July 7, 1970 J. W. GRAY ET AL 3,518,745

INSTALLATION TOOL

Filed Dec. 27, 1967

Fig. 2

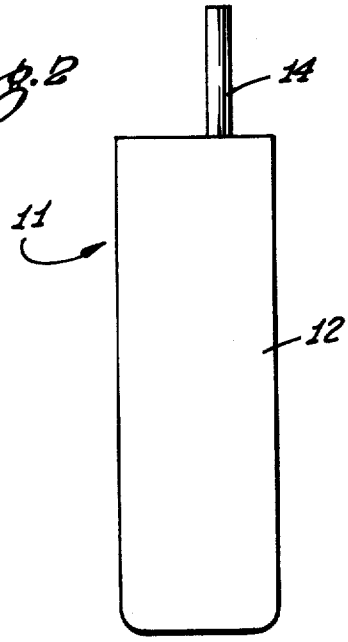


Fig. 1

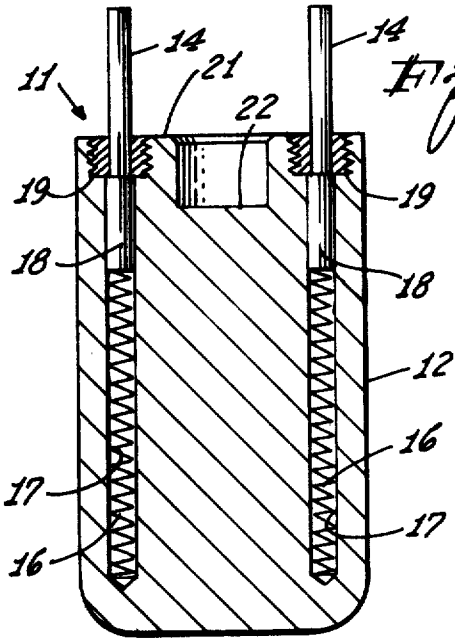


Fig. 4

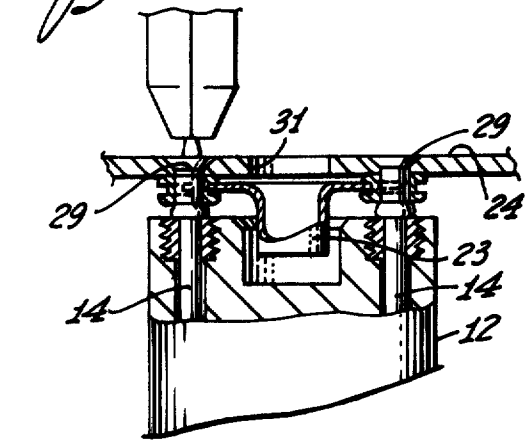
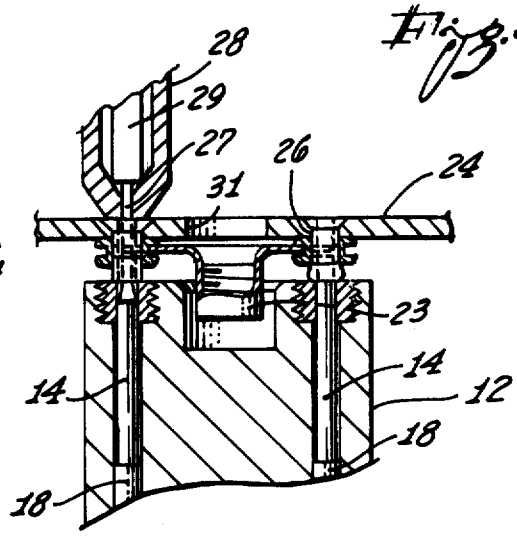


Fig. 3



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INSTALLATION TOOL

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Int. Cl. B25b 27/14
U.S. Cl. 29—271 2 Claims

ABSTRACT OF THE DISCLOSURE

A tool facilitating the installation of nut-plates and the like in which one or more rivets, bolts or the like are utilized to effect the installation. The tool includes a body portion and one or more pins, the latter being resiliently mounted in the body portion and normally have a projecting relation with respect to a face of the body portion. The face and projecting pins provide means for positioning a nut-plate and other associated components in troublesome, hard to reach, locations. The tool also provides means for locating a nut-plate in previously prepared holes and subsequently facilitates securing the same utilizing blind-type rivets.

Nut-plates and similar devices are extensively utilized to secure inspection plates and the like on various types of structures. In fact, nut-plates are extensively used in all situations where a plate or cover (inspection plate) must be removed and replaced numerous times, and a flush relationship preserved between the plate and surrounding structure. The foregoing is especially true in the airframe industry where nut-plates have acquired extensive use for this purpose.

Briefly, the present invention pertains to a tool functioning to locate, position and retain a nut-plate and associated components in position while a riveting operation, securing a nut-plate to supporting structure, is effected. Specifically, the tool includes a body in which one or more pins are resiliently mounted. The pins provide means on which a nut-plate and associated components may be placed in their proper relation, the pins are then urged through previously prepared apertures and so retained by the tool disclosed herein. Hollow rivets are utilized in securing the nut-plate to supporting structure, the rivets being urged into the apertures presently occupied by the pins. This is made possible by the pins being depressed into the body of the tool. In other words, the rivets occupy the space previously occupied by the pins. After the rivets are firmly seated, the shank thereof is expanded in a manner well known to those skilled in the art. Thus the nut-plate or plates are secured to supporting structure and an inspection plate is now secured in a conventional manner utilizing the nut-plate for this purpose. Thus, it will be seen that the inspection plate becomes a component of the aircraft and has a flush relationship with surrounding skin.

An object of the present invention is to provide a tool facilitating the positioning and retaining of a nut-plate or the like and associated components while the nut-plate is secured to supporting structure.

Another object is to provide a tool including a body having one or more pins resiliently mounted therein and in which the pins are depressed in the body and replaced by rivets permanently securing the nut-plate to supporting structure.

Although the characteristic features of the present invention are particularly pointed out in the appended claims, the invention itself, also the manner in which it may be carried out, will be better understood by referring to the following description taken in connection with

the accompanying drawings forming a part of this application and in which:

FIG. 1 constitutes a side view of a tool of the type disclosed herein; portions of the tool being broken away to better show the construction thereof.

FIG. 2 is a side view of the tool shown in FIG. 1.

FIGS. 3 and 4 are fragmentary side views of the tool of FIGS. 1 and 2 showing the tool being utilized to locate and install a nut-plate.

Referring to the drawing, a tool **11**, as disclosed herein, is shown in FIGS. 2 and 3. The tool **11** includes a body portion **12** having one or more pins **14** mounted in the body portion. In the present embodiment the tool **11** is utilized to install a nut-plate and for this reason a pair of spaced pins **14** is shown in the body **12**. In the present embodiment the portion **12** is shown as being constructed of metal, it, however, may be constructed of plastic or other formable material. The pins **14** are normally constructed of metal.

The pins **14** are resiliently mounted in the portion **12** for longitudinal movement and functions in a manner that will become apparent as the disclosure progresses. To accomplish the resilient mounting of the pins **14** a spirally wound spring **16** is positioned in the bores **17**; the springs acting to urge the pins to their extended position shown in FIGS. 1 and 2. The lower end of the pins **14** are enlarged as indicated by the numeral **18** and retained in the bores **17** by retainer means **19**. The enlarged end of the pins **14** maintains their alignment with the apertures in the retainers **19** and also provides contacting means for the springs **16**. The upper portions of the retainers **19** have a flush relation with the upper surface **21** of the body **12**. In other words, the surface constitutes a plane flat surface. Construction of the portion **12** is completed in that a recess **22** of a size and shape adapted to receive the body portion of a nut plate **23** (FIGS. 3 and 4).

Construction and relation of the components comprising the tool **11** having been described, a better understanding thereof will be forthcoming from the following discussion of its use and operation during the installation of a nut-plate.

A nut-plate, for example the nut-plate **23**, is positioned on the surface **21** with the pins extending through apertures provided therein and with the body portion thereof received in the recess **22** substantially as shown in FIGS. 3 and 4. One or more spacers (not shown) may also be positioned on the pins **14** of the nut-plate if required.

The tool **11**, with the nut-plate **23** and spacers (if required) positioned thereon are now positioned below supporting structure **24** with the pins **14** extending through previously prepared apertures **26** provided in the structure **24** substantially as shown in FIGS. 3 and 4.

The nut-plate is now secured to the structure **24** by means of hollow rivets by expanding the shanks thereof in a manner that is well known in the art. One shank of the rivets (right rivet) has been expanded in FIG. 3 securing the nut-plate **23** to the structure **24**. FIG. 3 also shows the operation in which the shank of the other rivet (left rivet) is expanded and how the tool **11** functions and cooperates during this operation.

To effect the above operation, a riveting tool **28** containing a plurality of hollow type rivets **29** is utilized. Prior to an expansion operation, one of the rivets **29** has been ejected from the tool **28**, assuming a position directly below the jaws of the tool **28**, and is thus supported by the mandrel **27** of the tool **28**.

The mandrel **27**, with rivet **29** mounted thereon, is now utilized to depress the pin **14**. As the pin **14** is depressed it will be apparent that the aperture, previously occupied by the pin **14**, will now be occupied by the

rivet **29** and the mandrel **27** as shown in FIG. 3. Thus the relative position of the nut-plate **23** with respect to the aperture **31** is maintained during the installation of the nut-plate **23**.

In FIG. 4 the installation of the nut-plate is completed and the pins **14** have returned to their extended position. By referring further to FIG. 4 it will be noted that countersunk rivets **29** are utilized in securing the nut-plate **23** to the structure **24** and, therefore, allows an inspection plate to be installed (secured) having an intimate contacting relation with the structure **24** and a flush relation with surrounding structure.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed is:

1. A hand tool for installing nut plates and the like in blind or fairly inaccessible locations, comprising:

(a) an elongated body portion of a size to be held and manipulated in one hand;

(b) said body portion including end portions and said body portion having a substantially rectangular configuration in lateral and longitudinal cross-section;

(c) one of said end portions defining a first end surface major portions of which are located in a flat reference plane;

(d) said one end portion including a recess of cylindrical configuration opening on said first end surface;

(e) a pair of bores in said body portion opening on said first end surface the axes of which have a parallel relation and are located equal distances on each side of said recess;

(f) a pin member of cylindrical configuration mounted in each of said bores;

(g) means normally urging said pin members a predetermined distance above said first end surface and allowing said pin members to be depressed a predetermined distance within said body portion at such times as said pin members are acted upon by longitudinal forces;

(h) and said pin members, recess and first end surface providing means on which a nut plate may be positioned and temporarily located with respect to supporting structure in that said pin members are received in apertures provided in the nut plate and the barrel portion thereof received in said recess thereby enabling the nut plate to be positioned and subsequently secured to the supporting structure.

2. A hand tool as set forth in claim **1**:

(a) in which said means normally urging said pin members a predetermined distance above said first end surface constitutes helical spring positioned in each of said bores below said pin members.

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U.S. Cl. X.R.

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