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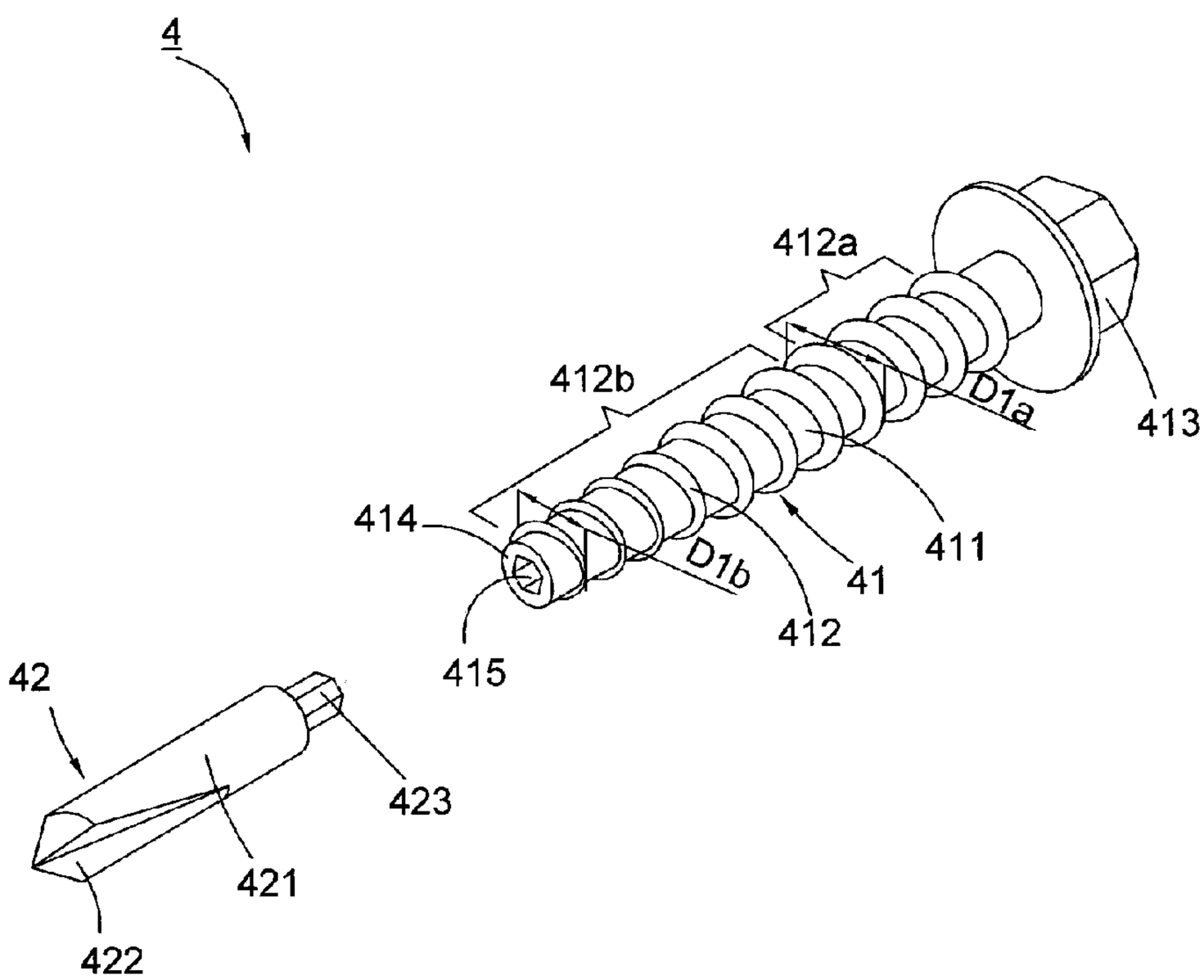
(54) Title: FASTENER WITH REMOVABLE ELEMENT



(57) Abrégé/Abstract:
The present invention pertains to a screw (4) with removable tip section comprising a shank (41) and a tip section (42); wherein the shank (41) has a first threaded section (412) including an upper (412a) and a lower (412b) threaded sections defined thereon with different outer diameters (D1a ' D1b) and a recess (415) defined at the surface of an end face (414); further an insertion (423) of the tip section (42) includes a coincident shape with the recess (415). In this manner, the shank (41) would be smoothly driven into the metal objects (5) without being interfered or damaging the first threaded section in time of screwing; After screwing in, the tip section is alternatively removed from the shank, whereby a wrench (6) is freely put into the recess to tighten or loosen the screw so as to increase the convenience of using.

ABSTRACT

The present invention pertains to a screw (4) with removable tip section comprising a shank (41) and a tip section (42); wherein the shank (41) has a first threaded section (412) including an upper (412a) and a lower (412b) threaded sections defined thereon with different outer diameters (D1a、D1b) and a recess (415) defined at the surface of an end face(414); further an insertion (423) of the tip section (42) includes a coincident shape with the recess (415). In this manner, the shank (41) would be smoothly driven into the metal objects (5) without being interfered or damaging the first threaded section in time of screwing; After screwing in, the tip section is alternatively removed from the shank, whereby a wrench (6) is freely put into the recess to tighten or loosen the screw so as to increase the convenience of using.

FASTENER WITH REMOVABLE ELEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a fastener, in particular to a screw with removable element.

2. Description of the Related Art

A conventional screw **1** for screwing into metal objects is shown in Fig. **1** and generally includes a head **11**, a shank **12** connecting thereto, a plurality of threads **13** defined around the shank **12**, and a tip section **14** formed at a distal end of the shank **12**. While screwing, the screw **1** is driven into the metal objects (not shown) by the tip section **14** and threads **13** to bore through it and further drill therein. When the screw **1** is in use of screwing roofing objects, users used to climb on the roof and use a tool (not shown) for rotating the head **11** and drilled into the objects. However, the screw **1** may be facilely screwed in but hardly taken out of the surface of objects, namely users often need to climb on the roof and repeat the above operation for repairing the objects or loosening and tightening the screw, which makes burden and damages users in time of operation.

Referring to Fig. **2**, a screw **2** made for improving the above shortcomings includes a shank **21** and a tip section **22**. The shank **21** fabricated of a stainless steel comprises a plurality of threads **211** spirally arranged thereon, a head **212** disposed at one end thereof, and a polygonal recess **213** at the other end. A tip section **22** made

of another kind of harden metal respectively forms a tip portion **221** and an insertion **222** at two ends thereof, and the insertion **222** fits with the polygonal recess **213**. While using, the screw **2** has the same operation as the screw **1** and here it is omitted; particularly, the tip section **22** can be removed from the shank **21** and repeatedly used after securing the objects to the roof, and users simply put a tool (not shown) into the recess **213** to directly tighten or loosen the screw **2** without climbing on the roof very often.

As seen in Fig. **3**, in practical, the insertion **222** is initially put into the recess **213**, and the tip section **22** bores a hole **31** through the metal objects **3**; nevertheless, the threads **221** with its outer diameter may not directly enter into the hole **31** and further make the screw **2** interfered between the shank **21** and the tip section **22**, which result of the screw **2** unable to be substantially drilled into the objects **3** or be broken under the forced screwing although being successfully drilled therein.

SUMMARY OF THE INVENTION

Therefore, the present invention intends to provide a screw with removable element which is conducive to substantially drive the screw into metal objects and increase the convenience of using.

The present invention relates to a screw comprising a shank and a tip section, wherein the shank includes a first threaded section consisting of threaded sections with different diameters, and an

insertion of the tip section has a coincident shape with a recess defined on the end face of the shank. In use, the tip portion initially bores through the metal objects, and the first threaded section is smoothly driven and drilled into the hole from the threaded section with a smaller outer diameter toward the threaded section with a larger outer diameter, thereby assisting the screw to be firmly fixed therein and preventing from damaging threads thereof under a forced screwing. Further, the insertion can be removed away and a wrench is used instead to loosen or tighten the screw if necessary and increase the convenience of using.

According to one aspect of the present there is provided a screw with removable element comprising a shank and a tip section; wherein, the shank comprising a cylindrical shank body, a first threaded section extending around the shank body, a head disposed at one end of the shank body, and an end face disposed at the other end thereof, opposite to the head; wherein the end face having a recess defined thereon; the tip section comprising a cylindrical body, a tip portion disposed at one end of the cylindrical body, and an insertion extending axially from the other end thereof for being removably inserted into the recess characterized in that the first threaded section has an upper threaded section located adjacent to the head and a lower threaded section located adjacent to the end face; the shank body tapers off from the head toward

the end face , so that an outer diameter of the upper threaded section is greater than an outer diameter of the lower threaded section for a gradual drilling.

According to a further aspect of the present invention there is provided a screw with removable element comprising a shank and a tip section; wherein, the shank comprising a cylindrical shank body, a first threaded section extending around the shank body, a head disposed at one end of the shank body, and an end face disposed at the other end thereof, opposite to the head; wherein the end face having a recess defined thereon; the tip section comprising a cylindrical body, a tip portion disposed at one end of the cylindrical body, and an insertion extending axially from the other end thereof for being removably inserted into the recess characterized in that the first threaded section has an upper threaded section located adjacent to the head and a lower threaded section located adjacent to the end face; the tip section further provides with a second threaded section disposed between the tip portion and the insertion; the threaded sections have the same pitches and respectively have outer diameters; the outer diameter of the upper threaded section is greater than the outer diameter of the second threaded section, and the outer diameter of the second threaded section is greater than the outer diameter of the lower threaded section; the first threaded section can engage to

the second threaded section by the insertion accurately fit with the recess.

According to another aspect of the present invention there is provided a screw with removable element comprising a shank and a tip section; wherein, the shank comprising a cylindrical shank body, a first threaded section extending around the shank body, a head disposed at one end of the shank body, and an end face disposed at the other end thereof, opposite to the head; wherein the end face having a recess defined thereon; the tip section comprising a cylindrical body, a tip portion disposed at one end of the cylindrical body, and an insertion extending axially from the other end thereof for being removably inserted into the recess characterized in that the first threaded section has an upper threaded section located adjacent to the head and a lower threaded section located adjacent to the end face; the tip section further provides with a second threaded section disposed between the tip portion and the insertion; the threaded sections have the same pitches and respectively have outer diameters; the outer diameter of the upper threaded section is greater than the outer diameter of the lower threaded section, and the outer diameter of the upper threaded section is greater than the outer diameter of the second threaded section; the first threaded section can engage to the second threaded section by the insertion accurately fit with the

recess.

The advantages of the present invention over the known prior arts will become more apparent to those of ordinary skilled in the art by reading the following descriptions with the relating drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing a conventional screw;

Fig. 2 is a perspective view showing another conventional screw;

Fig. 3 is a schematic view showing the screw of Fig. 2 drilled into the metal objects;

Fig. 4 is a perspective view showing a first preferred embodiment of the present invention;

Fig. 5 is a schematic view showing that a wrench is put into the recess while the tip section is removed away;

Fig. 6 is a perspective view showing a second preferred embodiment of the present invention;

Fig. 7 is an elevation view showing a third preferred embodiment of the present invention;

Fig. 8 is an elevation view showing a fourth preferred embodiment of the present invention; and

Fig. 9 is a schematic view showing the screw of Fig. 7 drilled into the metal objects.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. **4**, a fastener (for instance of a screw **4)** of a first preferred embodiment comprises a shank **41** and a tip section **42**; the shank **41** made of a kind of metal material, for instance of a stainless steel, comprises a shank body **411**, a first threaded section **412** extending around the shank body **411**, a head **413** disposed at one end of the shank body **411**, and an end face **414** disposed at the other end thereof, opposite to the head **413**; wherein the first threaded section **412** includes an upper threaded section **412a** located adjacent to the head **413** and a lower threaded section **412b** located adjacent to the end face **414**; an outer diameter "**D1a**" of the upper threaded section **412a** is greater than an outer diameter "**D1b**" of the lower threaded section **412b**. Further the end face **414** has a recess **415** defined on the surface thereof, and the recess **415** formed in a polygonal contour, e.g. a hexagonal shape, is applied to the preferred embodiments.

Still further, the tip section **42** made of another kind of harden metal material includes a tip body **421**, a tip portion **422** disposed at one end thereof, and an insertion **423** extending axially from the other end thereof for being removably inserted into the recess **415**. The insertion **423** can also have a polygonal configuration and here a hexagonal pillar is adopted so that the insertion **423** accurately fits with the recess **415**.

Referring to Fig. **4** and **5**, in operation, the screw **4** is adopted to use in screwing roofing panels, for instance of screwing metal objects **5**. Before screwing, the insertion **423** is initially put into the recess **415**, and then the tip portion **422** is drilled into the objects **5** by rotating the head **413** and bores a hole **51** through it. When the tip section **42** is entirely drilled therein, the shank body **411** is further driven along the hole **51** into the objects **5** by the lower threaded section **412b** with the smaller outer diameter "**D1b**" to prevent the screw **4** from being directly interfered or blocked between the shank body **411** and the tip body **421** in time of screwing and the upper threaded section **412a** with the larger outer diameter "**D1a**" to impel the shank **41** firmly fixed into the objects **5**. Subsequently, the tip section **42** can be alternatively removed from the recess **415** for a repeated use if necessary, and the recess **415** would perform in another use, namely users can work inside the house and exert a wrench **6** to insert into the recess **415** either for loosening or tightening the screw **4** from the objects **5**. In this manner, the

screw **4** is freely adjusted according to user's demand without climbing on the roof and thus increasing the convenience.

Further referring to Fig. **6**, a screw **4** of a second preferred embodiment still comprises the similar elements, and the operations and the effects are the same as the first embodiment. Differentially, the tip section **42** further provides with a second threaded section **424** disposed between the tip portion **422** and the insertion **423**, and the threaded sections **412a**、**412b**、**424** have the same pitches. Further referring to Fig. **7** and **8**, an outer diameter "**D1a**" of the upper threaded section **412a** is greater than an outer diameter "**D2**" of the second threaded section **424** and an outer diameter "**D1b**" of the lower threaded section **412b**, and the outer diameter "**D2**" can be larger (shown in Fig. **7**) or be smaller (shown in Fig. **8**) than the outer diameter "**D1b**". Here it is adopted in the Fig. **9** that the outer diameter "**D1a**" is greater than "**D2**" and further "**D2**" is greater than "**D1b**".

Referring to Fig. **9**, the tip portion **422** initially bores through the metal objects **5**, and the second threaded section **424** assists to form a bigger hole **51** so that the lower threaded section **412b** can also be gradually driven into the objects **5** along the hole **51** without being interrupted. While drilling from the lower threaded section **412b** toward the upper threaded section **412a**, the upper threaded section **412a** is secured into the objects **5** to result of

the screw **4** being firmly fixed therein and thus increasing the screwing stability.

To sum up, the present invention takes advantage of the shank having a first threaded section with different outer diameters and the tip section which may also include a second threaded section spiraling thereon. In use, the shank can be smoothly driven into the objects along the screwing hole by the above threaded sections, so that the screw is substantially and entirely drilled into the objects without breaking the first threaded section and retains a good screwing stability. After screwing, a wrench can be used instead of the tip section to insert into the recess for loosing or tightening the screw, thereby increasing the convenience of using.

While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

WHAT IS CLAIMED IS:

1. A screw (4) with removable element comprising:

a shank (41) and a tip section (42); wherein, said shank (41) comprising a cylindrical shank body (411), a first threaded section (412) extending around said shank body (411), a head (413) disposed at one end of said shank body (411), and an end face (414) disposed at the other end thereof, opposite to said head (413); wherein said end face (414) having a recess (415) defined thereon; said tip section (42) comprising a cylindrical body (421), a tip portion (422) disposed at one end of said cylindrical body (421), and an insertion (423) extending axially from the other end thereof for being removably inserted into said recess (415).

characterized in that said first threaded section (412) has an upper threaded section (412a) located adjacent to said head (413) and a lower threaded section (412b) located adjacent to said end face (414); said shank body (411) tapers off from said head (413) toward said end face (414), so that an outer diameter (D1a) of said upper threaded section (412a) is greater than an outer diameter (D1b) of said lower threaded section (412b) for a gradual drilling.

2. A screw (4) with removable element comprising:

a shank (41) and a tip section (42); wherein, said shank (41) comprising a cylindrical shank body (411), a first threaded section

(412) extending around said shank body (411), a head (413) disposed at one end of said shank body (411), and an end face(414) disposed at the other end thereof, opposite to said head (413); wherein said end face (414) having a recess (415) defined thereon; said tip section (42) comprising a cylindrical body (421), a tip portion (422)disposed at one end of said cylindrical body (421), and an insertion (423) extending axially from the other end thereof for being removably inserted into said recess (415).

characterized in that said first threaded section (412) has an upper threaded section (412a) located adjacent to said head (413) and a lower threaded section (412b) located adjacent to said end face (414); said tip section (42) further provides with a second threaded section (424) disposed between said tip portion (422) and said insertion (423); said threaded sections (412a、412b、424) have the same pitches and respectively have outer diameters (D1a、D1b、D2); the outer diameter (D1a) of said upper threaded section (412a) is greater than the outer diameter (D2) of said second threaded section (424), and the outer diameter (D2) of said second threaded section (424) is greater than the outer diameter (D1b) of said lower threaded section (412b); said first threaded section (412) can engage to said second threaded section (424) by said insertion (423) accurately fit with said recess (415).

3. A screw (4) with removable element comprising

a shank (41) and a tip section (42); wherein, said shank (41) comprising a cylindrical shank body (411), a first threaded section (412) extending around said shank body (411), a head (413) disposed at one end of said shank body (411), and an end face (414) disposed at the other end thereof, opposite to said head (413); wherein said end face (414) having a recess (415) defined thereon; said tip section (42) comprising a cylindrical body (421), a tip portion (422) disposed at one end of said cylindrical body (421), and an insertion (423) extending axially from the other end thereof for being removably inserted into said recess (415).

characterized in that said first threaded section (412) has an upper threaded section (412a) located adjacent to said head (413) and a lower threaded section (412b) located adjacent to said end face (414); said tip section (42) further provides with a second threaded section (424) disposed between said tip portion (422) and said insertion (423); said threaded sections (412a、412b、424) have the same pitches and respectively have outer diameters (D1a、D1b、D2); the outer diameter (D1a) of said upper threaded section (412a) is greater than the outer diameter (D1b) of said upper threaded section (412b), and the outer diameter (D1b) of said upper threaded section (412b) is greater than the outer diameter (D2) of said second threaded section (424); said

first threaded section (412) can engage to said second threaded section (424) by said insertion (423) accurately fit with said recess (415).

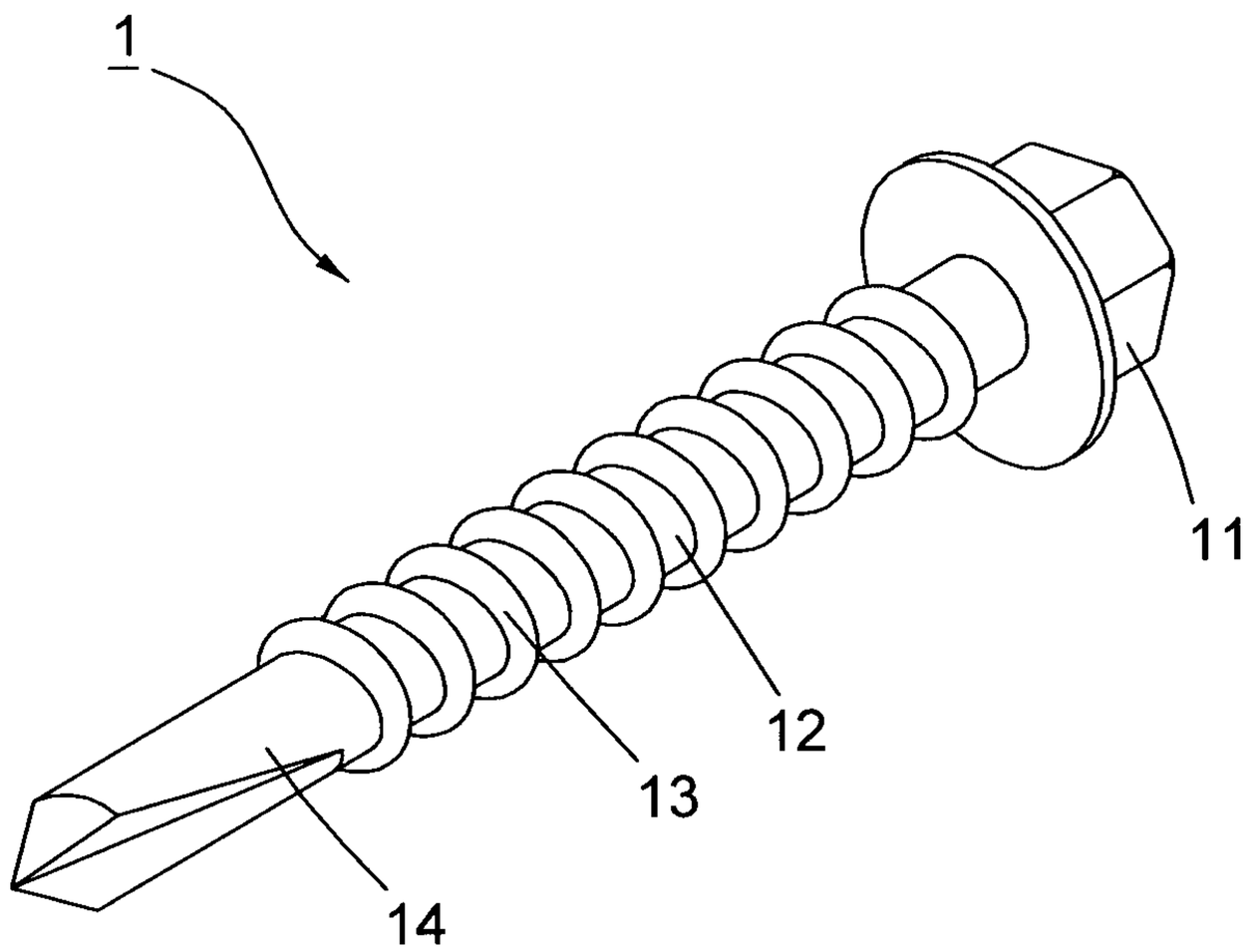


FIG. 1 (PRIOR ART)

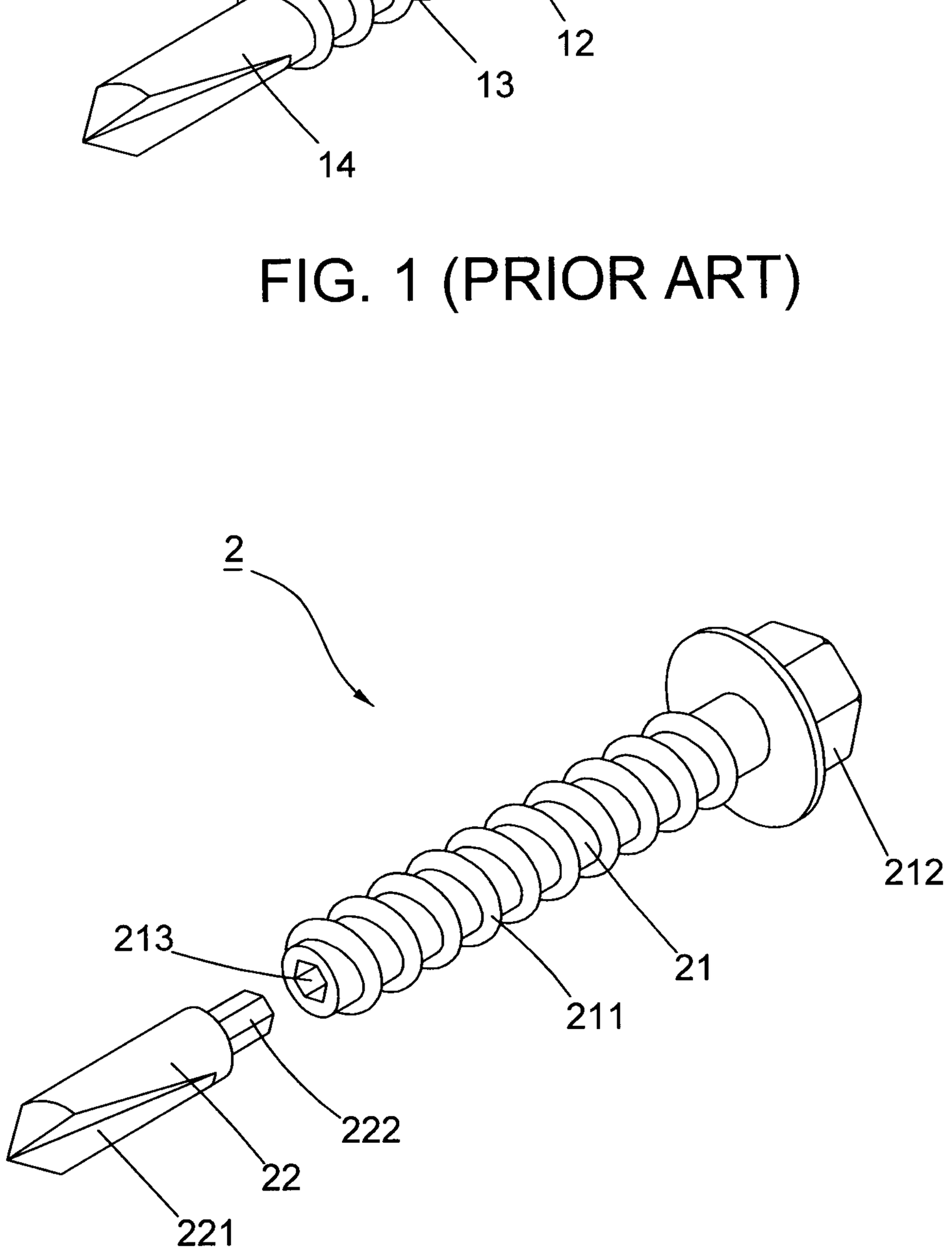


FIG. 2 (PRIOR ART)

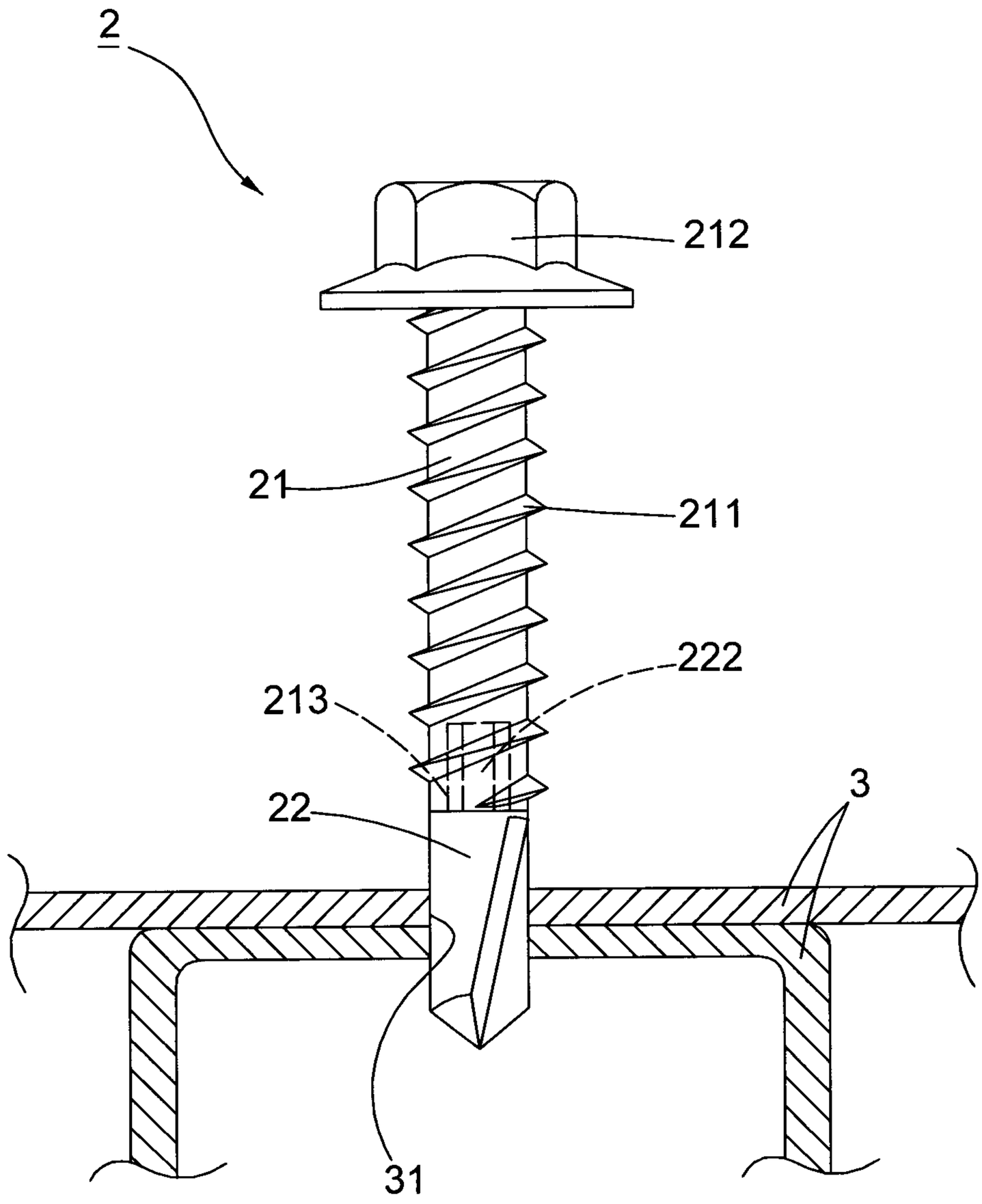


FIG. 3 (PRIOR ART)

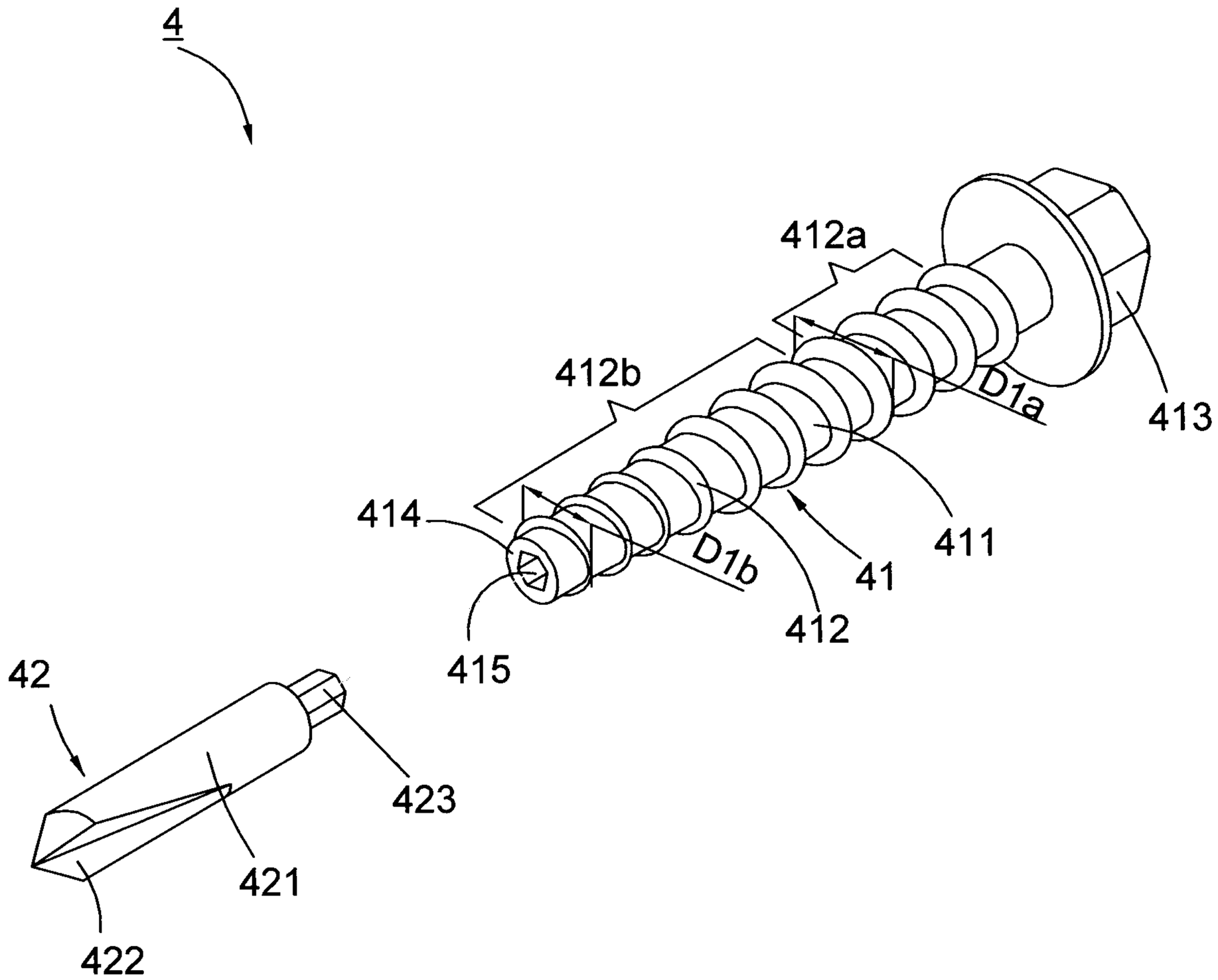


FIG. 4

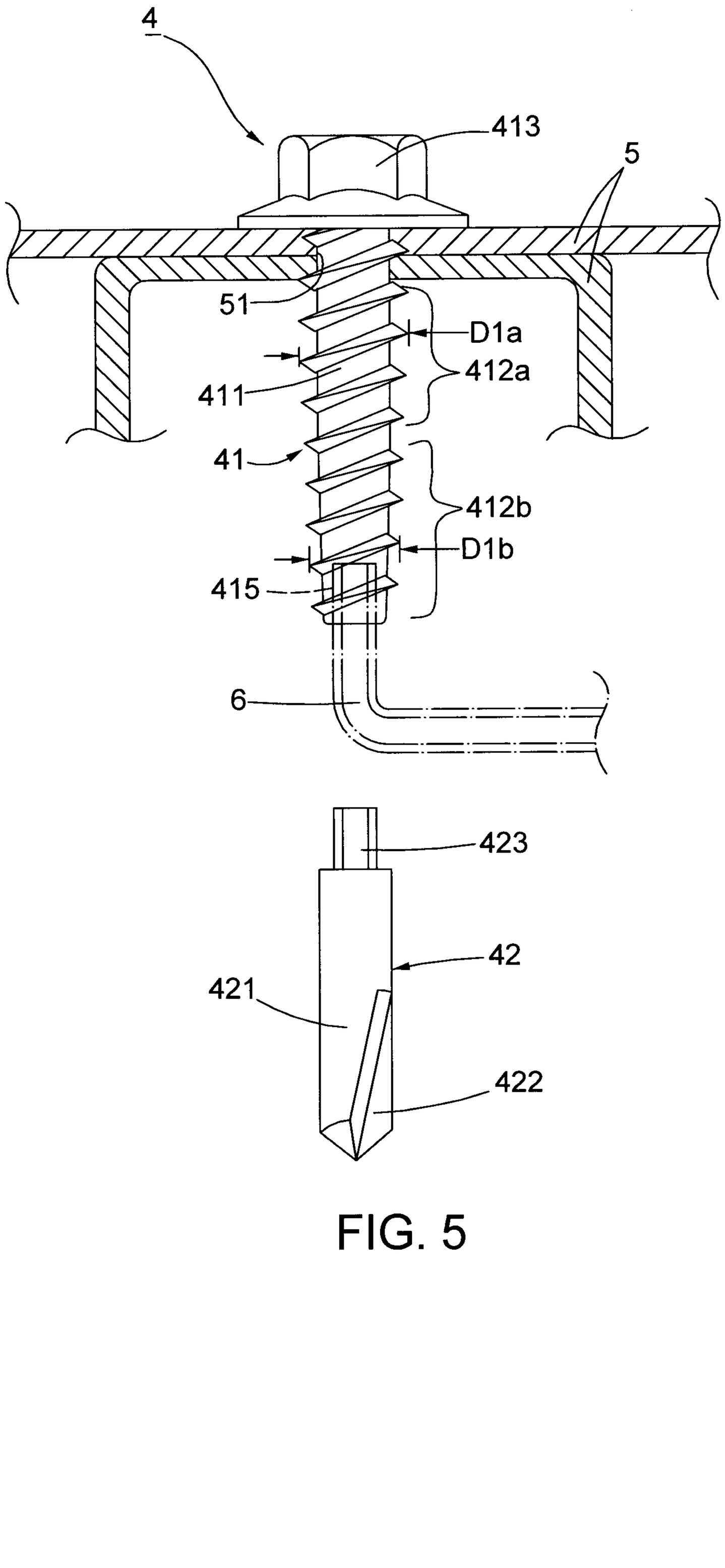


FIG. 5

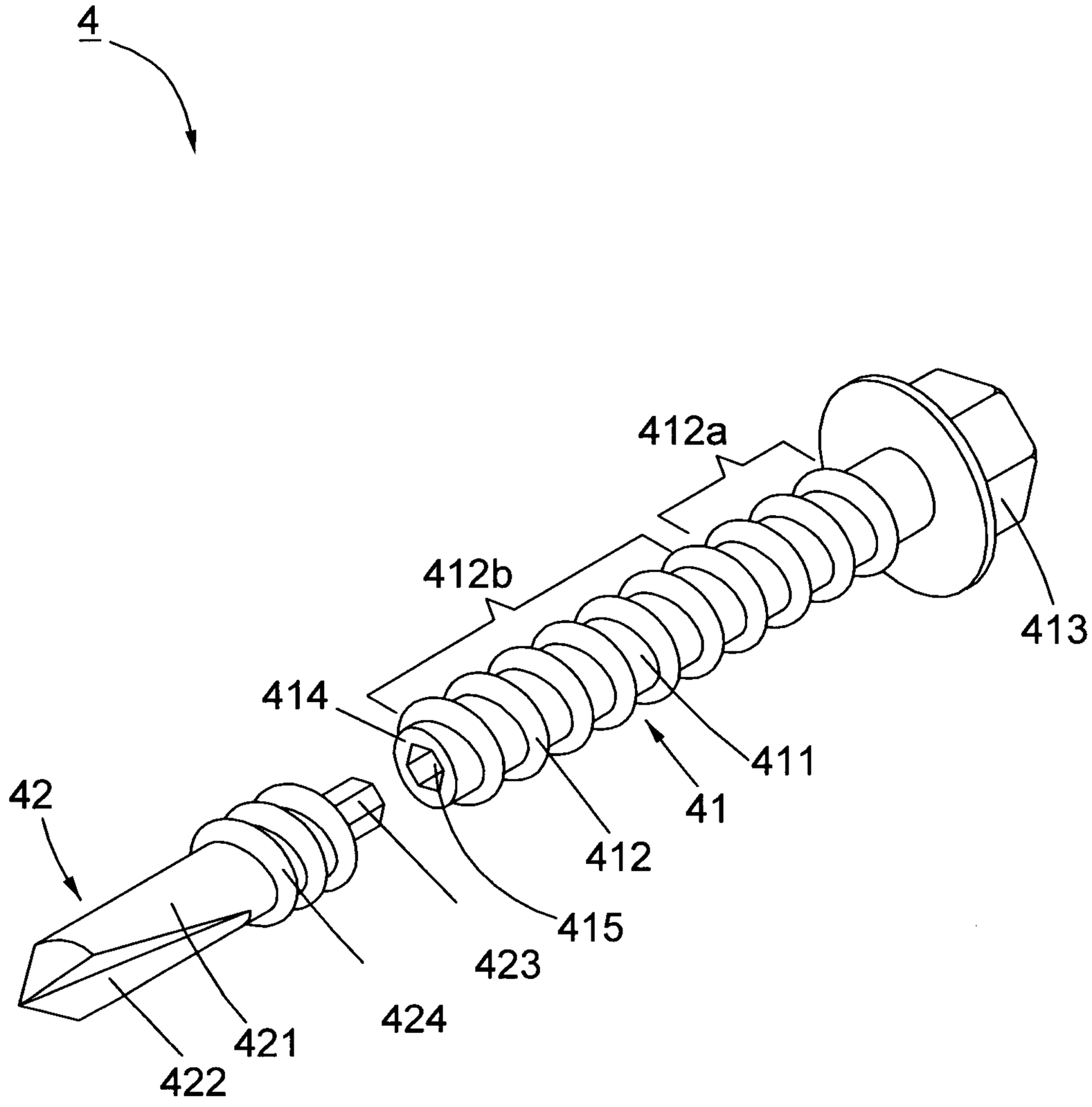


FIG. 6

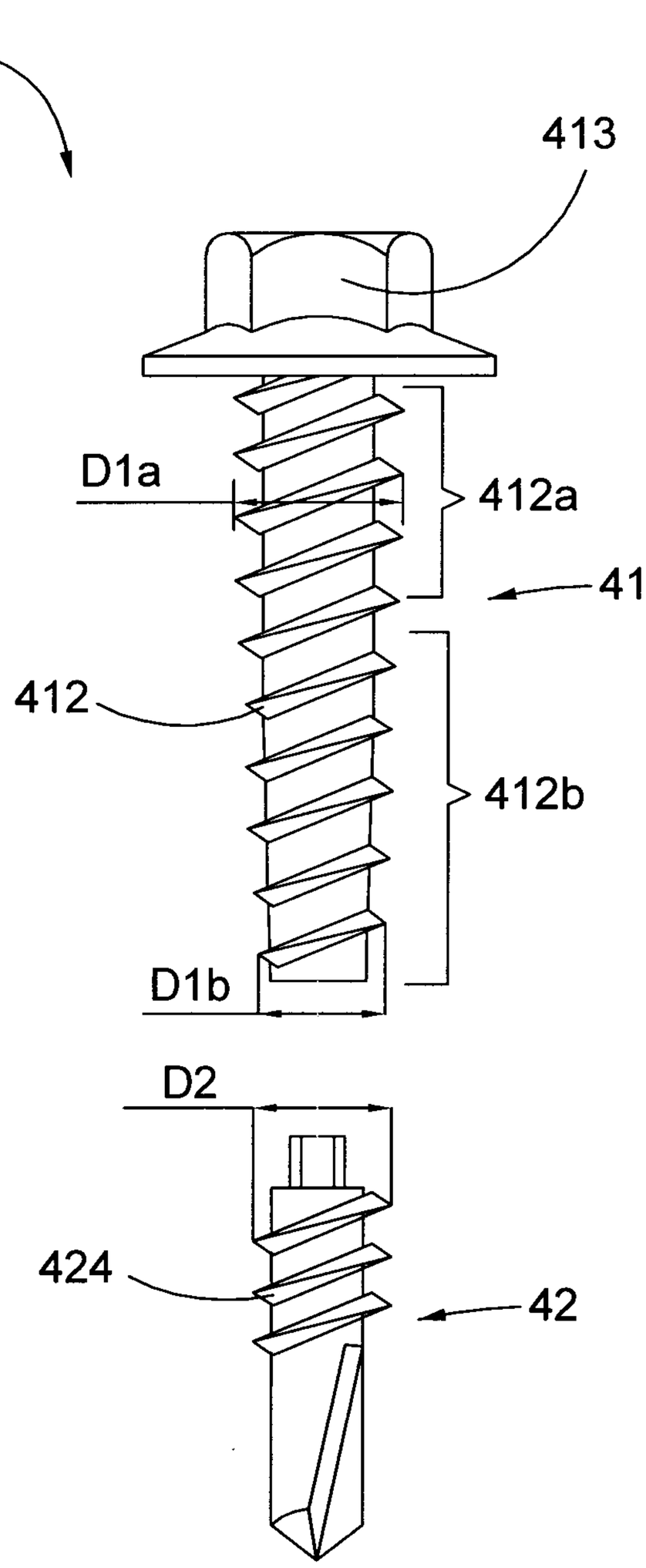


FIG. 7

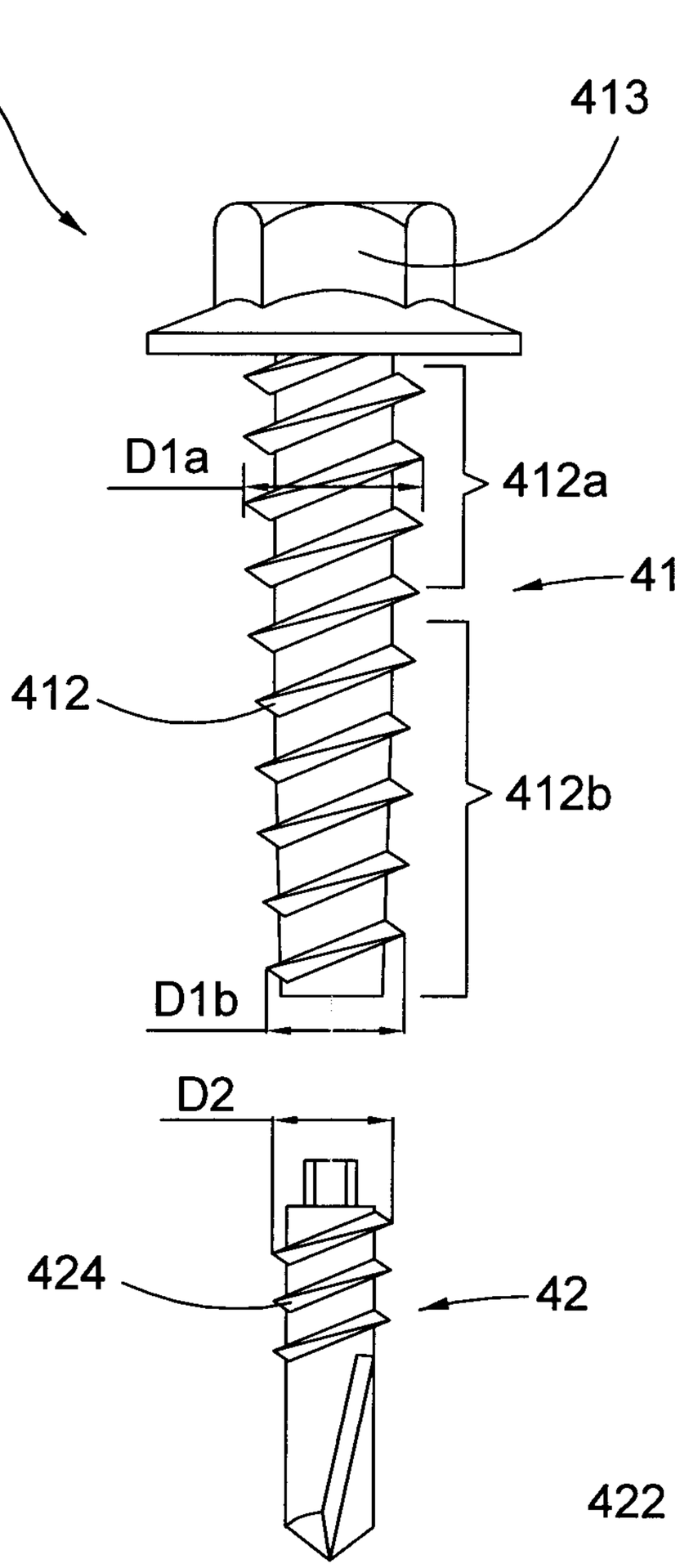


FIG. 8

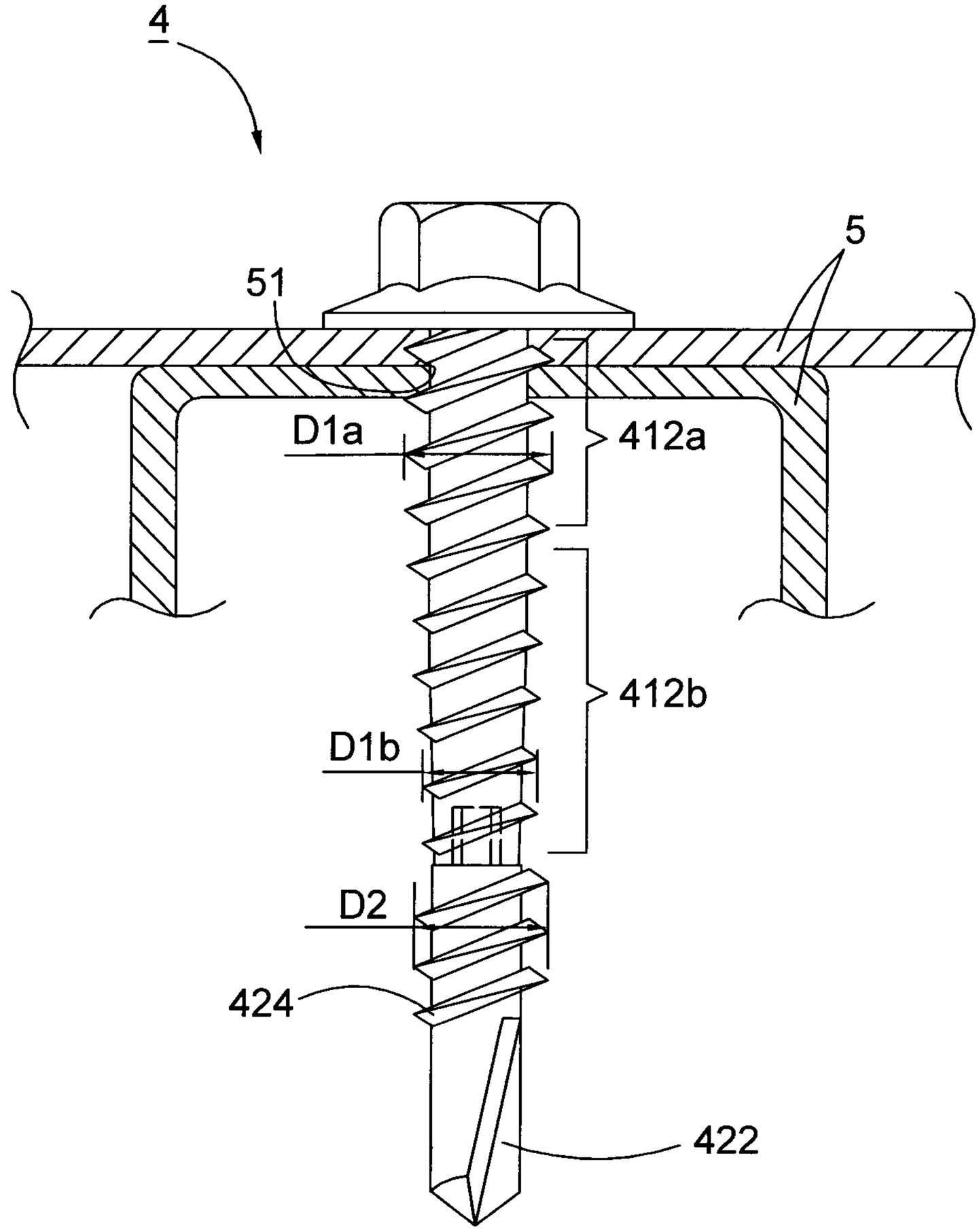
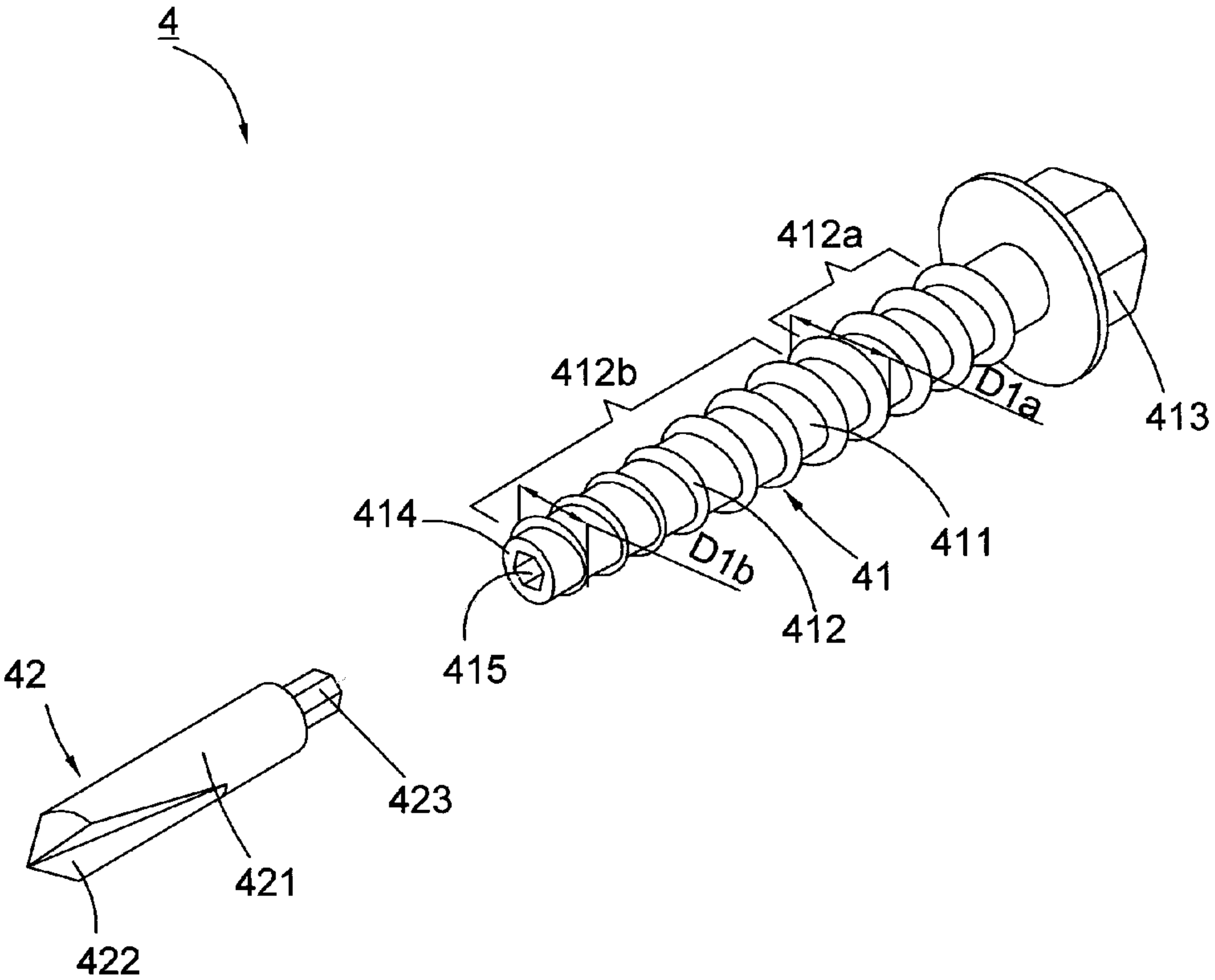


FIG. 9


4
412a
412b
D1a
413
414
D1b
41
411
412
415
42
423
421
422