

Description

This invention relates to a tool for installing wire coil screw thread inserts and, more particularly, to an improved installation tool for tangless wire coil inserts.

Tools for the installation of wire coil inserts having at one end a diametrical tang of its end convolution so arranged so that the tang can be gripped by the tool as it projects from the coil for installation into a tapped hole, are well known. Further, inserting tools for tangless wire coil inserts, according to the precharacterizing portion of claim 1 as described in US—A—2,586,805 are also known in the art.

The prior art insertion tools, however, as shown in US—A—2,586,805, generally comprise a complicated device in which the coil end is gripped by a plurality of gripping elements which press the lead coil inwardly while the tangless wire coil insert is inserted into the tapped hole. These prior art devices require many moving parts and additional operations before the coil is inserted in the tapped hole.

Thus, the object of the invention is to provide an inserting tool for tangless wire coil inserts that is less costly to manufacture and more simple to operate.

This is achieved in accordance with the invention by the features recited in the characterizing portion of claim 1.

The insertion tool has a threaded mandrel and a pivotal pawl which snaps into the notch located on the lead coil of a tangless wire coil insert, thus minimizing the time required to insert said coiled insert in a tapped hole.

A reliable installation tool is provided with a minimum of moving parts both for ease of manufacture and ease of use.

The installation tool can be removed and reinserted in the insert if necessary.

Advantageous features of the installation tool are recited in the dependent claims 2 and 3.

A more thorough understanding of the present invention will be gained by reading the following description of the preferred embodiments with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a tangless helically coiled insert installation tool;

Figure 2 is a side elevation, partially broken away, of one embodiment of the tool of Figure 1 with the pawl pivoted inwardly;

Figure 3 is an enlarged sectional view of the lead end of the tool of Figure 2 prior to prewinding the helical insert with the pawl pivoted inwardly;

Figure 4 is a side elevation of Figure 2 after the helical coil insert is inserted into the coil alignment portion of the prewinder and after the pawl is pivoted outwardly;

Figure 5 is an enlarged elevation view of the lead end of Figure 4;

Figure 6 is an enlarged elevation view of the pawl (with some details omitted) of another embodiment of the tool;

Figure 7 is a side elevation of the tool showing

the position of the parts prior to the installation of the tangless insert into a tapped hole;

Figure 8 is a sectional view, with some details omitted, taken along lines 8—8 of Figure 7;

Figure 9 is a perspective view of another embodiment of the pawl;

Figure 10 is a perspective view of another embodiment of the pawl;

Figure 11 is a sectional elevation view, with some details omitted, looking to the left of Figure 7, showing the removal of the tool as it is rotated past the recess of the trailing end of the helical coil insert;

Figure 12 is a sectional elevation view, with some details omitted, partially broken away, showing the reinstallation of the tool as it is rotated past the recess of the trailing end of an installed helical coil insert.

The tool is particularly adapted for use with tangless coils which are used, for example, where a steel alloyed bolt having conventional threads is desired to be fastened into a material of relatively softer alloy, such as aluminum.

As illustrated in figure 1, the installation tool 10 is comprised of two major portions: a tubular body member 12, and a mandrel assembly 14 insertable into the tubular body and adapted to receive a tangless insert which is to be threaded into a tapped hole. The tubular body member 12 provides, in part, the operator with a means for supporting the mandrel assembly 14 in order to install the insert correctly during operation. The tubular body member 12 may include a loading window 16, for supporting an insert for quick reloading, a countersunk coil alignment portion 19, and a coil sizing portion 18 disposed in said alignment means and having a tubular threaded portion which reduces the coil thread diameter for smooth transition into the tapped hole.

The mandrel assembly 14, as shown in figures 2—7 is insertable into the tubular body member 12 and is adapted to receive the tangless insert for installation into a tapped hole. The mandrel assembly 14 comprises a cylindrical rod 20 of a diameter substantially equal to the inner diameter of the tubular body member 12. The lead end 22 of the rod 20 is threaded and has a diameter according to the inner diameter that insert 11 will have when it is in its contracted state. This means the diameter of lead end 22 is somewhat smaller than the inner coil diameter of insert 11 prior to the application of the tool. At the end opposite the lead end there is generally a crank handle 24 for applying torque for installing the insert into a tapped hole. The crank handle 24 may be replaced at the driver end of the cylindrical rod 20 with a shaped portion, to which a wrench may be applied.

Further, as illustrated in Figures 1 and 4, an adjustable stop collar 26 serves as an abutment with the end portion 13 of movable tubular body member 12, thereby limiting the distance that the lead end 22 of the rod 20 may project out of the coil sizing portion 18 of the tubular body member 12, thus defining the proper depth to which the insert 11 may be installed in a tapped hole. A set screw 28

or other means is provided in the adjustable stop collar 26 to secure the stop in its proper position.

In Figures 2—5 and 7 a pivotable catch or pawl 30, constructed in accordance with one embodiment is illustrated in an elevation sectional view within a longitudinal cutout 32 of mandrel assembly 14. The cutout 32 generally does not extend through the front end 21 of the rod 20, but is generally equal in length to the pawl 30. The pawl 30 is biased within the cutout 32 so that a hook portion 34 protrudes through aperture 33 and engages the recess 52 of the tangless wire coil insert 11. The pawl is generally biased about pivot point 36 by spring 38 to locate the hook portion 34 into the recess of the insert when the insert is screwed onto the lead end 32 of the mandrel assembly 14 and the mandrel assembly 14 is axially moved in the tubular body 12 so that the cam means 48 moves from the smaller inner diameter portion 49 of tubular body 12 along ramp 50 to the larger inner diameter 51.

An alternate biasing means of the pivotal pawl 30 is illustrated in Figures 6 and 9—10. In this embodiment the hook portion 34 of the pawl with lead ramps 40 and the spring 38a are both located on the same side of pivot point 36. In this embodiment the cam means 48 and ramp 50 are not necessary since the ramp 40 in combination with the truncated end portion 46 of the insert provides a camming means for pivoting the pawl 30 inwardly. Use of the ramps 40 with the pivotal pawl 30 is shown in Figures 2—5 and 7 would also eliminate the cam means 48 and ramp 50. Accordingly, the important feature of the pivotable pawl 30 is that it has the ability to locate the hook portion 34, which generally extends between two peaks of the threaded portion of the lead end 22 of the rod, only in the recess of the insert 11 to threadably drive the insert 11 into a tapped hole. Further, counter rotation of the cylindrical rod 20 allows the pivotal pawl 30 to automatically disengage from the recess of the insert to permit extraction of the tool. As shown in Figure 9, ramps 40 may be provided adjacent but opposite the hook portion 34 so that the recess of the insert 11 may automatically push the pawl 30 downward upon counter clockwise rotation of the cylindrical rod 20, and thus providing an automatic extraction of the tool 10.

Figure 10 shows another embodiment of the pivotable pawl 30 in which a notch 60 is rearwardly adjacent the hook portion 34. This notch 60 captures the inner thread of the next adjacent thread to the lead thread of the insert to prevent the recess 52 of the insert from slipping off the hook portion 34 when rearward axial force is applied to the insert.

A stabilizing collar 42, as illustrated in Figure 7, serves as a means for insuring perpendicularity of the tool 10 when it is held in abutment to a tapped hole 15 in parent material 17. A set screw 44 is provided in stabilizing collar 42 to secure the tool in a stable position in order to install the insert 11 in the tapped hole 15.

As illustrated in Figure 8, the hook portion 34 of

the pawl 30 engages the recess 52 of the lead end 54 in order that the insert 11 may be screwed by means of the tool 10 into a tapped hole. Since both free ends of the helical coiled insert have recesses 52 cut therein, the insert may be inserted in the tool in either direction, thus eliminating the possibility of the operator inserting insert on the tool in the wrong direction.

In Figures 11—12 is illustrated the insertion tool embodying the novel features of the present invention, showing the trailing end 56 of the insert 11. Figure 11 shows the tool in a counter clockwise rotation, whereby the opposite side 58 of the hook portion 34 of the pawl is angled to pivot the pawl 30 in a downward direction as indicated by the arrow. This pivotal motion of the pawl 30 against the recess 52 of the trailing end 56 of the coil allows removal of the tool after the insert has been installed in a tapped hole. Figure 12 also illustrates the tool from the trailing end 56 of the coil but during reinsertion of the tool after an insert 11 has been installed. Accordingly, the ramp portion 40 of the pivotal pawl 30 cooperates with a truncated portion 46 of the free end of the insert 11 to push the pawl 30 in a downward direction, shown by the arrow, when the tool is rotated in a clockwise direction for reinsertion of the tool. During reinsertion of the tool 10 the pivotal pawl 30 moves along the inner surface of the coil past the truncated portion of the coil, past the recess 52 of the trailing portion of the coil axially along the insert until the hook portion 34 of the pawl again engages the recess at the lead end of the coil.

Claims

1. A tool for inserting a tangless helically coiled insert (11) in a tapped hole (15), comprising:
a mandrel (14) adapted to receive the tangless insert (11) for installation in the tapped hole (15),
a driving means (24) at one end of said mandrel (14), and

pivotable gripping means (30) mounted to said mandrel (14), adapted to engage the leading coil (54) of the tangless insert (11) when the insert (11) is on said mandrel (14) whereby rotation of said driving means (24) causes rotation of said tangless insert (11) into the tapped hole (15),

characterized in that the mandrel (14) is disposed in a tubular body (12) of substantially circular cross-section, the mandrel (14) being rotatable and axially movable with respect to the tubular body (12), that the opposite end of said mandrel (14) has a threaded portion for threading the tangless insert (11) thereupon, and that the pivotable gripping means (30) consists of a pivotable pawl (30) extending longitudinally within a cavity (32) formed within the mandrel (14) and adapted to engage a recess (52) within the leading coil (54) of the tangless insert (11).

2. A tool according to claim 1, characterized by said body (12) having a countersunk insert alignment means (19) adjacent the threaded portion of said mandrel (14), and a coil sizing means



or other means is provided in the adjustable stop collar 26 to secure the stop in its proper position.

In Figures 2—5 and 7 a pivotable catch or pawl 30, constructed in accordance with one embodiment is illustrated in an elevation sectional view within a longitudinal cutout 32 of mandrel assembly 14. The cutout 32 generally does not extend through the front end 21 of the rod 20, but is generally equal in length to the pawl 30. The pawl 30 is biased within the cutout 32 so that a hook portion 34 protrudes through aperture 33 and engages the recess 52 of the tangless wire coil insert 11. The pawl is generally biased about pivot point 36 by spring 38 to locate the hook portion 34 into the recess of the insert when the insert is screwed onto the lead end 32 of the mandrel assembly 14 and the mandrel assembly 14 is axially moved in the tubular body 12 so that the cam means 48 moves from the smaller inner diameter portion 49 of tubular body 12 along ramp 50 to the larger inner diameter 51.

An alternate biasing means of the pivotal pawl 30 is illustrated in Figures 6 and 9—10. In this embodiment the hook portion 34 of the pawl with lead ramps 40 and the spring 38a are both located on the same side of pivot point 36. In this embodiment the cam means 48 and ramp 50 are not necessary since the ramp 40 in combination with the truncated end portion 46 of the insert provides a camming means for pivoting the pawl 30 inwardly. Use of the ramps 40 with the pivotal pawl 30 is shown in Figures 2—5 and 7 would also eliminate the cam means 48 and ramp 50. Accordingly, the important feature of the pivotable pawl 30 is that it has the ability to locate the hook portion 34, which generally extends between two peaks of the threaded portion of the lead end 22 of the rod, only in the recess of the insert 11 to threadably drive the insert 11 into a tapped hole. Further, counter rotation of the cylindrical rod 20 allows the pivotal pawl 30 to automatically disengage from the recess of the insert to permit extraction of the tool. As shown in Figure 9, ramps 40 may be provided adjacent but opposite the hook portion 34 so that the recess of the insert 11 may automatically push the pawl 30 downward upon counter clockwise rotation of the cylindrical rod 20, and thus providing an automatic extraction of the tool 10.

Figure 10 shows another embodiment of the pivotable pawl 30 in which a notch 60 is rearwardly adjacent the hook portion 34. This notch 60 captures the inner thread of the next adjacent thread to the lead thread of the insert to prevent the recess 52 of the insert from slipping off the hook portion 34 when rearward axial force is applied to the insert.

A stabilizing collar 42, as illustrated in Figure 7, serves as a means for insuring perpendicularity of the tool 10 when it is held in abutment to a tapped hole 15 in parent material 17. A set screw 44 is provided in stabilizing collar 42 to secure the tool in a stable position in order to install the insert 11 in the tapped hole 15.

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In Figures 11—12 is illustrated the insertion tool embodying the novel features of the present invention, showing the trailing end 56 of the insert 11. Figure 11 shows the tool in a counter clockwise rotation, whereby the opposite side 58 of the hook portion 34 of the pawl is angled to pivot the pawl 30 in a downward direction as indicated by the arrow. This pivotal motion of the pawl 30 against the recess 52 of the trailing end 56 of the coil allows removal of the tool after the insert has been installed in a tapped hole. Figure 12 also illustrates the tool from the trailing end 56 of the coil but during reinsertion of the tool after an insert 11 has been installed. Accordingly, the ramp portion 40 of the pivotal pawl 30 cooperates with a truncated portion 46 of the free end of the insert 11 to push the pawl 30 in a downward direction, shown by the arrow, when the tool is rotated in a clockwise direction for reinsertion of the tool. During reinsertion of the tool 10 the pivotal pawl 30 moves along the inner surface of the coil past the truncated portion of the coil, past the recess 52 of the trailing portion of the coil axially along the insert until the hook portion 34 of the pawl again engages the recess at the lead end of the coil.

Claims

1. A tool for inserting a tangless helically coiled insert (11) in a tapped hole (15), comprising:
a mandrel (14) adapted to receive the tangless insert (11) for installation in the tapped hole (15),
a driving means (24) at one end of said mandrel (14), and

pivotable gripping means (30) mounted to said mandrel (14), adapted to engage the leading coil (54) of the tangless insert (11) when the insert (11) is on said mandrel (14) whereby rotation of said driving means (24) causes rotation of said tangless insert (11) into the tapped hole (15),

characterized in that the mandrel (14) is disposed in a tubular body (12) of substantially circular cross-section, the mandrel (14) being rotatable and axially movable with respect to the tubular body (12), that the opposite end of said mandrel (14) has a threaded portion for threading the tangless insert (11) thereupon, and that the pivotable gripping means (30) consists of a pivotable pawl (30) extending longitudinally within a cavity (32) formed within the mandrel (14) and adapted to engage a recess (52) within the leading coil (54) of the tangless insert (11).

2. A tool according to claim 1, characterized by said body (12) having a countersunk insert alignment means (19) adjacent the threaded portion of said mandrel (14), and a coil sizing means

(18) disposed in said alignment means (19) and including a tubular threaded portion for reducing the insert thread diameter for smooth transition into the tapped hole (15).

3. A tool according to claim 1 or 2, characterized by including a ringlike stabilizer means (42) circumscribed about one end of said tubular body (12) having a face for contacting a substantial portion of a parent material (17) around the tapped hole (15).

Patentansprüche

1. Werkzeug zum Einsetzen eines schaftlosen, schraubenförmig gewickelten Einsatzes (11) in ein Gewindeloch (15), mit:

einem Dorn (14) zum Aufnehmen des schaftlosen Einsatzes (11) zum Einbau in das Gewindeloch (15),

einer Antriebseinrichtung (24) an einem Ende des Dorns (14), und

einer schwenkbaren Einspanneinrichtung (30), die an dem Dorn (14) befestigt und ausgelegt ist zum Erfassen der vorderen Windung (54) des schaftlosen Einsatzes (11), wenn der Einsatz (11) auf dem Dorn (14) ist, wodurch die Drehung der Antriebseinrichtung (24) die Drehung des schaftlosen Einsatzes (11) in das Gewindeloch (15) bewirkt,

dadurch gekennzeichnet, daß der Dorn (14) in einem rohrförmigen Körper (12) mit im wesentlichen kreisförmigen Querschnitt angeordnet ist, wobei der Dorn (14) in bezug auf den rohrförmigen Körper (12) drehbar und axial bewegbar ist, daß das entgegengesetzte Ende des Dorns (14) einen Gewindeteil zum Aufschrauben des schaftlosen Einsatzes (11) hat und daß die schwenkbare Einspanneinrichtung (30) aus einer schenkbaren Klinke (30) besteht, die sich in Längsrichtung in einem Hohlraum (32) erstreckt, welcher innerhalb des Dorns (14) gebildet ist, und zum Erfassen einer Aussparung (52) in der vorderen Windung (54) des schaftlosen Einsatzes (11) ausgebildet ist.

2. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß der Körper (12) eine versenkte Einsatzausrichteinrichtung (19) benachbart zu dem Gewindeteil des Dorns (14) und eine Windungsbemessungseinrichtung (18) hat, die in der Ausrichteinrichtung (19) angeordnet ist und einen rohrförmigen Gewindeteil zum Reduzieren des Einsatzgewindedurchmessers für einen gleichmäßigen Übergang in das Gewindeloch (15) aufweist.

3. Werkzeug nach Anspruch 1 oder 2, gekenn-

zeichnet durch eine ringartige Stabilisierereinrichtung (42), welche ein Ende des rohrförmigen Körpers (12) umgibt und eine Seite zum Berühren eines wesentlichen Teils des Grundmaterials (17) um das Gewindeloch (15) hat.

Revendications

1. Outil (10) pour la pose d'inserts ou filetages rapportés hélicoïdaux filiformes sans tenon (11) dans des trous taraudés (15), du type comprenant:

a) un mandrin (14) propre à recevoir l'insert sans tenon (11) dans un trou taraudé (15),

b) un moyen d'entraînement (24) disposé à une extrémité du mandrin (14), et

c) un moyen de préhension pivotant (30) monté sur le mandrin (14), destiné à agir sur la spire de tête (54) de l'insert sans tenon (11) lorsque cet insert se trouve sur le mandrin (14), afin que la rotation du moyen d'entraînement (24) détermine la rotation de l'insert sans tenon (11) à l'intérieur dudit trou taraudé (15),

cet outil étant caractérisé en ce que le mandrin (14) est disposé dans un corps tubulaire (12) ayant une section transversale sensiblement circulaire, ledit mandrin (14) pouvant tourner et se déplacer axialement par rapport au corps tubulaire (12), que l'extrémité opposée du mandrin (14) présente une partie filetée destinée à recevoir par visage l'insert sans tenon (11), et que le moyen de préhension pivotant (30) consiste en un cliquet pivotant (30) qui s'étend dans le sens longitudinal à l'intérieur d'une cavité (32) formée à l'intérieur du mandrin (14) et propre à s'engager dans la spire de tête (54) de l'insert sans tenon (11).

2. Outil selon la Revendication 1, caractérisé en ce que ledit corps (12) comporte un moyen contre-percé (19) pour assurer l'alignement de l'insert (11) à proximité de la partie filetée du mandrin (14), et un moyen de calibrage des spires (18) disposé dans ledit moyen d'alignement (19) et comprenant une partie filetée tubulaire destinée à réduire le diamètre des filets de l'insert afin d'en permettre l'insertion sans difficulté dans le trou taraudé (15).

3. Outil selon l'une ou l'autre des Revendications 1 ou 2, caractérisé par le fait qu'il comprend un moyen stabilisateur (42) en forme de collier, qui entoure une extrémité du corps tubulaire (12) et présente une face destinée à entrer en contact avec une partie importante de la matière (17) dans laquelle doit se poser l'insert, autour du trou taraudé (15).

