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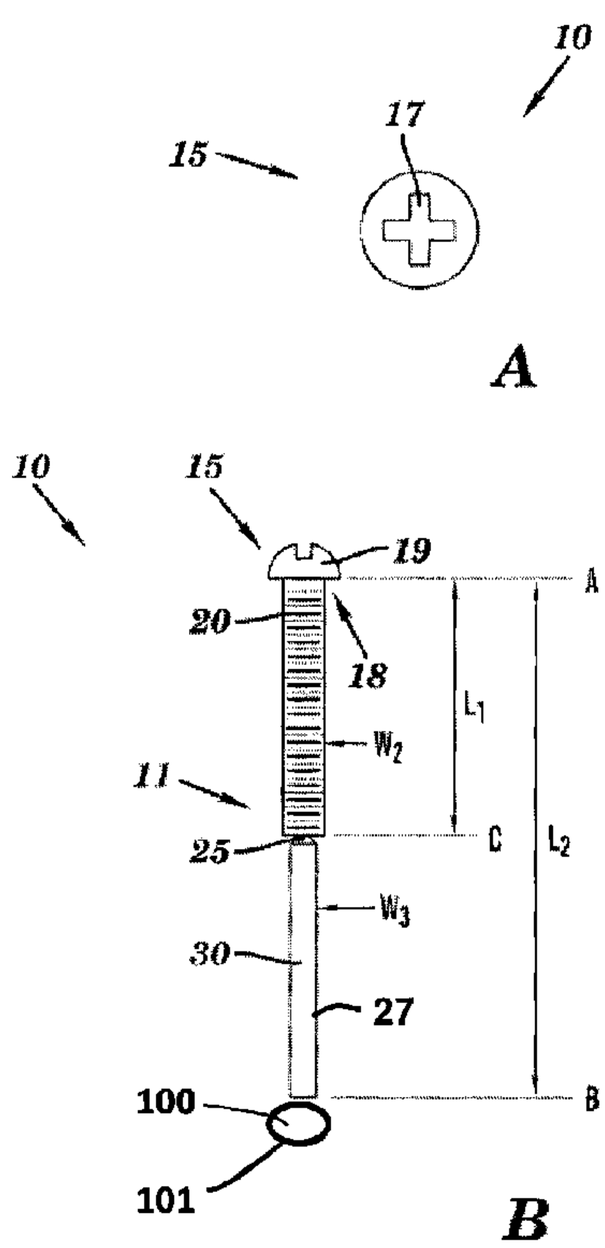

(57) Abrégé/Abstract:
A fastener with a breakaway and methods of using the same. In one embodiment the fastener is a screw having a head and elongated stem, adapted to be easily manipulated by a user when using the screw as a fastener in a hinge or joint. A means of holding a screw by providing a breakaway tab or non-threaded portion of the elongated stem which can be used to align and insert the screw into a screw hole in the process of engaging threads in the screw hole with threads of the screw. After engaging the threads in the screw hole, such as after the screw has been essentially completely inserted into the screw hole, the breakaway tab or non-threaded portion of the elongated stem of the screw may be broken off at a breakaway and discarded.

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(54) **Title:** SCREW WITH BREAKAWAY AND METHODS OF USING THE SAME

(57) **Abstract:** A fastener with a breakaway and methods of using the same. In one embodiment the fastener is a screw having a head and elongated stem, adapted to be easily manipulated by a user when using the screw as a fastener in a hinge or joint. A means of holding a screw by providing a breakaway tab or non-threaded portion of the elongated stem which can be used to align and insert the screw into a screw hole in the process of engaging threads in the screw hole with threads of the screw. After engaging the threads in the screw hole, such as after the screw has been essentially completely inserted into the screw hole, the breakaway tab or non-threaded portion of the elongated stem of the screw may be broken off at a breakaway and discarded.

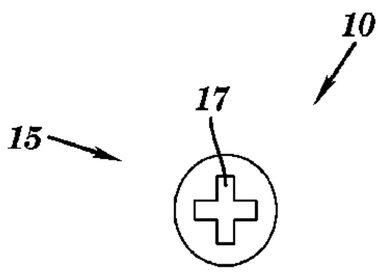

FIG. 1A

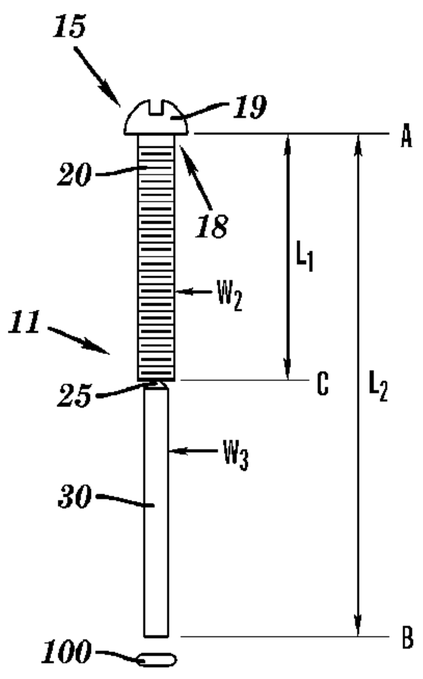

FIG. 1B

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SCREW WITH BREAKAWAY AND METHODS OF USING THE SAME

1. Field of the Invention

The present invention relates generally to fasteners. More specifically, the invention relates to screws and their use in joints.

2. Background

Small, hand held fastening devices are used in the mechanical and construction industries.

There is an increasing need for adaptations that facilitate the manipulation of such small, hand held fastening devices.

Summary of the Invention

A first aspect of the present invention provides a screw, comprising: a screw head, comprising: a first surface having a driver slot thereon, and a second surface, wherein the second surface of the screw head faces away from the first surface; an elongated stem, comprising: a threaded first portion and a non-threaded second portion extending from the distal end of the threaded first portion and a first breakaway therebetween, wherein a proximal end of the threaded first portion is mechanically and physically coupled to the second surface of the screw head, wherein the physical coupling between the second surface of the screw head and the proximal end of the threaded first portion is not a breakaway, wherein the first breakaway releasably couples the non-threaded second portion to the distal end of

the threaded first portion, wherein the diameter of the non-threaded second portion is smaller than the diameter of the threaded first portion of the elongated stem, wherein at least the distal end of the non-threaded second portion extends out of a threaded channel of a hinge, and wherein the screw is adapted to be manipulated by the non-threaded second portion by hand by a user, so the non-threaded second portion breaks off at the breakaway and is discarded.

A second aspect of the present invention provides a method of replacing a screw in a hinge, comprising: providing a hinge, comprising: first and second straps, pivotably coupled to a cylinder, wherein the cylinder has a threaded hollow channel therein; providing a screw, comprising: a head; an elongated stem comprising: a non-threaded second portion extending from the threaded first portion; and a first breakaway therebetween, wherein the first breakaway releasably couples the non-threaded second portion to the distal end of the threaded first portion, wherein the diameter of the non-threaded second portion is smaller than the diameter of the threaded first portion of the elongated stem; inserting the non-threaded second portion of the elongated stem into the hollow threaded channel in the hinge so that the non-threaded second portion of the elongated stem extends out of the hollow threaded channel of the hinge; aligning the threaded first portion of the elongated stem with the threads of the hollow threaded channel of the hinge; and screwing the first threaded portion of the elongated stem into the hollow threaded channel of the hinge by rotating the threaded first portion of the elongated stem that has been aligned with the threads of the threaded hollow channel of the hinge; adapting the screw to be manipulated by the non-threaded portion by hand by a user; breaking off

the non-threaded second portion at the breakaway; and discarding the non-threaded second portion.

A third aspect of the present invention provides a kit, comprising: a hinge, comprising first and second straps, pivotably coupled to a cylinder, wherein the cylinder has a threaded hollow channel therein; a screw, comprising: a head; an elongated stem, comprising: a threaded first portion adjacent to the head and a non-threaded second portion extending from the threaded first portion and a first breakaway therebetween, wherein the first breakaway releasably couples the first threaded portion of the elongated stem to the non-threaded second portion of the elongated stem, wherein the proximal end of the threaded first portion and the second surface of the screw head are non-releasably coupled, wherein the diameter of the non-threaded second portion is smaller than the diameter of the threaded first portion of the elongated stem, wherein at least the distal end of the non-threaded second portion extends out of a threaded channel of a hinge, and wherein the screw is adapted to be manipulated by the non-threaded second portion by hand by a user, so the non-threaded second portion breaks off at the breakaway and is discarded.

A fourth aspect of the present invention provides a system for guiding a screw into a hinge, comprising: a hinge, wherein the hinge has a hollow channel therein; a screw, comprising: a head; an elongated stem, comprising: a threaded first portion adjacent to the head; and a non-threaded second portion extending from the threaded first portion; and a breakaway, wherein the breakaway is removably connected therebetween, but the breakaway is not removably connected between

the threaded first portion of the elongated stem and the head of the screw, wherein the non-threaded second portion of the elongated stem has been aligned with the hollow threaded channel in the hinge, wherein the non-threaded second portion of the elongated stem has been manipulated by hand by a user into the threaded hole in the hinge so that the threaded first portion of the elongated stem is articulated with the threads of the hollow threaded channel of the hinge, and wherein the screw has been inserted into the threaded first portion of the elongated stem by threading the threads of the first portion of the elongated stem with the threads of the threaded hole.

Brief Description of the Figures

Fig. 1A depicts a top plan view of a first surface of a screw head of a screw, in accordance with embodiments of the present invention;

Fig. 1B depicts a longitudinal cross-sectional view of the screw depicted in Fig. 1A, in accordance with embodiments of the present invention;

Fig. 2A depicts a front longitudinal view of a screw, in accordance with embodiments of the present invention;

Fig. 2B depicts a top plan view of a first surface of a screw head of the screw depicted in Fig. 2A, in accordance with embodiments of the present invention;

Fig. 3A depicts a side elevation view of the screw the screw depicted in Figs. 2A and 2B, in accordance with embodiments of the present invention;

Fig. 3B depicts a top plan view of a first surface of a screw head of the screw depicted in Figs. 2A, 2B, and 3A, in accordance with embodiments of the present invention;

Fig. 4 depicts a longitudinal cross-sectional view of a kit, in accordance with embodiments of the present invention;

Fig. 5 depicts a top plan view of a screw having a screw head, in accordance with embodiments of the present invention; and

Figs. 6A – 6C depict a flow diagram of a method of replacing a screw in a hinge of the kit, depicted in Fig. 4, in accordance with embodiments of the present invention.

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Detailed Description of Embodiments of the Invention

Fig. 1A depicts a top plan view of a first surface **19** of a screw head **15** of a screw **10**. The screw head **15** includes a driver slot **17**. The screw **10** may be a

round head **15** made of stainless steel, brass, nickel/sliver, carbon steel, titanium, or other appropriate metals or metal alloys. The driver slot **17** may be a single groove, a Phillips® cross shaped groove, an hexagonal groove for turning with a hex wrench.

Fig. 1B depicts a longitudinal cross-sectional view of the screw **10**. The screw **10**, comprises: the screw head **15**, comprising: a first surface **19** having a driver slot **17** thereon, and a second surface **18**, wherein the second surface **18** of the screw head **15** faces away from the first surface **19**. The screw **10** comprises an elongated stem **11**. The elongated stem **11** comprises a threaded first portion **20**. A proximal end **A** of the threaded first portion **20** is mechanically and physically coupled to the second surface **18** of the screw head **15**. The mechanical and physical coupling between the second surface **18** of the screw head **15** and the proximal end **A** of the threaded first portion **20** is not a breakaway **25**, **43**. The elongated stem **11** comprises a non-threaded second portion **30** extending from a distal end **C** of the threaded first portion **20**; and a breakaway **25** therebetween.

Hereinafter, a "breakaway" is defined as a releasable coupling between a removable piece such as the proximal end **12** of the non-threaded second portion **30** and the distal end **C** of the threaded first portion **20**. Hereinafter, "distal end" is defined as the further point along the elongated stem **11** in reference to the second surface **18** of the screw head **15**, and "proximal" is defined as the nearer point along the elongated stem **11** in reference to the second surface **18** of the screw head **15**.

Hereinafter "releasably coupling" is defined as forming or breaking or cleaving or severing a mechanical and physical coupling between the removable piece such

as the proximal end **12** of the non-threaded second portion **30** and the distal end **C** of the threaded first portion **20**.

Hereinafter "screwing the screw **10**, **13** into a screw hole **59**, **100** of a substrate **101**, or threaded hollow channel of a hinge **64**" is defined as engaging the threads **63** in the screw hole **59**, **100** or hollow threaded channel **64** of a hinge **66**, by rotating the screw **10**, **13** about its longitudinal axis in a clockwise motion, resulting in the screw **10**, **13** being essentially completely inserted into the screw hole **59**, **100** or hollow threaded channel **64** of the hinge **66**. Such engaging the threads **63** in the screw hole or hollow threaded channel **64** has the ultimate end that the screw **10**, **13** has been essentially completely inserted into the screw hole **59**, **100**.

In one embodiment, the screw **10** comprises a non-threaded second portion **30** for making it easier to handle the screw **10**. You insert the non-threaded second portion **30** of the screw **10** into a screw hole **100** first and then you are able to pull the threaded first portion **20** of the screw **10** into the screw hole **100** as the non-threaded second portion **30** is removed from the screw hole **100**. This adapts the screw **10** to be more easily manipulated by hand by a user.

In one embodiment, a length L_1 from about 0.3375 in. to about 0.4125 in. may separate the proximal end **A** of the threaded first portion **20** and the distal end **C** of the threaded first portion **20**.

In one embodiment, a length L_2 from about 0.6973 in. to about 0.8525 in. may separate the proximal end **A** of the threaded first portion **20** and the distal end **B** of the non-threaded second portion **30** of the elongated stem **11**.

In one embodiment, a diameter W_3 of the non-threaded second portion **30** is preferably smaller than a diameter W_2 of the threaded first portion **20** of the elongated stem 11. In one embodiment the diameter W_3 is from about 0.036 in. to about 0.044 in.

In one embodiment an axial cross-section of the non-threaded second portion **30** is substantially circular. In this embodiment, an outer surface **27** of the non-threaded second portion **30** is substantially smooth.

Fig. 2A depicts a front longitudinal view of a screw **13**. The screw **13** comprises: a screw head **50** and an elongated stem **14**. The screw head **50**, comprises: a first surface **44** having a driver slot **51** thereon. The screw head **50**, comprises a second surface **48**, depicted in Fig. 3A and described in associated text. The second surface **48** of the screw head **50** faces away from the first surface **44**. The elongated stem **14**, comprises: either a threaded first portion **20** and a non-threaded second portion **30** extending from the distal end **C** of the threaded first portion **20** and a first breakaway **25** therebetween, depicted in Fig. 1B, or a threaded first portion **42**, without the non-threaded second portion **30**, depicted in Fig. 1B, extending from the threaded first portion **42** and a second breakaway **43**. A proximal end **E** of the threaded first portion **42** is non-releasably coupled to the second surface **48** of the screw head **50**. The mechanical and physical coupling between the second surface **48** of the screw head **50** and the proximal end **E** of the threaded first portion **42** is not a breakaway **25**, **43**. In this embodiment, the first breakaway **25** releasably couples the non-threaded second portion **30** to the distal end **C** of the threaded first portion **20**.

In an alternative embodiment the threaded first portion **42**, without the non-threaded second portion **30** extends from the threaded first portion **42** and a second breakaway **43**. In this embodiment, a proximal end **E** of the threaded first portion **42** is non- releasably mechanically and physically coupled to the second surface **48** of the screw head **50**. In this embodiment, the mechanical and physical coupling between the second surface **48** of the screw head **50** and the proximal end **E** of the threaded first portion **42** is not a breakaway **25**, **43**. In addition, the second breakaway **43** releasably couples the first surface **48** of the screw head **50** to a breakaway tab **45**.

In one embodiment, a screw **13** with a break away tab **45** on the screw head **50** guides screws **13** into the screw hole **59** of the substrate **101**, for easy maneuverability. Any size screw **13**, or break away tab **45** may be placed anywhere on the head **50** of the screw **13**. Insert the screw **13** in hole **59**, turn the break away tab **45** to start the screwing operation and then break the break away tab **45** off.

In one embodiment, a length $\mathbf{L_5}$ from the second surface **48** to the second breakaway **43**, releasably coupling the breakaway tab **45**, may be from about 0.1 in. to about 0.21 in.

In one embodiment, a width $\mathbf{W_7}$ of the breakaway tab **45** may be from about 0.225 in. to about 0.275 in. and a length $\mathbf{L_3}$ of the breakaway tab **45** may be from about 0.45 in. to about 0.55 in.

Fig. 2B depicts a top plan view of a first surface **44** of a screw head **50** of the screw **13**. The screw head **50** includes a driver slot **51**. The screw **13** may be made of stainless steel, brass, nickel/sliver, carbon steel, titanium, or other appropriate

metals or metal alloys. The driver slot **51** may be a single groove, a Phillips® cross shaped groove, or an hexagonal groove for turning with a hex wrench.

Fig. 3A depicts a side elevation view of the screw **13**. In one embodiment, a length L_4 from the proximal end **E** of the threaded first portion **20** to the distal end **F** of the threaded first portion **42** of the elongated stem **14** may be from about 0.3942 in. to about 0.4818 in.

In one embodiment, a face **49** of the breakaway tab **45** and a longitudinal plane of the driver slot **51** are parallel. A width W_8 of the driver slot **51** may be from about 0.045 in. to about 0.055 in. A ratio of the thickness L_9 of the breakaway tab **45** of the screw **13** to the width W_8 of the driver slot **51** is from about 0.3:1.0 to about 0.4:0.9.

In one embodiment, a ratio of the length L_1 of the threaded first portion **20** to a length of the non-threaded second portion **30** of the screw **10** is from about 1:1 to about 0.775:1. The length of the non-threaded second portion is defined as a length between proximal end **12** of the non-threaded second portion **30** and the distal end **B** of the non-threaded second portion **30** of the elongated stem **11**, as depicted in Figs. 1B and 4, and described in associated text, herein.

In one embodiment, a diameter of the first breakaway **25** of the screw **10** is less than or equal to 0.015 in., when the diameter of the elongated stem **11** is essentially equal to 0.040 in.

In one embodiment, a ratio of the width W_1 of the breakaway tab **45** to a length L_3 of the breakaway tab **45** is from about 1:2 to about 1:10.

In one embodiment, the screw head **50** is a slotted undercut oval countersunk head.

In one embodiment, the threaded first portion **42** has a 6-32 UNF thread, wherein conventional UNC or UNF thread is a 60 degree thread.

In one embodiment, a ratio of the length L_4 of the threaded first portion **42** to the length L_3 of the breakaway tab **45** of the screw **10** is from about 1:1 to about 0.876:1.

Fig. 3B depicts a top plan view of a first surface **44** of a screw head **51** of the screw **50**. In one embodiment, a width W_1 of the second breakaway **43** across the first surface **44** of the screw head **50**, depicted in Fig. 2B, is from about 75% to about 95% of the length L_{10} of the driver slot **51** thereon.

Fig. 4 depicts a longitudinal cross-sectional view of a kit **65**. In one embodiment, the kit **65** comprises: a hinge **66**, comprising first and second straps **60**, **61**, pivotably coupled to a cylinder **62**. The cylinder **62** has a hollow threaded channel **64** therein. The kit **65** comprises: a screw **10**, comprising: a head **19** and an elongated stem **11**. The elongated stem 11, comprises: either a threaded first portion **20** adjacent to the head **15** and a non-threaded second portion **30** extending from the threaded first portion **20** and a first breakaway **25** therebetween. The first breakaway **25** releasably couples the threaded first portion **20** of the elongated stem **11** to the non-threaded second portion **30** of the elongated stem **11**. The non-threaded second portion **30** of the elongated stem **11** has been aligned with the hollow threaded channel **64** in the hinge **66**. The non-threaded second portion **30** of the elongated stem **11** has been inserted into the hollow threaded channel **64** in the hinge **66** so that the threaded first portion **20** of the elongated stem **11** catches at least one of the threads **63** of the hollow threaded channel **64** of the hinge **66**.

Alternatively, the kit **65** comprises; a screw **13**, depicted in Figs 2A, 2B, and Figs. 3A, 3B. The screw **13** comprises: a screw head **50** and an elongated stem **14**.

The elongated stem **14** comprises a threaded first portion **42** physically and mechanically non-releasably coupled to the second surface **48** of the screw head **50** without the non-threaded second portion **30**, depicted in Figs. 1A, B extending from the threaded first portion **42** and a second breakaway **43**. The second breakaway **43** releasably couples the first surface **44** of the screw head **50** to a breakaway tab **45**. The threaded first portion **42** of the elongated stem **11** has caught at least one thread **63** of the hollow threaded channel **64** of the hinge **66**, by threading the threads **67** of the threaded first portion **20** of the elongated stem **11** with the threads **63** of the hollow threaded channel **64**.

In all preferred embodiments, the proximal end **E** of the threaded first portion **42** and the second surface **48** of the screw head **50** are mechanically and physically non-releasably coupled.

In one embodiment, the breakaway tab **45** extends along a longitudinal axis of the screw **13**, away from the first surface **44** of the screw head **50**.

Fig. 5 depicts a top plan view of a screw **85** having a screw head **86**. The screw head **86** has a first surface **80** and a driver slot **81**, therein. The screw head **86** is releasably coupled to a breakaway tab **84**, having a breakaway **83** therebetween. The breakaway tab **84** has a first surface **79**, and the first surface **79** may be coplanar with the first surface **80** of the screw head **86**.

Figs. 6A – 6C depict a flow diagram of a method **90** of replacing a screw **10**, **13** in a hinge **66**, depicted in Fig. 4, and described in associated text and depicted in Figs. 2A.-3B, and described in associated text. In a step **92** of the method **90**, a hinge **66** is provided. In the step **92** of providing the hinge **66**, first and second

straps **60**, **61** may be pivotably coupled to a cylinder **62**. The cylinder **62** has a hollow threaded channel **64** therein;

In a steps **96** and **98** a screw **10**, **13** is provided. The screw **10**, **13** comprises: a head **15**, **50**; an elongated stem **11**,**14**.

In the steps **96**, **98** the elongated stem **11**, **14** comprises: either a threaded first portion **20**, **42** adjacent to the head **15**, **50**; and a non-threaded second portion **30**, extending from the threaded first portion **20**, **42**; and a first breakaway **25** therebetween, wherein the first breakaway **25** releasably couples the non-threaded second portion **30** to the distal end **C** of the threaded first portion **20**, or
a threaded first portion **42** adjacent to the head **50** without the non-threaded second portion **30** extending from the threaded first portion **42** and a second breakaway **43**, wherein the second breakaway **43** releasably couples the first surface **44** of the screw head **50** to a breakaway tab **45**;

In a step **100** of the method **90**, the non-threaded second portion **30** of the elongated stem **11** may be inserted into the hollow threaded channel **64** in the hinge **66** so that the non-threaded second portion **30** of the elongated stem **11** extends out of the hollow threaded channel **64** of the hinge **66**.

Alternatively, in the step **102** of the method **90**, the threaded first portion **42** of the elongated stem **14** may be inserted into the hollow threaded channel 64 in the hinge **66** by a user manipulating the insertion using the breakaway tab **45**.

In a step **104** of the method **90**, the threaded first portion **20**, **42** of the elongated stem **11**, **14** may be aligned with the threads **63** of the hollow threaded channel **64** of the hinge **66**.

In a step **106** of the method **90**, the first threaded portion **20**, **42** of the elongated stem **11**, **14** may be screwed into the hollow threaded channel **64** of the hinge **66** by rotating the threaded first portion **20**, **42** of the elongated stem **11**, **14** that has been aligned with the threads **63** of the threaded hollow channel **64** of the hinge **66**.

In one embodiment of the step **102** of the method **90**, the breakaway tab **45** extends along a longitudinal axis of the screw **13**, away from the first surface **44** of the screw head **50**.

In one embodiment of the step **102** of the method **90**, a first surface **79** of the breakaway tab **84** and a first surface **80** of the screw head **86** are coplanar, depicted in Fig. 5, and described in associated text.

In one embodiment of the step **106** of the method **90**, a user may turn the breakaway tab **45** about its longitudinal axis to rotate the screw **13**, wherein the breakaway tab **45** is releasably coupled to the first surface **44** of the screw head **50** by the second breakaway **43**.

In one embodiment of the step **106** of the method **90**, the breakaway tab **45**, **84** is broken off from the first surface **44** of the screw head **50** at the second breakaway **43**, or at the second breakaway **83**, after the threaded first portion **42** of the elongated stem **14** catches at least one thread **63** of the threaded hollow channel **64** of the hinge **66**.

In one embodiment of the step **106** of the method **90**, the non-threaded second portion **30** of the elongated stem **11** is broken off at the first breakaway **25** from the threaded first portion **20** of the elongated stem **11** after the threaded first

portion **20** of the elongated stem is essentially completely screwed into the threaded hollow channel **64** of the hinge **66**.

In one embodiment of the step **102** of the method **90**, inserting the non-threaded second portion **30** of the elongated stem **11** into the hollow threaded channel **64** in the hinge **66** so that the non-threaded second portion **30** of the elongated stem **11** extends out of the hollow threaded channel **64** of the hinge **66**, by a user pulling the non-threaded second portion **30** of the elongated stem **11**.

In one embodiment of the step **106** of the method **90**, a user removes the non-threaded second portion **30** from the elongated stem **11** of the screw **10** after catching at least one thread **63** of the hollow threaded channel **64** of the hinge **66**.

one embodiment of the step **106** of the method **90**, the breakaway tab **45** extends along a longitudinal axis of the screw **13**, away from the first surface **44** of the screw head **50** when the breakaway tab **45** is broken off from the first surface **44** of the screw head **50** at the second breakaway **43**, after the threaded first portion **42** of the elongated stem **14** catches at least one thread **63** of the threaded hollow channel **64** of the hinge **66**.

The description of the embodiments of the present invention is given above for the understanding of the present invention. It will be understood that the invention is not limited to the particular embodiments described herein, but is capable of various modifications, rearrangements and substitutions as will now become apparent to those skilled in the art without departing from the scope of the invention. Therefore, it is intended that the following claims cover all such modifications and changes as fall within the true spirit and scope of the invention.

I claim:

1. A screw adapted to be manipulated by hand by a user when using the screw as a fastener in a screw hole (100), comprising:

a head (15), comprising:

a first surface (19) having a driver slot (17) thereon, and a second surface (18),

wherein the second surface (18) of the head (15) faces away from the first surface (19);

an elongated stem (11), comprising:

a threaded first portion (20) and a non-threaded second portion (30) extending from the distal end (C) of the threaded first portion (20) and a breakaway (25) therebetween,

wherein a proximal end (A) of the threaded first portion is mechanically and physically coupled to the second surface of the head,

wherein the physical coupling between the second surface of the head and the proximal end (A) of the threaded first portion is not a breakaway,

wherein the breakaway releasably couples the non-threaded second portion to the distal end (C) of the threaded first portion,

wherein the diameter (W3) of the non-threaded second portion is smaller than the diameter (W2) of the threaded first portion of the elongated stem (11),

wherein the screw (10) is adapted to be manipulated by hand by a user, so the non-threaded second portion breaks off at the breakaway and is discarded by the non-threaded second portion (30), said non-threaded second porition (30) having a length (L_2-L_1) equal to or greater than a length (L_1) of the threaded first portion (20) for first insertion of the non-threaded second portion (30) into the screw hole (100), and

wherein upon insertion of the non-threaded second portion (30) into the screw hole (100) at least the distal end (B) of the non-threaded second portion extends out of the screw hole.

2. The screw of claim 1, wherein a ratio of the length (L_1) of the threaded first portion (20) to the length (L_2-L_1) of the non-threaded second portion (30) is from about 1:1 to about 0.775:1.

3. The screw of claim 1, wherein the diameter of the breakaway (25) is less than or equal to 0.015 in., when the diameter of the elongated stem is essentially equal to 0.040 in.

4. The screw of claim 1, wherein the screw head is a slotted undercut oval countersunk head.

5. The screw of claim 1, wherein the threaded first portion has a 6-32 UNF thread (major diameter 0.1380 in., 3.5052 mm 32 tpi), wherein conventional UNC or UNF thread is a 60 degree thread.

6. The screw of claim 1, wherein the diameter of the breakaway (25) is less than or equal to 0.015 in (0.38 mm).

7. The screw of claim 1, wherein the length of the first threaded portion is from about 0.3375 in. to about 0.4125 in. (8.6-10.5 mm) and the length of the second non-threaded portion is from about .6973 in. to about 0.8525 in. (18-21.7mm).

8. The screw of claim 1, which is of metal or alloy.

9. The screw of claim 8, which is of stainless steel.

10. The screw of claim 1, which is of carbon steel, brass, nickel silver or titanium.

11. The screw of claim 1, wherein the first surface has a driver formation which is a single groove, a cross-shaped groove or is hexagonal for turning with a hex wrench.

12. A hinge (66) comprising first and second straps (60, 61) pivotably coupled to a cylinder (62) having a hollow threaded channel (64) therein, and a screw (10) as defined in any one of claims 1 to 11 having its non-threaded second portion (30) aligned with the hollow threaded channel (64) and inserted into the hollow threaded channel so that the threaded first portion (20) of the elongated stem (11) catches at least one of the threads (63) and the non-threaded second portion (30) of the stem extends out of the hollow threaded channel (64) of the hinge.

13. The hinge of claim 12, which is of metal or alloy.

14. The hinge of claim 13, which is of stainless steel.

15. The hinge of claim 12, which is of carbon steel, brass, nickel silver or titanium.

16. A method of inserting a screw (10) into a screw hole (100), comprising:

providing a screw hole (100);

providing a screw (10), comprising:

a head;

an elongated stem comprising:

a threaded first portion (20) adjacent to the head; and

a non-threaded second portion (30) extending from the threaded first portion (20); and

a breakaway (25) therebetween,

wherein the breakaway (25) releasably couples the non-threaded second portion (30) to the distal end (C) of the threaded first portion (20), and

wherein the diameter (W2) of the non-threaded second portion (30) is smaller than the diameter (W2) of the threaded first portion (20) of the elongated stem (11);

inserting the non-threaded second portion (30) of the elongated stem (11) into the screw hole (100);

extending the non-threaded second portion (30) of the elongated stem (11) out of the screw hole (100);

screwing the screw (10) into the screw hole (100);

removing the non-threaded second portion (30) on complete insertion of the screw (10) into the screw hole (100) by manipulating the non-threaded second portion (30) of the elongated stem (11) by a user by hand, resulting in breaking or cleaving the breakaway (25).

17. The method of inserting a screw into a screw hole (100) of claim 16, wherein the non-threaded second portion of the elongated stem is broken off at the first breakaway from the threaded first portion of the elongated stem after the threaded first portion of the elongated stem is essentially completely screwed into the screw hole (100).

18. The method of claim 16, wherein a ratio of the length of the threaded first portion to the non-threaded second portion is from about 1:1 to about 0.775:1.

19. The method of claim 16, wherein insertion of the non-threaded portion of the elongated stem so that it extends out of the hollow threaded channel comprises a user manipulating said non-threaded second portion (30) by hand.

20. The method of claim 16, comprising the step of providing a hinge comprising first and second straps (60, 61) pivotably coupled to a cylinder (62) having a hollow threaded channel (64) therein, said hollow threaded channel being said screw hole.

21. The method of claim 20, wherein the hinge is of metal or alloy.

22. The method of claim 21 wherein the hinge is of stainless steel.

23. The method of claim 20, wherein the hinge is of carbon steel, brass, nickel silver or titanium.

24. The method of claim 20, wherein insertion of the non-threaded portion of the elongated stem so that it extends out of the hollow threaded channel comprises a user manipulating said non-threaded second portion (30) by hand.

25. A kit, having a screw (10) adapted to be manipulated by hand by a user when using the screw as a fastener in a screw hole (100), comprising:

a hinge comprising first and second straps (60, 61) pivotably coupled to a cylinder (62) having a hollow threaded channel (64) therein;

said screw, comprising:

a head;

an elongated stem, comprising:

a threaded first portion adjacent to the head and a non-threaded second portion extending from the threaded first portion and a breakaway therebetween,

wherein the breakaway releasably couples the first threaded portion of the elongated stem to the non-threaded second portion of the elongated stem,

wherein the proximal end of the threaded first portion and the second surface of the screw head are non-releasably coupled,

wherein the diameter of the non-threaded second portion is smaller than the diameter of the threaded first portion of the elongated stem,

wherein at least the distal end of the non-threaded second portion extends out of the threaded channel of the hinge, and

wherein the screw (10) is adapted to be manipulated by the non-threaded second portion (30) by hand by a user, so the non-threaded second portion breaks off at the breakaway and is discarded, said non-threaded second porition (30) having a length (L_2-L_1) equal to or greater than a length (L_1) of the threaded first portion (20) for first insertion of the non-threaded second portion (30) into the threaded channel of the hinge, and

wherein upon insertion of the non-threaded second portion (30) into the screw hole (100) at least the distal end (B) of the non-threaded second portion extends out of the threaded channel of the hinge. .

26. The kit of claim 25, wherein the hinge is made of a metal or metal alloy selected from the group of metals or metal alloys consisting of nickel, brass, stainless steel or titanium.

27. A method of guiding a screw (10) into a screw hole (100), comprising:

providing a screw hole (100);

providing a screw (10), comprising:

a head;

an elongated stem comprising:

a threaded first portion (20) adjacent to the head; and

a non-threaded second portion (30) extending from the threaded first portion (20); and

a breakaway (25) therebetween,

wherein the breakaway (25) releasably couples the non-threaded second portion (30) to the distal end (C) of the threaded first portion (20), and

wherein the diameter (W2) of the non-threaded second portion (30) is smaller than the diameter (W2) of the threaded first portion (20) of the elongated stem (11);

aligning the non-threaded second portion (30) of the elongated stem (11) with the screw hole (100);

extending the non-threaded second portion (30) of the elongated stem (11) out of the screw hole (100);

screwing the screw (10) into the screw hole (100);

removing the non-threaded second portion (30) on complete insertion of the screw (10) into the screw hole (100) by manipulating the non-threaded second portion (30) of the elongated stem (11) by a user by hand, resulting in breaking or cleaving the breakaway (25).

28. The method of claim 27, wherein the non-threaded second portion of the elongated stem is broken off at the first breakaway from the threaded first portion of the elongated stem after the threaded first portion of the elongated stem is essentially completely screwed into the screw hole (100).

29. The method of claim 27, wherein a ratio of the length of the threaded first portion to the non-threaded second portion is from about 1:1 to about 0.775:1.

30. The method of claim 27, comprising the step of providing a hinge comprising first and second straps (60, 61) pivotably coupled to a cylinder (62) having a hollow threaded channel (64) therein, said hollow threaded channel being said screw hole.

31. The method of claim 30, wherein the hinge is of metal or alloy.

32. The method of claim 31, wherein the hinge is of stainless steel.

33. The method of claim 30, wherein the hinge is of carbon steel, brass, nickel silver or titanium.

34. The method of claim 27, wherein insertion of the non-threaded portion of the elongated stem so that it extends out of the hollow threaded channel comprises a user manipulating said non-threaded second portion (30) by hand.

Nancy Tedeschi

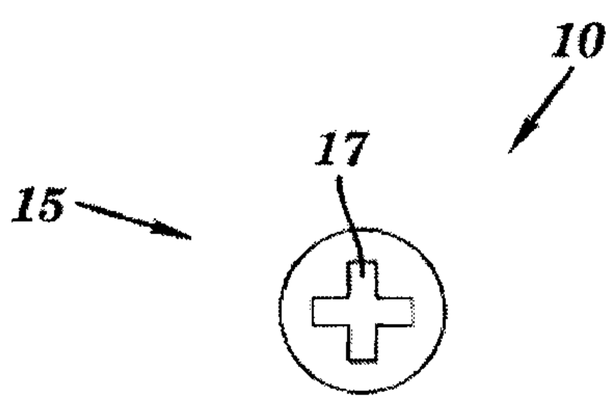


FIG. 1A

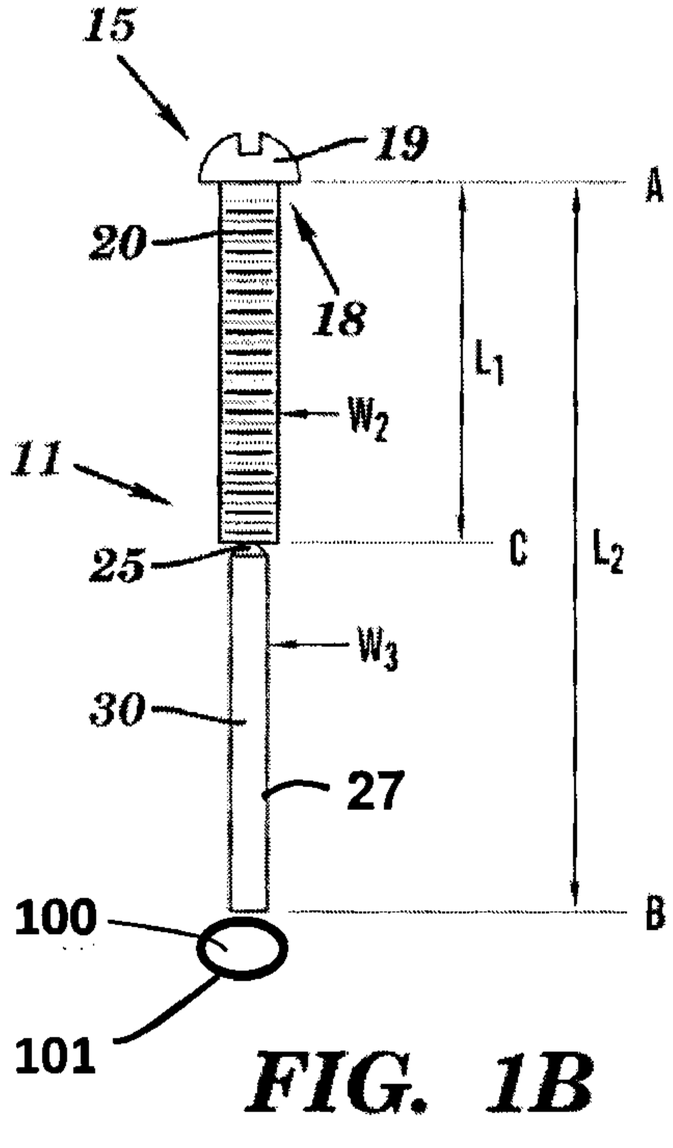


FIG. 1B

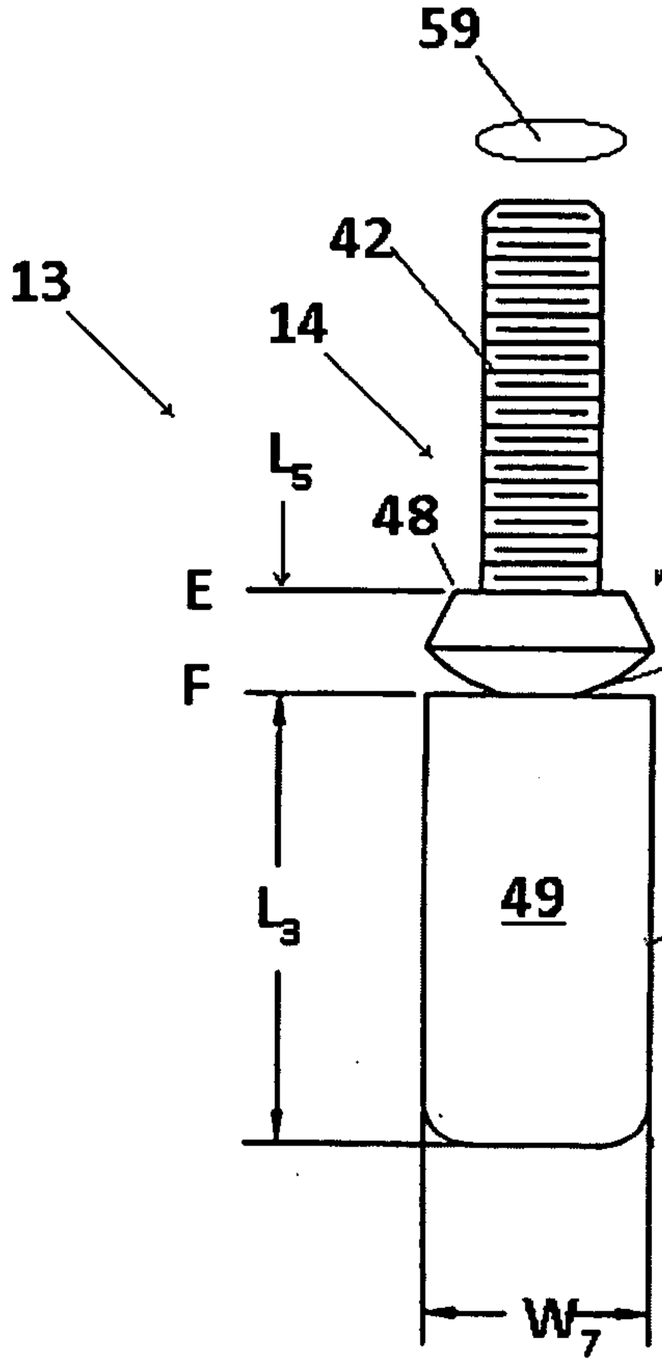


Fig. 2A

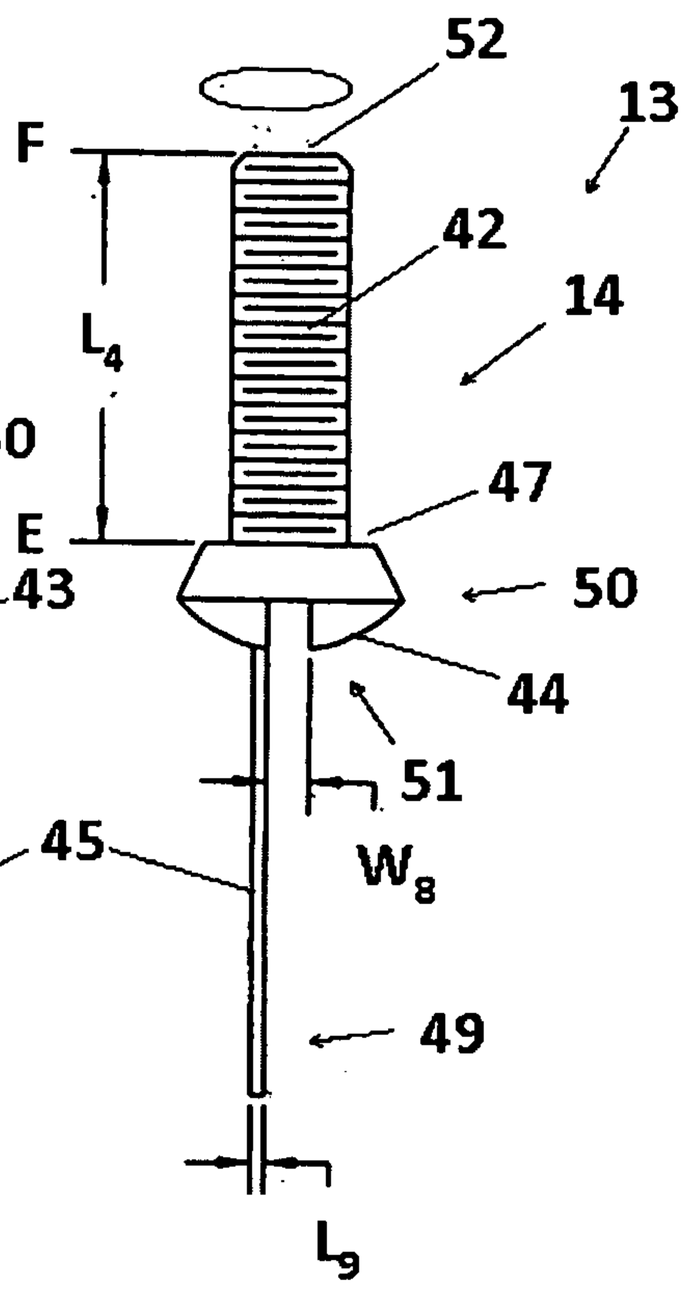


Fig. 3A

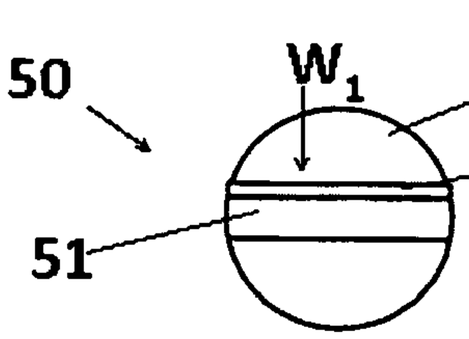


Fig. 2B

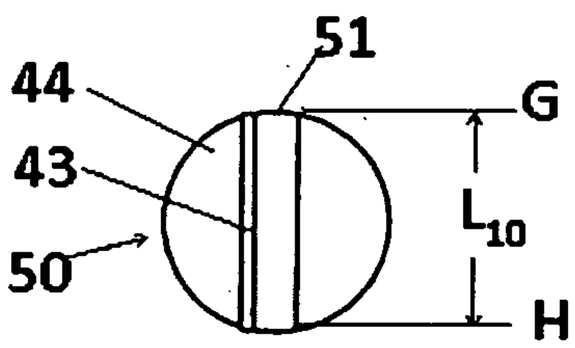


Fig. 3B

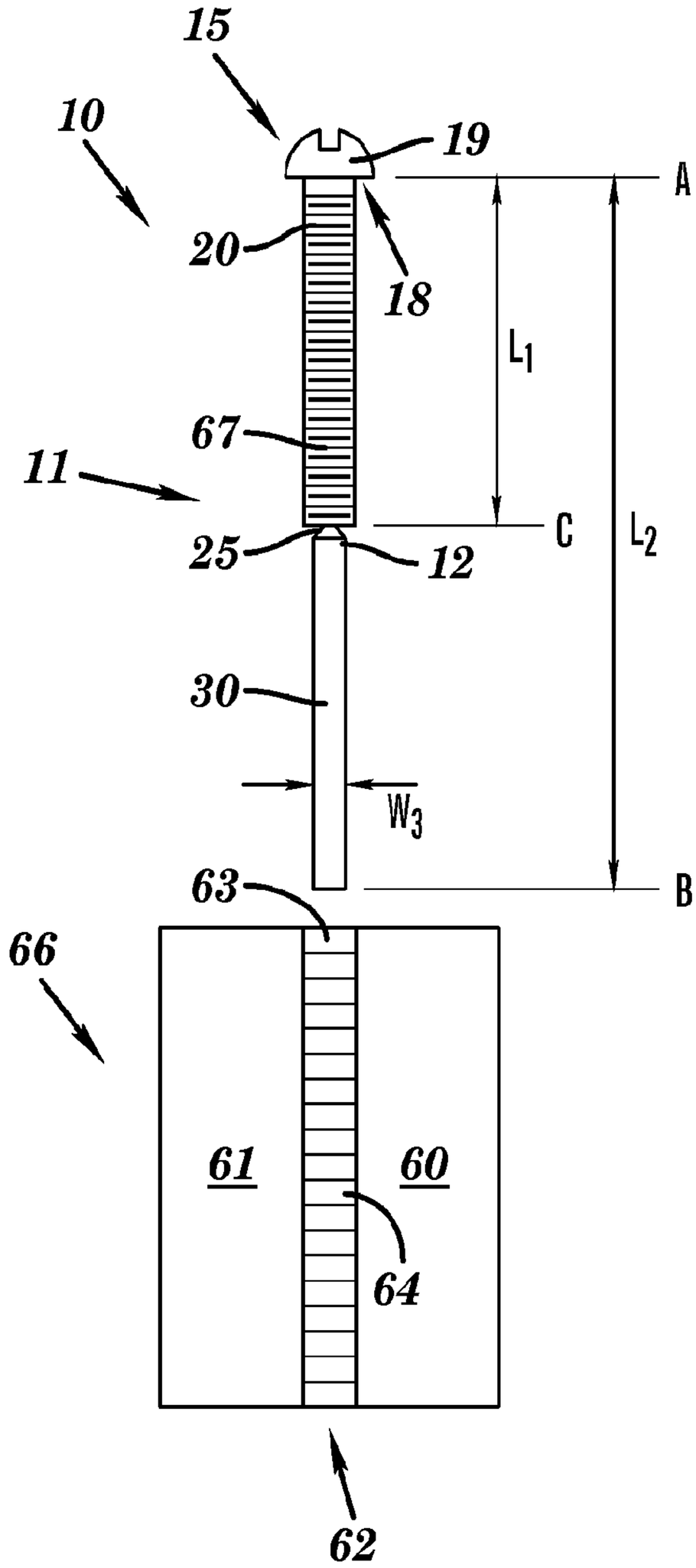


FIG. 4

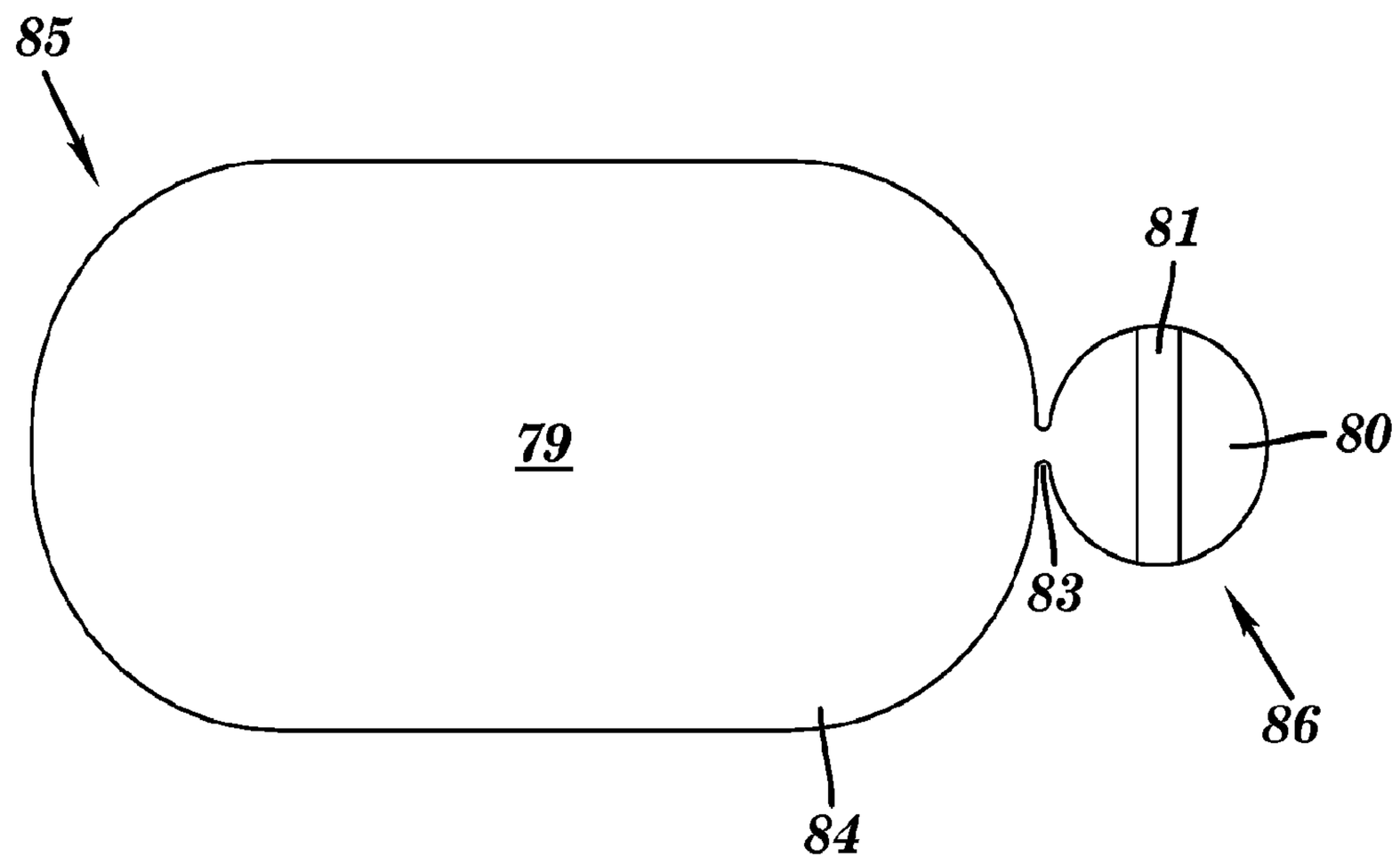


FIG. 5

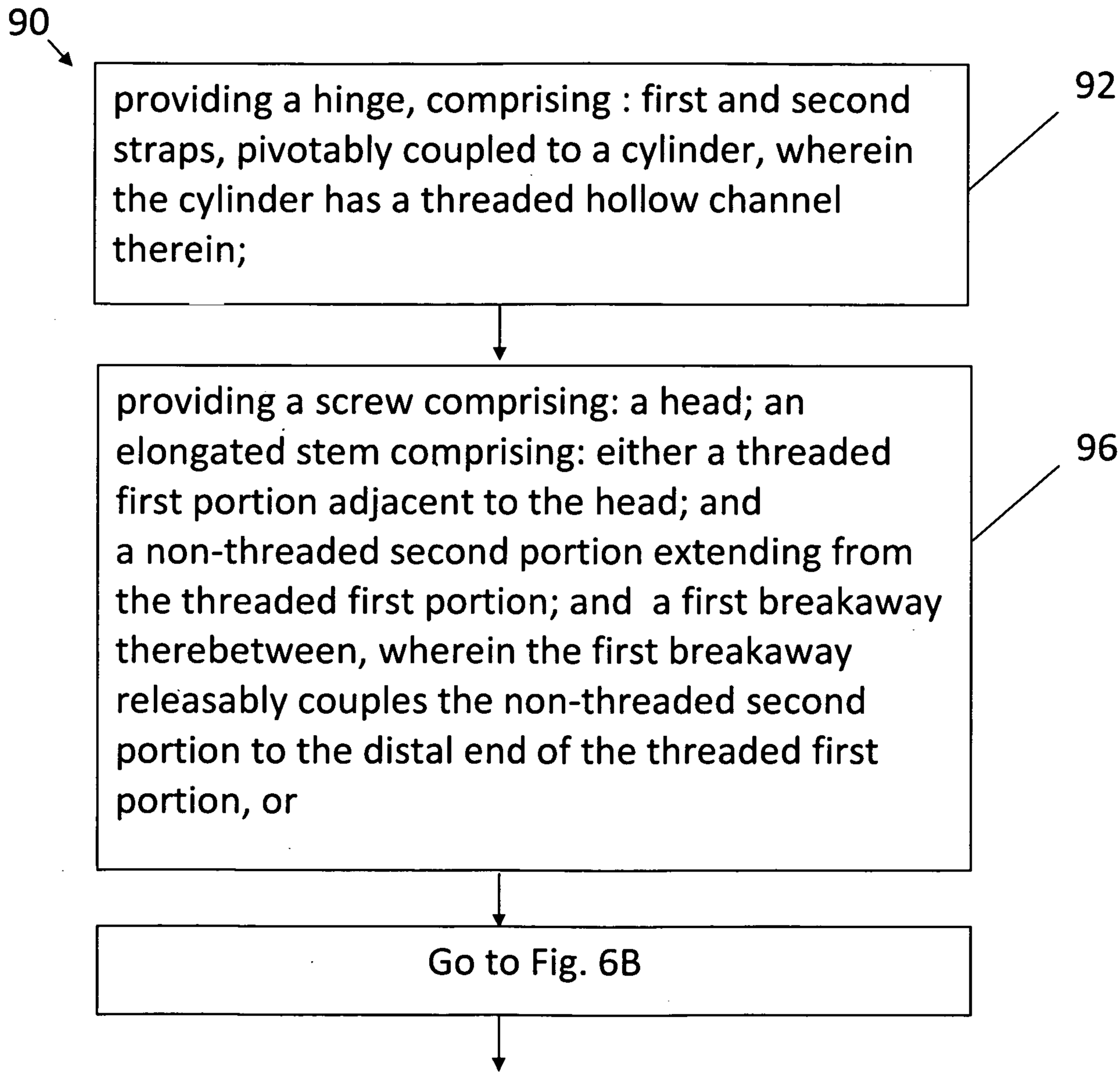

90
providing a hinge, comprising : first and second straps, pivotably coupled to a cylinder, wherein the cylinder has a threaded hollow channel therein;
92
providing a screw comprising: a head; an elongated stem comprising: either a threaded first portion adjacent to the head; and
a non-threaded second portion extending from the threaded first portion; and a first breakaway therebetween, wherein the first breakaway releasably couples the non-threaded second portion to the distal end of the threaded first portion, or
96
Go to Fig. 6B

Fig. 6A

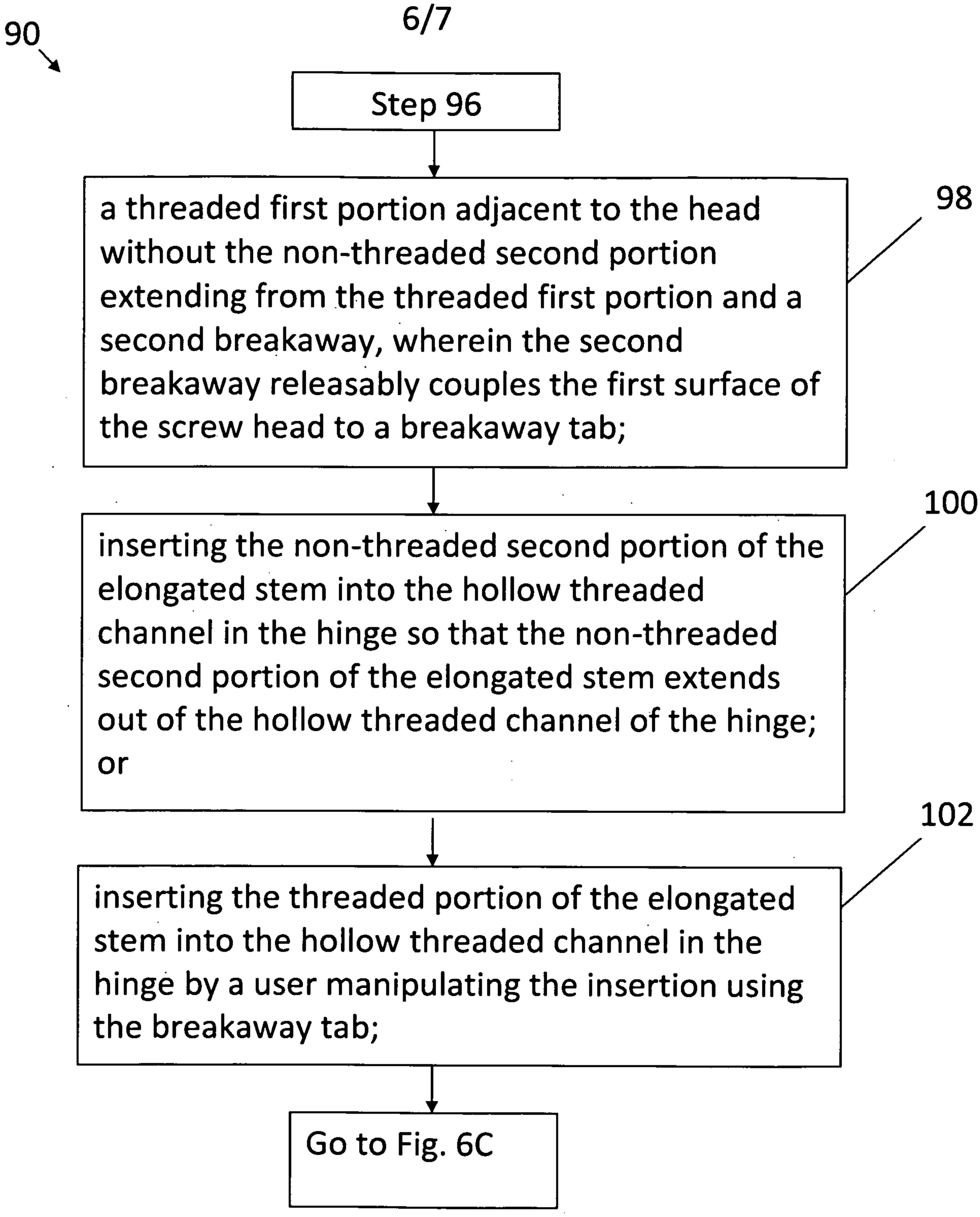

90
Step 96
a threaded first portion adjacent to the head without the non-threaded second portion extending from the threaded first portion and a second breakaway, wherein the second breakaway releasably couples the first surface of the screw head to a breakaway tab;
98
inserting the non-threaded second portion of the elongated stem into the hollow threaded channel in the hinge so that the non-threaded second portion of the elongated stem extends out of the hollow threaded channel of the hinge; or
100
inserting the threaded portion of the elongated stem into the hollow threaded channel in the hinge by a user manipulating the insertion using the breakaway tab;
102
Go to Fig. 6C

Fig. 6B

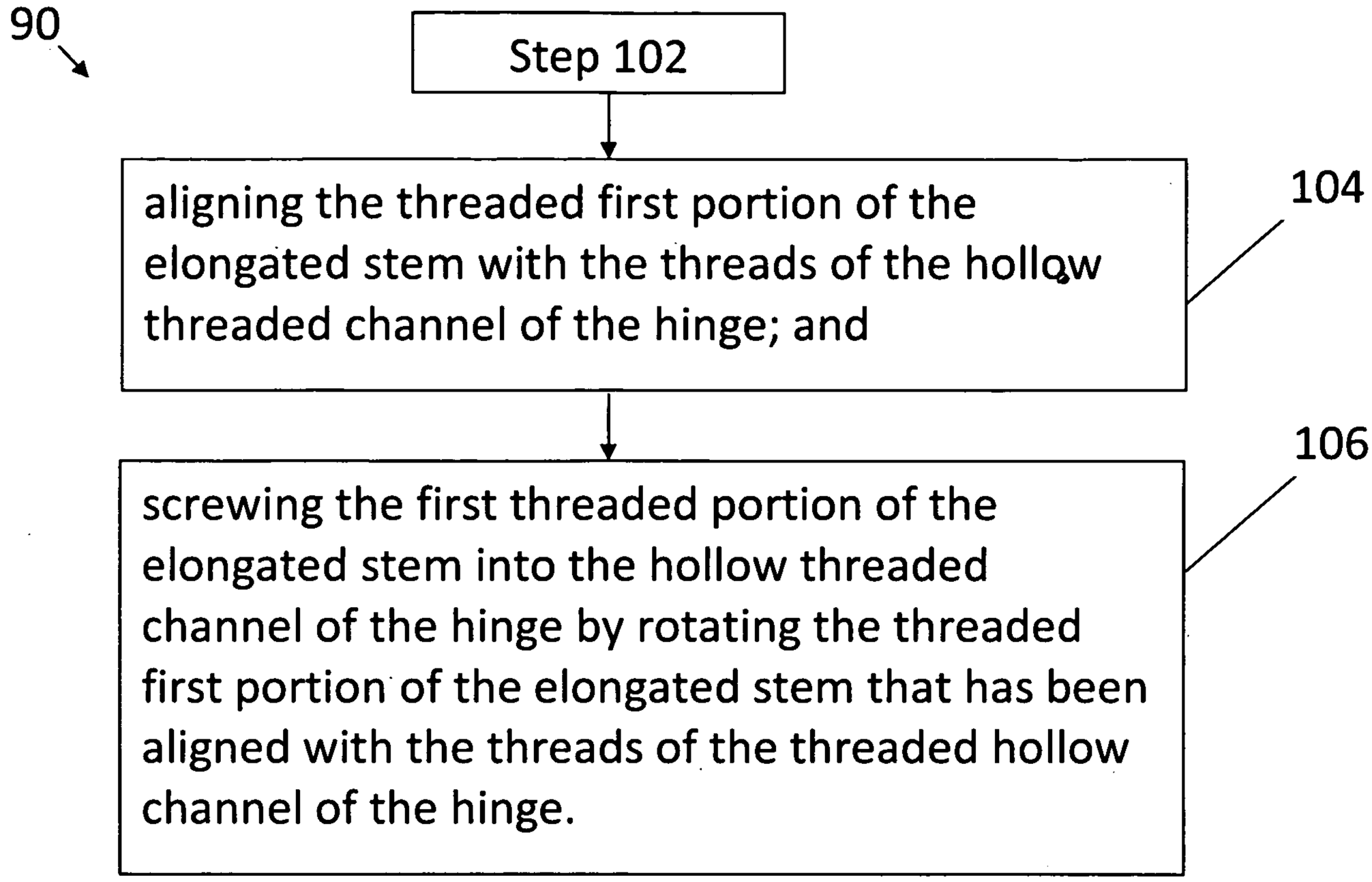
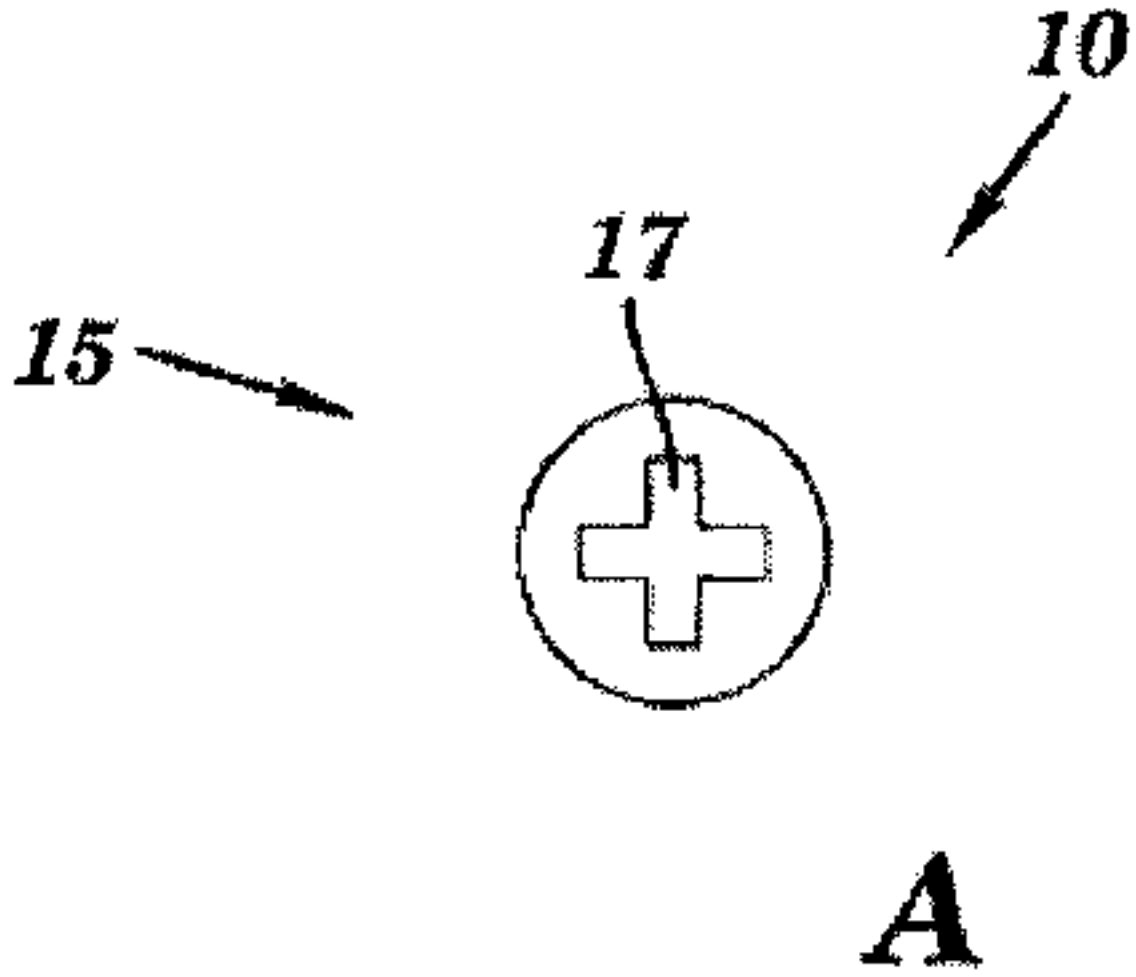
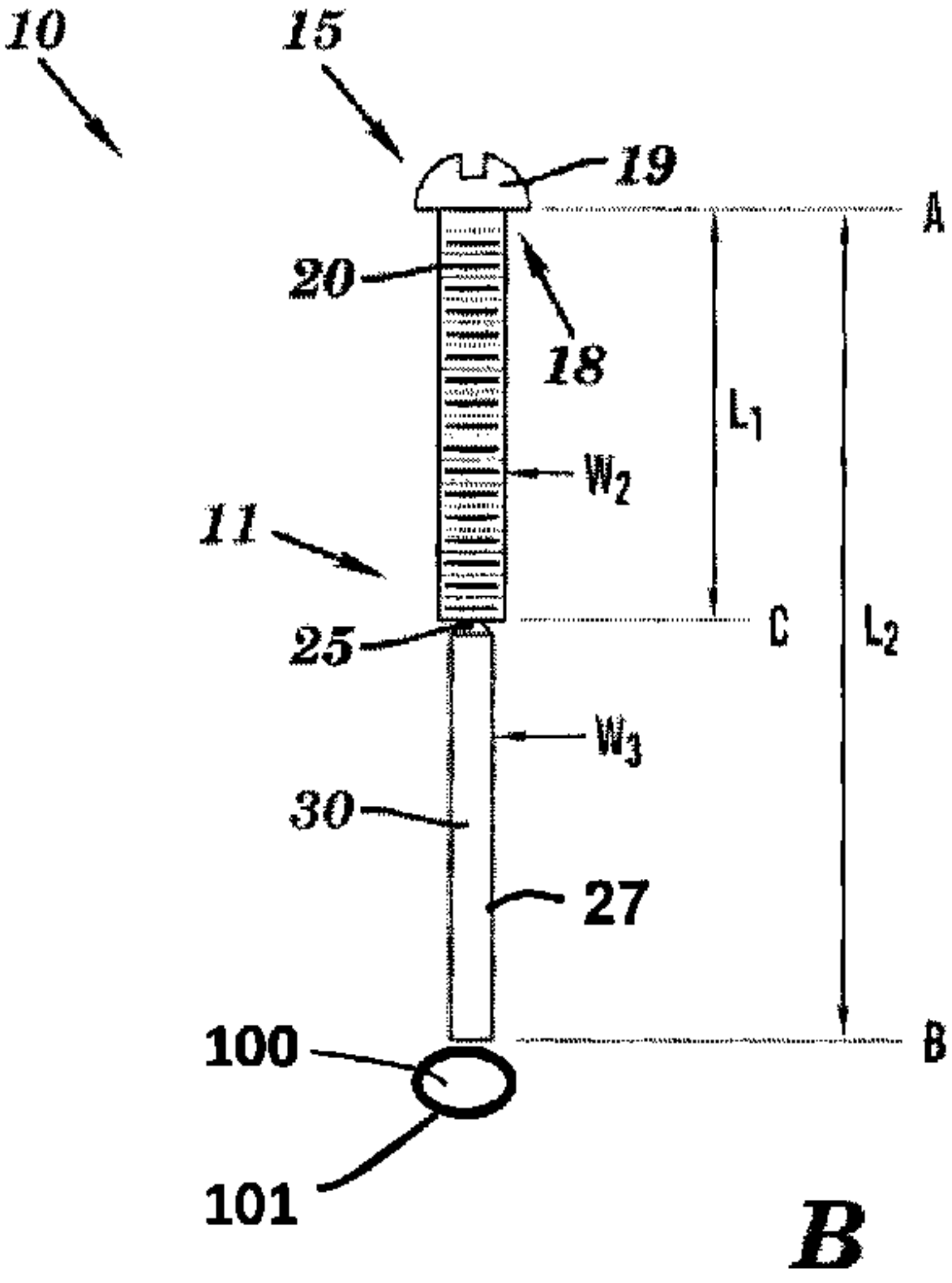

90
Step 102
aligning the threaded first portion of the elongated stem with the threads of the hollow threaded channel of the hinge; and
104
screwing the first threaded portion of the elongated stem into the hollow threaded channel of the hinge by rotating the threaded first portion of the elongated stem that has been aligned with the threads of the threaded hollow channel of the hinge.
106

Fig. 6C



A



B