrench-gripping member, the protruding bearings contact and move ahead of the fastener until forced against a slide-limit stop. The wrench is thereby held in position with a substantial portion of its socket depth in contact with the periphery of the fastener.



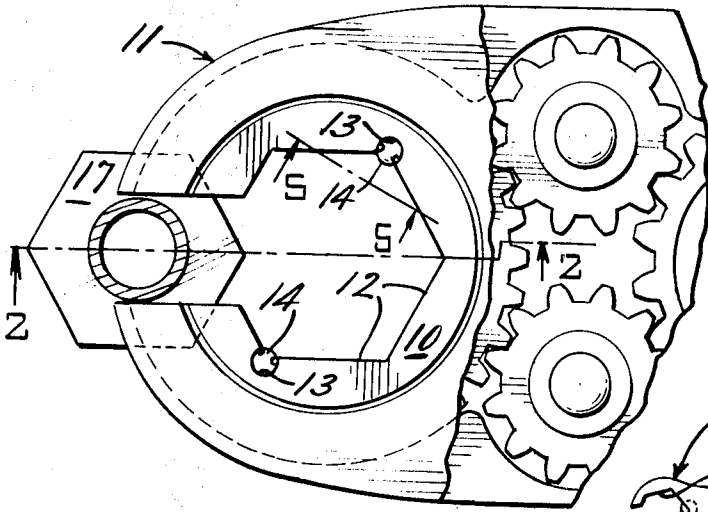


FIG-1-

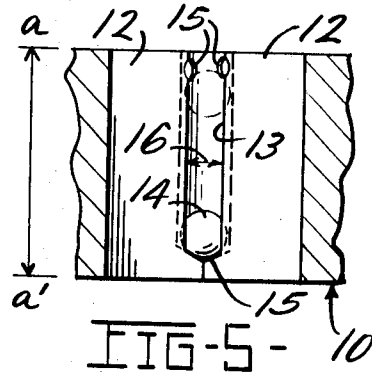


FIG-5- 10

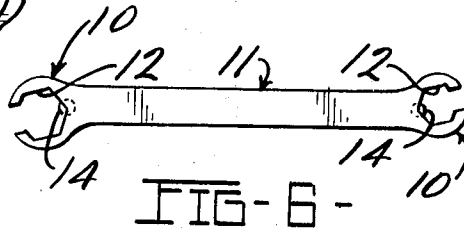


FIG-6-

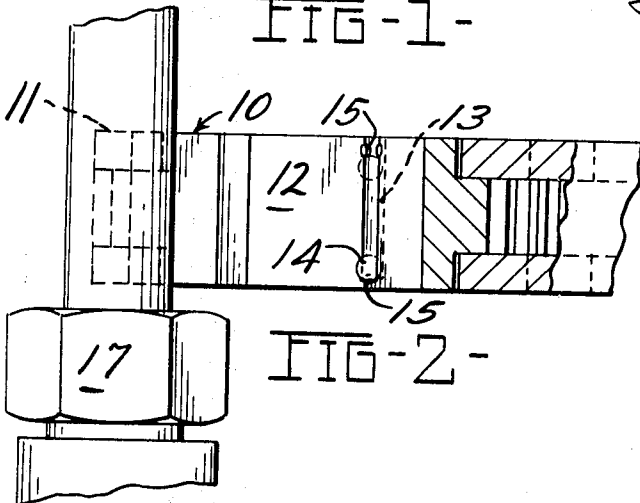


FIG-2-

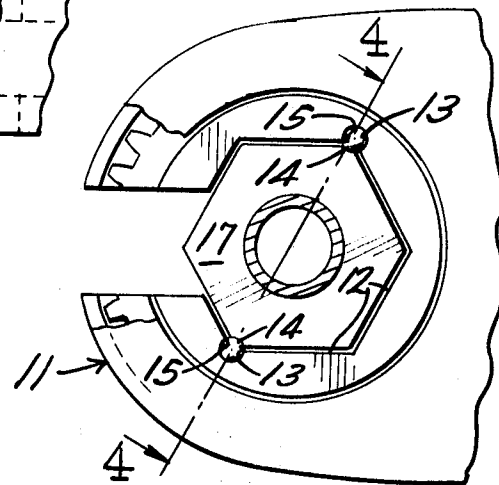


FIG-3-

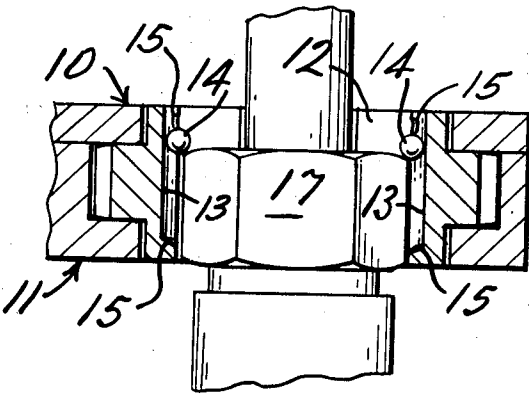


FIG-4-

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FASTENER RETAINER

BACKGROUND OF THE INVENTION

Conventional open-socketed wrenches, unlike closed-socketed varieties having one blind end, can easily slip axially out of position when applied to a fastener. It is for this reason that in power-driven wrenches, or in hand-driven wrenches where limited access or high-torque requirements are present, that a closed-socketed wrench has been preferred. In some applications, where, for example, the fastener must be guided along a shaft to form a coupling or where the driven element is not located near either extremity of the fastener, it is impossible to use a blind or closed socketed wrench.

Previous attempts to provide a simple and reliable fastener retainer for conventional crescent, box-end and other open-socketed wrenches are known in the art. U.S. Pat. No. 1,550,436, for example, shows a retainer in a position contiguous with, and overlapping one side of the jaws of a conventional open-socketed wrench. This has the disadvantage of permitting the application from only one side of the wrench-gripping member to the fastener without removing and replacing the retainer on the opposite face of the wrench.

U.S. Pat. No. 2,197,283 shows opposed inwardly tapering jaws which, at the axial midpoint of the gripping member, create an opening smaller than the outer periphery of a fastener base. The tapered jaws thus retain the wrench in place when they abut the head of a fastener axially received by the gripping member. This construction is fully reversible without any adjustment by the operator. However, since the tapered jaws receive the fastener only as far as about one-half of the socket depth of the gripping member, the wrench may slip off a conventionally designed fastener and the wrench and fastener may be unduly stressed in high-torque applications.

It is therefore the primary object of the present invention to provide a fastener retainer for open-socketed wrenches and the like which facilitates the receipt of a fastener from either face of a wrench and which will receive the fastener substantially throughout the entire socket depth of the gripping member.

Other objects and advantages of the invention will be apparent from the following detailed description of the preferred embodiments thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is a plan view of a power-driven tubing wrench-gripping member about to be placed upon a fastener;

FIG. 2 is a partially fragmented, elevational view of a tubing wrench-gripping member about to be placed upon a fastener and including the retainer of this invention;

FIG. 3 is a plan view of a power-driven tubing wrench-gripping member in position over the head of a fastener;

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 3 of a tubing wrench-gripping member in place over a fastener;

FIG. 5 is a fragmented, elevational view of the interior surface of a tubing wrench-gripping member showing the retainer detent in detail; and

FIG. 6 is a plan view of a hand-operated wrench embodying the invention.

Referring to FIGS. 1—4, a wrench-gripping member 10 embodying the invention is surrounded by a housing 11 with means for rotating the member 10 and defining an interior such as are disclosed in my copending application Ser. No. 724,408 filed Apr. 9, 1968, now U.S. Pat. No. 3,535,960 granted Oct. 27, 1970. The inner faces 12 of the member 10 define the wrench socket, in this case, designed for a hexagonal nut. As can best be seen in FIGS. 2—5, captive grooves 13 are located across the axial width (line a—a' in FIG. 5) of the gripping member 10.

Each captive groove 13 retains a detent or bearing 14 for movement along the length of said groove 13 between two slide-limit stops 15 spaced on either side of said bearing 14. In the preferred embodiment of the invention, the groove 13 ex-

tends substantially across the axial width (line a—a' of FIG. 5) of the gripping member 10 and the slide-limit stops 15 are located at both extremities of each of said grooves 13.

The captive groove 13 has an open face 16, the chord of which is less than the diameter of the bearing 14. The bearing 14 is thereby slidably retained in the groove 13 while a segment of said bearing 14 protrudes inwardly from the open face 16 and thus beyond the inner surface of the gripping member 10. It is to be understood that this invention is not limited to bearings but is intended to include any other fastener retainer having a slidable protruding member located in a captive groove.

In operation, the gripping member 10 is placed in relationship above a fastener 17 and moved axially over said fastener 17 which contacts the protruding segment of the bearing 14. The bearing 14 is then moved ahead of the fastener 17 along its groove 13 until it is forced against the slide-limit stop 15. The gripping member 10 is thereby retained in place with a substantial portion of its axial width (line a—a' of FIG. 5) in contact with the periphery of the fastener 17. It can be seen that, regardless of which side of the gripping member 10 is brought into initial contact with the fastener 17, the gripping member 10 will receive a substantial portion of said fastener 17 before being axially retained in place by the protruding bearings.

Thus, the retainer of this invention enables the wrench to be installed from either side and to receive the fastener to a proper depth for high-torque applications and insures against slipping axially off the nut.

FIG. 6 shows a hand wrench of conventional nature having a single fastener retainer in accordance with this invention.

Modifications to the above-described embodiments will be apparent to those skilled in the art and can be made without departing from the scope of the invention defined in the accompanying claims.

I claim:

1. A fastener retainer comprising a gripping member with an opening defined by a geometrical inner surface complementary to the periphery of a fastener whereby said fastener may be axially received by said gripping member, at least one open groove having spaced-apart slide-limit stops and extending axially across said inner surface, a protruding member slidably positioned in said groove and extending inwardly therefrom and beyond said inner surface of said gripping member.

2. A fastener retainer according to claim 1 wherein said groove extends substantially across the axial width of the inner surface of the gripping member.

3. A fastener retainer according to claim 1 wherein the slide-limit stops are positioned at or near the extremities of said groove.

4. An open-ended fastener retainer comprising a gripping member with an opening defined by a hexagonal inner surface complementary to the periphery of a hexagonal fastener whereby said fastener may be axially received by said gripping member, two opposed captive grooves having spaced-apart slide-limit stops and extending axially substantially across said inner surface of said gripping member, a protruding ball bearing slidably positioned in said grooves from extending inwardly therefrom and beyond said inner surface of said hexagonal gripping member.

5. A method of retaining a fastener within a gripping member having an opening defined by a geometrical inner surface complementary to the periphery of a fastener whereby said fastener may be axially received by said gripping member, at least one open groove having spaced-apart slide-limit stops and extending axially across said inner surface, and a protruding member slidably positioned in said groove and extending inwardly therefrom and beyond said inner surface of said gripping member, comprising the steps of placing the gripping member axially over the periphery of a fastener, and causing said fastener to contact and slide said protruding member against a slide-limit stop at one end of said groove to thereby retain the gripping member in position on the fastener.