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(72) Inventeur/Inventor:
HECHT, GIL, IL

(73) Propriétaire/Owner:
ISCAR LTD., IL

(74) Agent: WILSON LUE LLP

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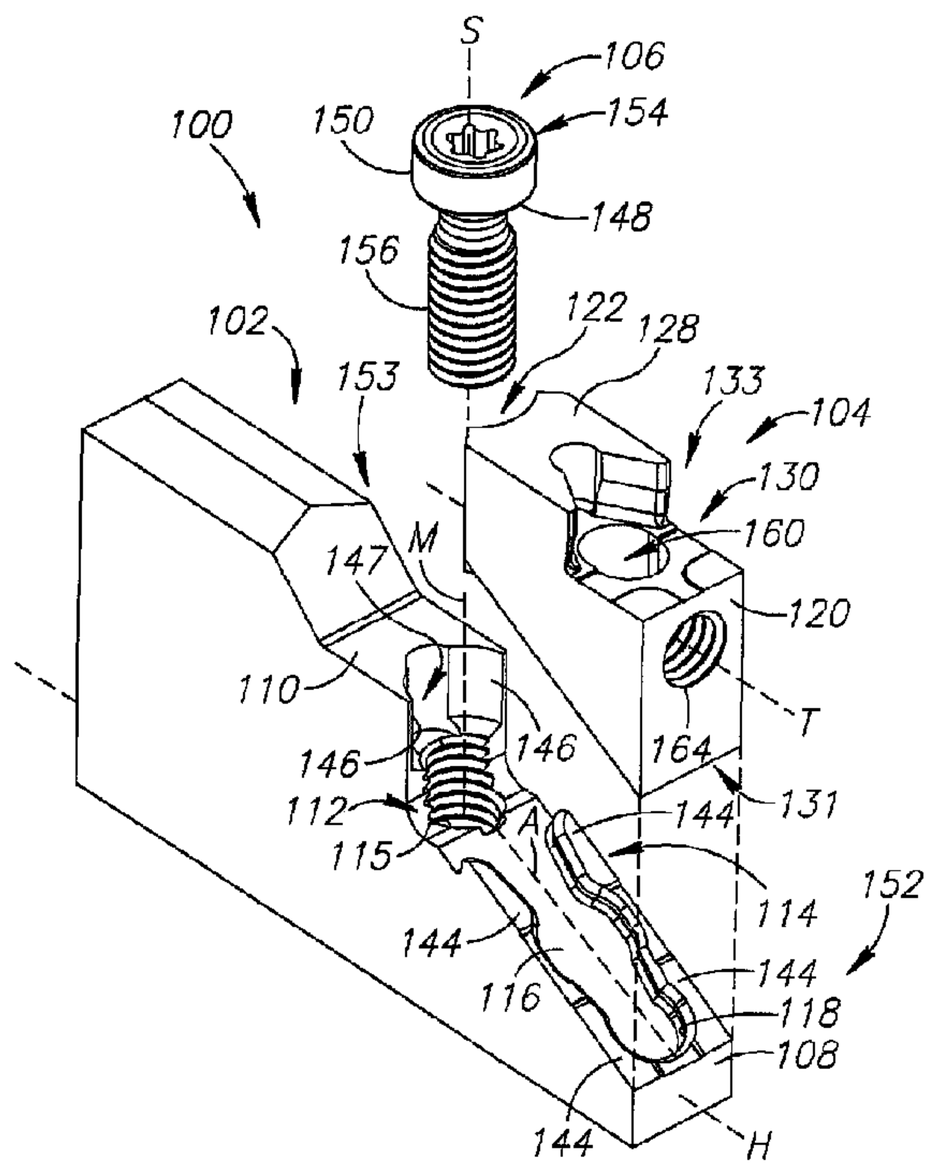


(57) Abrégé/Abstract:
A cutting tool assembly (100, 200, 300) has a tool holder (102, 202, 302), a tool head (104, 204, 304) and a tool head fastening member. The tool holder has a holder mating surface (114, 314) and a holder clamping portion (112) spaced apart in the rearward direction from the holder mating surface (114, 314). The tool head (104, 204, 304) is provided with a tool head mating surface (132, 316) and a tool head clamping recess (124). In an assembled position of the cutting tool assembly (100, 200, 300) the tool head mating surface (132, 316) forms a dovetail connection with the holder mating surface (114,314) and the tool head fastening member (106) clamps the tool head clamping recess (124), thereby externally clamping the tool head (104, 204, 304) to the tool holder (102, 202,302).

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(71) Applicant: **ISCAR LTD.** [IL/IL]; P.O. Box 11, 24959 Tefen (IL).

(72) Inventor: **HECHT, Gil**; 30/18 Ahad Ha'am Street, 22443 Nahariya (IL).

(74) Agent: **Iscar LTD., Patent Department**; P.O. Box 11, 24959 Tefen (IL).

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*[Continued on next page]*

(54) Title: CUTTING TOOL ASSEMBLY WITH REMOVABLE TOOL HEAD

(57) Abstract: A cutting tool assembly (100, 200, 300) has a tool holder (102, 202, 302), a tool head (104, 204, 304) and a tool head fastening member. The tool holder has a holder mating surface (114, 314) and a holder clamping portion (112) spaced apart in the rearward direction from the holder mating surface (114, 314). The tool head (104, 204, 304) is provided with a tool head mating surface (132, 316) and a tool head clamping recess (124). In an assembled position of the cutting tool assembly (100, 200, 300) the tool head mating surface (132, 316) forms a dovetail connection with the holder mating surface (114,314) and the tool head fastening member (106) clamps the tool head clamping recess (124), thereby externally clamping the tool head (104, 204, 304) to the tool holder (102, 202,302).

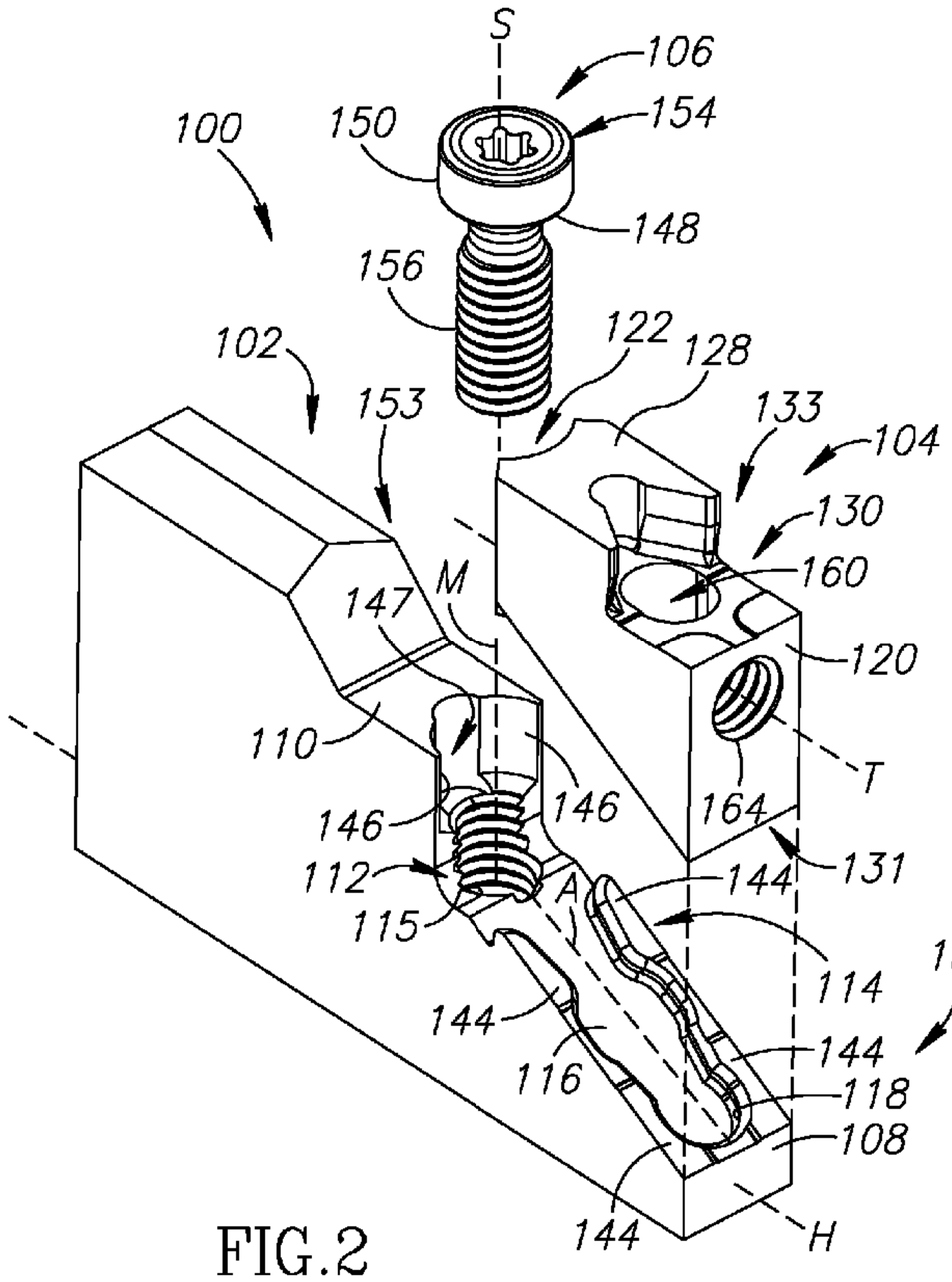


FIG.2

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# CUTTING TOOL ASSEMBLY WITH REMOVABLE TOOL HEAD

## FIELD OF THE INVENTION

[001] The present invention relates to cutting tool assemblies, for metal cutting processes in general, and to cutting tool assemblies with a removable tool head for holding a cutting insert employed in turning and grooving operations, in particular.

## BACKGROUND OF THE INVENTION

[002] Cutting tools may have a holder and a releasable tool head with an insert pocket for holding a cutting insert. The cutting insert is usually formed of a hard material, such as cemented carbide. The releasable tool head is removably attached to the holder, by an attachment element. Such attachment element is usually a screw which passes through a pre-formed through hole in the releasable tool head and engages a corresponding threaded hole formed in the holder body. Examples of such cutting tools are disclosed in US3289273, US3500523, US4057884, US4066376, US5555784, US6702526, US7086812, US7118311, US7240593, US7578640 and US2010/0254774.

[003] It is an object of the subject matter of the present application to provide an improved novel cutting tool assembly with a removable tool head for holding a cutting insert, wherein the tool head does not require a through hole for clamping to the holder.

## SUMMARY OF THE INVENTION

[004] In accordance with the subject matter of the present application, there is provided a cutting tool assembly, comprising

a tool holder having a longitudinal holder axis extending in a rearward to forward direction, the tool holder including a holder front end, a holder top end, a holder mating surface extending therebetween, and a holder clamping portion spaced apart in the rearward direction from the holder mating surface;

a tool head having a longitudinal tool head axis extending in the rearward to forward direction, a tool head bottom end provided with a tool head mating surface, and a

tool head clamping recess extending upwards from the tool head bottom end, and spaced apart in the rearward direction from the tool head mating surface; and

a tool head fastening member;

wherein in an assembled position of the cutting tool assembly:

the tool head mating surface forms a dovetail connection with the holder mating surface; and

the tool head fastening member clamps the tool head clamping recess, thereby externally clamping the tool head to the tool holder.

Further in accordance with the subject matter of the present application, there is provided a cutting tool comprising the cutting tool assembly according to the above, in the assembled position, wherein:

the tool head top end is provided with an insert pocket; and

a cutting insert is retained in the insert pocket.

In accordance with the subject matter of the present application, there is also provided a tool head having a longitudinal tool head axis extending in the rearward to forward direction, and comprising:

a tool head top end provided with an insert pocket;

a tool head bottom end provided with a tool head mating surface including a plurality of tool head mating sidewalls; and

a tool head rearward surface provided with a tool head clamping recess which extends upwards from the tool head bottom end to the tool head top end and is spaced apart in the rearward of the tool head mating surface; wherein:

the tool head mating surface is tilted by a tilt angle relative to tool head axis.

## BRIEF DESCRIPTION OF THE FIGURES

[005] For a better understanding of the present application and to show how the same may be carried out in practice, reference will now be made to the accompanying drawings, in which:

**Fig. 1** is a perspective view of a cutting tool, in accordance with an embodiment of the disclosed technique, in an assembled position;

**Fig. 2** is a perspective view of a cutting tool assembly of the cutting tool of Figure 1, in a disassembled position;

**Fig. 3** is a bottom perspective view of a removable tool head of the cutting tool assembly of Figure 2;

**Fig. 4** is a bottom plan view of the head mating surface of the removable tool head of Figure 3;

**Fig. 5** is a plan view of the holder mating surface of the tool holder of the cutting tool assembly of Figure 2;

**Fig. 6** is a top view of the cutting tool assembly of Figure 2, in an assembled position;

**Fig. 7** is a cross sectional view of the cutting tool assembly of Figure 6, according to the line VII-VII;

**Fig. 8** is a cross sectional view of the cutting tool assembly of Figure 6, according to the line VIII-VIII;

**Fig. 9** is a cross sectional view of the tool holder of Figure 5, according to the line IX-IX;

**Fig. 10** is a cross sectional view of the tool head of Figure 4, according to the line X-X;

**Fig. 11** is a perspective view of a cutting tool assembly according to another embodiment of the present invention, in a disassembled position;

**Fig. 12** is a bottom perspective view of the tool head of the cutting tool assembly of Figure 11;

**Fig. 13** is a bottom plan view of the head mating surface of the tool head of Figure 12;

**Fig. 14** is a plan view of the holder mating surface of the tool holder of the cutting tool assembly of Figure 11;

**Fig. 15** is a perspective view of a cutting tool assembly according to yet another embodiment of the present invention, in a disassembled position;

**Fig. 16** is a bottom perspective view of the tool head of the cutting tool assembly of Figure 15;

**Fig. 17** is a bottom plan view of the head mating surface of the tool head of Figure 16; and

**Fig. 18** is a plan view of the holder mating surface of the tool holder of the cutting tool assembly of Figure 15.

[006] It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity, or several physical components may be included in one functional block or element. Further, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements.

## DETAILED DESCRIPTION OF THE INVENTION

[007] In the following description, various aspects of the subject matter of the present application will be described. For purposes of explanation, specific configurations and details are set forth in sufficient detail to provide a thorough understanding of the present invention. However, it will also be apparent to one skilled in the art that the subject matter of the present invention can be practiced without the specific configurations and details presented herein.

[008] Attention is first drawn to Fig. 1 depicting a cutting tool **101** according to an embodiment of the present invention, in an assembled position. The cutting tool **101** comprises a cutting tool assembly **100** and a cutting insert **162**. The cutting tool assembly **100** comprises a tool holder **102**, a removable tool head **104**, and a tool head fastening member **106** for firmly clamping the removable tool head **104** to the tool holder **102**. The tool head **104** has an insert pocket **130**, for holding the cutting insert **162**, during metal cutting operations (e.g., turning or grooving).

[009] Reference is further made to Figure 2, which is a perspective view of the cutting tool assembly **100** of the cutting tool **101** of Figure 1, in a disassembled position. The tool holder **102** has a longitudinal holder axis **H** extending in a rearward $\mathbf{D_F}$ to forward $\mathbf{D_F}$ direction. The tool holder **102** has a front end **152** with a holder front surface **108** extending in the upward-downward direction **U**, **D** (i.e., substantially perpendicular to the holder axis **H**), and a holder top end **153** with a holder top surface **110**, extending substantially parallel to the holder axis **H**. A holder mating surface **114** extends between the holder front end **152** and the holder top end **153**, and a holder clamping portion **112** is formed rearwards of the holder mating surface **114**.

[0010] The holder clamping portion **112** extends along a clamping axis **M**, and has a threaded bore **115** and at least one forward-facing holder support surface **146**. According to some embodiments, the clamping axis **M** extends perpendicular to the holder axis **H**. The holder support surfaces **146** are located upwards from the threaded bore **115**, along the clamping axis **M**. According to some embodiments of the present invention (e.g., Figures 1 and 5), the holder clamping portion **112** includes two holder support surfaces **146**. The two holder support surfaces **146** lie on a common substantially circular arc **158**, the center of which is on the clamping axis **M**, but are separated by a rearwards release recess **147**. According to another embodiment of the disclosed technique (e.g., Figure 14), the holder clamping portion **112** includes a single support surface **146**, lying on a unitary circular arc **158**, with no release recess **147**.

[0011] The removable tool head **104** has a longitudinal tool head axis **T** extending in the rearward to forward directions $\mathbf{D_R}$, $\mathbf{D_F}$, and a tool head bottom end **131** having a tool head mating surface **132**. The tool head **104** includes a tool head front surface **120** and an opposite tool head rearward surface **122**, both extending in the upward to downward direction **U**, **D**. The tool head front and rearward surfaces **120**, **122** are distanced by a tool head length **L** (Figure 2).

[0012] The tool head rearward surface **122** has an external tool head clamping recess **124**, extending upwards from the tool head bottom end **131**. According to some embodiments, the tool head clamping recess **124** extends perpendicular to the tool head axis **T**. The tool head clamping recess **124** includes a clamping surface **126**, extending from the tool head rearward surface **122**. The tool head **104** includes a tool head top end **133**, provided with a tool head top surface **128** extending from the tool head rearward surface **122**, towards the insert pocket **130**. As seen in the figures, the external tool head clamping recess **124** extends upwards from the tool head bottom end **131** to the tool head top end **133**.

[0013] The holder mating surface **114** includes a beveled female portion **116**, partially limited by a plurality of holder mating sidewalls **140**. According to some embodiments, the holder mating sidewalls **140** may be connected by a unitary holder sidewall **118**, which diverges towards the holder clamping portion **112** (i.e., in the rearward direction $\mathbf{D_R}$).

[0014] The tool head mating surface **132** includes a male portion **134** projecting therefrom, partially limited by a plurality of tool head mating sidewalls **138**. According to some embodiments, the tool head mating sidewalls **138** are connected by a unitary tool head sidewall **136**, which diverges towards the tool head clamping recess **124**.

[0015] Reference is further made to Figures 3-5. In a respective plan view of the holder and tool head mating surfaces **114**, **132**, the holder and tool head mating sidewalls **140**, **138** exhibit mirror symmetry relative to a holder and a tool head mating axes **A**, **B**, respectively. The holder mating axis **A** is located along the female portion **116**, and the tool head mating axis **B** is located along the male portion **134**. The holder mating sidewalls **140** are transverse to the holder mating axis **A**, diverging away from the holder mating axis **A** towards the holder clamping portion **112**. Similarly, the tool head mating sidewalls **138** are transverse to the tool head mating axis **B**, diverging away from the tool head mating axis **B** towards the tool head clamping recess **124**.

[0016] A tool head abutment surface **135** extends on the tool head mating surface **132**, adjacent to the tool head mating sidewalls **138**, substantially parallel to the male portion **134**. The tool head mating sidewalls **138** conform in shape, size and orientation, to the holder mating sidewalls **140**, in order to allow firm abutment between the mating sidewalls **138**, **140** in the assembled position.

[0017] The holder mating surface **114** and the tool head mating surface **132** are tilted by a tilt angle **δ** relative to the holder axis **H** and the tool head axis **T**, respectively (as indicated in Figure 8). The tilt angle **δ** is an acute angle, typically in the range of 0-60°. It is noted that by being positioned in this tilt, the holder and tool head mating surfaces **114**, **132** may be positioned substantially perpendicular to the direction of an operational force, applied on the tool head **104** through a cutting edge of the cutting insert **162**, during chip removing operations (i.e., metal cutting operations). Thereby, the cutting tool assembly **100** withstands various operational forces, reducing the possibility of breakage of the holder and the tool head mating surfaces **114**, **132**.

[0018] With further reference to Figures 4 and 5, the holder mating surface **114** also includes at least three coplanar holder abutment surfaces **144**, located adjacent to the holder mating sidewalls **140**. The holder abutment surfaces **144** are elevated relative to the holder mating surface **114**, in a direction perpendicular to the holder mating surface **114**. According to some embodiments, the holder mating surface **114** includes four spaced apart coplanar holder abutment surfaces **144**, as indicated in Figure 5.

[0019] Figures 4 and 5 depict plan views of the tool head and holder mating surfaces **132**, **114**, respectively. These plan views are taken perpendicular to the tool head and holder abutment surfaces **135**, **144**, respectively. According to some embodiments of the invention, the tool head

and the holder mating sidewalls **138**, **140**, are substantially linear, when viewed in the respective plan view of the mating surfaces **132**, **114**.

[0020] Reference is further made to Figures 9 and 10, depicting a portion of the holder and tool head mating surfaces **114**, **132** in cross sections along the respective cutting lines IX-IX and X-X (indicated in Figures 5 and 4, respectively). The cross section of Figure 9 is taken perpendicular to one of the holder mating sidewall **140** of the holder mating surface **114**. The cross section of Figure 10 is taken perpendicular to one of the tool head mating sidewalls **140** of the tool head mating surface **132**. The female portion **116** forms an acute holder dovetail angle **α** with the holder mating sidewall **140**, while the male portion **134** forms an acute tool head dovetail angle **β** with the tool head mating sidewall **138**. In a preferred embodiment of the present invention, the holder dovetail angle **α** is the same as the tool head dovetail angle **β**, in order to provide a tight dovetail connection between the tool head mating surface **132** and the holder mating surface **114**.

[0021] The male portion **134** is substantially parallel to the tool head abutment surface **135**, and spaced apart therefrom by a first distance **H1**. The female portion **116** is substantially parallel to the holder abutment surface **144**, and spaced apart therefrom by a second distance **H2**. In a preferred embodiment of the present invention, the second distance **H2** is the same as, or greater than the first distance **H1**, in order for the tool head abutment surface **135** to abut the holder abutment surfaces **144**, when the male portion **134** is received within the female portion **116**.

[0022] With further reference to Figures 3-5, according to some embodiments of the disclosed technique, the unitary holder sidewall **118** may include, at a front end thereof, a convergence circular portion **142**, having a radius **R1** and subtending a circular end angle **γ**. The convergence circular portion **142** may be a result of the manufacturing of the beveled female portion **116**, and is not necessarily required for the disclosed invention.

[0023] The tool head fastening member **106** is a fastening screw, having a substantially circular head portion **154** and an narrower elongated threading portion **156**, extending from the head portion **154** along a screw axis **S**. The head portion **154** has a head clamping surface **148**, facing towards the elongated fastening portion **156**, and a fastening support surface **150**, extending circumferentially on the head portion **154**.

[0024] The cutting tool assembly **100** can be moved from a disassembled position (Figure 2) to an assembled position (Figure 1). In order to assemble the cutting tool assembly **100**, the tool head **104** is placed on the tool holder **102**, such that the tool head mating surface **132** is located

on the holder mating surface **114**. The male portion **134** is then fitted into the female portion **116**. In this position, the tool head clamping recess **124** is aligned with the holder clamping portion **112**, and the clamping surface **126** faces the holder support surfaces **146**.

[0025] The tool head fastening member **106** is then fitted into the holder clamping portion **112**, such that the screw axis **S** coincides with the clamping axis **M**, and the threading portion **156** threadingly engages the threaded bore **115**. The tool head fastening member **106** is screwed into the holder clamping portion **112**, by rotating in a screw direction **R** about the screw axis **S** (Figures 6 and 7), until the head clamping surface **148** presses against, and applies a clamping force **F1**, perpendicularly on the clamping surface **126** of the tool head **104**. The circular shape of the head portion **154** conforms to the circular arc **158** formed by the holder support surfaces **146** (as indicated in Figures 5 and 6). Thus, the fastening support surface **150** slides, with friction, along the holder support surfaces **146** of the tool holder **102**. Thus, since there is no direct pressure or force applied on the fastening support surface **150**, the tool head fastening member **106** does not incur bending forces, and is more resilient to breakage, while keeping the cutting tool assembly **100** in the assembled position.

[0026] The cross section view of Figure 8 is taken perpendicular to a plane including both the holder axis **H** and the clamping axis **M**. In this view, the clamping surface **126** is angled by an acute clamping angle **φ** relative to the tool head mating surface **134**. Thus, the clamping force **F1** applied perpendicularly on the clamping surface **126** by the screw head clamping surface **148**, includes a downward force component, urging the tool head **104** to be tightened in the downward direction **D**.

[0027] In the assembled position, the tool head mating sidewalls **138** firmly abut the holder mating sidewalls **140** in a dovetail manner, and so the tool head mating surface **132** forms a dovetail connection with the holder mating surface **114**. Further, the tool head abutment surface **135** firmly abuts the holder abutment surfaces **144**. The dovetail connection and the external clamping of the tool head **104** by the tool head fastening member **106** are the only means for retaining the tool head **104** on the tool holder **102**. The angled dovetail structure of the mating sidewalls **138**, **140** prevents the tool head **104** from being pulled out of the tool holder **102**, for example, by a mere upward or forward force. Thus, the tool head **104** is firmly retained in the tool holder **102**, withstanding various operational forces (e.g., longitudinal, radial or lateral forces), without moving, shaking or being pulled out of the tool holder **102**.

[0028] Further in the assembled position, the cutting tool assembly **100** may be provided with the cutting insert **162** in the insert pocket **130** of the tool head **104**, and then employed in metal cutting operations. The cutting insert **162** may be retained within the insert pocket **130** prior to assembly of the tool head **104** onto the tool holder **102**, since the mounting of the tool head **104** to the tool holder **102** does not involve contact with the insert pocket **130**. As explained herein, assembling the cutting tool assembly **100** involves only contact with the rearward surface **122** and the bottom end **131** of the tool head **104**. Alternatively, the cutting insert **162** may be retained within the insert pocket **130** after assembly of the tool head **104** onto the tool holder **102**, since a clamping arrangement thereof would not involve contact with the rearward surface **122** or the bottom end **131** of the tool head **104**.

[0029] It is noted that the tool head **104** may include any type of clamping arrangement for retaining the cutting insert **162**. For example, the tool head **104** may include an insert clamping recess **160** extending generally downwards from the insert pocket **130** for receiving a clamping pin for contacting the cutting insert **162** and attaching it to the insert pocket **130**. The tool head **104** may further include a forward recess screw **164** for engaging and pressing against the clamping pin.

[0030] The removable tool head **104** has a substantially rectangular chest form, having a tool head length **L** and a tool head width **W** (indicated in Figure 2). The tool head width **W** extends across the tool head front surface **120**. It should be appreciated, that in the cutting tool assembly **100**, the removable tool head **104** is coupled to the tool holder **102** only by external clamping (i.e., pressing on an external surface thereof), and without having a clamping member pass through the body of the tool head **104**. Thus, it is not required to make a through hole in the tool head **104** (i.e., a hole entirely surrounded by the body of the tool head **104**), to enable coupling thereof to the tool holder **102**.

[0031] This external clamping structure presents an advantage to the cutting tool assembly **100**, in particular for a tool head **104** with small dimensions of the tool head length and width **L**, **W**, which would limit the available space for making a through hole in the tool head **104**, however with sufficient space for forming the external clamping recess **124**, as described herein above. In another example case, if the insert pocket **130** of the tool head **104** includes an insert clamping recess **160** for receiving a clamping pin or a fastening screw for clamping the cutting insert, this may limit the available space for making another through-hole in the tool head **104**. Thus, it

would be advantageous to externally clamp the tool head **104** to the tool holder **102**, rather than by a through-hole clamping.

[0032] Reference is now made to Figures 11-14. Figure 11 depicts a cutting tool assembly **200**, according to another embodiment of the disclosed technique, including a removable tool head **204**, a tool holder **202**, and a tool head fastening member **106**. Figure 12 depicts a perspective view of the tool head **204**, and figures 13 and 14 depict respective plan views of the tool head and holder mating surfaces **132**, **114**. Each of the unitary tool head and holder sidewalls **136**, **118** generally forms a V-shape, in the plan view of the respective mating surface **132**, **114**. The V-shapes of the unitary tool head and holder sidewalls **136**, **118** open out (i.e., diverge) towards the tool head and holder clamping recesses **124**, **112**, respectively.

[0033] Reference is now made to Figures 15-18, depicting a cutting tool assembly **300**, according to yet another embodiment of the disclosed invention. The cutting tool assembly **300** includes a tool holder **302**, a removable tool head **304** and a tool head fastening member **106**. The holder **302** includes a holder mating surface **314**, having a male portion **306** projecting therefrom, and the tool head **304** includes a tool head mating surface **316**, having a beveled female portion **308**.

[0034] Moving the cutting tool assembly **300** from the disassembled position to the assembled position is as described herein above with regards to the cutting tool assembly **100**. In the assembled position, the holder's male portion **306** is received within the tool head's female portion **308**, in a dovetail connection.

[0035] The holder mating surface **314** includes a plurality of holder mating sidewalls **310**, which partially limit the male portion **306**. The tool head mating surface **316** includes a plurality of tool head mating sidewalls **312**, which partially limit the female portion **308**, and are formed to abut the holder mating sidewalls **310** in a dovetail connection, when in the assembled position. The holder and tool head mating sidewalls **310**, **312** diverge in the forward direction, in order to form a forward fit between the mating surfaces **314**, **316** under the force applied by the tool head fastening member **106** on the tool head clamping recess **124** (as opposed to diverging towards the clamping recesses **112**, **124**, as in the cutting tool assemblies **100**, **200**).

[0036] While the present invention has been described with reference to one or more specific embodiments, the description is intended to be illustrative as a whole and is not to be construed as limiting the invention to the embodiments shown. It is appreciated that various modifications

may occur to those skilled in the art that, while not specifically shown herein, are nevertheless within the scope of the invention.

# CLAIMS

1. A cutting tool assembly, comprising:

a tool holder having a longitudinal holder axis (H) extending in a rearward to forward direction ($D_R$, $D_F$), the tool holder including a holder front end, a holder top end, a holder mating surface extending therebetween, and a holder clamping portion spaced apart in the rearward direction ($D_R$) from the holder mating surface;

a tool head having a longitudinal tool head axis (T) extending in the rearward to forward direction ($D_R$, $D_F$), and including a tool head bottom end provided with a tool head mating surface, and a tool head clamping recess extending upwards from the tool head bottom end, and spaced apart in the rearward direction ($D_R$) from the tool head mating surface; and

a tool head fastening member,

wherein in an assembled position of the cutting tool assembly:

the tool head mating surface forms a dovetail connection with the holder mating surface; and

the tool head fastening member clamps the tool head clamping recess, thereby externally clamping the tool head to the tool holder,

wherein the holder mating surface and the tool head mating surface are tilted by a tilt angle ($\delta$) relative to the holder and tool head axes (H, T), respectively.

2. The cutting tool assembly according to claim 1, wherein the tilt angle ($\delta$) is an acute angle in the range of 0-60°.

3. The cutting tool assembly according to any one of claims 1-2, wherein the holder mating surface includes a plurality of holder mating sidewalls, and the tool head mating surface includes a plurality of tool head mating sidewalls conforming to the holder mating sidewalls.

4. The cutting tool assembly according to claim 1, wherein the tool head clamping recess includes a clamping surface, and the tool head fastening member is pressed against the clamping surface.

5. The cutting tool assembly according to claim 1, wherein the holder clamping portion has at least one holder support surface, and the tool head fastening member slides, with friction, along the at least one holder support surface lying on a substantially circular arc.

6. The cutting tool assembly according claim 1, wherein:

the holder clamping portion extends along a clamping axis (M), and

the clamping axis (M) and the tool head clamping recess are substantially perpendicular to the holder axis (H) and the tool head axis (T), respectively.

7. The cutting tool assembly according to claim 6, wherein the tool head has a tool head top end provided with an insert pocket for holding a cutting insert.

8. The cutting tool assembly according to claim 3, wherein in a respective plan view of the holder mating surfaces and the tool head mating surface, the holder mating sidewalls and the tool head mating sidewalls exhibit mirror symmetry relative to a holder mating axis (A) and a tool head mating axis (B), respectively.

9. The cutting tool assembly according to claim 3, wherein in a respective plan view of the holder mating surfaces and the tool head mating surface, the holder mating sidewalls and the tool head mating sidewalls are substantially linear.

10. The cutting tool assembly according to claim 3, wherein:

the holder mating surface includes a female portion partially limited by the holder mating sidewalls, the female portion forming an acute holder dovetail angle ($\alpha$) with the holder mating sidewalls,

the tool head mating surface includes a male portion partially limited by the tool head mating sidewalls, the male portion forming an acute tool head dovetail angle (β) with the tool head mating sidewalls

11. The cutting tool assembly according to claim 10, wherein:

the tool head includes a tool head abutment surface, substantially parallel to the male portion and spaced apart therefrom by a first distance (H1), and

the holder includes at least three coplanar holder abutment surfaces substantially parallel to the female portion, and spaced apart therefrom by a second distance (H2), which is the same as, or greater than the first distance (H1).

12. The cutting tool assembly according to claim 3, wherein:

the holder mating surface includes a male portion partially limited by the holder mating sidewalls, and

the tool head mating surface includes a female portion partially limited by the tool head mating sidewalls.

13. The cutting tool assembly according to claim 3, wherein the holder mating sidewalls are connected by a unitary holder sidewall, and wherein the unitary holder sidewall diverges towards the holder clamping portion.

14. The cutting tool assembly according to claim 3, wherein the tool head mating sidewalls are connected by a unitary tool head sidewall, and wherein the unitary tool head sidewall diverges towards the tool head clamping recess.

15. The cutting tool assembly according to claim 3, wherein:

the holder mating sidewalls are connected by a unitary holder sidewall, diverging towards the holder clamping portion;

the tool head mating sidewalls are connected by a unitary tool head sidewall, diverging towards the tool head clamping recess; and

each of the unitary tool head and holder sidewalls forms a V-shape, when the tool head mating surface and the holder mating surface are viewed in a respective plan view.

16. The cutting tool assembly according to claim 1, wherein

the dovetail connection between the tool head mating surface and the holder mating surface, and

the clamping of the tool head by the tool head fastening member,

are the only means for retaining the tool head on the tool holder.

17. A cutting tool comprising the cutting tool assembly according to claim 1 in the assembled position, wherein:

the tool head top end is provided with an insert pocket; and

a cutting insert is retained in the insert pocket.

18. A tool head having a longitudinal tool head axis (T) extending in the rearward to forward direction ($D_R$, $D_F$), and comprising:

a tool head top end provided with an insert pocket;

a tool head bottom end provided with a tool head mating surface including a plurality of tool head mating sidewalls; and

a tool head rearward surface provided with a tool head clamping recess which extends upwards from the tool head bottom end to the tool head top end and is spaced apart in the rearward of the tool head mating surface; wherein:

the tool head mating surface is tilted by a tilt angle ($\delta$) relative to tool head axis (T).

19. The tool head according to claim 18, wherein:

the tool head mating surface includes a male portion partially limited by the tool head mating sidewalls; and

the male portion forms an acute tool head dovetail angle (β) with the tool head mating sidewalls.

20. The tool head according to claim 18, wherein the tool head mating surface includes a female portion partially limited by the tool head mating sidewalls, and wherein the tool head mating sidewalls are connected by a unitary tool head sidewall diverging towards the tool head clamping recess.

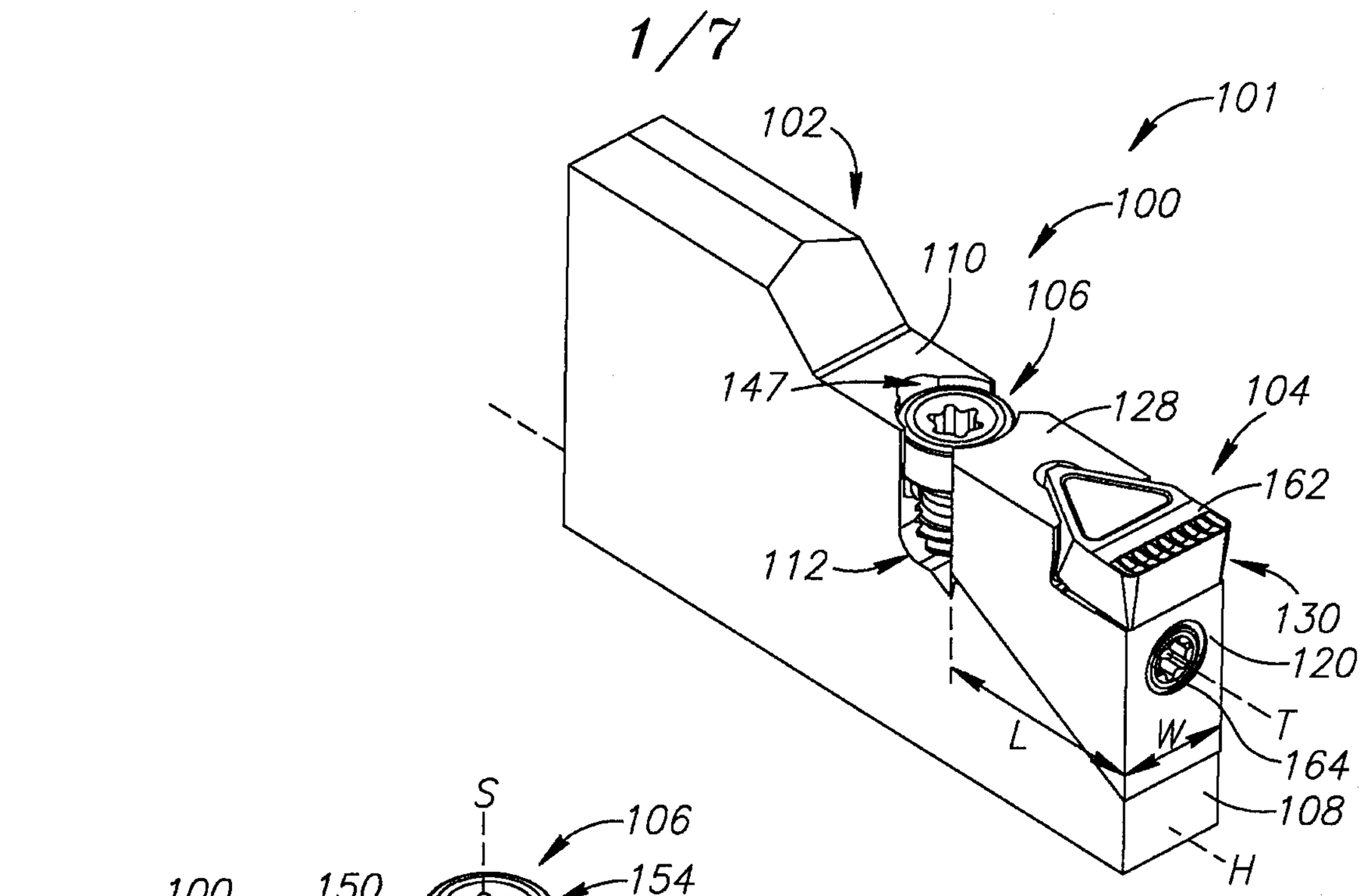
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FIG.1

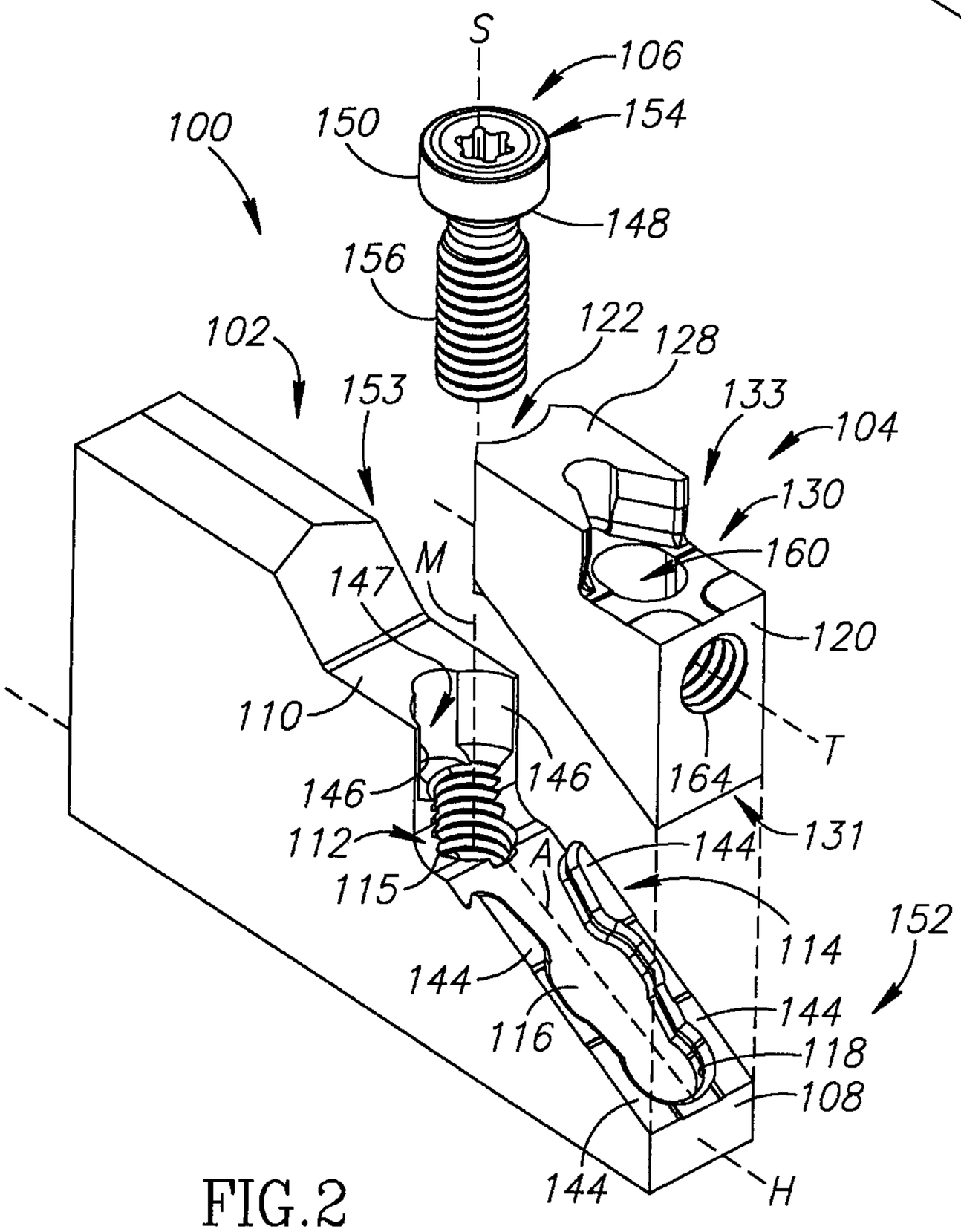
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FIG.2

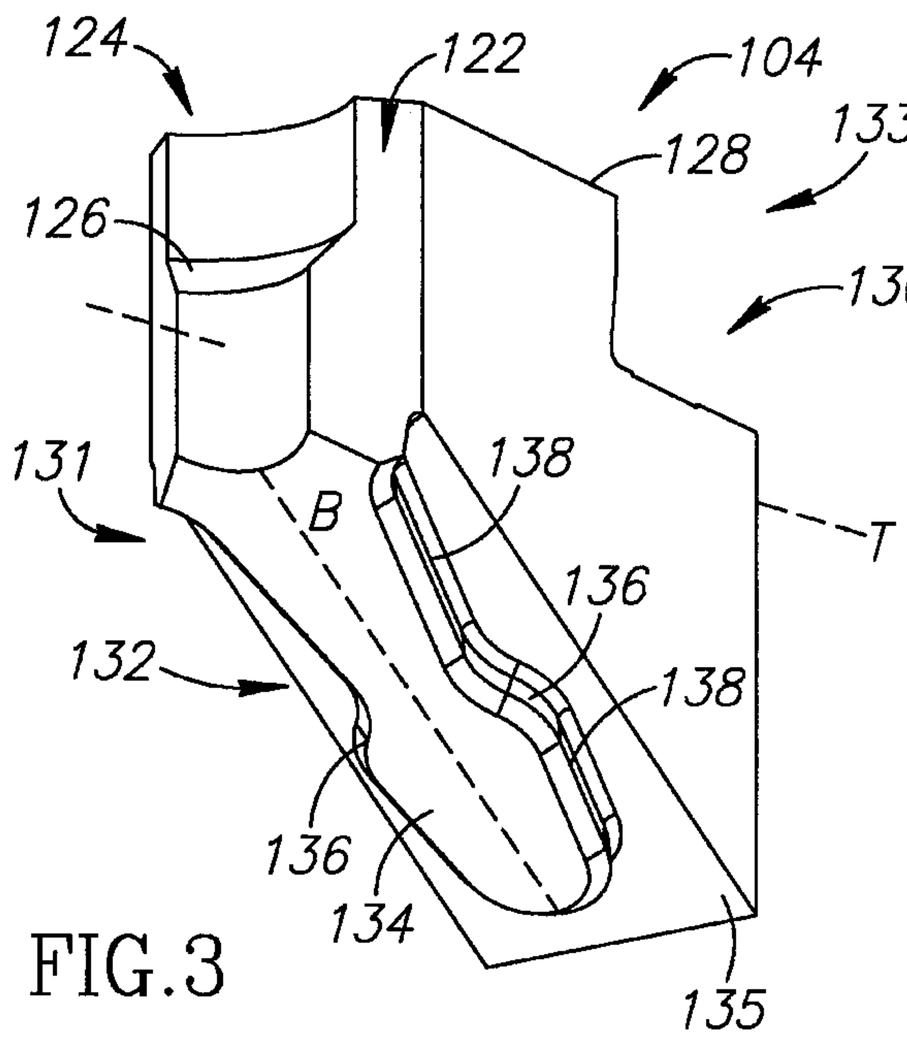



FIG.3




FIG.4

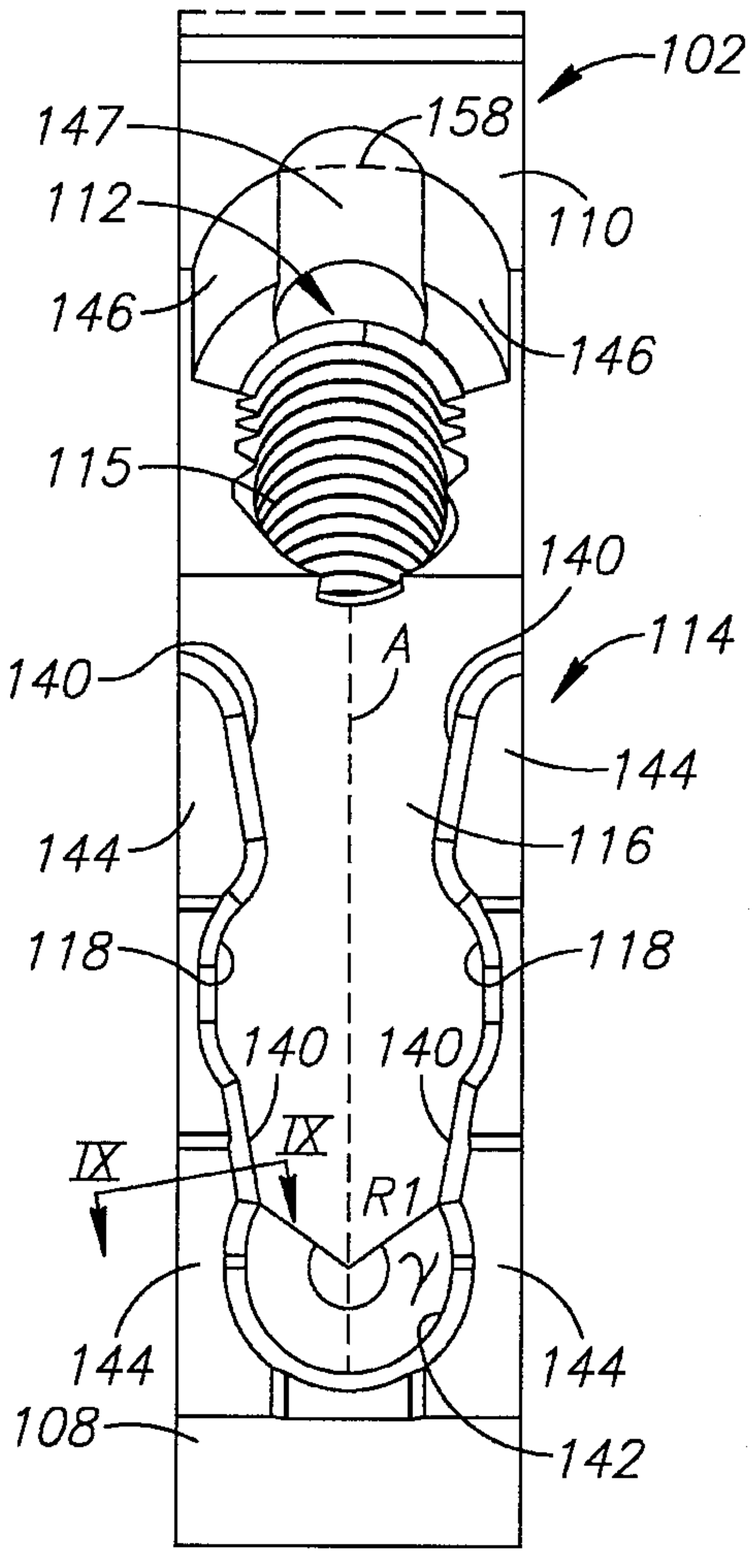



FIG.5

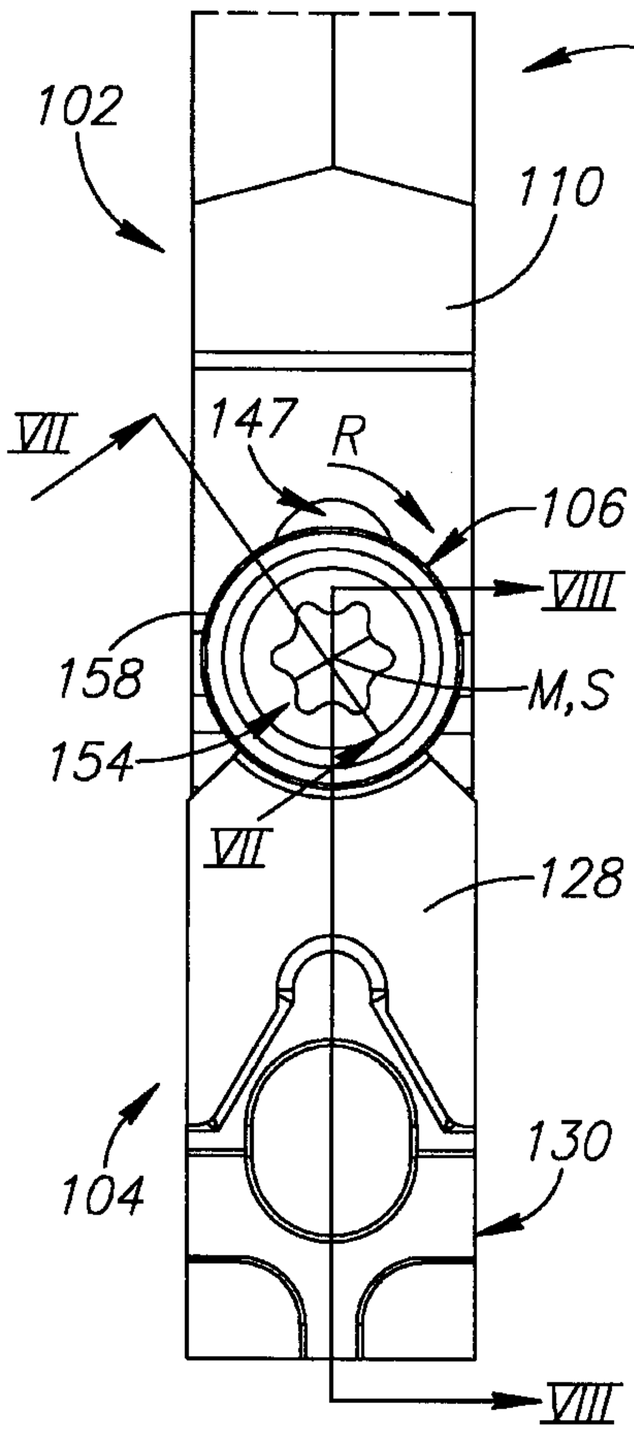



FIG.6

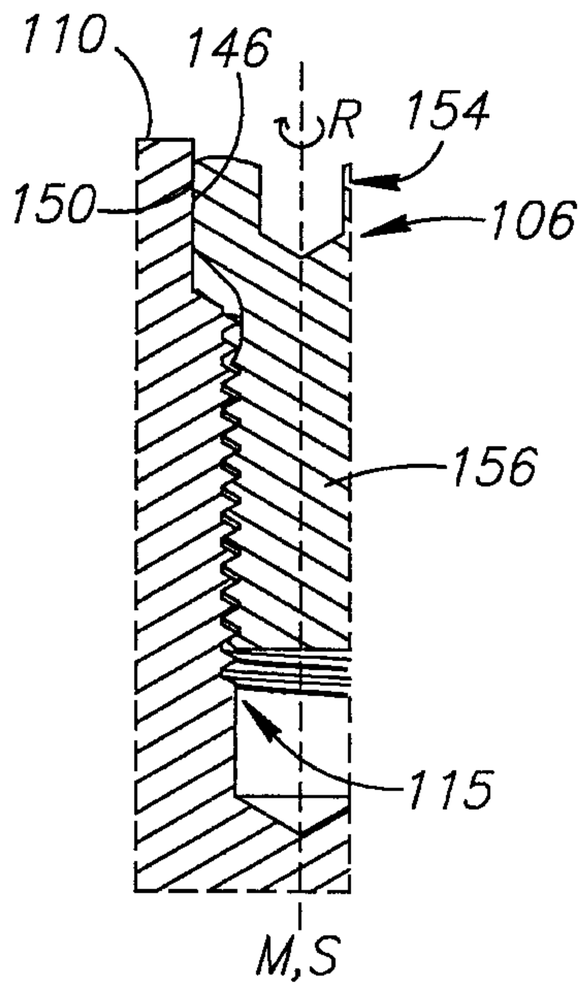



FIG.7

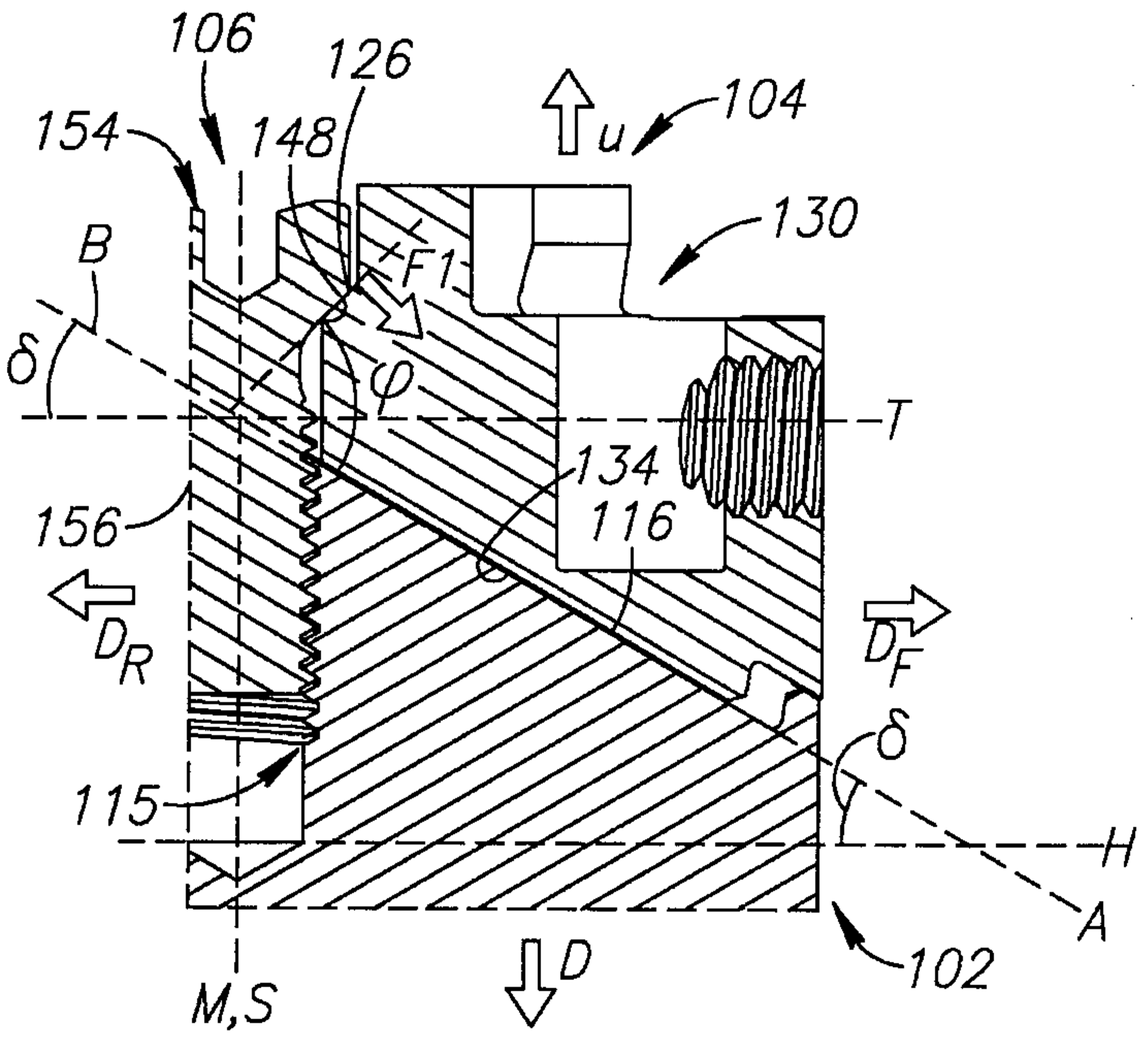



FIG.8

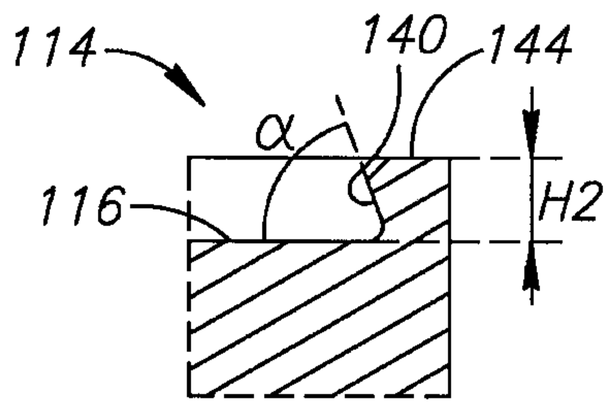



FIG.9

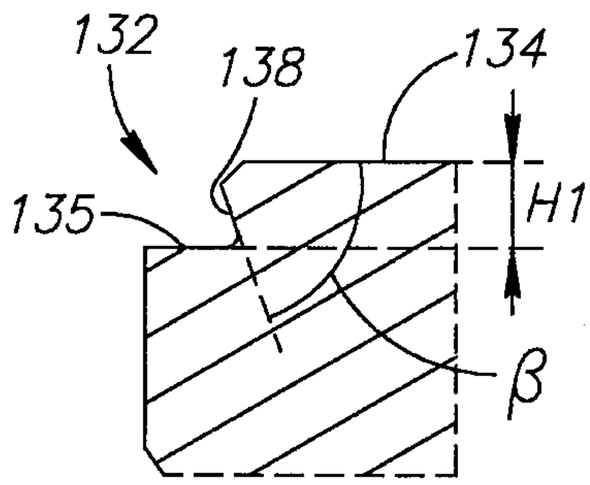



FIG.10

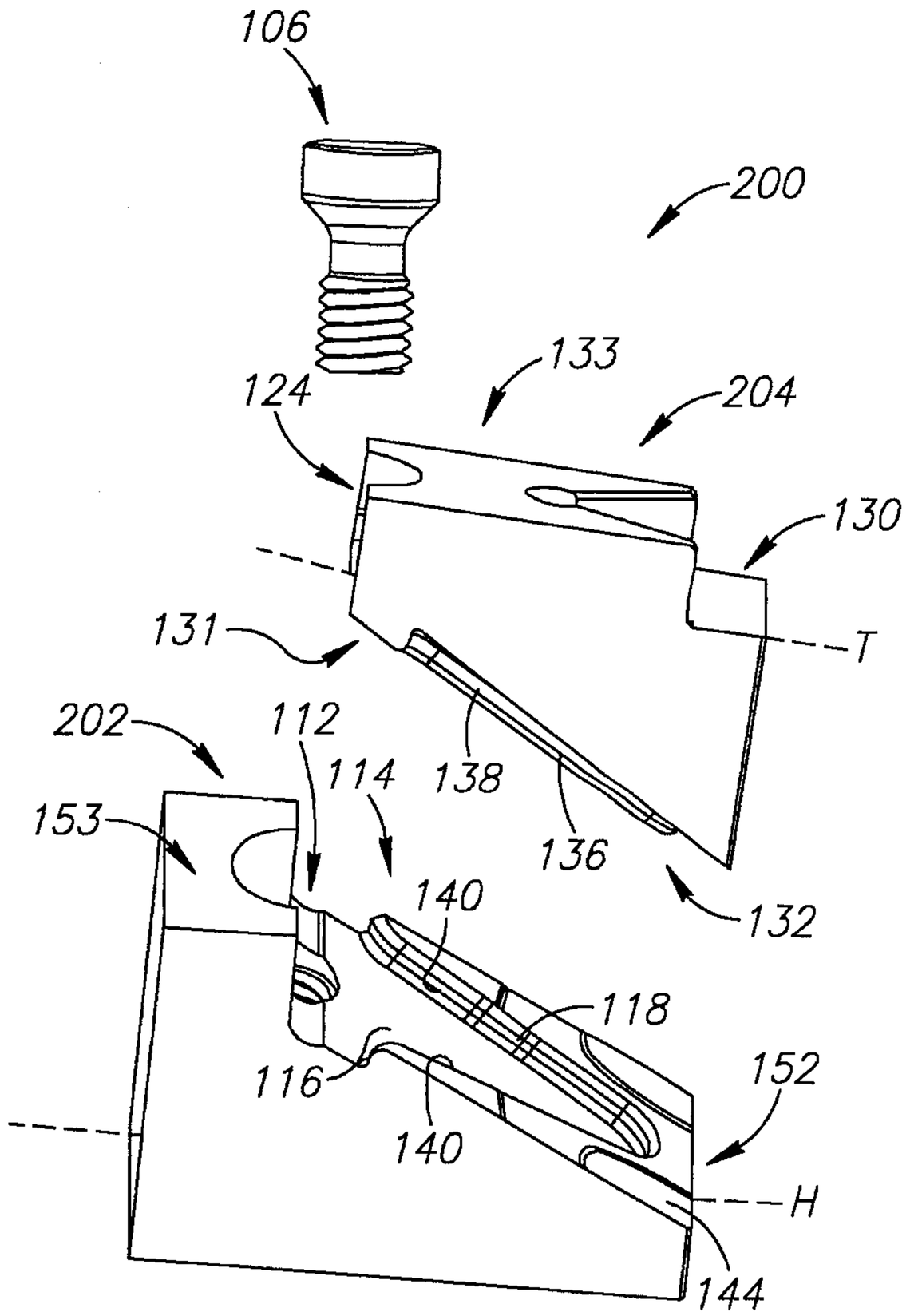



FIG.11

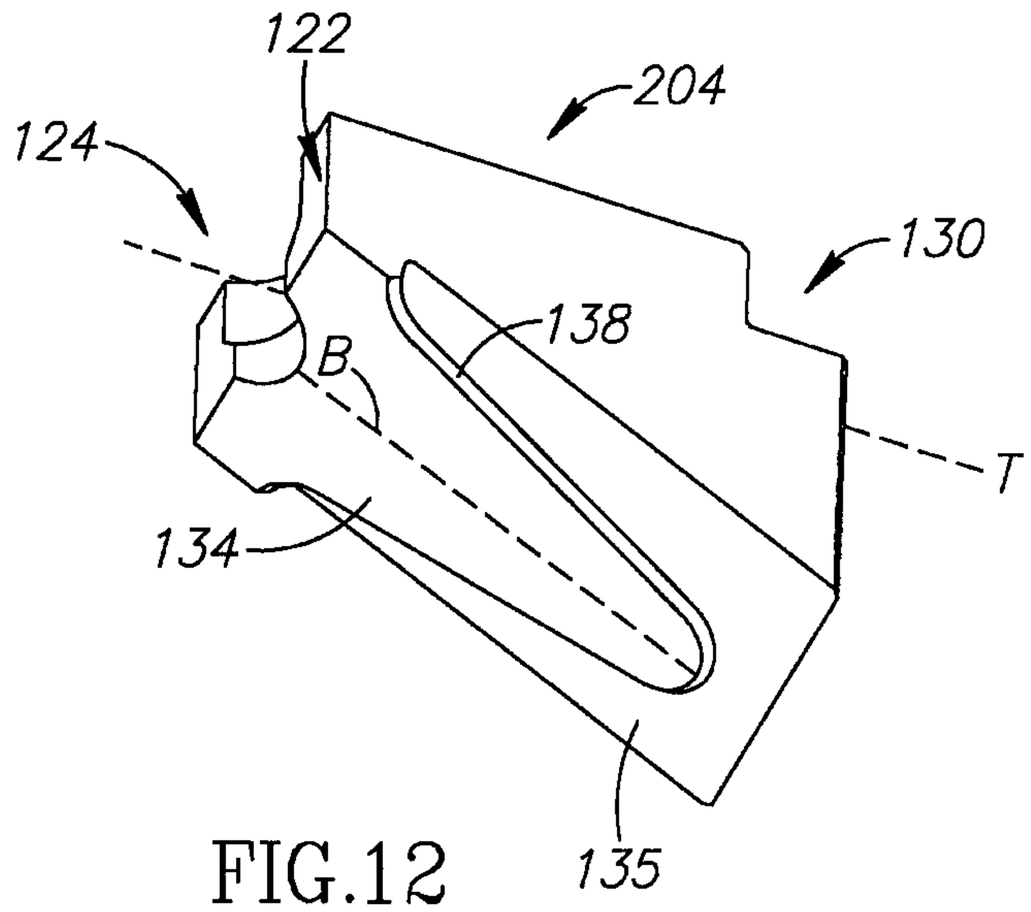



FIG.12

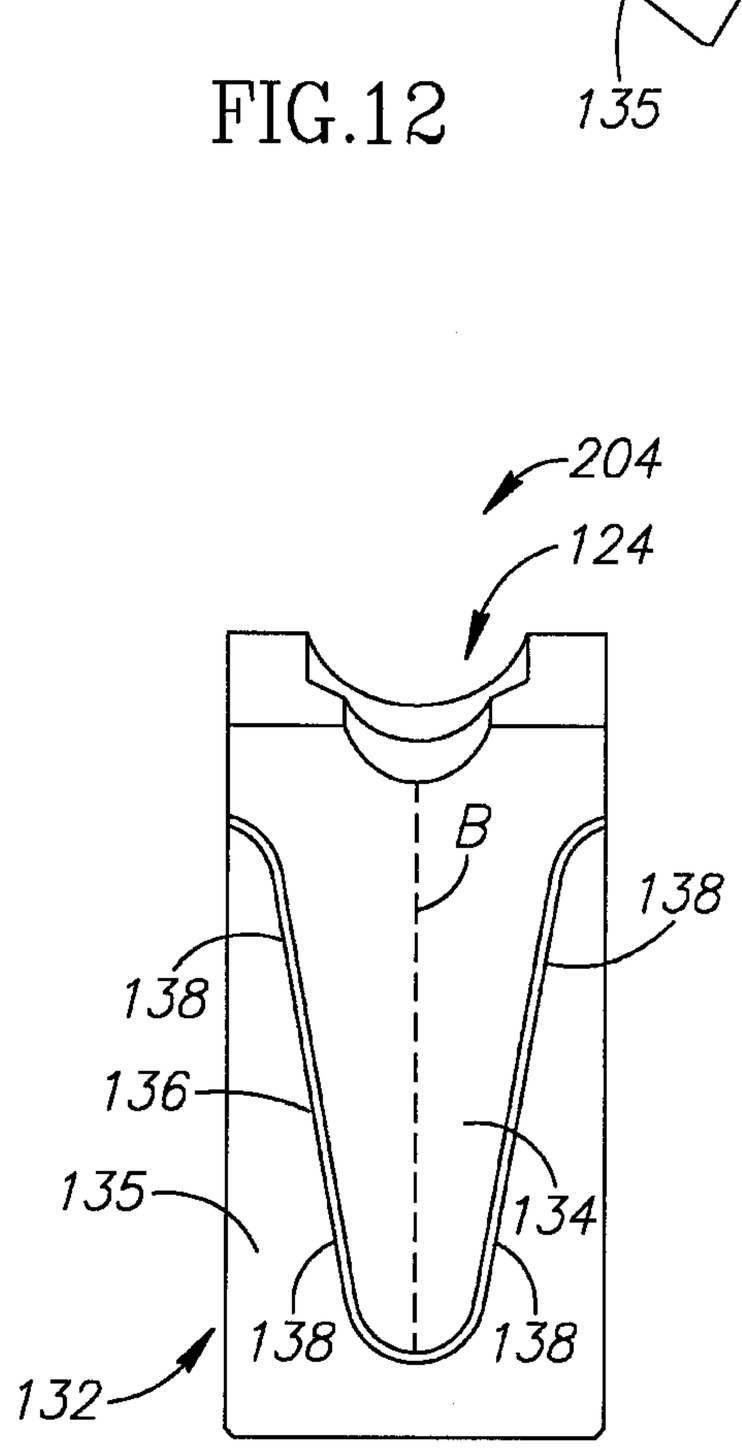



FIG.13

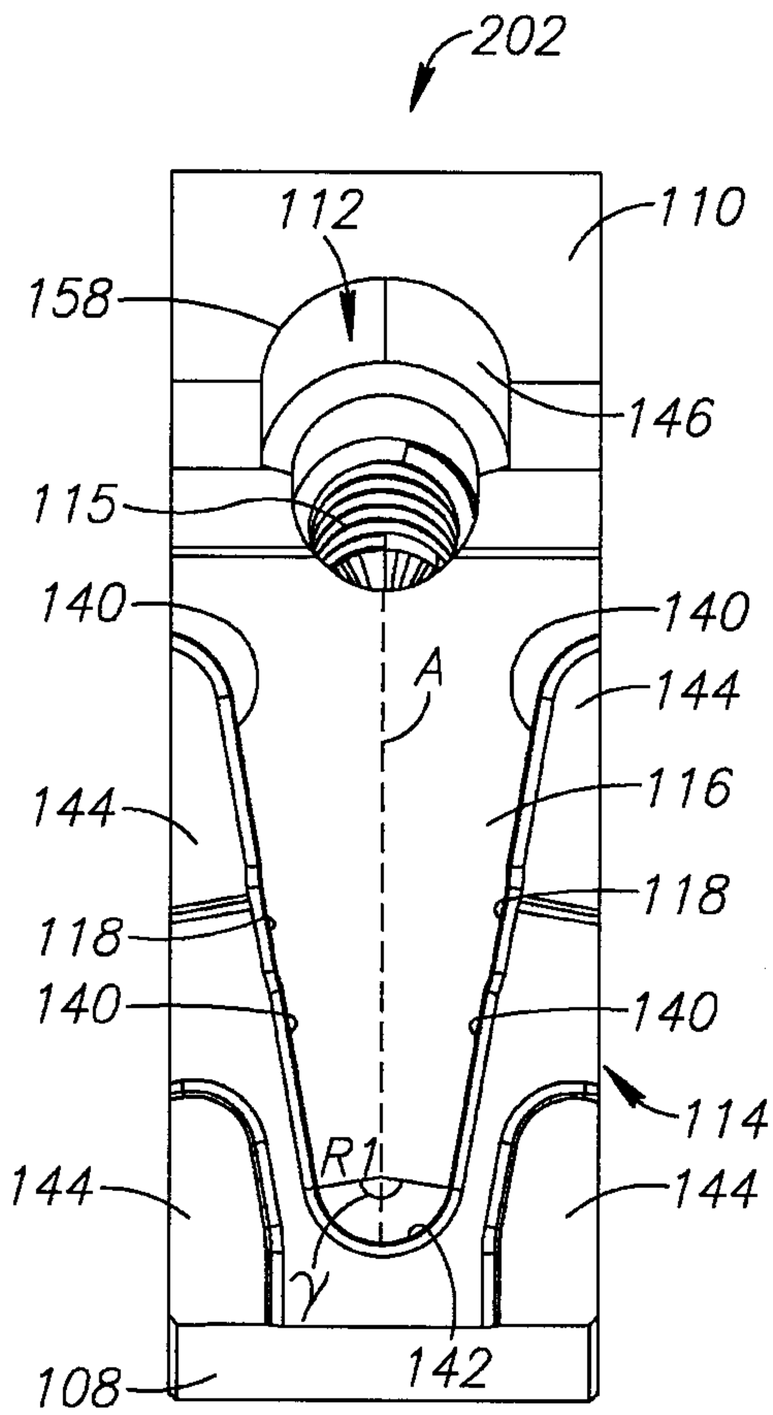



FIG.14

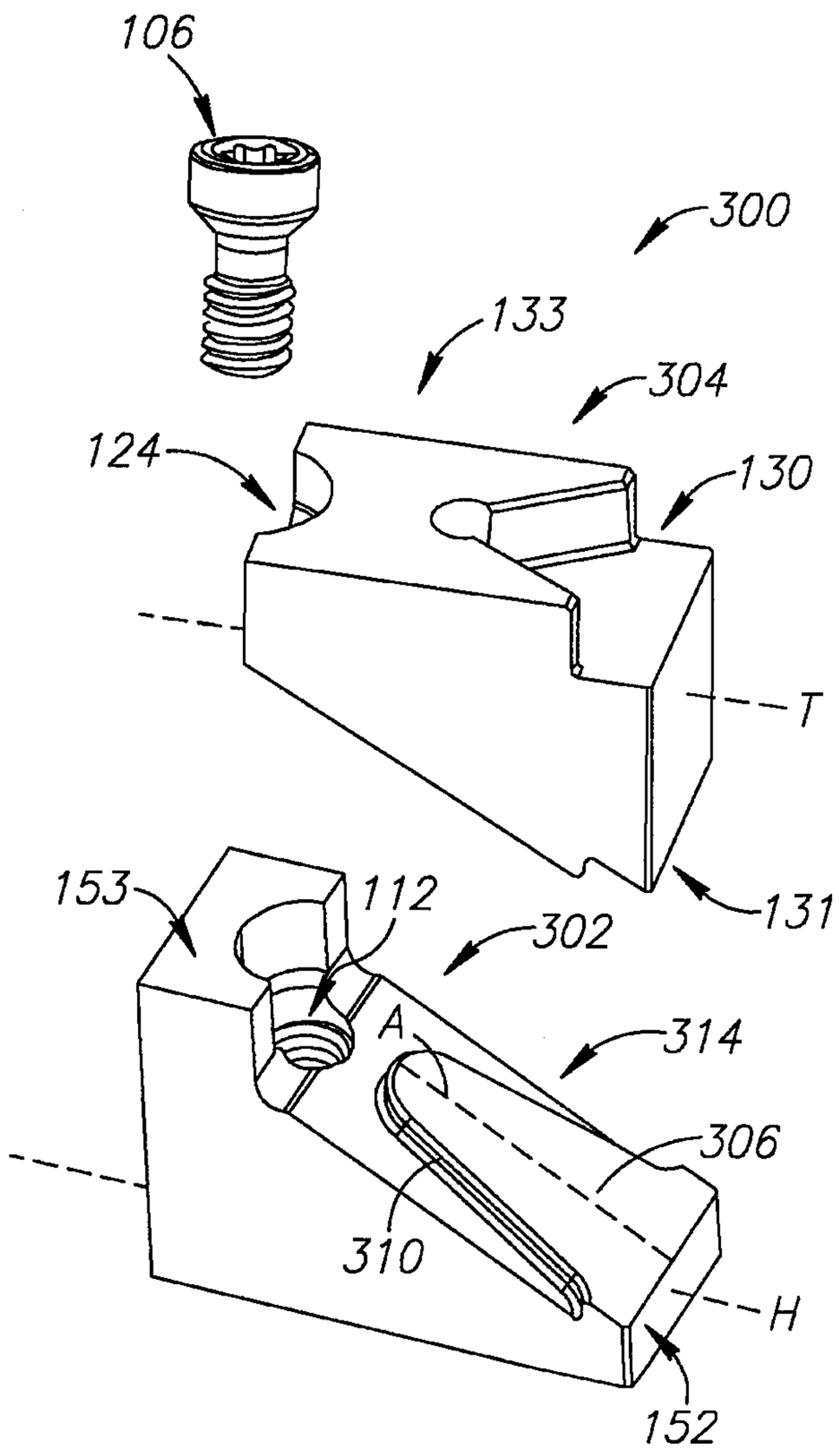



FIG.15

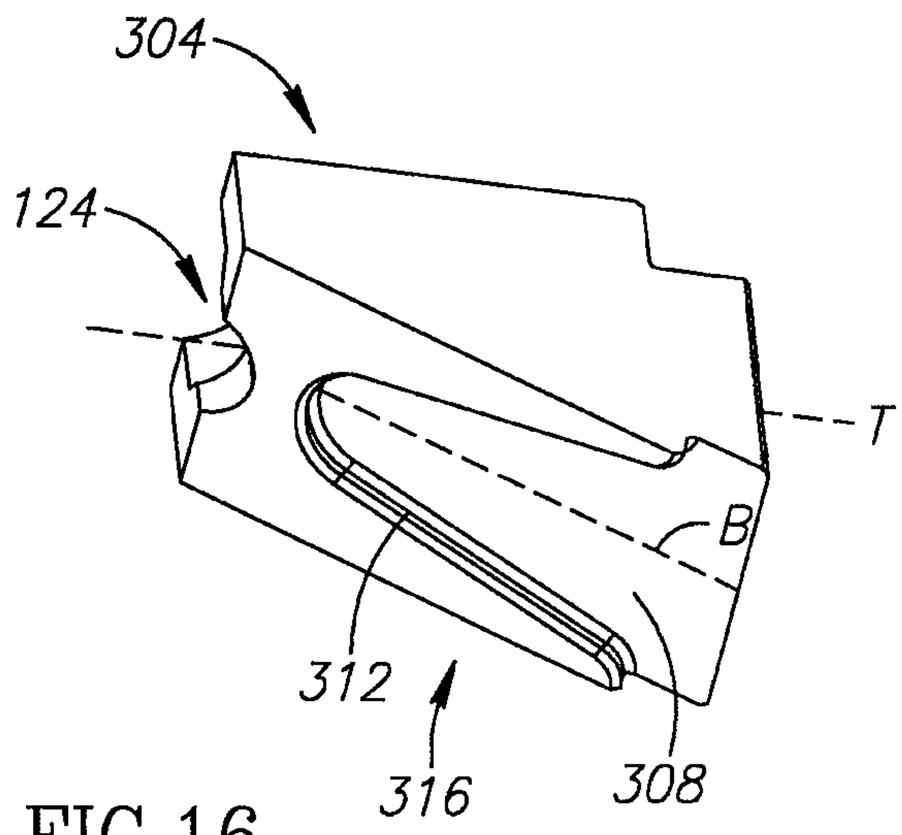



FIG.16

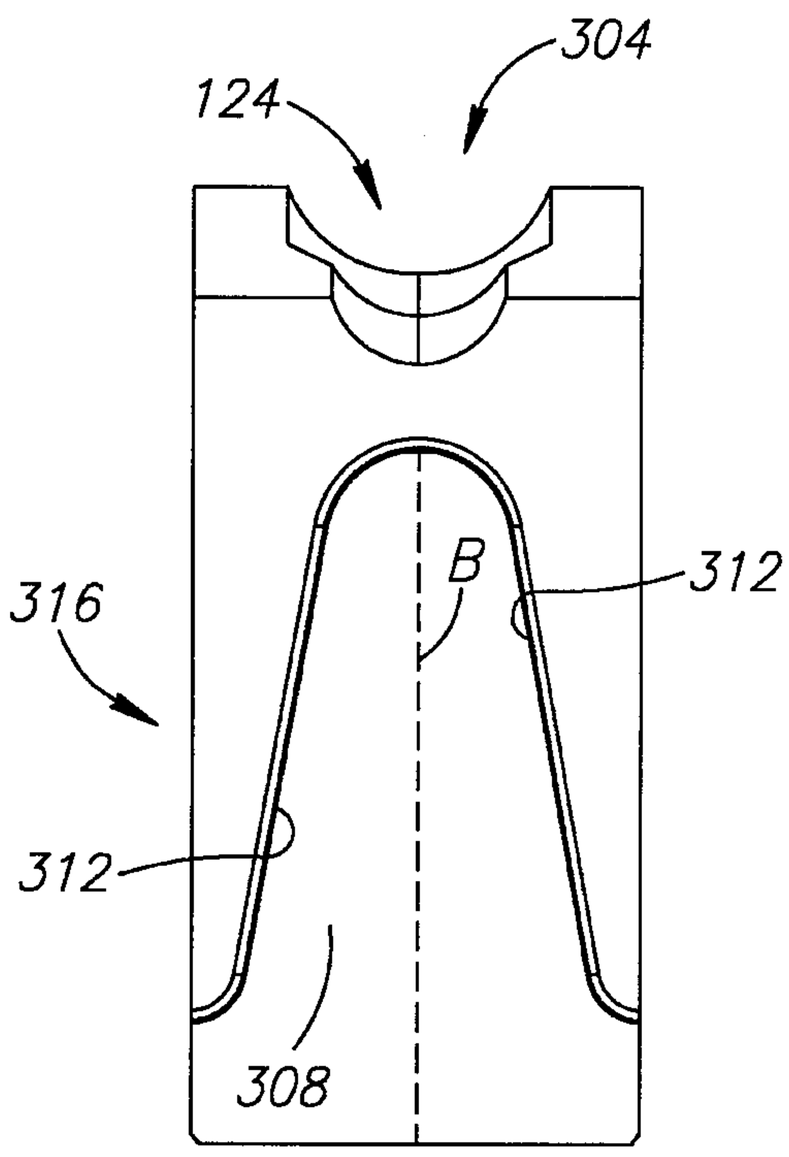



FIG.17

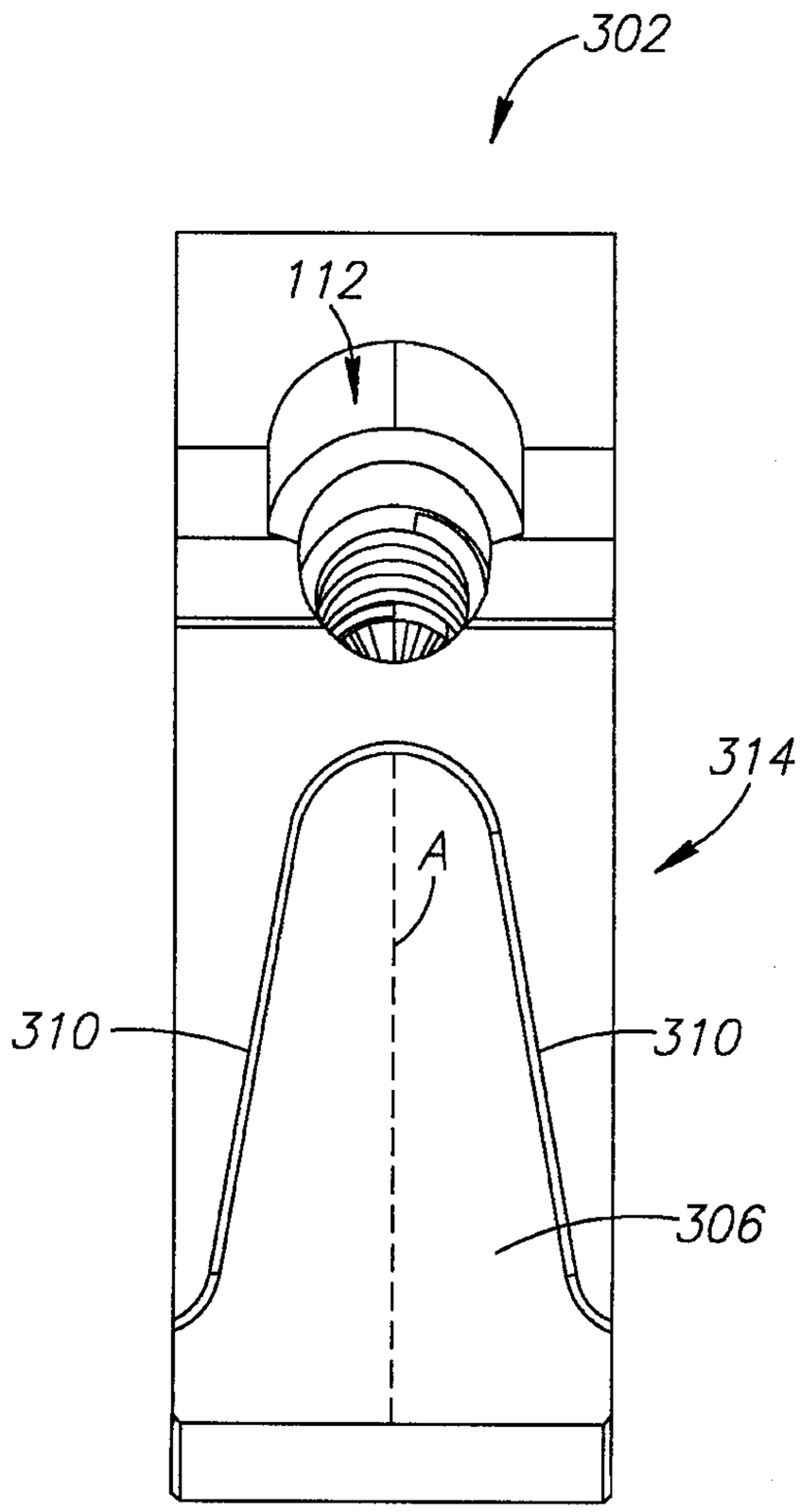
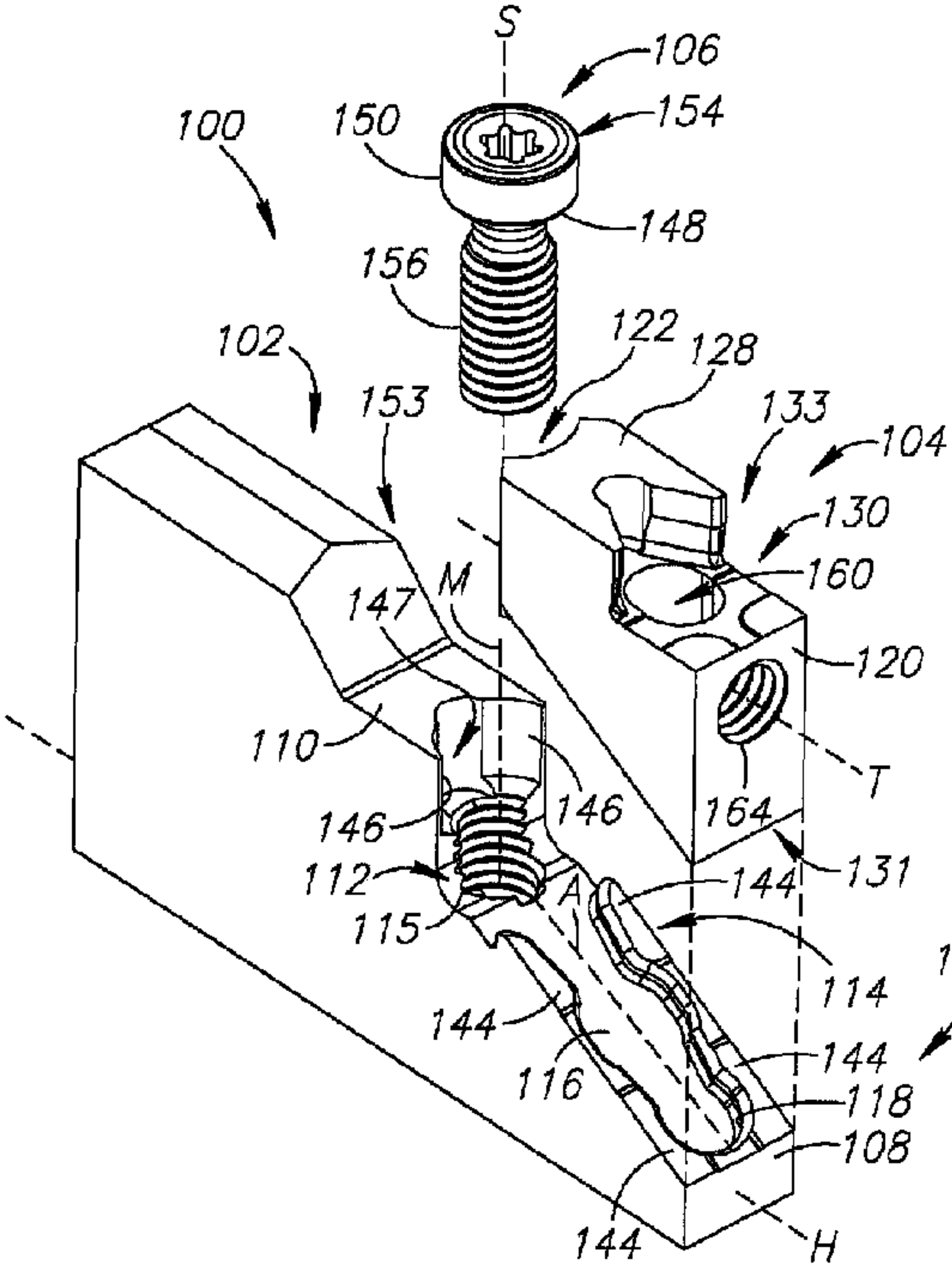



FIG.18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