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(54) **DECK PLANK FASTENER**

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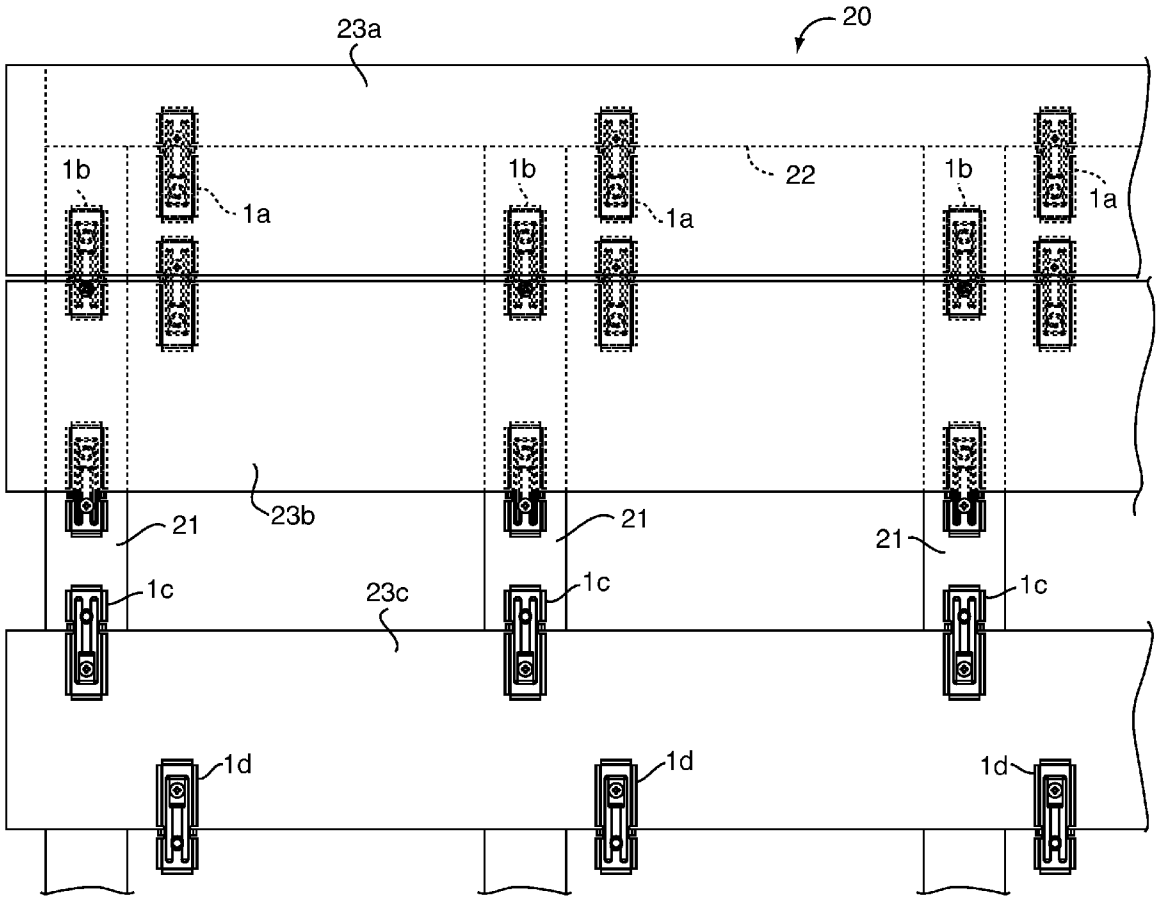
(57) **ABSTRACT**

A deck plank fastener for securing the deck planks to the underlying joists of a decking structure. The fastener includes a flat body, a top surface, a first end including a first hole, a second end including a second hole, and two upward tabs. One such fastener is attached to an edge of the bottom surface of the plank by inserting an anchoring element through the first hole and to an upper surface of a joist by inserting an anchoring element through the second hole. A second such fastener is attached to the opposing edge of the bottom surface of the plank by inserting an anchoring element through the first hole and is projected under an adjacent plank in the area of the second end. The two upward tabs ensure uniform spacing and parallelism between adjacent planks.



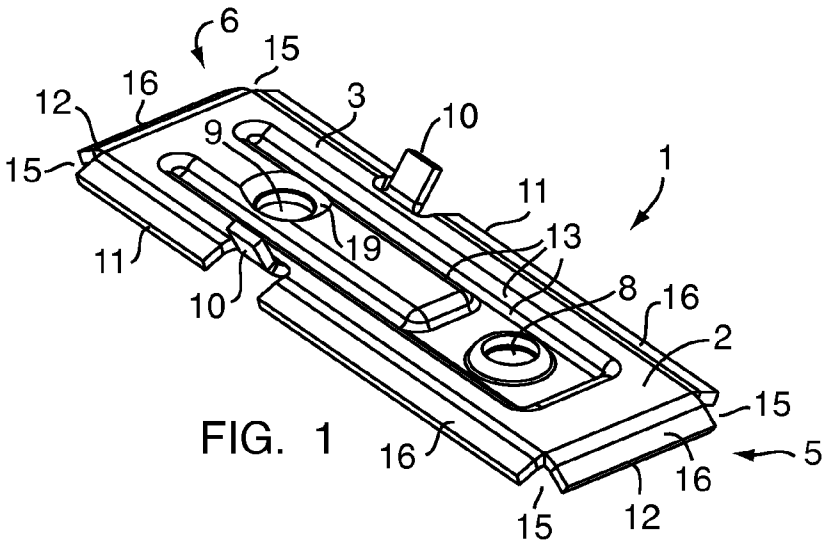


FIG. 1

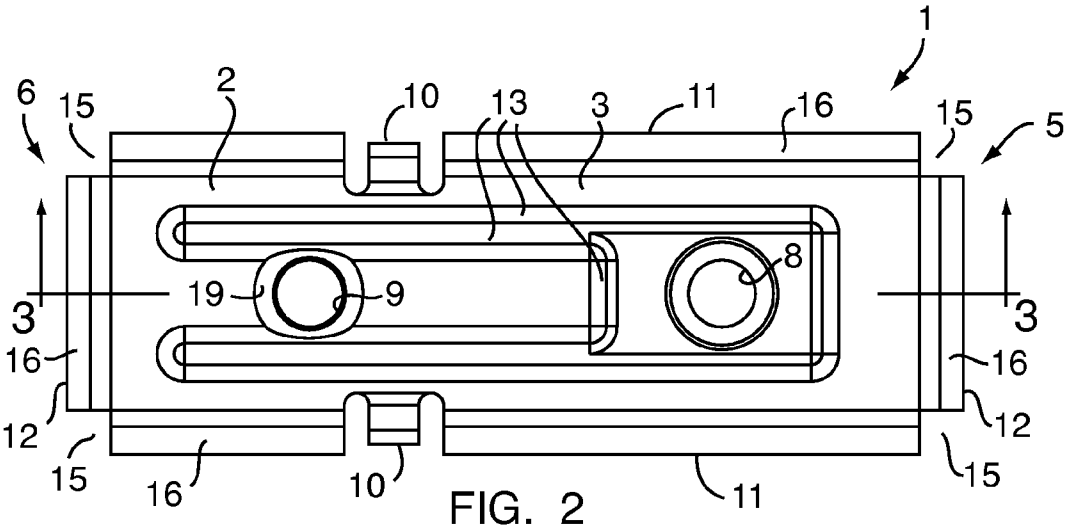


FIG. 2

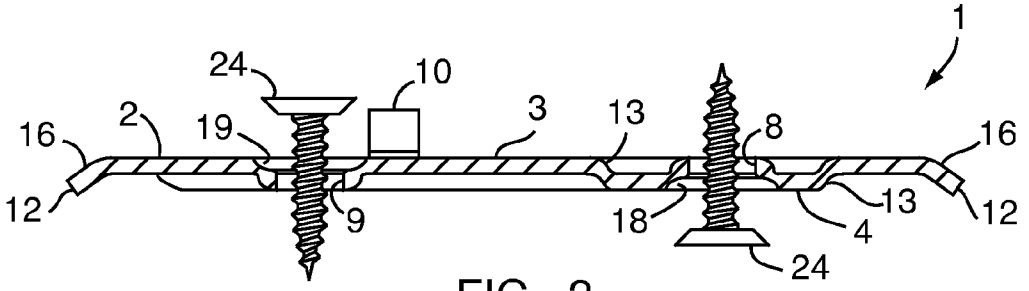


FIG. 3

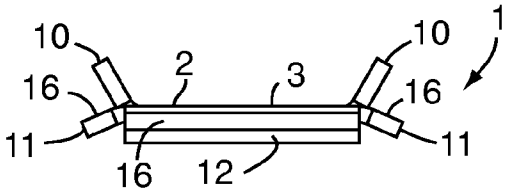


FIG. 4

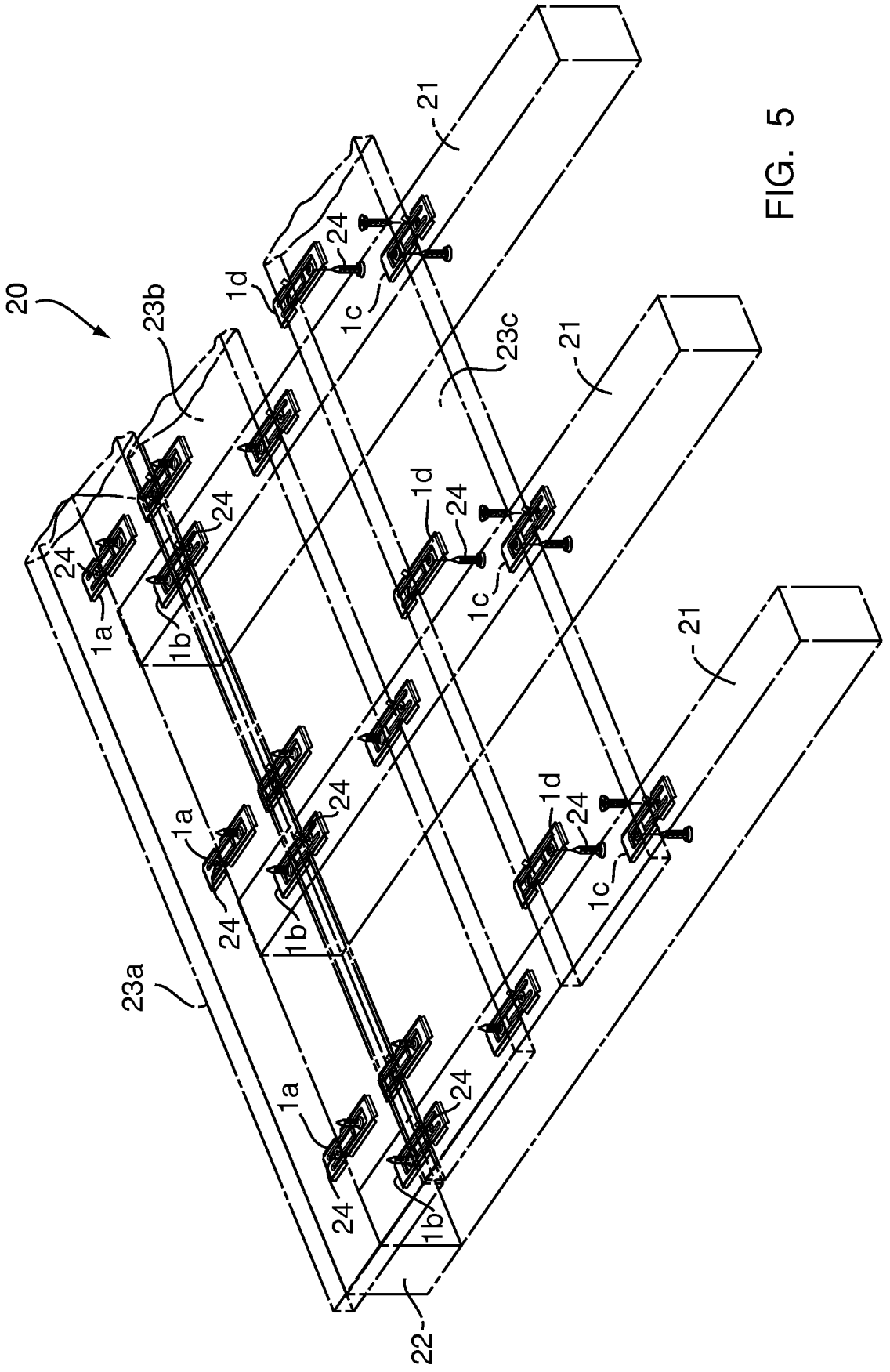


FIG. 5

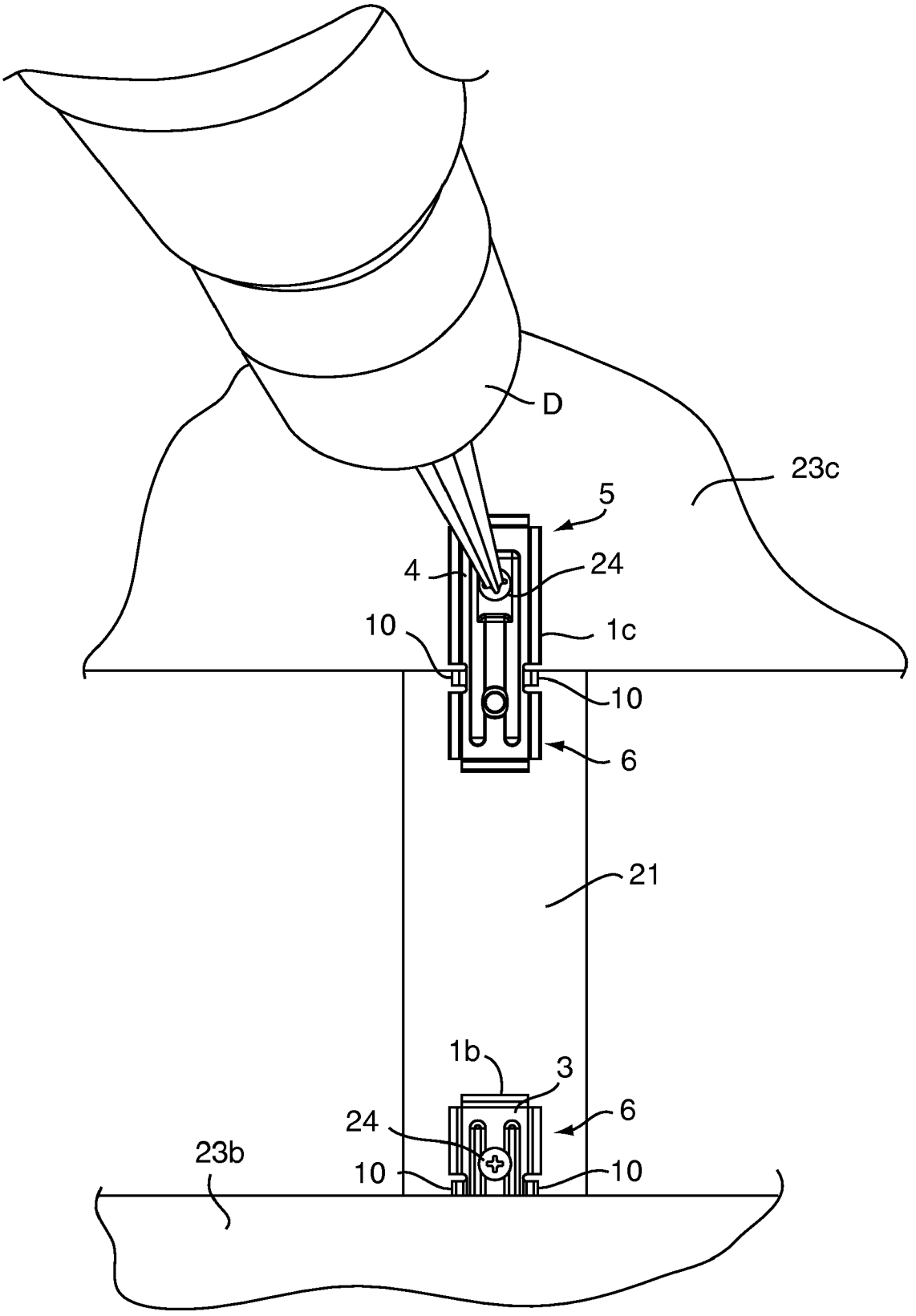


FIG. 6

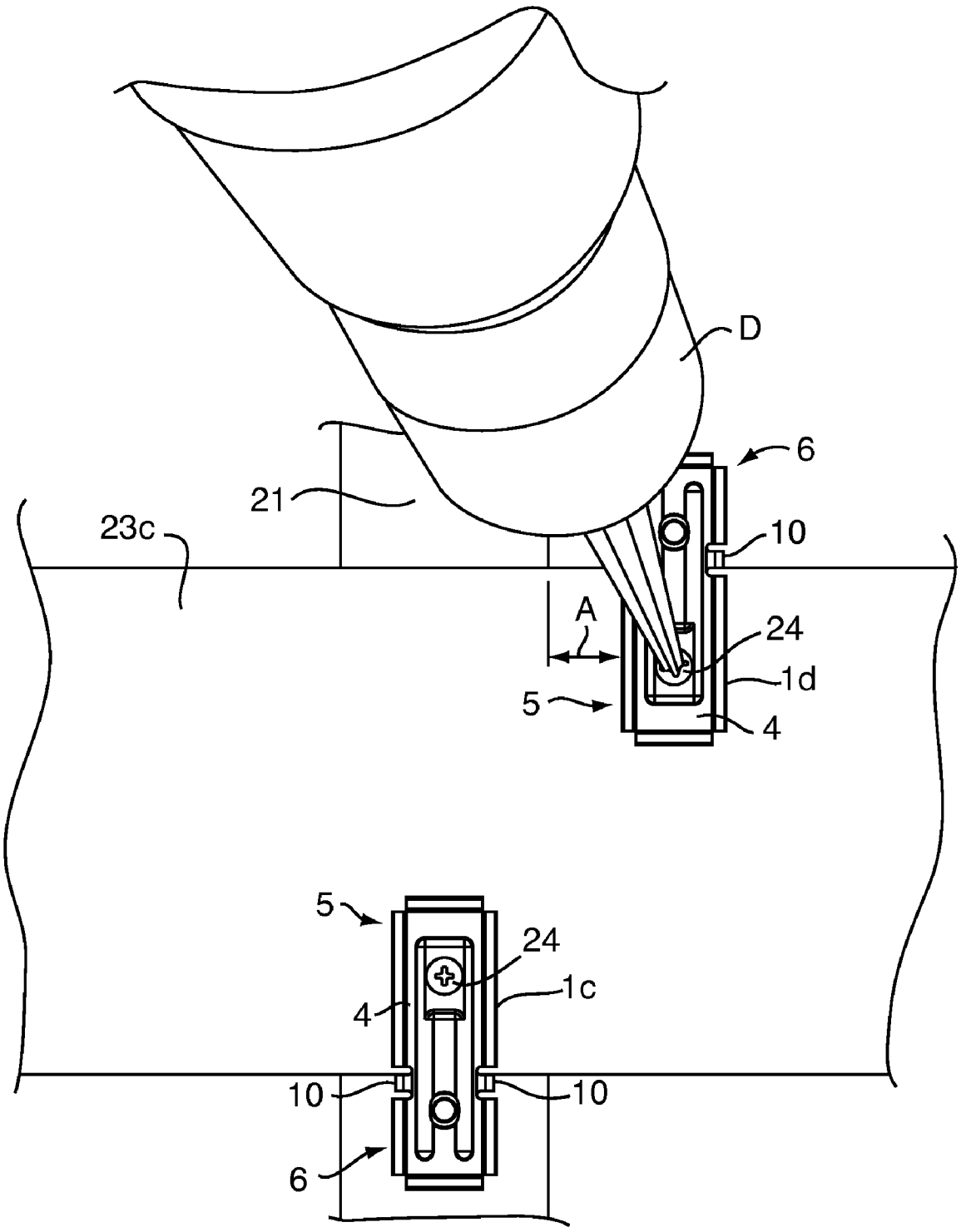


FIG. 7

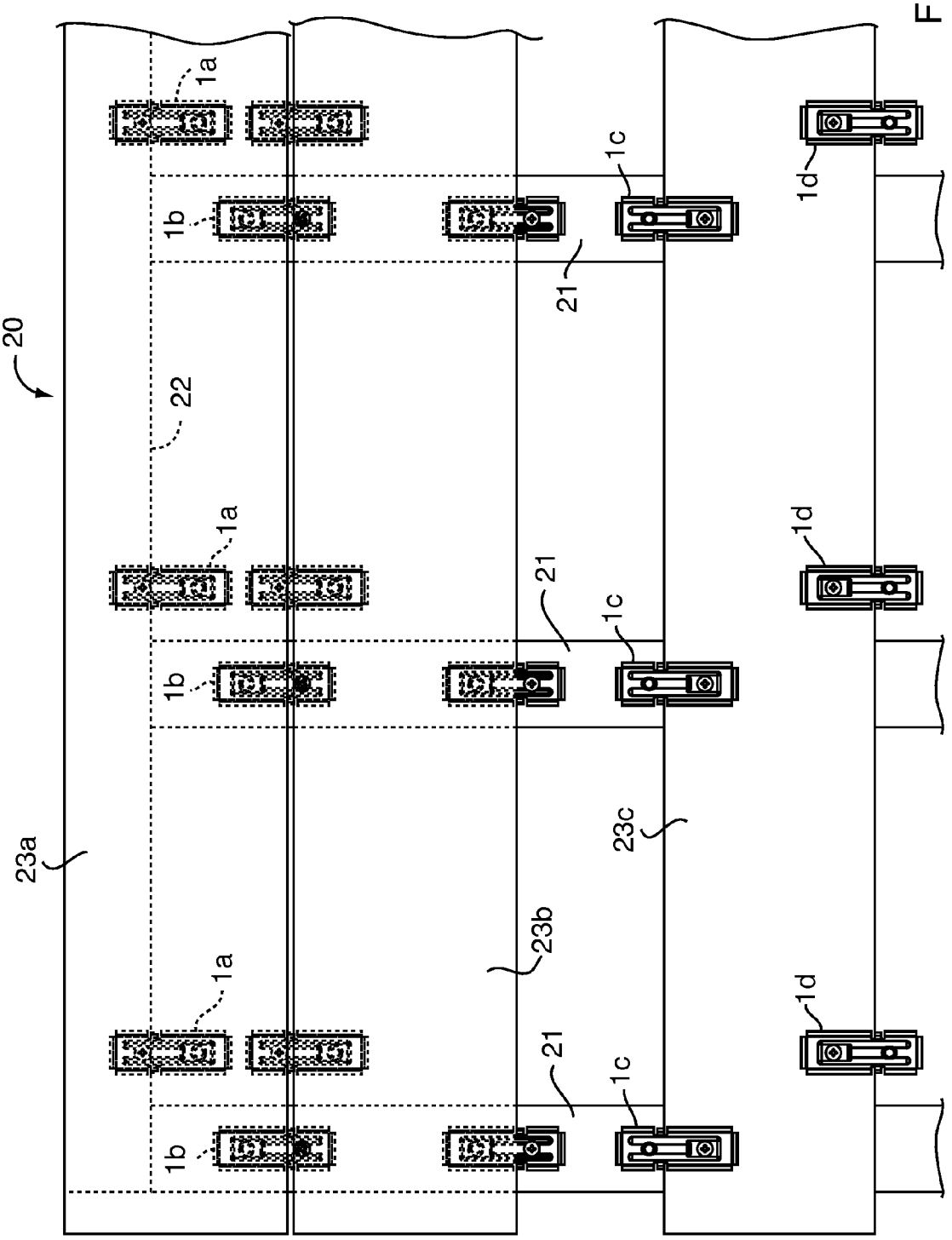


FIG. 8

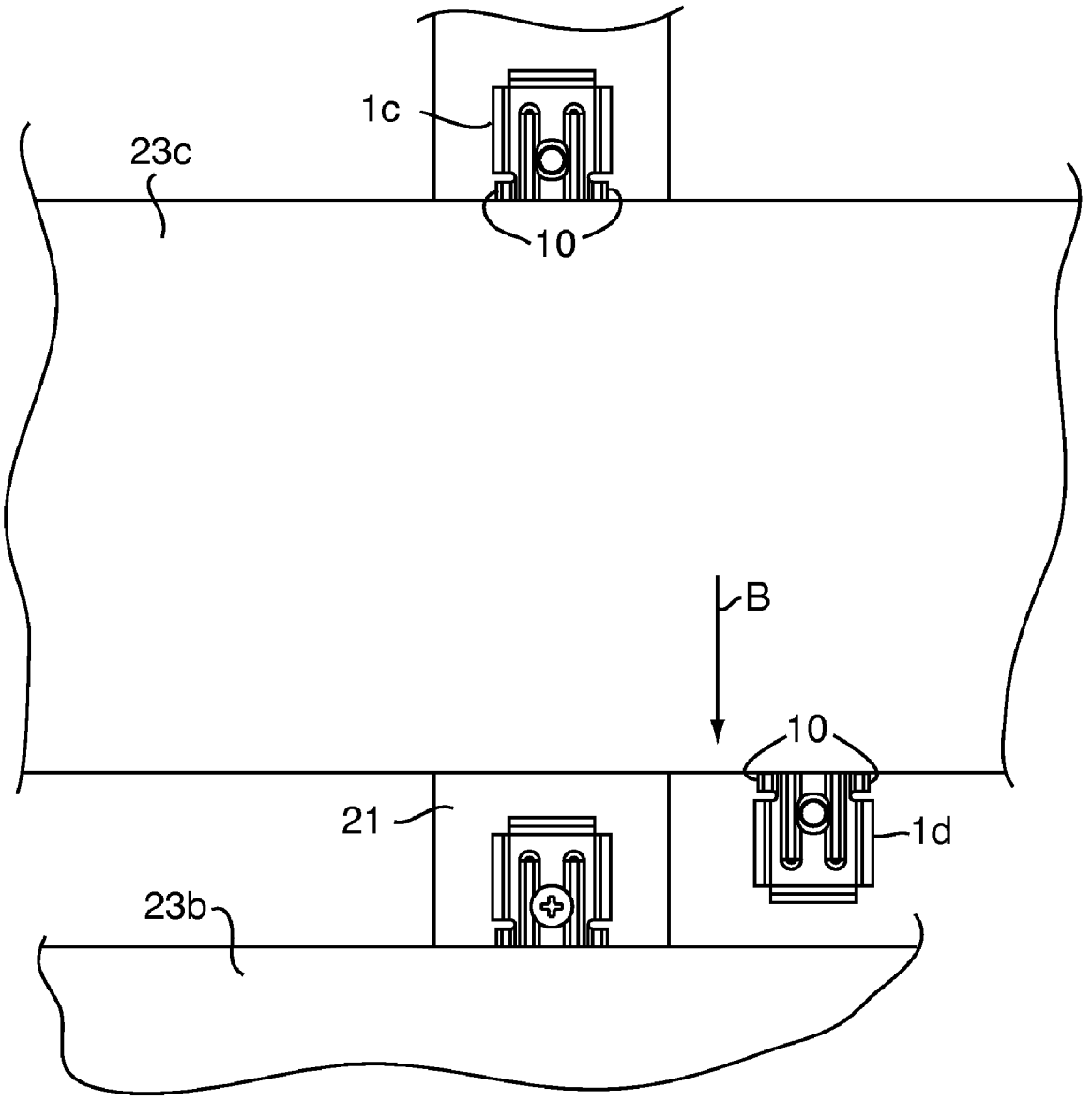


FIG. 9

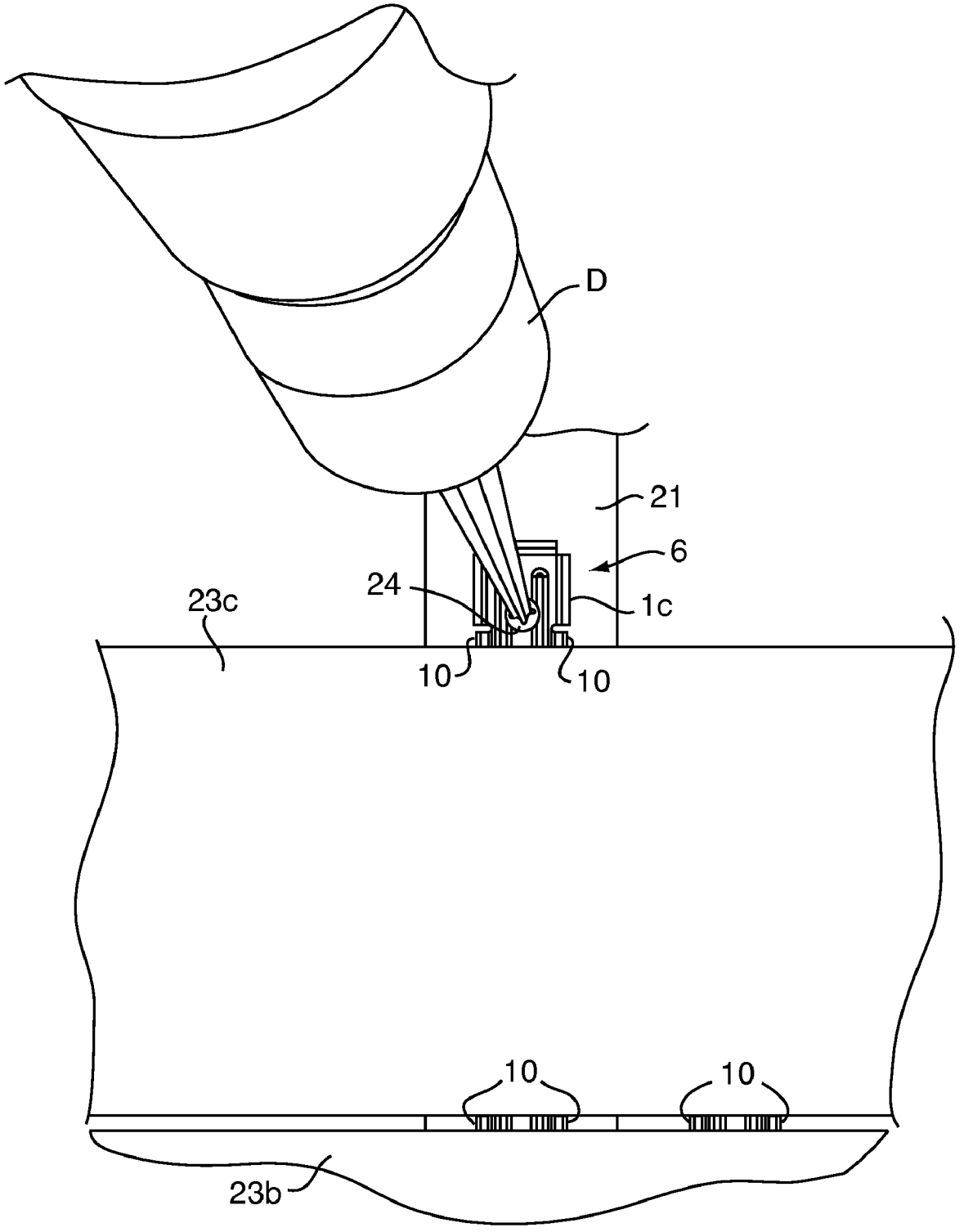


FIG. 10

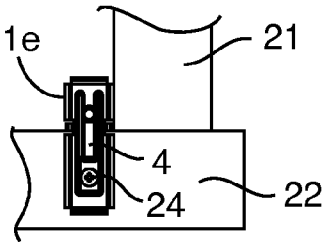


FIG. 11

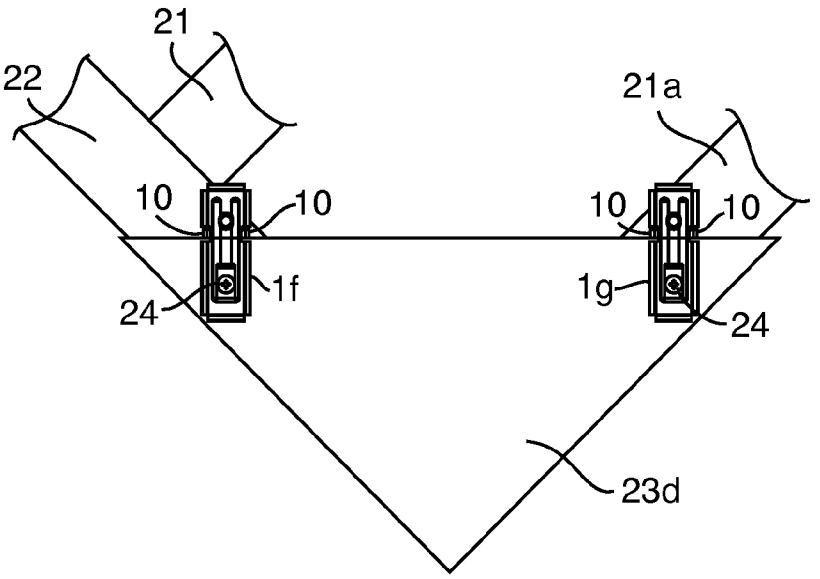


FIG. 12

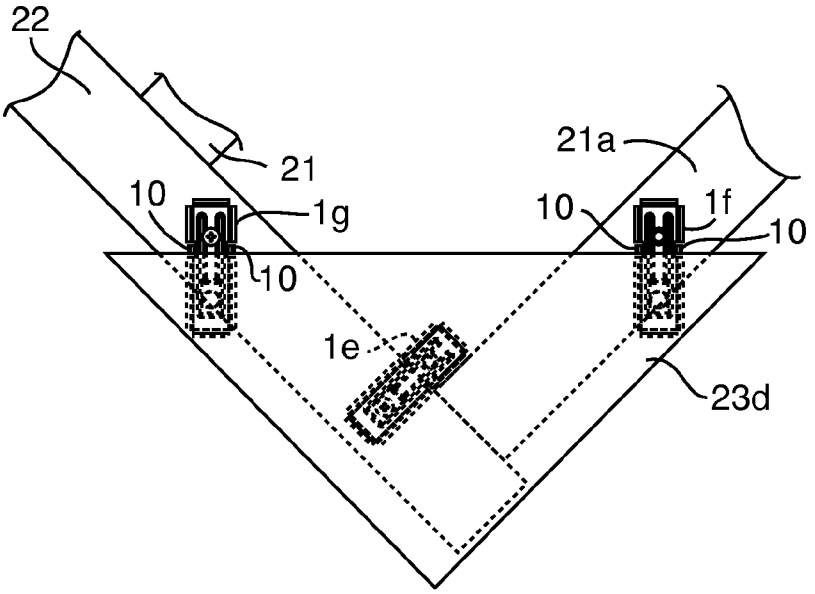


FIG. 13

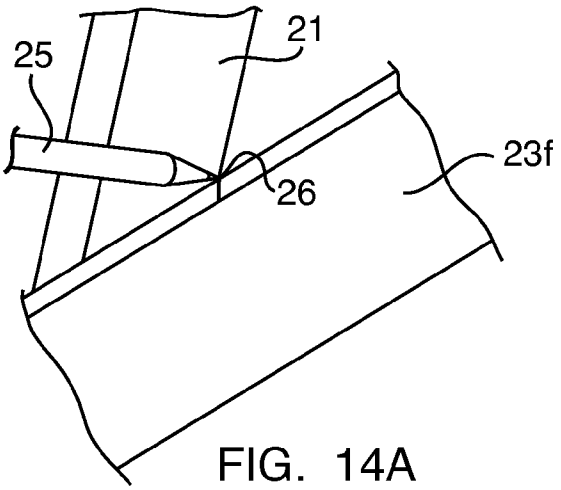


FIG. 14A

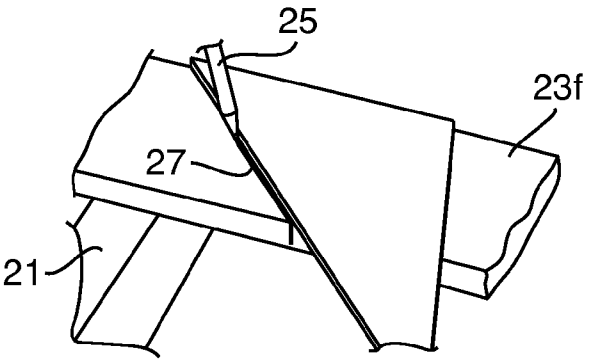


FIG. 14B

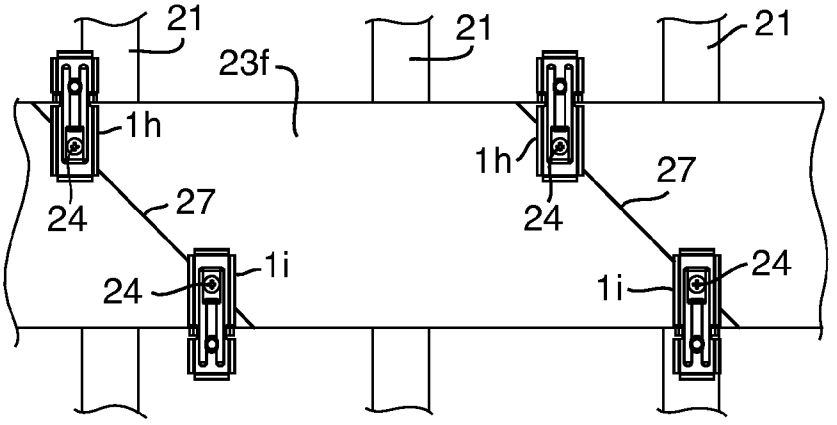


FIG. 15

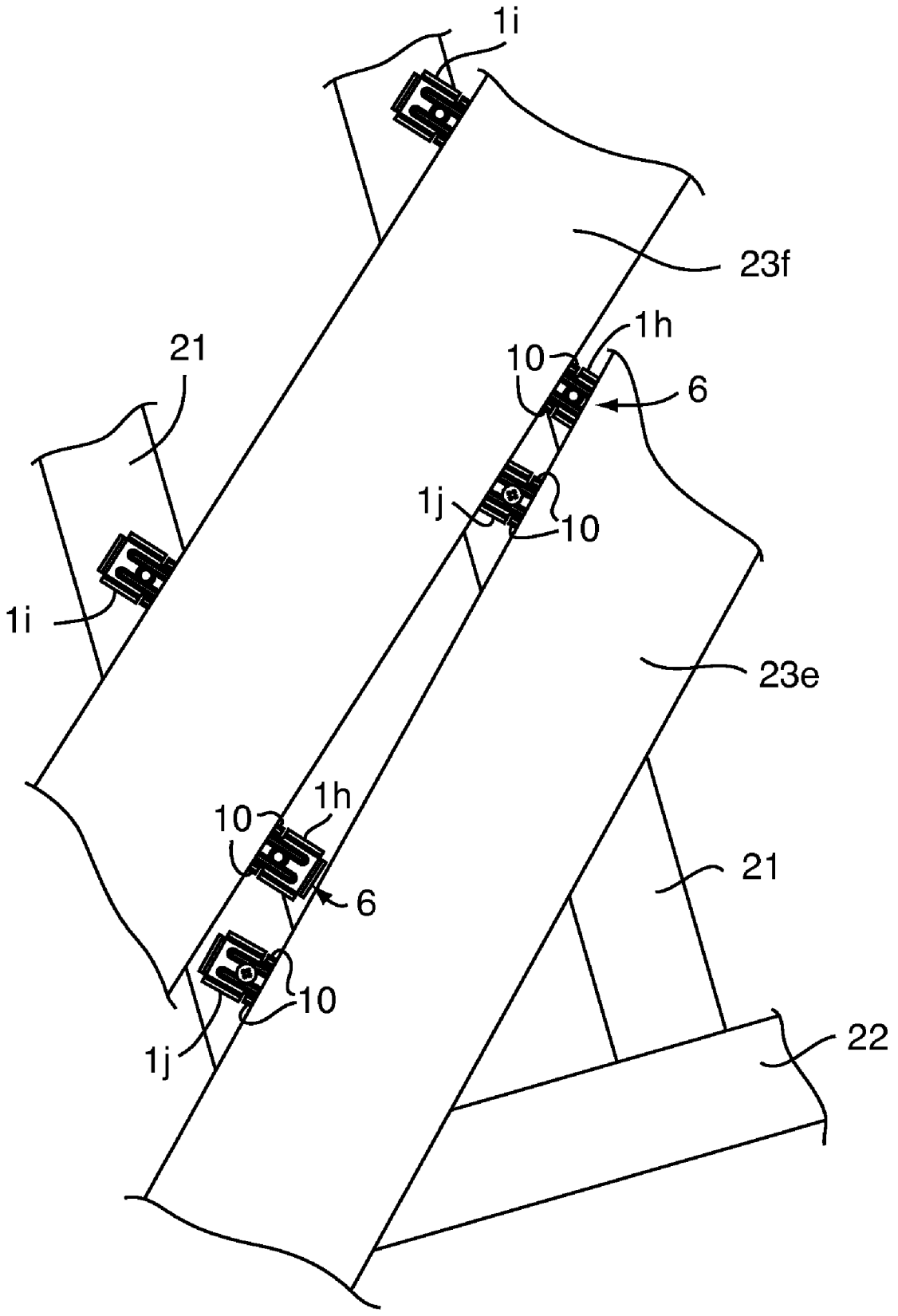


FIG. 16

DECK PLANK FASTENER

FIELD OF THE INVENTION

[0001] The invention relates to deck plank fastener for securing a deck plank to a joist and for supporting deck planks relative to one another. More particularly, the invention relates to a hidden deck plank fastener that is not visible, does not protrude from the deck surface, and is secured against the under-side of the planks.

BACKGROUND OF THE INVENTION

[0002] The simplest deck plank fastening system consists of a plurality of securing or anchoring elements, such as nails or screws, driven downward through the top of a plank, such as a wood or composite board, and into the top surface of a supporting beam, such as a joist or ledger board. Although the concept is simple, professional quality installation using this approach requires a high degree of precision, significant time expenditure, and sometimes leads to a flawed result.

[0003] Deck planks installed using the simplest system of the preceding paragraph must be carefully aligned to achieve a desirable aesthetic as well as functional result, for example, secure attachment and uniform spacing or parallelism without large gaps. Also, the insertion of the nails or screws must be performed carefully to ensure proper penetration of the joist, which will be concealed from view by the overlying wood board at the time of insertion, in order to achieve optimal attachment. This process is time consuming and requires some skill.

[0004] Even if the installation is performed properly, the anchoring element's penetration of the upper surface of the plank leaves the plank with a pock-marked appearance and prone to rot and weather damage, which severely decreases the longevity of the deck. In addition, the nail or screws may work loose and protrude from the upper surface of the planks, which poses a risk of injury to users of the deck. Penetration of the top of the plank decreases the integrity of the plank and thus the deck as a whole, and increases the risk of injury.

[0005] These and other problems have spurred on numerous advancements in the field. For instance, an improved deck plank fastening system includes fasteners that attach to a side surface of the plank and a top surface of the joist using nails or screws. Such designs facilitate uniform spacing or parallelism of planks by providing tabs or vertically oriented flanges that engage adjacent planks. The tabs facilitate installation by locating the points of penetration at more readily visible and accessible positions. The fasteners improve the longevity of the resulting deck by repositioning the point of penetration to the side of the plank, which is less prone to weathering. In addition, the tabs reduce the risk of injury to the user of the deck by hiding the nails or screws below the surface. Also, the fasteners improve the aesthetic appeal of the deck.

[0006] Many other improvements and permutations have been conceived in this field, including: replacing the use of nails or screws with sharp prongs or teeth that penetrate or bite into the deck planks to provide attachment; and increasing the angle of insertion (relative to the vertical) of the nail or screw into the joist to facilitate insertion. Such improvements have specific advantages in specific circumstances, but have not foreclosed innovation in the field.

[0007] The object of the present invention is, therefore, to provide an improved deck plank fastener, which, among other desirable attributes, significantly reduces or overcomes the above-mentioned deficiencies of prior deck plank fasteners.

SUMMARY OF THE INVENTION

[0008] Accordingly, the present invention provides a hidden deck plank fastener, a decking system, and methods for assembling a decking structure.

[0009] A first aspect of the present invention is a hidden deck plank fastener for securing a deck plank to a joist. The fastener comprises a substantially flat body having a top surface, a first end, a second end and two opposing lateral edges. The fastener further comprises a first hole in the first end, and a second hole the second end. The fastener further comprises two tabs extending upward away from the body at an angle to the top surface from two opposing positions located along the opposing lateral edges.

[0010] A second aspect of the present invention is a decking system using the hidden deck plank fastener of the first aspect of the present invention. The decking system comprises a plurality of joists arranged in a planar array at spaced intervals. The decking system further comprises a plurality of planks in spaced and side-by-side relationship on the joists, each plank having a near and a far edge, the near and far edges of adjacent planks being parallel to one another and confronting one another. The decking system further comprises a plurality of hidden fasteners securing the planks to the joists, each of a first set of the hidden fasteners connecting the bottom of a plank at the near edge to the top of a joist, and each of a second set of the hidden fasteners connecting to the bottom of a plank at a far edge projecting under the near edge of the adjacent plank.

[0011] A third aspect of the present invention is a method for assembling a decking structure using the hidden deck plank fastener of the first aspect of the present invention. The first step of the method comprises providing a base formed by an array of spaced-apart joists, each joist having an upper surface lying in a common plane with the other joists. The second step comprises affixing a first plank to the plurality of joists in a desired position to serve as a reference plank. The third step comprises positioning a second plank with a bottom surface of the second plank facing upward. The fourth step comprises attaching each of a first plurality of fasteners to the bottom of the second plank at a far edge of the second plank and at positions corresponding to the underlying joists. The fifth step comprises attaching each of a second plurality of fasteners to the bottom of the second plank at a near edge of the second plank and at positions offset from the underlying joists. The sixth step comprises turning the second plank over so that the bottom surface of the second plank and the fasteners face downward. The seventh step comprises then positioning the second plank in the desired position side-by-side with the reference plank with each of the first plurality of fasteners overlying a joist, and each of the second plurality of fasteners projecting under an adjacent edge of the reference plank. The eighth step comprises securing each of the first plurality of fasteners to a corresponding joist. Lastly, the method includes installing a plurality of additional planks to the decking structure by repeating the third and subsequent steps with the second plank as the reference plank and the additional plank as the second plank.

[0012] A fourth aspect of the present invention is a method for assembling a decking structure having planks angled at a predetermined angle, such as 45 degrees, to the joists using the hidden deck plank fastener of the first aspect of the present

invention. The first step of the method comprises providing a base formed by an array of spaced-apart joists, each joist having an upper surface lying in a common plane with the other joists. The second step comprises affixing a first plank to a corner of the plurality of joists in a desired position and at the predetermined angle to the joists to serve as a reference plank. The third step comprises positioning a second plank on the joists side-by-side with the reference plank and in a position corresponding substantially to the desired position of the second plank in the decking structure with a top surface of the second plank facing upward. The fourth step comprises marking the bottom surface of the second plank along each joist with a marking line extending across the plank from the near edge to the far edge, each marking line being positioned to correspond substantially with the edge of the joist nearest the reference plank. The fifth step comprises attaching each of a first plurality of fasteners to the bottom surface of the second plank along the far edge at a position such that one of the plurality of marking lines is visible through a first hole of the first plurality of fasteners. The sixth step comprises attaching each of a second plurality of fasteners to the bottom surface of the second plank along the near edge at positions such that each marking line is visible through a first hole of the second plurality of fasteners. The seventh step comprises positioning the second plank in the desired position side-by-side with the reference plank with each of the second fasteners projecting under the adjacent edge of the reference plank. The eighth step comprises securing each of the plurality of the first plurality of fasteners to a joist. Lastly, the method includes installing a plurality of additional planks to the decking structure by repeating the third and subsequent steps with the second plank as the reference plank and the additional plank as the second plank.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1** illustrates a perspective view of a deck plank fastener embodying the present invention in one embodiment;

[0014] FIG. **2** illustrates a top plan view of the deck plank fastener in FIG. **1**;

[0015] FIG. **3** illustrates a cross-sectional side view of the deck plank fastener in FIG. **1**, viewed along the section line **3-3** of FIG. **2**;

[0016] FIG. **4** illustrates an end view of the deck plank fastener in FIG. **1**;

[0017] FIG. **5** illustrates a decking structure using the deck plank fasteners;

[0018] FIG. **6** shows the installing of a fastener at one edge of an inverted plank according to the present invention;

[0019] FIG. **7** shows the installing of another fastener at the opposite edge of an inverted plank according to the present invention;

[0020] FIG. **8** shows the inverted plank with fasteners at each edge in preparation for installation with a previously installed plank according to the present invention;

[0021] FIG. **9** shows the detail of positioning a plank right side up with a previously installed plank according to the present invention;

[0022] FIG. **10** shows the securing of a plank right side up in the desired position relative to a previously installed plank according to the present invention;

[0023] FIG. **11** shows a first step of assembling the decking structure, wherein the deck planks are to be installed in a 45 degree angular orientation according to the present invention;

[0024] FIG. **12** shows an initial plank inverted with fasteners secured at one edge in the 45 degree angular orientation installation according to the present invention;

[0025] FIG. **13** shows the initial plank installed right side up in the 45 degree angular orientation installation according to the present invention;

[0026] FIGS. **14**A and **14**B show the marking of a second plank for fastener locations in the 45 degree angular orientation installation according to the present invention;

[0027] FIG. **15** shows multiple fasteners attached to each edge of an inverted plank in the 45 degree angular orientation installation according to the present invention; and

[0028] FIG. **16** shows the positioning of a plank with fasteners right side up adjacent a previously installed plank in the 45 degree angular orientation installation according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0029] Referring to FIGS. **1-4**, a first embodiment of the hidden deck plank fastener **1** is shown. The deck plank fastener **1** has a body **2**, which is preferably stamped in finished form from a sheet of stainless steel in a metal forming press. The body **2** is generally rectangular as shown in the plan view of FIG. **2**. The body **2** is a substantially planar member having a top surface **3** and a bottom surface **4**. The body **2** also has a first end **5**, a second end **6** and two pairs of opposing lateral edges including long edges **11** and short edges **12**. First end **5** and second end **6** correspond to the ends of the body **2** that abut the short edges **12**.

[0030] It should be appreciated that a symmetrical or asymmetrical deck plank fastener **1** is possible, and thus the designations of first end **5**, second end **6**, long edges **11** and short edges **12** do not necessarily indicate structural distinctions in all embodiments.

[0031] The deck plank fastener **1** also has a first hole **8** formed at a substantially central position of the first end **5** of the body **2**, and a second hole **9** formed at a substantially central position of the second end **6** of the body **2**. The first hole **8** and the second hole **9** are sized to receive an anchoring element, such as a wood screw **24** as shown in FIG. **3**.

[0032] The deck plank fastener **1** also has two tabs **10** which are integral with the long edges **11** of the body **2** and extend upward at an angle to the top surface **3**. The width of tabs **10** is set to establish plank-to-plank spacing in the resulting deck structure. The tabs **10** may be positioned either closer toward the first end **5** or the second end **6** of the body **2**. Generally, the width and lateral placement of the tabs **10** is only limited by the distance between and relative positions of the first hole **8** and second hole **9**. The tabs **10** may be formed using a number of techniques but, preferably, are formed in the metal forming press contemporaneously with the forming of the body **2**.

[0033] The body **2** is formed to include a plurality of ribbed contours, such as impressed reinforcement contours **13**. The contours **13** serve many functions including, for example, reinforcing the structure of the body **2**, promoting traction between the fastener **1** and the planks or joists, and providing body thickness for a deeper first hole **8** and second hole **9**.

[0034] The first hole **8** and second hole **9** are circumscribed by a pair of conical recesses **18**,**19**, respectively, for engaging with screws **24**. The conical recess **18**, which surrounds the first hole **8**, is tapered inwardly from the bottom surface **4** to the top surface **3** and, hence, is larger at the bottom and smaller at the top as the first hole **8** approaches the top surface

3. The taper of the conical recess **18** engages a screw **24** that is inserted from the bottom side of the body **2** through the first hole **8** and into a plank that abuts the top surface **3** of the body **2**. Whereas the conical recess **19**, which surrounds second hole **9**, is tapered inwardly from the top surface **3** to the bottom surface **4** and, hence, is larger at the top and smaller at the bottom as the second hole **9** approaches the bottom surface **4**. The taper of conical recess **19** engages a screw **24** that is inserted from the top side of the body **2** through the second hole **9** and into a joist that abuts the bottom surface **4** of the body **2**. Referring to FIG. **3**, a cross-sectional view of the fastener **1** shows the undulating height of the contours **13** and the holes **8**, **9** with conical recesses **18**, **19** along the longitudinal centerline of the body **2**.

[0035] Preferably, the anchoring elements are screws **24**, such as wood screws having conical-shaped head portions, as shown in FIG. **3**. It should be appreciated that the screws **24** or other anchoring elements may be of many shapes and sizes and that the first hole **8** with conical recess **18** and second hole **9** with conical recess **19** may be shaped and sized to receive the anchoring elements.

[0036] Referring to FIGS. **1-4**, the deck plank fastener **1** also comprises wings **16**, which are integral with the edges **11**, **12** of the body **2** and are bent downward toward the bottom surface **4**. Preferably, wings **16** are discontinuous around portions of the edges **11**, **12** of the body **2** from which the tabs **10** extend. The length of the wings **16** along the edge of the body **2** may be varied, but, preferably, the length is maximized such that a wing **16** extends along the entire edge of body **2** except from where the upward tabs **10** extend. Preferably, the wings **16** are also discontinuous around the corners of the body **2**, for example, around corner carve-outs **15**. However, the wings **16** may also be continuous around the corners by being formed into a rounded or angular corner. Like the tabs **10**, wings **16** may be formed by many techniques, but, preferably, are formed in the metal forming press contemporaneously with the forming of the body **2**. Preferably, the wings **16** are bent at a smaller angle toward the bottom surface **4** than the tabs **10** are bent toward the top surface **3**. The wings **16** serve many functions including, for example, reinforcing the structure of the body **2**, promoting traction between the fastener **1** and planks or joists, and facilitating the sliding of the protruding fastener **1** attached to a plank under the exposed edge of a previously installed plank.

[0037] Referring to FIG. **5**, the present invention provides a decking structure **20** that is constructed using the hidden fasteners of FIGS. **1-4**. The decking structure **20** comprises a base structure formed by horizontal support beams, including joists **21** and ledger boards **22**. The joists **21** are connected at opposite ends of the ledger boards **22** and at evenly spaced intervals. Together, the joists **21** and ledger boards **22** form a substantially horizontal plane that serves as a support surface for the planks **23**.

[0038] A first plank **23***a* is attached to one side of the decking structure **20**. Preferably, the first plank **23***a* is affixed to the joists **21** and ledger board **22** along one edge of the base structure such that second plank **23***b* can be attached in parallel across the entirety of the working surface created by the joists **21**. For discussion purposes, a plank has a near and a far edge, wherein the near edge faces the viewer in FIG. **5** and exposed joists of the base structure, and the far edge face away from the viewer in FIG. **5** and toward the installed planks.

[0039] For illustrative purposes, in FIG. **5**, a first plank **23***a* is shown in an installed position in the decking structure on top of the ledger board **22** and the mating ends of the joists **21**. The first plank **23***a* may be attached to the decking structure **20** by any known means. Preferably, the first plank **23***a* is attached using a set of the hidden fasteners la, which are secured to the top of the ledger board **22** along the facing edge at positions offset from the joists **21** using screws **24** or other anchoring elements. Preferably to fasteners **1***a* are attached with the tabs **10** facing downward and butted against the ledger board **22**. Additional screws **24** are used to connect the hidden fasteners **1***a* with the bottom of the first plank **23***a* in its desired position and are installed from below the plank **23***a*. Before installation of the first plank **23***a*, another set of hidden fasteners **1***b* is attached along the near edge in the same manner as explained hereafter in connection with hidden fastener **1***c* and plank **23***c*, as shown in FIG. **6**. The fasteners **1***b* are located at positions corresponding to the underlying joists **21** so that the first plank **23***a* can be secured to the joists **21** by inserting screws **24** or other anchoring elements downward into the joists **21** from above the plank.

[0040] The second and subsequent planks **23** are also attached to the joists **21** using hidden fasteners **1**. The planks **23** may be cut to length before placement or after being secured to the joists **21**. For the purposes of illustration and description, it will be assumed that several planks **23***a*, **23***b* have already been installed, as shown in FIG. **5**, and that plank **23***c* is the next plank to be installed in the decking structure **20** adjacent to the near edge of plank **23***b*.

[0041] As shown in FIG. **6**, to facilitate the securing of the hidden fasteners **1***c* to the near edge of the plank **23***c*, the plank **23***c* is initially inverted and placed on the joists in the desired final position lengthwise with the bottom surface of the plank **23***c* facing upward.

[0042] With the plank **23***c* inverted in the desired position, the hidden fastener **1***c* is attached to the near edge of the plank **23***c* above each underlying joist **21** with the tabs **10** butted up against the edge of the plank **23***c*, the bottom surface **4** facing upward and the free end **6** of the hidden fastener **1***c* projecting outward from the edge. The first end **5** of the hidden fasteners **1***c* is secured to the plank **23***c* by inserting a screw **24** or other anchoring element through the first hole **8** of the first hidden fastener **1***c* and driving the screw **24** into the plank **23***c* with a drill D or screw driver.

[0043] As shown in FIG. **7**, another set of hidden fasteners **1***d* is attached to the bottom surface **4** of the inverted plank **23***c* along the far edge at positions offset by a minimal distance A from the underlying joists **21** and the hidden fasteners **1***c*. A first end **5** of the hidden fastener **1***d* is attached to the plank **23***c* by inserting a screw **24** through the first hole of the hidden fastener **1***d* and driving the screw **24** into the plank **23***c* with a drill D or screw driver. Again, the tabs **10** of the hidden fastener **1***d* are butted up against the edge of the plank **23***c* and the free end **6** of the hidden fastener **1***d* projects outwards from the edge.

[0044] FIG. **8** illustrates the inverted plank **23***c* after the first and second sets of hidden fasteners **1***c*, **1***d* are attached to opposite edges. The inverted plank **23***c* is shown on the deck structure with previously installed planks **23***a* and **23***b*.

[0045] With the hidden fasteners **1***c*, **1***d* attached to the bottom surface of the plank **23**, the plank **23***c* is turned over into an upright position so that the top surface of the plank **23***c* faces upward and the hidden fasteners **1***c*, **1***d* are facing downward.

[0046] As shown in FIG. **9**, the righted plank **23***c* is then positioned for attachment to the joists **21** in approximately the proper position relative to the plank **23***b* that was previously installed and serves as a reference.

[0047] The final positioning of the plank **23***c* relative to the plank **23***b* is accomplished as shown in FIG. **9** by, first, sliding the projecting second ends **6** of the hidden fasteners **1***d*, which are positioned on a far edge (as viewed in FIG. **5**) of the plank **23***c*, under the near edge of the reference plank **23***b*. The plank **23***c* is slid in the direction of the arrow B toward the reference plank **23***b* in the plane of the working surface created by the joists **21** so that the fasteners **1***d* slide under the plank **23***b* until tabs **10** of the hidden fasteners **1***c* of the reference plank **23***b* engage with far edge of the plank **23***c*, and tabs **10** of the hidden fasteners **1***d* of the plank **23***c* engage with the near edge of the reference plank **23***b* in the desired final position of the plank **23***c*. The tabs **10** thus establish a uniform spacing between the adjacent planks **23***b*, **23***c*.

[0048] Referring to FIG. **10**, after positioning the second plank **23***c* in its final, desired position, with the hidden fasteners **1***d* projecting under the near edge of the reference plank **23***b* and with the exposed second end **6** of the hidden fasteners **1***c* overlying the joists **21**, the hidden fasteners **1***c* are secured to the joists **21** with screws **24** and a drill D, or other anchoring means.

[0049] It should be appreciated that the turning over step and the positioning step may be merged into a single motion, for instance, by simultaneously rotating the plank **23***c* proximate to the reference plank **23***b*, thereby causing the protruding end **6** of the fasteners **1***d* to pivot under the reference plank **23***b* rather than slide, and pressing the plank **23***c* toward the reference plank **23***b* so that the plank **1***c* is firmly held in the desired position. In either arrangement, the far edge of the second plank **23***c* faces (or "confronts") the near edge of the reference plank **23***b*, creating the desired aesthetic of the decking structure.

[0050] Additional planks **23** are installed in the decking structure **20** by repeating the fastener attachments and plank installing steps until the entire working surface of the decking structure **20** is complete.

[0051] Referring to FIGS. **11-16**, a method for assembling a decking structure having planks angled at a predetermined angle to the joists and utilizing the hidden fasteners **1** is shown. For exemplary purposes, this method will be described in relation to a decking structuring having planks angled at 45 degrees to the joists, however, it should be appreciated that the method is also applicable to other predetermined angle designs.

[0052] A base structure is provided using known techniques and methods as mentioned above. In general, the base structure comprises horizontal support beams, including the parallel joists **21** connected at their ends with transverse ledger boards **22** to establish a support surface for the planks.

[0053] Referring to FIG. **11**, an initial hidden fastener **1***e* is affixed to the top surface at the junction of the outermost joist **21** and the ledger board **22**. The initial hidden fastener **1***e* is preferably affixed such that the bottom surface **4** of the initial hidden fastener **1***e* faces upward and the tabs **10** are aligned with the inside edge of the outermost joist **21** or the ledger board **22**. The initial hidden fastener **1***e* is secured by inserting a screw **24** downward through the first hole **8** into the joist **21** or the ledger board **22**.

[0054] FIGS. **12-13** show the method of attaching a first plank **23***d* to the base. In a 45-degree angled decking structure, the first plank **23***d* is shaped like an isosceles right triangle. The first plank **23***d* may be cut from a larger plank before or after the first plank is secured to the base.

[0055] It should be appreciated that a decking structure having planks angled relative to the joists at an angle other than 45 degrees would use a first plank of another shape (i.e. not an isosceles right triangle). For instance, a decking structure having planks angled at 30 degrees relative to the joists would use a first plank of a 30-60 degree right triangle.

[0056] Referring to FIG. **12**, if the first plank **23***d* has a textured or otherwise designated upper surface, the plank is inverted with the upper surface facing downward. If desired, the plank may be located on the outermost joist **21***a* and the ledger board **22** to facilitate placement of the fasteners **1***f* and **1***g*.

[0057] The hidden fastener **1***f* of the first plank **23***d* is secured by a screw **24** along the hypotenuse edge of the plank **23***d* at a position such that the first hidden fastener **1***f* is a predetermined distance from the apex of the adjacent 45 degree angle. The predetermined distance is set so that the projecting second end **6** of the hidden fastener **1***f* overlies the joist **21** or ledger board **22** when the plank **23***d* is installed in the upright position, as shown, for example, in FIG. **13**. The second hidden fastener **1***g* of the first plank **23***d* is secured by a screw **24** along the hypotenuse edge of the first plank **23***d* at a predetermined distance from the apex of the adjacent 45 degree angle in the same fashion. In each case, the fasteners are secured with the tabs **10** abutting the hypotenuse edge.

[0058] It should be appreciated that the amount that first plank **23***d* overhangs the outermost joist **21** and ledger board **22** may be adjusted by altering the placement of the hidden fasteners **1***f* and **1***g* along the hypotenuse edge of the first plank **23***d*. In addition, to create a deck wherein the planks **23** are flush with the edge of the joists **21** and ledger board **22**, a doubler (not shown) may be required at the corner for the first plank **23***d*. In general, a doubler is attached to the inside of the outermost joist **21** or the ledger board **22** facing toward the array of joists **21** and extending from the intersection of the outermost joist **21** and the ledger board **22** a sufficient distance to provide fastening points for the fasteners connected to the first plank **23***d*. If a doubler is used, the initial hidden fastener **1***e* may be affixed to the doubler rather than the outermost joist **21** or the ledger board **22**.

[0059] Referring to FIG. **13**, the first plank **23***d* is turned upright so that the top surface of the first plank **23***d* faces upward. Next, the first plank **23***d* is aligned relative to the outermost joist **21** and ledger board **22** so that the securing holes **9** of the hidden fasteners **1***f* and **1***g* are positioned centrally over the outermost joist **21** and ledger board **22**. For example, in a deck structure assembled with planks at 45 degrees to the joists **21**, the apex of the right angle of the triangle-shaped first plank **23***d* points away from the array of joists **21**, the two sides of the triangle-shaped first plank **23***d* are parallel to the outermost joist **21** and ledger board **22** respectively, and the hypotenuse of the triangle-shaped first plank **23***d* runs at 45 degrees to the outermost joist **21** and ledger board **22**.

[0060] After placement, the first plank **23***d* is secured to the outermost joist **21** and ledger board **22** by inserting screws **24** downward through the second holes **9** of the hidden fasteners **1***f*, **1***g* of the first plank **23***d* into the outermost joist **21** and ledger board **22**, respectively. Finally, the outermost joist **21** is

secured to the first plank **23***d* by inserting a screw **24** upward through the second hole **9** of the initial hidden fastener **1***e* into the first plank **23***d*.

[0061] Once installed, the first plank serves the function of a reference plank for the adjacent planks.

[0062] FIGS. **14**A, **14**B, **15** and **16** show the installation of a second 45 degree plank **23***f* on the base structure after several other planks **23***e* have been installed utilizing the hidden fasteners. In particular, FIG. **14**A shows the second plank **23***f* positioned with a top surface of the plank **23***f* facing upward in a position corresponding to a desired final position of the plank **23***f* on the decking structure spaced from the previously installed plank (see FIG. **16**) by the tabs **10** of the fastener **1***b*. The plank **23***f* may be cut to size and shape before or, if permitted, after installation.

[0063] An exposed near edge of the second plank **23***f* is marked with a marking utensil **25** at marking positions **26** corresponding to the intersections of the edge of the plank **23***f* and the far side of each joist **21**. Each intersection of the plank **23***f* edge with the joists **21** is marked.

[0064] The plank **23***f* is then turned over so that the bottom surface of the plank **23***f* faces upward, as shown in FIG. **14**B, and marking lines **27** are extended from the marking positions **26** across the bottom of plank **23***f* at a 45 degree angle to the plank **23***f*. The marking lines **27** thus correspond to the far side of the intersecting joists **21** and could also be drawn from below using the joists themselves as a guide. For example, in a decking structure having planks angled at 60 degrees to the joists **21**, the marking line **27** would be at 60 degrees to the lengthwise axis of the second plank **23***f*. In each case, only one intersection per joist is marked, and the marking line **27** could also be drawn with the use of a 60 degree triangle.

[0065] It should be appreciated that the plank **23***f* may be marked with marking positions **26** and/or marking lines **27** without being placed on the surface of the joists **21** and/or having marking positions **26** marked. One skilled in the art could measure and mark marking positions **26** and/or marking lines **27** along the bottom surface of the plank **23***f* based on the known positions of, distance between, and orientation of the joists **21**.

[0066] FIG. **15** shows how the hidden fasteners **1***h*, **1***i* are secured to the plank **23***f* after it has been marked. A first set of hidden fastener **1***h* is butted against an edge of the plank **23***f* and the marking line **27** visible through and centered within the first hole **8** of the hidden fastener **1***h*. After the hidden fastener **1***h* is properly aligned, the hidden fastener **1***h* is secured to the second plank **23***f* by inserting a screw **24** downward through the first hole **8** into the second plank **23***f*. As shown, a second set of hidden fastener **1***i* is affixed to the plank **23***f* in the same manner along the opposing edge at each marking line **27**.

[0067] Referring to FIG. **16**, the plank **23***f* is shown top side up after the hidden fasteners **1***h* are secured at various positions corresponding to the intersections with each joist **21**.

[0068] The plank **23***f* is ready to be positioned and affixed to the joists **21** adjacent a previously installed plank **23***e*.

[0069] The plank **23***f* is aligned relative to the previously installed plank **23***e*, which serves as a reference together with its secured fasteners **1***j*. First, the protruding ends **6** of the hidden fasteners **1***h* are slid under the adjacent edge (i.e. near edge) of the reference plank **23***e*. Next, plank **23***f* is pressed against the adjacent edge of the reference plank **23***e* until the tabs **10** of the fasteners **1***h*, **1***j* abut the adjacent edges of the planks **23***e*, **23***f* when the planks are in their desired final position. The hidden fasteners **1***i* at the near edge of the plank **23***f* can then be secured to the joists **21** by inserting screws **24** downward through the second hole **9** of the hidden fastener **1***g* into the joist **21**.

[0070] Additional planks are installed in the decking structure in the same manner as plank **23***f* until the entire surface of the decking structure **20** is complete.

[0071] It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the broader aspects of the present invention. For example, the hidden fasteners can be stamped in a number of shapes with or without ribbed contours. The projecting ends of the hidden fasteners which are slid under a previous attached plank can be secured with screws from below after installation, or be left unsecured. This one secured edge of a plank holds down the adjacent edge of the adjacent plank. Accordingly, the invention has been described in several preferred embodiments by way of illustration rather than limitation.

What is claimed is:

1. A deck plank fastener for securing a deck plank to a joist, the fastener comprising:
- a generally flat body having a top surface, a first end, a second end and two opposing lateral edges;
- a first hole in the first end;
- a second hole in the second end; and
- two tabs extending upward from the body at an angle to the top surface from two opposing positions located along the opposing lateral edges.

2. The deck plank fastener of claim **1**,
- wherein the body is substantially rectangular; and
- wherein the body has two longer edges and two shorter edges.

3. The deck plank fastener of claim **1**,
- wherein the body includes a plurality of impressed contours.

4. The deck plank fastener of claim **1**,
- wherein the first hole and the second hole are circumscribed by conical recesses.

5. The deck plank fastener of claim **1**,
- wherein the opposing positions from which the tabs extend upward are offset toward the first end.

6. The deck plank fastener of claim **1**,
- wherein the opposing positions from which the tabs extend upward are offset toward the second end.

7. The deck plank fastener of claim **1**, further comprising:
- a plurality of wings extending downward from a plurality of the edges of the body.

8. The deck plank fastener of claim **7**,
- wherein the wings extend downward at an angle to the top surface.

9. The deck plank fastener of claim **8**,
- wherein the body has impressed contours which cooperate with the downward extending wings to reinforce the body.

10. The deck plank fastener of claim **8**,
- wherein the wings are discontinuous along the two opposing lateral edges from which the tabs extend upward.

11. A decking system, comprising:
- a plurality of joists arranged in a planar array at spaced intervals;
- a plurality of planks in spaced and side-by-side relationship on the joists, each plank having a far and a near

edge, the far and near edges of adjacent planks being parallel to one another and confronting one another; and

a plurality of hidden fasteners securing the planks to the joists,

each of a first set of the hidden fasteners connected to the bottom of a plank at the near edge and to the top of a joist; and

each of a second set of the hidden fasteners connected to the bottom of a plank at the far edge and projecting under the near edge of the adjacent plank.

12. The decking system of claim **12**,

wherein the hidden fasteners of the second set are offset along the length of a plank from the hidden fasteners of the first set to avoid positions overlying a joist.

13. The decking system of claim **12**,

wherein a spacing between planks is established by a plurality of tabs extending upward from a body of the hidden fasteners.

14. A method for assembling a decking structure, the method comprising the steps of:

providing a base formed by an array of spaced-apart joists, each joist having an upper surface lying in a common plane with the other joists;

affixing a first plank to the plurality of joists in a desired position to serve as a reference plank;

positioning a second plank in a desired position with a bottom surface of the second plank facing upward;

attaching each of a first plurality of fasteners to the bottom of the second plank at a far edge of the second plank and at positions corresponding to the underlying joists;

attaching each of a second plurality of fasteners to the bottom of the second plank at a near edge of the second plank and at positions offset from the underlying joists;

turning the second plank over so that the bottom surface of the second plank and the fasteners face downward;

then positioning the second plank in the desired position side-by-side with the reference plank with each of the first plurality of fasteners overlying a joist, and each of the second plurality of fasteners projecting under an adjacent edge of the reference plank; and

securing each of the first plurality of fasteners to a corresponding joist.

15. A method for assembling a decking structure as defined in claim **14**, further including the step of:

installing additional planks by repeating the steps for installing the second plank for each additional plank and using the most recently installed plank as the reference plank.

16. A method for assembling a decking structure as defined in claim **14**, wherein:

the step of positioning the second plank with the bottom surface upward comprises positioning the plank on the joists side-by-side with the first plank and in a position corresponding substantially to the desired position of the second plank in the decking structure; and

the step of attaching the first plurality of fasteners comprises attaching the fasteners at positions which overlie the joists on which the plank is positioned.

17. A method for assembling a decking structure as defined in claim **14**,

wherein the first and second plurality of fasteners are elongated and are positioned to extend beyond the edges of the planks when attached.

18. A method for assembling a decking structure as defined in claim **14**,

wherein the second plurality of fasteners projecting under the adjacent edge of the reference plank are not attached to the reference plank.

19. A method for assembling a decking structure as defined in claim **14**,

wherein the first plurality of fasteners have the same construction as the second plurality of fasteners.

20. A method for assembling a decking structure having planks angled relative to the joists, the method comprising the steps of:

providing a base formed by an array of spaced-apart joists, each joist having an upper surface lying in a common plane with the other joists;

affixing a first plank to a corner of the plurality of joists in a desired position and at the predetermined angle to the joists to serve as a reference plank;

positioning a second plank on the joists side-by-side with the reference plank and in a position corresponding substantially to the desired position of the second plank in the decking structure with a top surface of the second plank facing upward;

marking the bottom surface of the second plank along each joist with a marking line extending across the plank from the near edge to the far edge, each marking line being positioned to correspond substantially with the edge of the joist nearest the reference plank;

attaching each of a first plurality of fasteners to the bottom surface of the second plank along the far edge at a position such that one of the plurality of marking lines is visible through a first hole of the first plurality of fasteners;

attaching each of a second plurality of fasteners to the bottom surface of the second plank along the near edge at positions such that each marking line is visible through a first hole of the second plurality of fasteners;

positioning the second plank in the desired position side-by-side with the reference plank with each of the second fasteners projecting under the adjacent edge of the reference plank;

securing each of the plurality of the first plurality of fasteners to a joist

21. A method for assembling a decking structure as defined in claim **20**, further including the step of:

installing additional planks by repeating the steps for installing the second plank for each additional plank and using the most recently installed plank as the reference plank.

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