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Walstrom

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[54] **TAMPER RESISTANT FASTENING APPARATUS**

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[52] **U.S. Cl.**.....**220/55 C,** 85/35, 81/53.2, 81/183, 292/251, 109/52

[51] **Int. Cl.**.....**A47j 36/10**

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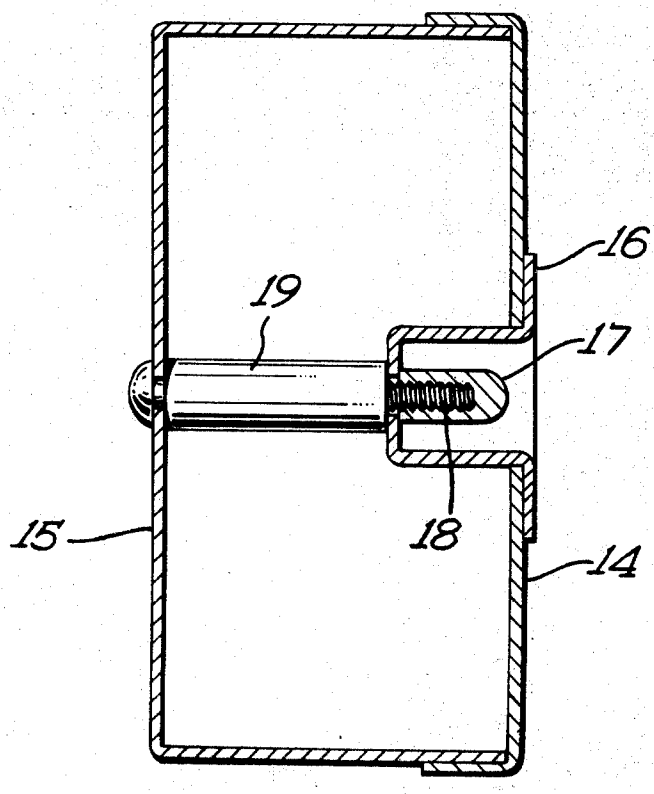
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[57] **ABSTRACT**

A fastening apparatus including a rachet-type tool adapted to transmit torque to a nut-type fastener. The tool includes a handle mounted to one or a plurality of tubular-type roller clutches which have the property of providing torque in only one direction. Openings in the handle are provided to enable a roller clutch to transmit unidirectional torque to the nut-type fastener and to allow the user to select the direction of this torque by selection of the appropriate opening. The particular configuration and material of the nut-type fastener is such that contact made by any device other than said tool for purposes of applying torque thereto would be reasonably detectable from subsequent examination of said fastener. A recessed portion of a fastened member is provided in which the nut-type fastener is attached to a complementary fastening member, said recessed portion being of special configuration adapted to receive the said tool for purposes of engaging the nut-type fastener while preventing access of commonly available tools.

5 Claims, 4 Drawing Figures



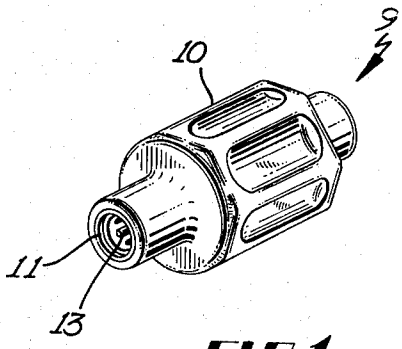


FIG 1

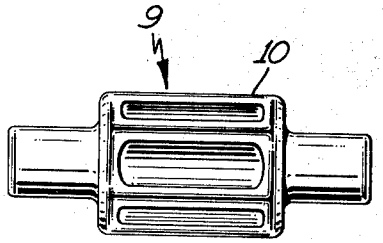


FIG 2

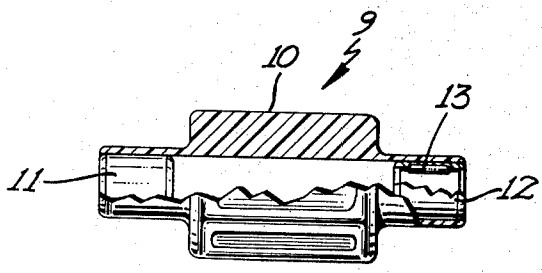


FIG 3

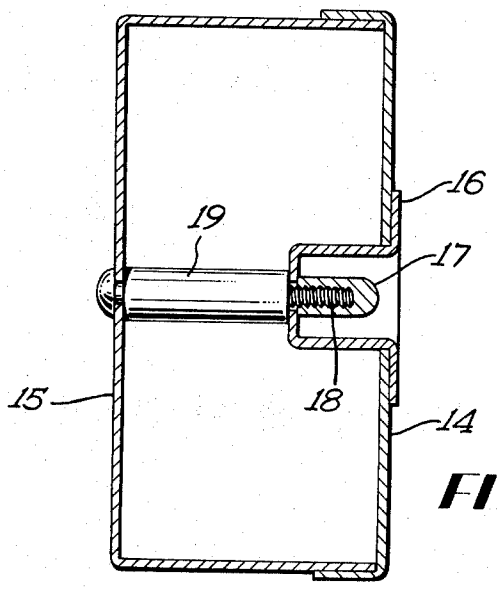


FIG 4

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TAMPER RESISTANT FASTENING APPARATUS

BACKGROUND OF THE INVENTION

One common use of prior art tamper-proof devices has been for the purpose of preventing of tampering with output recording devices or meter boxes. A common embodiment of these tamper-proof devices consists of a safety wire and a lead seal. The disadvantages of such prior art devices are the inconvenience to the authorized meter recorder of cutting and replacing in wire and seal device and the ineffectiveness of such devices as locking means.

The apparatus of this invention overcomes the above disadvantages by providing the authorized meter recorder with a very convenient and replaceable means of fastening the box while providing him with an accurate and convenient tampering examination procedure. Also, it provides the box with a convenient locking means not found in the prior art.

SUMMARY OF THE INVENTION

Briefly described, the apparatus of this invention comprises one or more generally tubular clutches which are adapted to provide torque in only one direction of rotation to a nut-type member placed within the tube-like structure. A handle is provided in which the roller clutch(es) is mounted with openings adapted to provide access to different roller clutches or different ends of the same roller clutch such that unidirectional torque application may be conveniently accomplished in either direction of rotation without leaving reasonably detectable evidence of such application. Preferably, the fastened member may be provided with a recessed portion of special configuration adapted to preclude access of commonly available tools.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the rachet tool of an embodiment of this invention;

FIG. 2 is a side plane view of the rachet tool of FIG. 1;

FIG. 3 is a sectional side plane view of the rachet tool of FIG. 1; and

FIG. 4 is a sectional side view of the nut-type fastener of an embodiment of this invention shown as used in the fastening of an enclosure.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGS. 1, 2 and 3, there is shown a rachet-type tool or wrench 9 including an outerpiece or handle 10 and a pair of roller clutches 11 and 12. Handle 10 is shown as being generally tubular with a circular inner periphery cross section and a preferably varying outer periphery cross section; hexagonal at center, such as may be gripped by a wrench or similar tool, and reduced to circular at the extremity for purposes described below.

Roller clutches 11 and 12, each having a plurality of rollers 13, are rigidly mounted inside of handle 10 by a press fit. As used in this specification, "roller clutch" shall mean the well-known barrel or tubular-type roller clutch which is adapted to provide torque in only one direction of rotation to a member placed within its barrel or tubular-type opening.

Reference is now made to FIG. 4 which shows a meter box or any fastened member to which restricted access is desired. This fastened member includes wall portions 14 and 15, recessed portion 16, nut-type fastener 17, complementary fastening member or bolt 18, and bushing-type member 19. Bushing-type member 19 is provided to restrain wall portions 14 and 15 and to prevent collapse of the fastened member.

At least a sufficient part of the outer surface of nut-type fastener 17 should be of at least sufficient convexity so as to allow a roller clutch such as shown in FIG. 3 to pass over it and to engage it in the process of transmitting torque thereto. Such curved shape should serve to discourage use of commonly available tools in application of torque thereto and should further make reasonably detectable on subsequent examination any such application other than that made by a tool including roller clutches similar to those shown in FIG. 3, assuming nut-type fastener 17 or at least its outermost portion is composed of those materials commonly used in the production of commonly available fastening apparatus. Use of commonly available roller clutches may be discouraged by use of sizes of engaging members not otherwise available. Fastening to bolt 18 may be provided by internal threads in nut-type member 17 adapted to combine with external threads on bolt 18 as shown.

Recessed portion 16 is provided to further discourage contact for purposes of transmitting torque to the nut-type fastener by means other than wrench 9. The reduced outer periphery cross section of the extremity of wrench 9 is adapted to allow its insertion into the recessed portion 16 such that roller clutch 11 or 12 located within this extremity may properly engage nut-type fastener 17 for purposes of transmitting unidirectional torque. The restricted access provided by limited space within recessed portion 16 serves to discourage application of tools other than the wrench 9 where those tools are not adapted to allow insertion into recessed portion 16, such tools including a roller clutch adapted to normally engage a nut-type fastener similar to that shown in FIG. 4.

In operation, an extremity of wrench 9 is inserted in recessed portion 16 of the fastened member shown in FIG. 4 so as to properly engage nut-type fastener 17 with roller clutch 11 or 12 located in that extremity. Torque is then applied to the hexagonal portion of handle 10 which is then transmitted to roller clutch 11 or 12. If the torque is in the direction in which particular clutch 11 or 12 will transmit the torque, torque is then transmitted to nut-type fastener 17, allowing it to rotate. If the torque applied is in the opposite direction, wrench 9 will rotate freely without the application of torque to nut-type fastener 17, thus providing a complete rachet-type action. If it is desired to apply torque to nut-type fastener 17 in the opposite direction, it is only necessary to remove wrench 9 from recessed portion 16, reverse it, and reinsert it into recessed portion 16 from the opposite extremity, thereby engaging opposite roller clutch 11 or 12.

It is thus apparent from the described embodiment that a relatively inexpensive tamper resistent fastening apparatus is provided which has the features of simplicity of structure and ease of operation. It will be further apparent that embodiments other than those shown may be utilized without departing from the spirit

of the invention. For example, it is not necessary that both roller clutches **11** and **12** be provided due to the reversible properties of a single roller clutch. Also, reduction of handle **10** at the extremities is not necessary for use with nut-type fasteners having unrestricted access; eliminating such reduction may facilitate hand use similar to the use of the common "nut driver," while remaining within the spirit of the invention.

What is claimed is:

1. In an enclosure formed by a base, side walls and a cover, the improvement which comprises:

a recessed portion in said cover, said recessed portion having an aperture;

a threaded member having an axis, said threaded member extending from the base and passing through said aperture; and

means engaging said threaded member for holding said cover in place, said means having one generally flat surface from which a threaded bore extends, the remainder of the surface of said means being smooth and generally arcuate having no depressions or indentations, said means being positioned within said recess such that it may be approached only along the axis of said threaded member.

2. The combination of claim **1** wherein said recessed portion has a base and side wall, the recessed portion side wall forming a generally right angle with the enclosure cover.

3. The combination of claim **2** wherein the recessed portion side wall forms a generally right angle with the recessed portion base.

4. The combination of claim **3** wherein the improvement further comprises a bushing surrounding said threaded member and extending from said base to the recessed portion base, said bushing being larger than the aperture in the recessed portion.

5. The combination of claim **4** wherein the arcuate surface of said engaging means comprises a first portion of a generally cylindrical configuration and a second portion of a configuration generally corresponding to the shape of one half of a sphere, the diameters of said first and second portions being substantially identical.

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