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(71) Applicant: **Hall Clip Limited**
Chorley Lancashire PR7 5TA (US)

(72) Inventor: **Hall, James**
Chorley, Lancashire PR7 5TA (GB)

(74) Representative: **Misselbrook, Paul**
Appleyard Lees
15 Clare Road
Yorkshire
GB-Halifax HX1 2HY (GB)

(54) **Slate retainer and method of replacing broken slates**

(57) A method of replacing a slate (30a,30b,30c), without affecting surrounding slates (30a,30b,30c) is disclosed. The method comprises removing a broken slate. Once removed a respective fixing baton (20) of two underlying slates (30b) is visible. The method comprises securing a first portion (310) of a slate retainer (300) to the baton (20) visible between the two underlying slates (30b). Once attached, a replacement slate (30r) is slid upwardly along the underlying slates into position, wherein a head of the replacement slate (30r) rests on a respective head baton (20). This is made possible by causing a second portion (320) of the slate retainer (300) to resiliently flex between the two underlying slates when the replacement slate (30r) is slid into position. Once the replacement slate (30r) is in position, the second portion (320) can flex back in order to retain the replacement slate (30r) in position relative to the baton (20) using a second portion (320) of the slate retainer (300). A single-piece slate retainer (300) including a first portion (310) that is securable to a baton (20), a second portion (320) for holding a slate in position on a roof relative to the first portion (310) is also disclosed. The first portion (310) and second portion (320) are separated by an integral middle portion (330). The middle portion (330) is resilient so that the second portion (320) is resiliently flexible relative to the first portion (310) so that, in use, the second portion (320) is flexible between two underlying slates (30b).

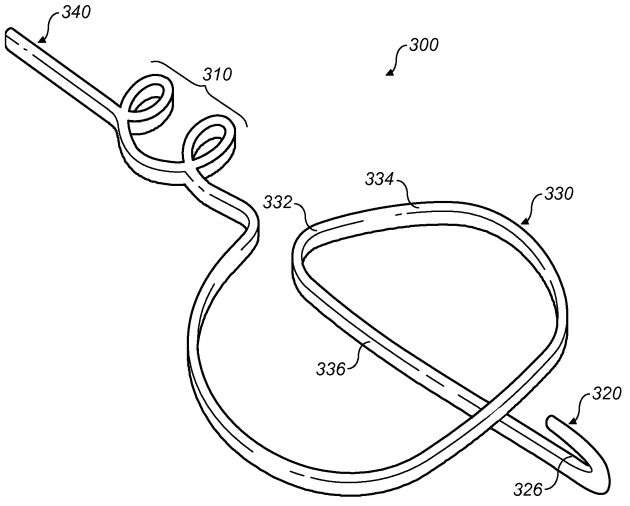

FIG. 5

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Description

[0001] The present invention relates to a slate retainer and in particular, although not exclusively, to a slate retainer for replacing broken slates and a method thereof.

[0002] It is extremely common for pitched roofs to be covered in slates or tiles to provide weather proofing. It should be noted that the term slate is used herein to refer to any natural or synthetic slates or tiles used as roof coverings. Conventionally, when covering a new roof or completely replacing an existing roof covering, each slate is drilled with two holes and held in place by driving nails through the holes into target areas of a roof.

[0003] One known technique is to use batons as target areas. Consequently, as illustrated in Figure 1, roof batons consisting of wooden strips are first secured to the roof. The roof batons are arranged to run across the roof in continuous parallel lines that are generally substantially horizontal. The slates are then added in rows working from the bottom upwards. Each slate is arranged so that an uppermost edge is located on a first free baton (herein the respective head baton). The slate is nailed to a baton immediately below the respective head baton (herein the respective fixing baton) with the nails generally locating slightly above an uppermost edge of an underlying slate. A lowermost edge of the slate being secured, extends beyond a baton immediately below the underlying slates respective fixing baton thereby concealing the nail heads holding the underlying slate in place. The process is continued, working up the roof, until the roof is covered. Consequently, a durable and long lasting weatherproof covering is provided.

[0004] As an alternative to conventional batoned roofs, it is also known to cover the roof with boards of wooden sheets. On so called boarded roofs, the boards form much larger target areas than the batons. Moreover, the head of a slate rests on an area of the board spaced from the target area rather than a respective head baton.

[0005] In use, the slates are prone to damage and require replacement. Where only a small number require replacement, it is not practical to remove all higher levels. In this case it is known to use a tool referred to as a "ripper". The ripper is a flat tool that is slightly thinner than the slates and includes a hooked portion. Thus the ripper can be used to remove the broken slate from the roof and the hooked portion can be used to rip the nails that previously held the broken slates in place from the roof. This can be done without affecting the surrounding slates. It is known to then slide a replacement slate upwardly into position and secure it in place using a strip of lead. For example, the strip of lead is nailed to a fixing baton of the underlying slates before a replacement slate is slid upwardly into position and the strip of lead subsequently bent to form a hook around the replacement slate. However, lead strips are prone to failing over time. Consequently, it is also know to secure the replacement slate in place using a slate retainer.

[0006] For instance, GB 2 228 502 discloses a two-part slate retainer comprising a fixing member that is secured to the respective fixing baton of the row of underlying slates, and a slate retaining member. The fixing member and slate retaining member are separate and arranged to slidably engage. Here the replacement slate is slid into position when the fixing means is secured. The slate retaining member is then slid into position, at which point the fixing member locks the slate retaining member relative thereto.

[0007] Know slate retainers can be unsightly. Furthermore, two part slate retainers can be fiddly to assemble, particularly given that roofers often wear gloves for protection from the cold.

[0008] It is an aim of the present invention to attempt to solve the above or other disadvantages. It is a further aim to provide a slate retainer for replacing broken slates that are less visible during use. It is a further aim of the present invention to provide a slate retainer and method of replacing broken slates that is easy and quick.

[0009] According to the present invention there is provided a method of replacing a slate and a single-piece slate retainer as set forth in the appended claims. Other features of the invention will be apparent from the dependent claims, and the description which follows.

[0010] According to an exemplary embodiment, there is provided a method of replacing a slate, without affecting the surrounding slates. The method comprises removing the slate. Once removed generally tops of two underlying slates are uncovered. Thus, a target area for a slate fixing of the underlying slates is visible between the abutment of the sides of the two underlying slates. The method comprises securing a first portion of a slate retainer to the target area visible between two underlying slates. Once attached, a replacement slate can be slid upwardly along the underlying slates into position. This is made possible by causing a second portion of the slate retainer to resiliently flex between the two underlying slates when the replacement slate is slid into position. Once the replacement slate is in position, the second portion can flex back in order to retain the replacement slate in position relative to the target area using a second portion of the slate retainer.

[0011] According to an exemplary embodiment, there is provided a single-piece slate retainer for use in the method of replacing a slate as previously described. Here the slate retainer includes a first portion that is securable to a target area of a roof. Suitably, the target area is a respective fixing baton of underlying slates. Here the baton is visible between the abutment of the sides of two underlying slates. Alternatively, the target area is a board of a boarded roof. The slate retainer also includes a second portion for holding a slate in position on a roof relative to the first portion. The first portion and second portion are separated by an integral middle portion. The middle portion is resilient so that the second portion is resiliently flexible relative to the first portion so that, in use, the second portion is flexible between two underlying slates.

[0012] Advantageously, because the second portion

flexes downwardly between the two underlying slates, the second portion does not interfere with the replacement slate. Consequently, a head of the replacement slate is able to correctly locate on its respective head baton or part of the board of a boarded roof.

[0013] Preferably, at least a portion of the slate retainer comprises an anchor portion. Here, the anchor portion is arranged above the two underlying slates. The anchor portion is sized so as to extend, relative to an elongate axis of said batons, a greater extent than the gap between the underlying slates so that the anchor portion can not flex between the two underlying slates. Advantageously, the anchor portion improves the resilience of the second part and enables the middle and second portions to be offered at an improved orientation. Suitably, the anchor portion is spaced from the first portion. Suitably, the anchor portion is spaced from the second portion. For instance, the anchor portion may form part of the middle portion.

[0014] In one exemplary embodiment, the integral middle portion is also able to resiliently extend to locate the second portion further from the first portion. Thus, the method comprises causing the second portion to resiliently move away from the first portion. Here the middle portion may comprise one or more loops. The middle portion may be arranged to locate the second portion above the desired location of a foot of the replacement slate. Advantageously, this allows the slate retainer, to retain the replacement slate in a pre-tensioned state. For example, the slate retainer, in the pre-tensioned state acts to urge the replacement slate upwardly with respect to the roof. Here, the second portion may comprise a hook. Advantageously, a hook provides better support to the replacement slate.

[0015] In an exemplary embodiment the first portion includes at least one fixing location for receiving a fixing, such as a nail, in order for the first portion to be secured to the respective fixing baton of the underlying slates or secured to the board of a boarded roof. Suitably, the fixing location is an aperture. Preferably however, it is advantageous to provide at least two fixing locations, particularly when fixing to batoned roofs. Here, each fixing location is arranged so as to be spaced from the second portion a desired distance to accommodate two or more standard baton spacing distances. Thus, one slate retainer can be used to repair roofs having different baton spacings. Alternatively, a number of slate retainers can be designed, each suitable for a specific baton spacing. It will be appreciated that the location of the fixing location is not as critical for boarded roofs as the target area is larger.

[0016] In an exemplary embodiment, the slate retainer includes a locating portion. The locating portion is arranged, in use, to locate between the two underlying slates when the first part is secured to the target area. Thus, advantageously, the locating portion enables the slate retainer to be quickly and repeatedly positioned and aligned in place. Suitably, the locating portion is arranged on the opposite side of the first portion with respect to the second portion.

[0017] Preferably, the slate retainer is formed, at least partially, from a sprung wire such as sprung steel wire. More preferably, the slate retainer is formed entirely from sprung wire. Here the fixing locations may be formed by a loop of wire. Furthermore, the second portion may be formed by bending the wire to create at least one elbow. A hook may be formed by creating at least two elbows. Furthermore, the locating portion may be formed by bending the wire. Moreover, the middle portion may be formed by creating a looped section of wire. The loop may be a full loop or a portion thereof.

[0018] For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings in which:

Figure 1 shows a conventionally covered roof;

Figure 2 illustrates using a ripper tool to remove a broken slate from a roof;

Figure 3 shows a pictorial view of a first embodiment of a slate retainer;

Figure 4 shows a pictorial view of a second embodiment of a slate retainer.

Figure 5 shows a pictorial view of a third embodiment of a slate retainer.

Figure 6 and 7 show plan and side elevation views of Figure 5.

Figure 8 shows a side elevation view of a fourth embodiment of a slate retainer.

Figure 9 shows plan and side elevation views of a fifth embodiment of a slate retainer.

Figures 10 and 11 show process steps detailing a method of replacing a broken slate using the slate retainer shown in Figures 5 to 7.

Figures 12a and 12b show a perspective and side elevation view respectively of a tool for use in replacing a broken slate using the slate retainer.

[0019] Referring to Figure 1, a conventional roof 10 is shown. The roof 10 has a plurality of batons 20 secured in parallel lines and at a predetermined spacing. The roof 10 is slated by securing a first, lowermost, row of slates 30a to the roof. Further slate rows 30b and 30c are added working up the roof. Each slate is pre-drilled with two fixing holes. Each slate is secured to the roof by locating an uppermost edge or head of the slate on a respective

head baton 22a (i.e. 22c for slate 30c). The slates can then be nailed to a respective fixing section 24c using nails 40. It will be appreciated that the respective head baton of a lower slate forms the respective fixing baton of the next upper level of slates. Furthermore, a lowermost edge of each slate extends so as to conceal the nail heads of the row of underlying slates.

[0020] Referring to Figure 2, a ripper tool 50 is used to remove a broken slate and to pull the redundant nails 40 from the batons (i.e. in nails previously used to hold the broken slate in place). This can be done without affecting the surrounding slates.

[0021] Figure 3 shows a first embodiment of a slate retainer 100. The slate retainer 100 is a single piece. The slate retainer 100 includes a first portion 110 and a second portion 120. The first portion 110 and the second portion 120 are joined by a middle portion 130. Here, the first portion is shown as a fixing location 112. The first portion is sized so as to be greater than the gap between the two underlying slates. Thus the first portion provides an anchor point located, in use, above the underlying slates. Suitably, the slate retainer is formed from a continuous piece of sprung wire. Thus, because the middle portion is formed from a straight piece of wire, the second portion can resiliently flex relative to the anchor portion as indicated by arrow A. Here, the second portion 120 comprises an upwardly bent portion of wire 122. Consequently, from the description which follows, it will be appreciated that the second end, in use, can flex between two underlying slates. Consequently, as a replacement slate is slid into position, the second portion 120 is able to resiliently flex between the two underlying slates with a distal end 124 pushing upwardly against the replacement slate. When the replacement slate is slid upwardly so that the distal end is clear of the replacement slate, the resiliency of the middle portion causes the second portion to spring upwardly. Thus as the replacement slate is released and urged to slide downwardly under gravity, the replacement slate abuts the upwardly bent portion 122. Thus the slate retainer holds the replacement slate in position. Advantageously, because only the upwardly bent portion 122 is visible, the slate retainer is very discrete. Moreover, because the slate retainer is one piece, it is easy to install.

[0022] Referring to Figure 4, a slate retainer 200 according to a second embodiment is shown. The slate retainer 200 is a single piece having a first end 210, a second end 220 and a middle portion 230. However, the slate retainer 200 also includes a locating portion 240. The locating portion 240 extends from the opposite side of the first portion to that of the second portion and comprises a downwardly bent portion of wire. Consequently, the locating portion extends in an opposite direction to the second portion (e.g. one extends in a positive z-direction and the other extends in a negative z-direction). In use, the locating portion 240 is able to locate permanently between the two underlying slates, even when the second portion 220 flexes.

[0023] Consequently, the locating portion 240 enables the slate retainer 200 to be quickly and correctly located. As will be herein described, the locating portion is aligned with fixing locations 212a and 212b and the second portion 220 along the same axis (axis y of Figure 4).

[0024] The first portion 210 of the slate retainer 200 is shown in Figure 4 as suitably including two fixing locations 212a and 212b. Each fixing location 212 is an aperture formed from a loop of the wire. The distance between the fixing location 212a and the second portion 220 is arranged to be suitable for a first standard baton spacing. Whereas, the distance between the fixing location 212a and the second section 220 is arranged to be suitable for a second standard baton spacing. Thus, the slate retainer 200 may be used on roofs having either the first or second standard spacing. Referring to Figure 4, the fixing locations 212 lie in the x-y plane.

[0025] In contrast to the first embodiment, the middle portion 230 of the second embodiment is not only able to flex up and down in the z-direction (indicated by arrow A), but is also resiliently extendable in the y-direction. Suitably, the middle portion is formed from a partial loop of wire. For instance, as shown in Figure 4, the middle portion forms a substantially semi-circular loop of wire. Consequently, the second portion extends on the same axis as the fixing locations. This is necessary in order for the fixing locations 212 and the second portion 220 to locate over the gap between the two underlying slates. Because the middle portion 230 is resilient, the second portion 220 can be moved in the y-direction to extend the distance between the fixing locations 212 and second portion 220. It will be appreciated that this acts to flatten the loop of sprung wire. When the second portion is released, the resilient nature of the middle portion 230 causes the second portion 220 to return to its initial position relative to the fixing locations 212. The middle portion 230 is shown as a loop of the sprung wire extending in the x-y plane. Suitably, the loop extends, relative to the length of the batons, a greater distance than the gap between the slates. That is the radius of the middle section may be greater than 10 times or greater than 20 times or greater than 30 times the gap between the underlying slates. Consequently, in this embodiment the middle portion 230 forms an anchor. This is because the middle portion, in use, is arranged on top of the underlying slates and the resilient nature of a bend 232 causes the second portion 220 to flex between the underlying slates.

[0026] The second portion 200 of the slate retainer 200 is shown in Figure 4 as a hook 226. The hook 226 is shown as a portion of the sprung wire being bent 180° about a bend having a radius r. The radius r is suitably sized so as to be the same as a thickness of the replacement slate. In order to accommodate variances in slate thickness, the radius may be greater than the thickness of the slate. For instance, the radius may be greater than the slate thickness, by less than 50% or by less than 20% or by less than 10% of the slate thickness. Importantly, the hook 226 is sized so that it can flex completely be-

tween the two underlying slates. The hook 226 includes a length of wire 228 that runs back toward the fixing location. The length of the wire 228 is less than the distance that the middle section can resiliently expand in the y-direction. Alternatively the hook 216 may comprise an end portion of the sprung wire being bent to extend at right angles and the tip being bent over a further 45 degrees. Consequently, although the hook still springs around the foot of a replacement slate, the slate retainer has to expand a lesser degree.

[0027] In use, as the replacement slate is slid into position, the hook is able to flex downwardly between the underlying slates. When the slate is in position, the hook 226 remains in contact with the replacement slate as the hook does not move clear of the replacement slate. Thus, a tool can be used to cause the hook 226 to move in the y-direction due to the expansion of the middle portion. Once the hook 226 is clear of the relevant slate, the resilient nature of the middle portion 230 causes the hook 226 to flex upwardly, out of the gap between the two underlying slates and also contract to its original distance from the fixing locations 212. Thus the hook is arranged about the replacement slate.

[0028] It may be desirable to cause the hook to hold the replacement slate in a tensioned state. In this case the distance between the second portion 220 and the fixing location 212, in the unstressed state is arranged to be less than the desired distance between the respective fixing batons and foot of the replacement slate. Thus, when hooked on a replacement slate, the middle portion remains in an extended state along the y-direction and therefore applies a force on the replacement slate acting to urge the replacement slate upwardly. It will be appreciated that this upwardly force would be resisted either by the replacement slate abutting nails in higher rows or it would be insufficient to overcome the gravitational force of the replacement slate so that the replacement slate remains in the correct alignment on the roof.

[0029] Referring to Figures 5-7, a third embodiment of a slate retainer 300 is shown. The slate retainer 300 includes a first portion 310, a second portion 320 and a middle portion 330 formed from a continuous, single piece of sprung wire. The first portion 310 and second portion 320 are substantially the same as the first 210 and second portions 220 of the second embodiment 200. Moreover, the slate retainer 300 also includes a locating portion 340 substantially the same as the locating portion 240 of the second embodiment 200. Whilst the middle portion 330 of the slate retainer 300 is able to resiliently expand in the y-direction and also enable the second portion 320 to resiliently flex between the underlying slates, the middle portion 330 is shown in Figures 5-7 as comprising a substantially circular loop 334 and a straight extension 336. The straight extension 336 extends under (with respect to the replacement slate) the loop 334. This is advantageous because the substantially circular loop 334 provides the second portion 320 with greater resiliency in the y-expansion. Moreover, the straight extension 336 provides greater distance between resilient bend 332 and the hook 326. Consequently, to obtain the same movement of the hook 326 between the underlying slates requires reduced twisting of the bend 332, which further improves the resiliency. As shown in Figures 5-7, the loop 334 extends in the x-y plane, and the straight section is coincident with the hook 326 such that it is arranged, in use, directly above the gap between two underlying slates.

[0030] Figure 8 shows a fourth embodiment of a slate retainer 400. The slate retainer 400 includes a first portion 410, a second portion 420 and a middle portion 430. The slate retainer also includes a locating portion 440. The slate retainer 400 is substantially the same as the slate retainer 300 of the third embodiment. However, the second and third portions are arranged in a plane angled to the x-y plane of the fixing locations. Consequently, when the slate retainer 400 is secured to a respective fixing baton, the middle portion rises upwardly rather than being parallel to the replacement slate. This provides improved resiliency.

[0031] Referring to Figure 9, a fifth embodiment of a slate retainer 500 is shown. The slate retainer 500 comprises a first portion 510, a second portion 520 and a middle portion 530. A locating portion 540 is also included. The first and second portions are substantially as herein described. The locating portion 540 is substantially as herein described. However, rather than being a loop as described in relation to locating portion 340, locating portion 540 is a straight piece of wire extending at right angles to the first portion. Whilst the middle portion 530 is able to resiliently expand in the y-direction and also enable the second portion 520 to flex between the underlying slates, the middle portion 530 is shown in Figure 9 as comprising a snaking length of a sprung wire. Suitably, the snaking length of sprung wire includes a first, second and third u-shaped bend 538. Each u-shaped bend causes the sprung wire to turn back on itself through 180°. As with the second through fourth embodiments, the middle portion acts as an anchor and extends a greater extent relative to the length of said batons than the gap between the slates. The resiliency in the bends 538 causes the middle portion 530 to allow the second section 520 to move further away from the fixing locations but biases the second portion to return to the original position once a force is removed. Thus whereas in the second, third and fourth embodiments a single loop of sprung wire are provided.

[0032] A method of using the slate retainer 300 will now be described with reference to Figures 10 and 11. It will be appreciated however, that the method will be equally applicable to securing a replacement slate using any of the slate retainers described above.

[0033] As shown in Figure 10, a broken slate is first removed from the roof. This includes removing the nail fixings previously used to hold the broken slate in place. A ripper tool may be used as in known replacement methods. A slate retainer 300 is then secured to a respective

fixing baton of a course of underlying slates. The respective fixing baton is visible through a gap and found between two underlying slates. The slate retainer 300 is secured by driving a nail or other fixing through the fixing location 212. Once secured, the hook 326 is arranged slightly above the desired level of the foot of the replacement slate. The middle portion 330, forming the anchor, is arranged on top of the two underlying slates and the second portion 320 arranged spaced above the gap between the two underlying slates. The locating portion 340 locates easily and quickly between the two underlying slates in order to aid assembly to the roof.

[0034] As shown in Figure 11, a replacement slate 30r is slid upwardly with respect to the roof to locate in the space of the removed slate. In sliding the replacement slate upwardly, the replacement slate abuts the hook causing the hook to flex downwards between the slates. Consequently, the hook does not interfere with the replacement slate and as such, the replacement slate can be located correctly on its respective head baton. Once the replacement slate 30r is in position a tool, such as a ripper tool 50 can be used to pull the hook 326 downwardly. Here the ripper 50 is slid under the replacement slate and then a barbed portion used to catch the hook 326. By pulling the hook 326 downwards, it is able to move clear of the replacement slate. When it is clear, the natural resiliency provided by the middle section causes the hook to flex upwards and contract thereby securing the replacement slate in position.

[0035] As an alternative to causing the hook 326 to move downwardly, clear of the replacement slate using the ripper, a tool may be used. A suitable tool 600 is shown in Figure 12. The tool 600 includes a catch 610 a handle 620 and an elongate middle section 630. The catch is sized so as to fit about the hook 326 of the slate retainer. Suitably, the catch is shown in Figure 12 as an eyelet. The handle 620 is sized so as to be gripped by the fingers of a user. Suitably, the handle is shown in Figure 12 as a substantially circular loop of wire. The handle 620 is bent upwardly with respect to the elongate middle section to aid gripping. Suitably, the handle is shown being bent at an angle A of approximately 45°. The elongate middle section is substantially straight. Suitably, the elongate middle section is substantially straight. Suitably, the elongate middle section is formed from a length of wire. Advantageously, the tool may therefore be formed from a single, continuous length of wire. As shown in Figure 12, although not essential, the elongate middle section may include a kink 632. The kink 632 extends downwardly. In use, once a slate retainer has been secured to the roof but before a replacement slate is arranged is position, a tool 600 is hung from the hook. This is done by causing the catch 610 of the tool 600 to locate about the hook. The kink 632 locates in the gap between the two underlying slates in order to give the tool some positional stability. The elongate middle section 630 is long enough so that the handle is located so as not to interfere with the locating of the replacement slate. Once the replacement slate is arranged in position, the handle can be pulled downwardly in order to extend the slate retainer so that the hook moves clear of the replacement slate and is therefore able to spring upwardly to hook the replacement slate.

[0036] Advantageously, the slate retainer and method herein described allows replacement slates to be quickly and easily installed. Moreover, the slate retainers provide improved aesthetics as only a minimal portion of the hook is visible. Furthermore, the slate retainers provide improved securing as the replacement slates are less likely to be dislodged.

Claims

1. A method of replacing a slate, the method comprising:

   removing the slate;
   attaching a first portion of a slate retainer to a target area of a roof that is visible between two underlying slates;
   arranging a replacement slate into position;
   retaining the replacement slate in position relative to the target area using a second portion of the slate retainer; and
   causing the second portion of the slate retainer to resiliently flex between the two underlying slates when the replacement slate is arranged in position.

2. The method as claimed in claim 1, wherein the method comprises the step of causing the second portion to resiliently move away from the first portion in order to retain the replacement slate.

3. The method as claimed in claim 2, wherein the step of causing the second portion to resiliently move away from the first portion comprises using a tool to catch the second portion, and using the tool to extend the second portion away from the first portion.

4. The method as claimed in any preceding claim wherein the method includes the step of locating a locating portion between the two underlying slates.

5. A single-piece slate retainer comprising:

   a first portion that is attachable to a target area of a roof;
   a second portion for holding a slate in position on a roof relative to the first portion; and
   a middle portion, arranged between the first portion and the second portion, the middle portion being resilient so that the second portion is resiliently flexible relative to the first portion so that, in use, the second portion is flexible between

two underlying slates.

6. The single-piece slate retainer of claim 5, wherein a portion of the slate retainer comprises an anchor.

7. The single-piece slate retainer of claim 6, wherein the anchor portion comprises the middle portion.

8. The single-piece slate retainer of any of claims 5 to 7, wherein the middle portion is resiliently extendable to move the second portion away from the first portion.

9. The single-piece slate retainer of claim 8, wherein the second portion comprises a hook.

10. The single-piece slate retainer of claim 8 or claim 9, wherein the second portion is arranged to be spaced from the first portion a distance less than the desired distance between the first portion and that of the replacement slate, so that, in use, the slate retainer retains the replacement slate in a tensioned state that biases the foot of the slate to move toward the first portion.

11. The single-piece slate retainer of any of claims 5 to 10, wherein the first portion includes at least a first fixing location for receiving a fixing.

12. The single-piece slate retainer of claim 11, wherein the first portion includes a second fixing location.

13. The single-piece slate retainer of any of claims 5 to 12 wherein the slate retainer includes a locating portion.

14. The single-piece slate retainer of any of claims 5 to 13 wherein the single-piece slate retainer is fabricated from a continuous length of sprung wire.

15. A method of manufacturing a single-piece slate retainer that is as claimed in any of claims 5 to 14, wherein the method of manufacture comprises forming the single-piece slate retainer by bending a continuous length of sprung wire.

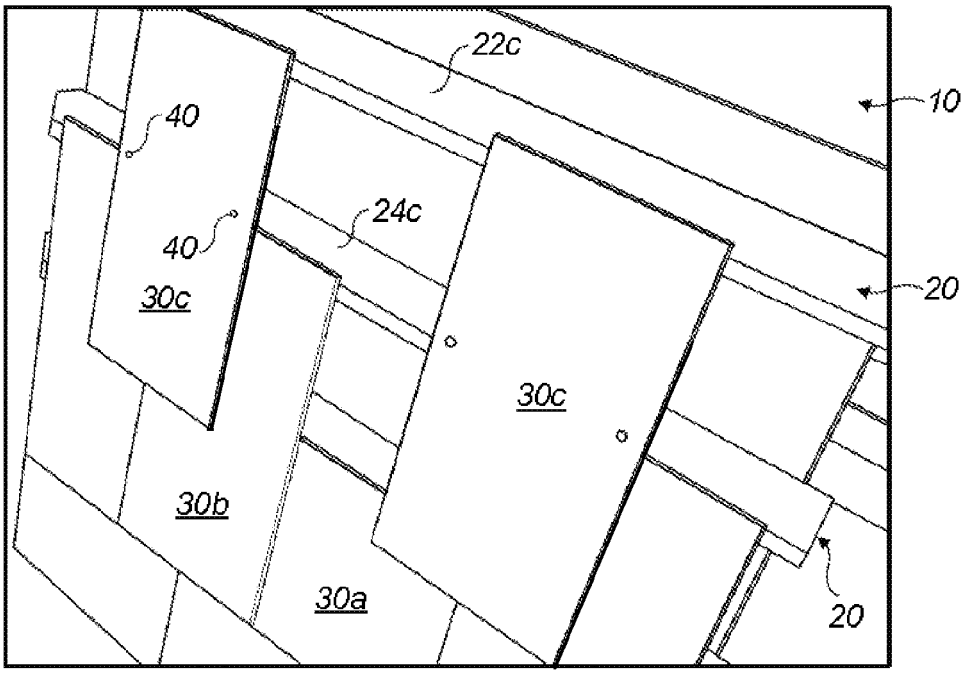

FIG. 1

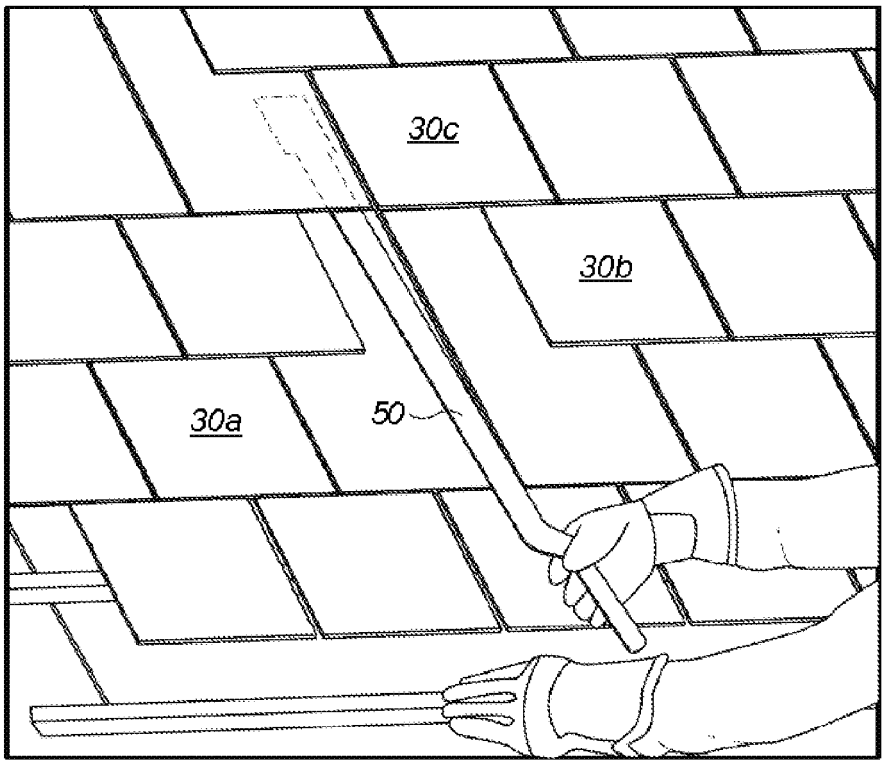

FIG. 2

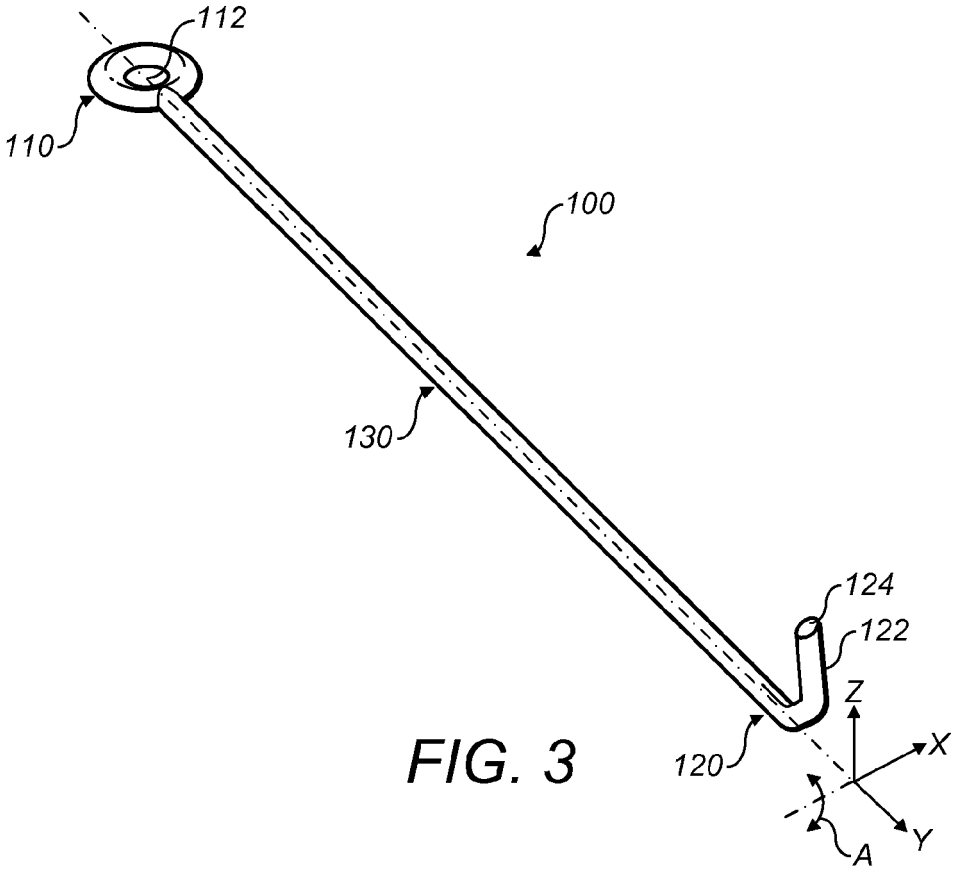
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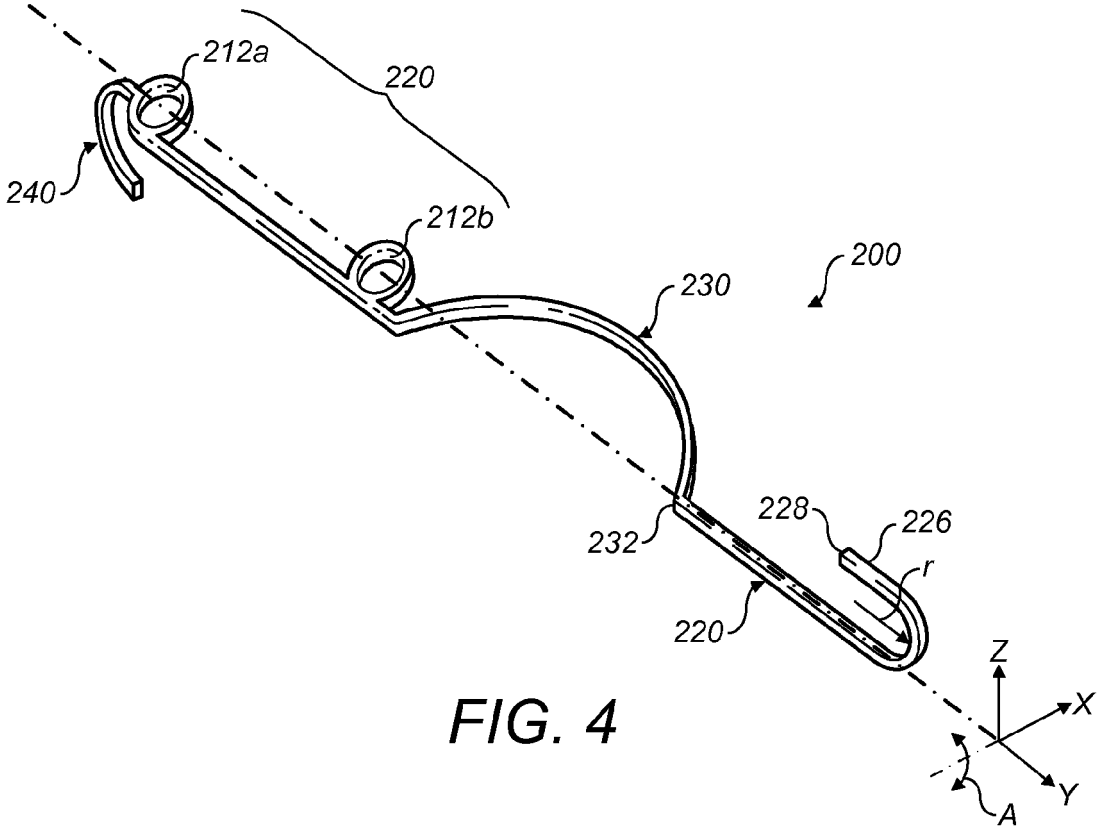
FIG. 3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228
226
232
r
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Z
X
Y
A

FIG. 4

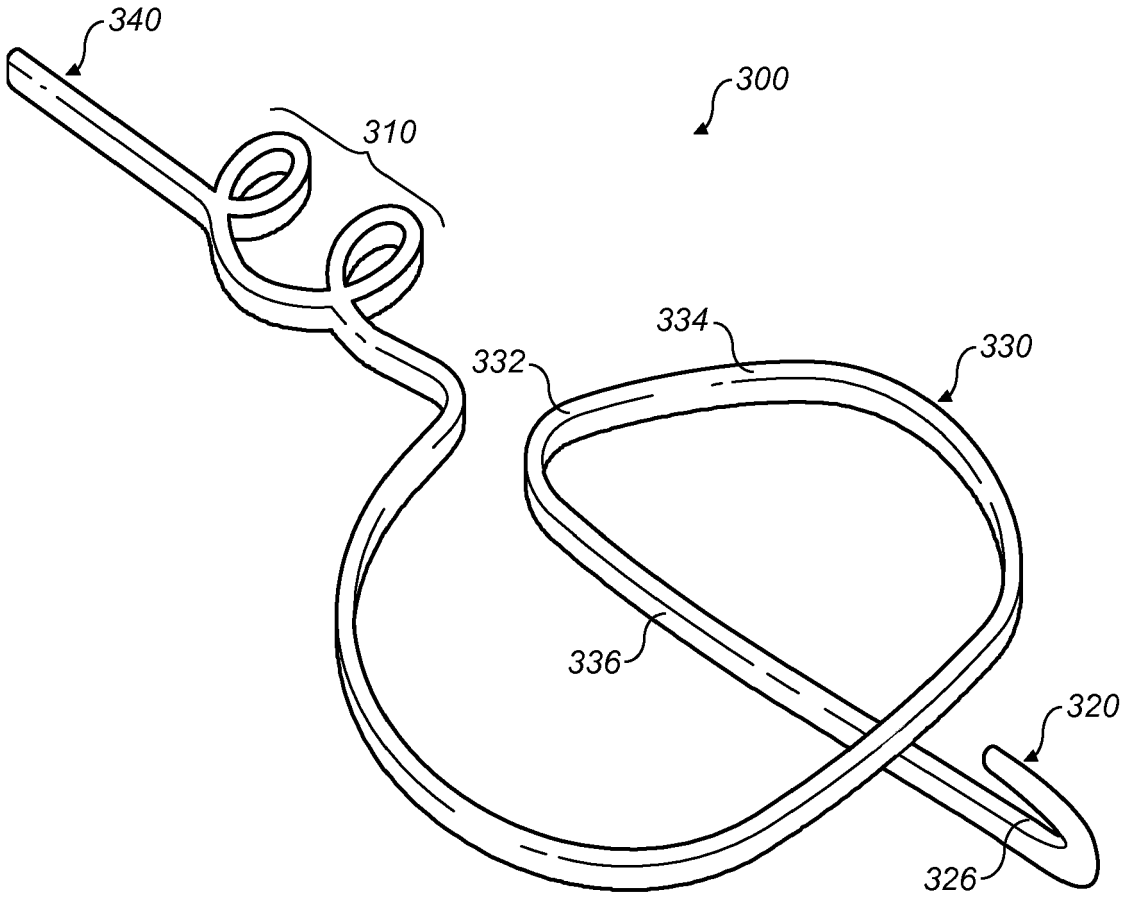

FIG. 5

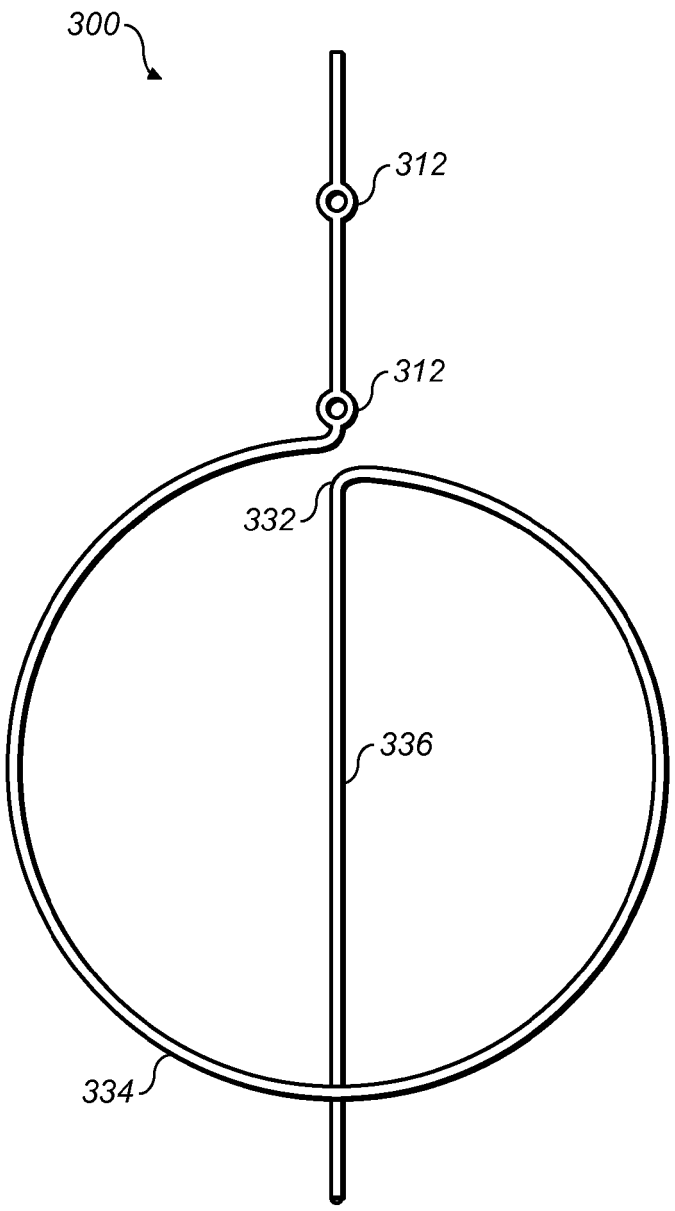

FIG. 6

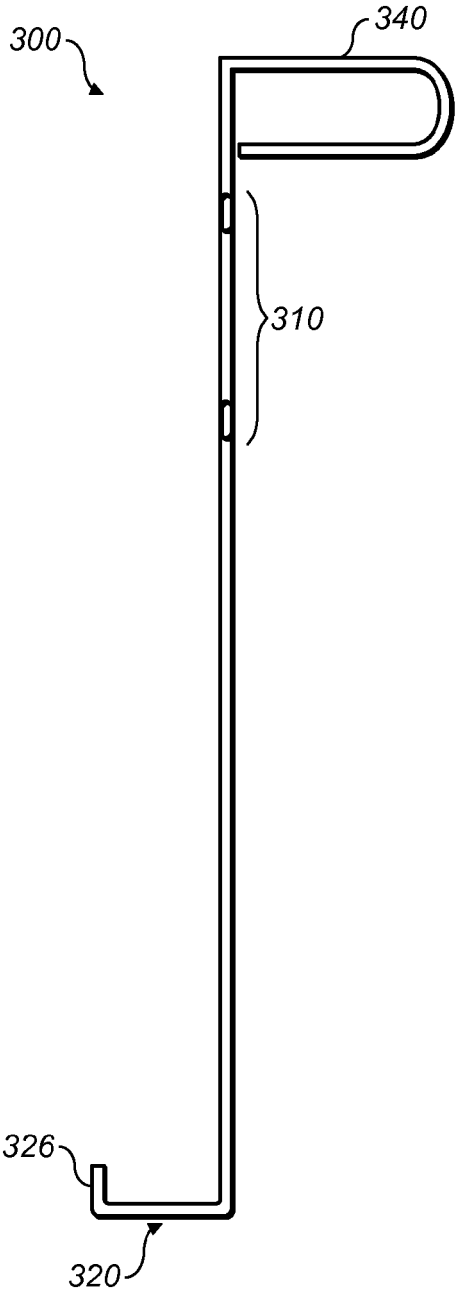

FIG. 7

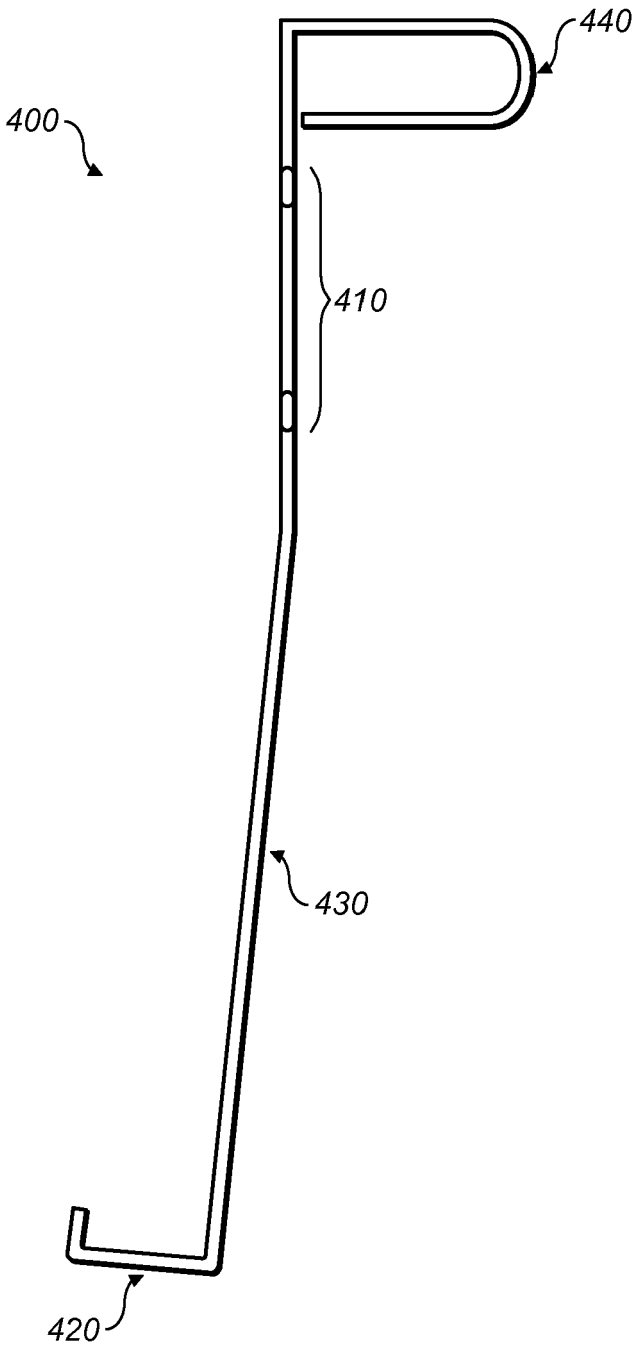

FIG. 8

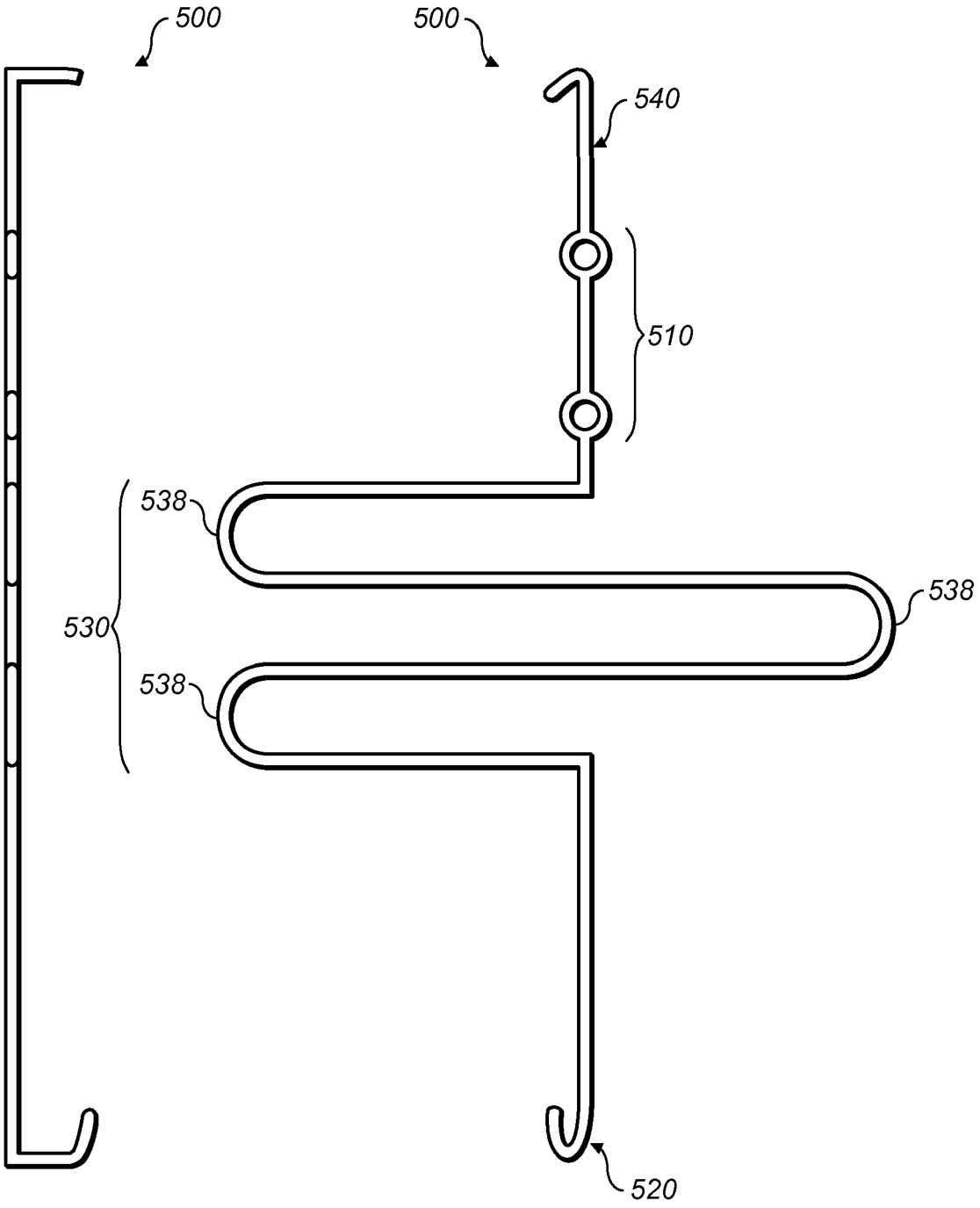

FIG. 9

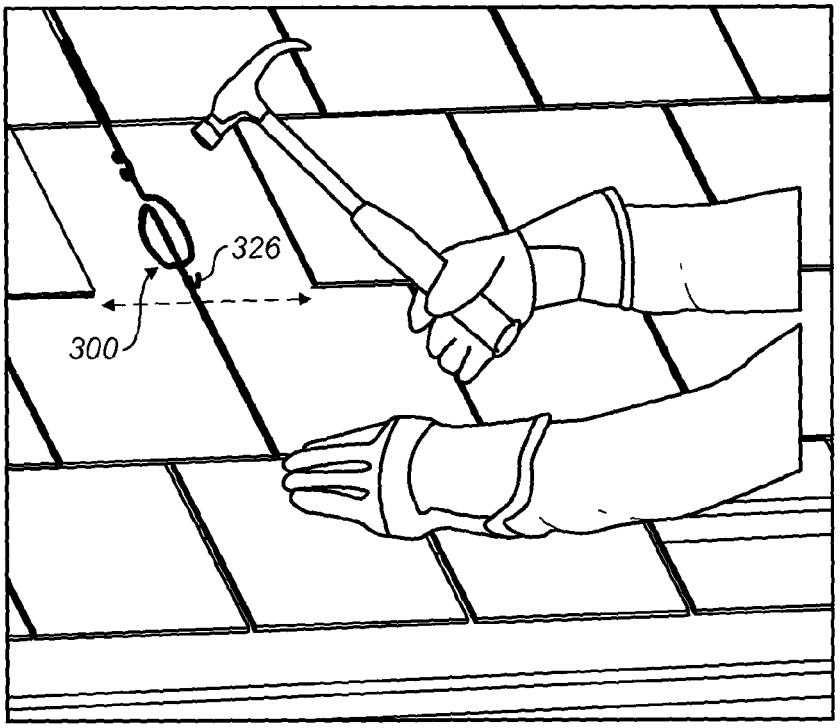

FIG. 10

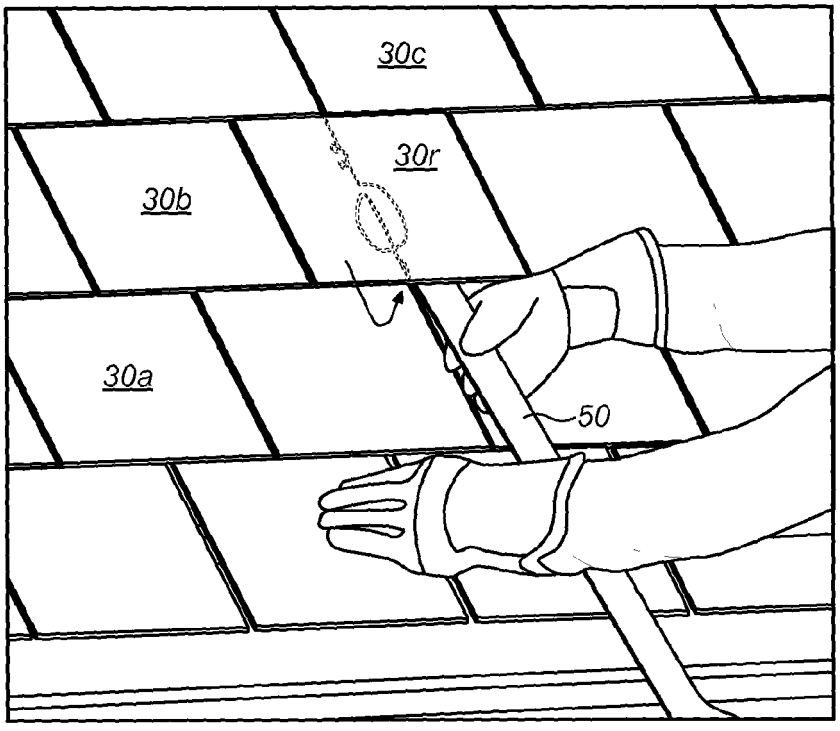

FIG. 11

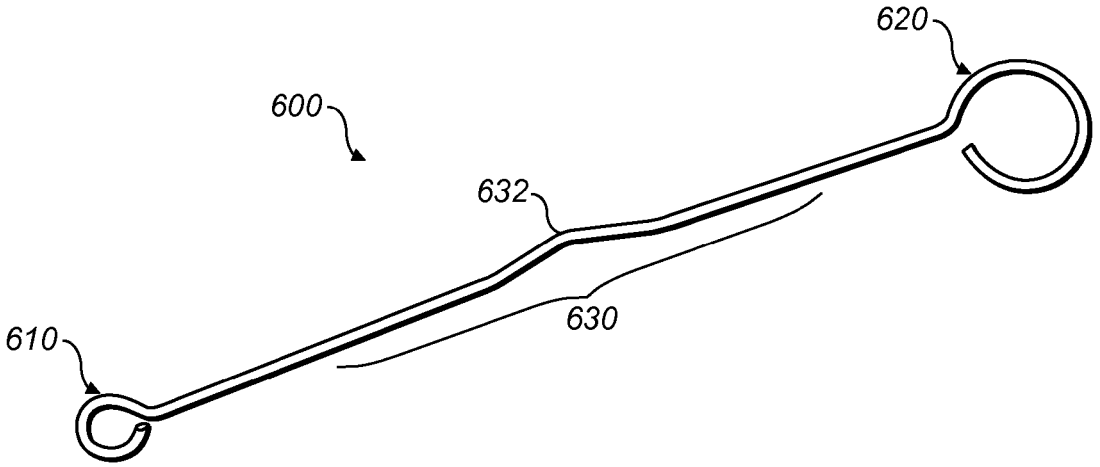

FIG. 12a

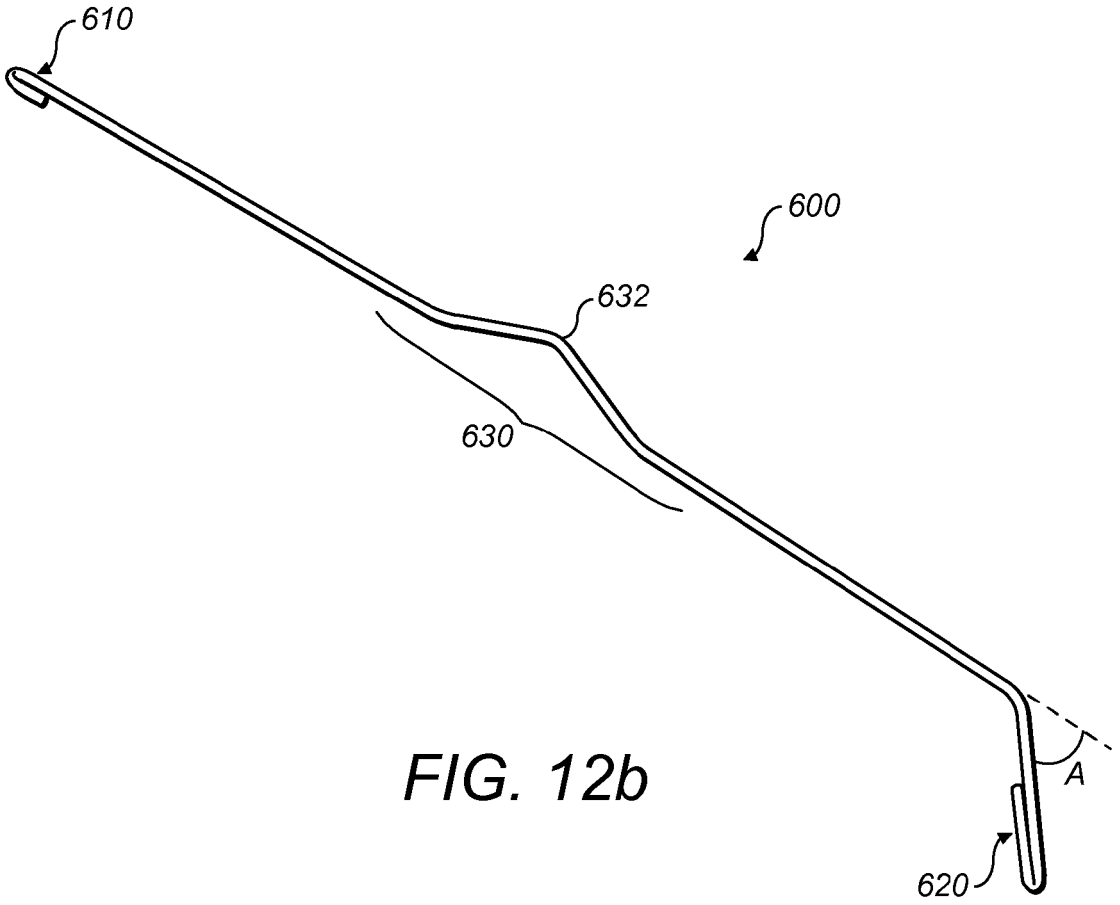

FIG. 12b

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EUROPEAN SEARCH REPORT

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 794 396 A (GIBBS ALDEN T [US]) 18 August 1998 (1998-08-18) * column 12, line 60 - column 13, line 7; figure 42 *	1-4	INV. E04D1/34
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 November 2010	Giannakou, Evangelia

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 November 2010	Giannakou, Evangelia

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