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(71) Applicant: **Rosso, Alberta**
10098 Rivoli (TO) (IT)

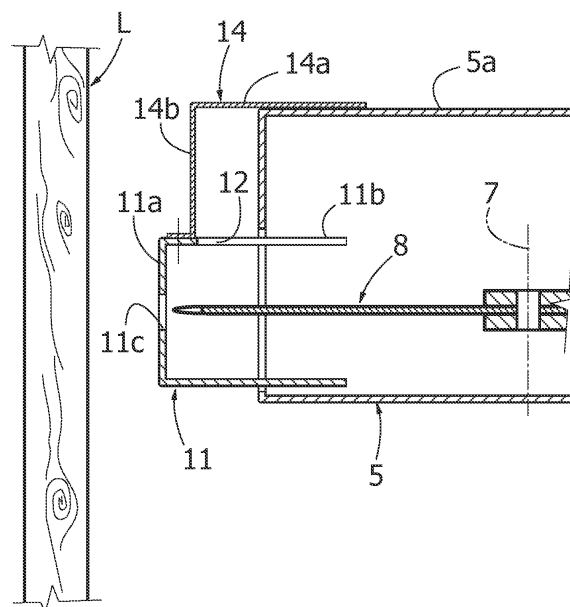
(72) Inventor: **Rosso, Alberta**
10098 Rivoli (TO) (IT)

(74) Representative: **Notaro, Giancarlo**
c/o Buzzi, Notaro & Antonielli d'Oulx
Via Maria Vittoria 18
10123 Torino (IT)

(54) **Protection assembly for vertical panel splitting machine cutting disks, and a splitting machine including said assembly**

(57) Protection assembly (14,15,16,17), that may be mounted on a vertical splitting or sawing machine for wood panels, the protection assembly being an additional protection structure including a surface (14a,14b) that can cover an aperture (12) in an auxiliary cover (11) so as to exclude any possible access to the circular blade (8). The additional protection structure may be made in any suitable material, such as metal sheet, or metal mesh, or synthetic material, including transparent material. Also disclosed is a vertical panel splitting machine with a saw guard comprising an additional protection structure (14) that prevents any possible access by the operator to the circular blade (8).

FIG. 4



Description

TEXT OF THE DESCRIPTION

Field of the invention

[0001] The present invention relates to vertical panel splitting machines, particularly for wood panels (but its application to panels of any other material, such as plastic or glass, for example, is not excluded), of the type comprising:

- a fixed support structure, defining a substantially vertical plane to support the panels to be split,
- a structure to act as a traverser carriage, comprising a vertical upright that is horizontally mobile above the plane of the fixed structure and having its upper and lower extremities fitted to slide in a horizontal direction on the fixed structure,
- a carriage fitted to slide vertically along said upright,
- an operating head, comprising at least one motorised circular blade, carried by said carriage and moveable with respect to it closer and farther away from the aforementioned support plane of the panel to be split along a direction orthogonal to the support plane,

in which said circular blade is supported to turn inside a principle cover of said operating head, and protrudes from said principal cover to engage a panel to be split, following a movement of the operating head in the direction of the panel,

in which the part of said circular blade that protrudes from the principal cover of the operating head is protected by an auxiliary safety cover, fitted to slide into the principal cover along said orthogonal direction and pushed by spring devices towards an extracted position, said auxiliary cover having a front surface destined to enter into contact with the panel to be split when the operating head approaches the panel, in such a way that further proximity to the panel causes the auxiliary cover to retract into the principal cover, with the consequent protrusion of the circular blade through a slit created in said front surface of the auxiliary cover, and

in which, moreover, said auxiliary cover has a surface normal to the axis of rotation of the circular blade, that has an aperture to prevent interference with the shaft of the circular blade when said auxiliary cover is retracted, and thus when the auxiliary cover is extracted a portion of the circular blade is accessible through said aperture.

Known art

[0002] A vertical splitting machine of known type specified above is shown in the annexed figures 1-3. Figure 1 is a perspective schematic view of the machine that illustrates the fixed support structure 1, defining a substantially vertical plane 2, (the plane is slightly inclined

with respect to the vertical to ensure that the wood panels to be split rest on a stable base) on which a structure to act as a traverser carriage is fitted to slide horizontally, including a vertical upright 2, the ends of which are fitted to slide on the upper and lower horizontal edges of fixed structure 1 (see also figure 2, which illustrates a side view of the machine). A carriage 4, bearing an operating head 5 that can be moved closer to and farther away from plane 2 in a direction substantially orthogonal to said plane, by means of a manually controlled mechanism (not illustrated) acting on two actuation levers 6, is fitted to slide along upright 3. Figure 3 of the annexed drawings shows a diagram of the detail of operating head 5 illustrated at a distance from a panel L to be split. Normally, in machines of this type, the operating head is fitted articulated around an axis parallel to the aforementioned orthogonal direction to plane 2, in such a way that the circular blade carried by it can be oriented both for performing vertical cuts and for performing horizontal cuts on the panel. Figure 3 illustrates a plan view, and thus in this figure operating head 5 is oriented at 90° to the position illustrated in figure 1, with the axis of rotation 7 of the circular blade 8 that it supports oriented in a vertical direction. Operating head 5 presents a principal cover 5a that supports circular blade 8, rotating around axis 7, which serves to split panel L (that is, to cut through the entire thickness of the panel), and a further circular blade 9, that turns around an axis 10 parallel to axis 7, to cut into panel L.

[0003] As is clearly visible in figure 3, in the known machines of the type specified above, at least circular blade 8, used to split the wood panels, presents a portion that protrudes from principal cover 5a of operating head 5, so as to be able to penetrate through the panel of wood to be split. Again in the known machines of the type indicated above, for safety, the protruding part of circular blade 8 is protected by an auxiliary cover 11 that is fitted to slide into the principal cover 5a in the direction (indicated by an X in figure 3) orthogonal to the wood panel L. The structure of the operating head 5 is equipped with elastic means (not visible in figure 3) that tend to push auxiliary cover 11 towards the extracted position that is visible in figure 3. Starting from this condition, when operating head 5 is brought close to the panel L to be split in direction X, a front surface 11a of the auxiliary cover 11 first comes into contact with L panel. The further advancement in direction X of operating head 5 causes auxiliary cover 11 to retract into principal cover 5a with consequent protrusion of circular blade 8 through a slit (not visible in figure 3) formed in front surface 11a.

Limitations of the known art

[0004] The limitation of the known machines of the type illustrated above lies in the fact that when auxiliary cover 11 is extracted, shown in figure 3, part of circular blade 8 is accessible through aperture 12 formed in a surface 11b of auxiliary cover 11 that is orthogonal to axes 7 and

10. Aperture 12 becomes necessary to prevent interference between surface 11b and the shaft of circular blade 8. In the same way, surface 11b also has an aperture 13 to prevent interference with the shaft of cutting disk 9.

[0005] Consequently, machines of the known type described above are not optimal in terms of operator safety.

Purpose of the invention

[0006] The purpose of the present invention is to resolve the aforementioned problem.

Summary of the invention

[0007] With a view to achieving this purpose, the object of the invention is a vertical splitting machine having all the characteristics that were indicated at the start, and, moreover, characterised by the fact that an additional protection structure is attached to the aforementioned auxiliary cover and is also guided in such a way as to slide with respect to the principal cover and which includes a surface that covers the above aperture in the auxiliary cover, in such a way as to exclude any possibility of access to the circular blade.

[0008] It should be noted that the invention is aimed at both the vertical splitting machine as a whole, as defined in the annexed independent claims 1 or 8, and at a circular blade protection assembly as defined in the attached independent claim 6, which may be adapted on a machine of the known type described above in order to equip it with the additional characteristic defined above.

[0009] Further preferred characteristics of the invention are defined in the attached dependent claims.

Advantages of the invention

[0010] Thanks to the invention, both the creation in the design phase of a vertical splitting machine that presents the characteristics of the invention and the creation of an assembly that may be adapted easily and rapidly on a machine originally lacking the above additional characteristic, so that it conforms with the present invention.

[0011] Thus the invention presents the advantage of allowing vertical splitting machines for wood panels that are optimal in terms of operator safety to be created or adapted with extremely simple means, and at low cost.

Brief description of the drawings

[0012] Further characteristics and advantages of the invention will now be described with reference to the enclosed drawings, provided by mere way of non-limiting example, wherein:

- figures 1-3 already described above, refer to a perspective view, a lateral view and a plan view of a detail of a machine according to the known art,

figures 4-6 illustrate a section view along line IV-IV of figure 3 modified in accordance with the lessons of the present invention, in three different machine operating conditions, and

- figure 7 is a perspective view on a larger scale that illustrates a detail of the machine according to the invention;
- figures 8-9 illustrate a lateral view of a machine according to the known art modified in accordance with the lessons of a variation of this invention, in two different machine operating conditions;
- figures 10 and 11 illustrate a lateral view of a machine according to the known art modified in accordance with the lessons of another variation of this invention, in two different machine operating conditions.

Detailed description of an example of embodiment of the invention

[0013] With reference to figure 4, according to the invention, auxiliary cover 11 is attached to additional protection structure 14 presenting an upper surface 14a that is fitted to slide over principal cover 5a of operating head 5, and a front surface 14b that, in conjunction with upper surface 14a, completely covers aperture 12 in auxiliary cover 11, rendering circular blade 8 completely inaccessible, even in the extracted condition illustrated in figures 3 and 4.

[0014] Figure 4 of the annexed drawings refers to the initial condition, in which operating head 5 is set at a distance from a wood panel to be split. In this condition, auxiliary cover 11 is in its extracted condition (in which it is maintained by elastic means not visible in the figure) and thus covers circular blade 8. Aperture 12 in upper surface 11b of auxiliary cover 11 is instead surmounted by additional protection structure 14, which is attached in some way (with screws, for example) to auxiliary cover 11. Figures 4-6 also show slit 11c in frontal surface 11a of auxiliary cover 11, through which circular blade 8 can protrude.

[0015] Figure 5 illustrates the condition in which, after advancement of operating head 5 in direction X, approaching panel L, front surface 11a of auxiliary cover 11 comes into contact with panel L. Further advancement of head 5 (see figure 6) causes both the retraction of auxiliary cover 11 from principal cover 5 (causing circular blade 8 to protrude through slit 11c) and the retraction of additional protection structure 14. In this condition, blade 8 penetrates in wood thickness and thus it is able to split the panel. Figure 7 illustrates a perspective view of additional protection structure 14, with its upper surface 14a fitted to slide over the upper surface of cover 5a. Adjacent to structure 14, a further structure 15 is envisaged, separated from or integrated with structure 14 which, in a way similar to structure 14, has the function of covering aperture 13 in correspondence with cutting disk 9. Figure 7 also illustrates the construction details (which are of a known type) of the articulation that allows the operating

head with circular blade 8 to be oriented vertically or horizontally. These details may be executed in any known manner and, of themselves, are not part of the scope of this invention.

[0016] Both additional protection structure 14 and structure 15 may be made in any suitable material, such as metal sheet, or metal mesh, or synthetic material, including transparent material, or in any other form.

[0017] The embodiment described above refers to the case in which an additional protection assembly 14, 15 is fitted over the existing structure of a machine originally lacking the aforementioned protections. Naturally, a machine that is equipped with a single auxiliary cover in which structures 11, 14 and/or 15 are integrated together falls within the scope of the present invention.

[0018] Figures 8 and 9 show an alternative embodiment in which the additional protection structure consists of two plates 16 hinged to auxiliary cover 11 in a reciprocal scissor-like arrangement with the interposition of elastic means (not shown) that tend to pull plates 16 into a closed condition in which they cover aperture 12.

[0019] Plates 16 also each present cam surfaces 16a that, during the translation of auxiliary cover 11 inside principal cover 5a, work with the rotation shaft of circular blade 8 in such a way that the plates are turned by said shaft, against the action of the aforementioned elastic means, so as to clear aperture 12 and allow the shaft of circular blade 8 to be received inside it.

[0020] Naturally, plates 16 described above may be replaced by a single plate fitted on auxiliary cover 11 in a way similar to that described above, able to cover the whole of aperture 12 on its own.

[0021] Finally, a further embodiment is illustrated in figures 10 and 11. According to this embodiment, the additional protection structure includes an extendible panel 17 fitted in correspondence with aperture 12. Panel 17 is attached from one side of auxiliary cover 11 to the opposite side on principal cover 5a. In this way panel 17 assumes an extended configuration in which it covers aperture 12 when auxiliary cover 11 is in extracted condition, while when auxiliary cover 11 is in retracted condition it presents a packed configuration in which a portion of aperture 12, recessed in cover 5a, is cleared, to enable the shaft of circular blade 8 to be received inside this aperture.

[0022] Alternatively, it is also possible to envisage a solution in which panel 17 is fitted on auxiliary cover 11, cooperating with the shaft of circular blade 8 in such a way that, during translation of auxiliary cover 11 inside principal cover 5a, the panel is compressed in the aforementioned packed configuration by said shaft, against the action of the elastic means tending to pull it into the aforementioned distended configuration.

[0023] In both cases described above, panel 17 may be formed by a set of telescopically interconnected metal strips, or by a cap presenting sections that are reciprocally connected in a pivoting way.

[0024] It is clear that the protection structures repre-

sented in figures 8 to 11, in correspondence with aperture 12 of circular blade 8, may also be fitted in correspondence with aperture 13 of the cutting disk.

[0025] Naturally, without prejudice to the principles of the invention, construction details and embodiments could widely vary with respect to what has been described and shown by mere way of example, without leaving for this reason the scope of the present invention.

[0026] It must be specifically noted that although the invention has been described by way of an example with reference to a manually controlled machine, it is also applicable to machines in which the movements of the operating head are motorised.

Claims

1. Vertical panel splitting machine, consisting of:

- a fixed support structure (1), defining a substantially vertical plane (2) to support the panels (L) to be split,
- a structure to act as a traverser carriage (3), comprising a vertical upright (3) that is horizontally mobile above the plane (2) of the fixed structure (1) and having its upper and lower extremities fitted to slide in a horizontal direction on the fixed structure (1),
- a carriage (4) fitted to slide vertically along said upright (3),
- an operating head (5), comprising at least one motorised circular blade (8), carried by said carriage (4) and moveable with respect to it closer to and farther away from the aforementioned support plane (2) of the panel (L) to be split along a direction (X) orthogonal to the support plane (2),

in which said circular blade (8) is supported to turn inside a principle cover (5a) of said operating head (5), and protrudes from said principal cover (5a) to engage a panel (L) to be split, following a movement of the operating head (5) in the direction of the panel (L),

in which the part of said circular blade (8) that protrudes from the principal cover (5a) of the operating head (5) is protected by an auxiliary safety cover (11), fitted to slide into the principal cover (5a) along said orthogonal direction (X) and pushed by spring devices towards an extracted position, said auxiliary cover (11) having a front surface (11a) destined to enter into contact with the panel (L) to be split when the operating head (5) approaches the panel (L), in such a way that further proximity to the panel (L) causes the auxiliary cover (11) to retract into the principal cover (5a), with the consequent protrusion of the circular blade (8) through a slit (11c) created in said front surface (11a) of the auxiliary cover (11),

in which, moreover, said auxiliary cover (11) has a surface (11b) normal to the axis of rotation (7) of the circular blade (8), that has an aperture (12) to prevent interference with the shaft of the circular blade (8) when said auxiliary cover (11) is retracted, and thus when the auxiliary cover (11) is extracted from the auxiliary cover (11) a portion of the circular blade (8) is accessible through said aperture (12),

characterised in that an additional protection structure (14, 16, 17) that includes a surface (14a, 14b, 16, 17) that covers said aperture (12) in the auxiliary cover (11) is fitted on said auxiliary cover (11), so as to exclude any possible access to the circular blade (8).

2. Vertical splitting machine according to claim 1, **characterised in that** said auxiliary protection structure is fixed to the auxiliary cover (11) of a machine originally lacking said additional protection structure.

3. Vertical splitting machine according to claim 1, **characterised in that** said additional protection structure (14) is integrated with said auxiliary cover (11).

4. Vertical splitting machine according to claim 1, **characterised in that** said auxiliary protection structure (14) consists of metal sheet or metal mesh or synthetic material or of a metal or synthetic structure of any suitable conformation.

5. Vertical splitting machine according to claim 1, **characterised in that** it also includes a cutting disk (9) and a further additional protection structure (15) to exclude any possibility of access to the blade of the cutting disk (9) in the extracted condition of said auxiliary cover (11).

6. Vertical splitting machine according to claim 1, **characterised in that** said additional protection structure (14) is attached to said auxiliary cover (11) and is guided so as to slide with respect to the principal cover (5a).

7. Vertical splitting machine according to claim 1, **characterised in that** said additional protection structure includes at least one plate (16) hinged to said auxiliary cover (11) with the interposition of elastic means that tend to pull said plate into a closed condition in which it covers said aperture (12), said plate also presenting a cam surface that, during the translation of the auxiliary cover (11) inside principal cover (5a), work with the rotation shaft of the circular blade (8) in such a way that the plate is turned by said shaft, against the action of the aforementioned elastic means, so as to clear the aperture (12) and allow the shaft of the circular blade (8) to be received inside it.

8. Vertical splitting machine according to claim 1, **characterised in that** said additional protection structure includes an extendable panel (17) fitted in correspondence with said aperture (12), which assumes an extended configuration in which it covers the aperture (12) when the auxiliary cover (11) is in extracted condition, while when auxiliary cover (11) is in a retracted condition, it presents a packed configuration in which a portion of aperture (12), recessed in cover (5a), is cleared, to enable the shaft of circular blade 8 to be received inside this aperture.

9. Vertical splitting machine according to claim 8, **characterised in that** said panel (17) is fitted on one side on said auxiliary cover (11) and on the opposite side on said principal cover (5a) in such a way that, after translation of the auxiliary cover (11) inside the principal cover (5a), said panel assumes said packed configuration.

10. Vertical splitting machine according to claim 8, **characterised in that** said panel (17) is fitted on said auxiliary cover (11), cooperating with the shaft of the circular blade (8) in such a way that, during translation of auxiliary cover 11 inside principal cover 5a, the panel is compressed in the aforementioned packed configuration by said shaft, against the action of the elastic means tending to pull it into the aforementioned distended configuration.

11. Protection assembly (14, 15), that may be adapted on a vertical splitting machine for wood panels of the type corresponding to the preamble of claim 1, **characterised in that** it includes an additional protection structure that can be fitted on said principal cover (5a), including a surface (14a, 14b) that can cover said aperture (12) in the auxiliary cover (11) so as to exclude any possible access to the circular blade (8).

12. Assembly according to claim 11, **characterised in that** said additional protection structure includes at least one plate (16) that can be hinged on said auxiliary cover (11) with the interposition of elastic means tending to pull said plate into a condition in which it covers said aperture, said plate presenting a cam surface (16a) in correspondence with the extremity opposite the hinge point.

13. Assembly according to claim 11, **characterised by** the fact that said additional protection structure includes an extendable panel (17).

14. Assembly according to claim 6, **characterised in that** it also includes an additional protection structure (15) to prevent access to the blade of a cutting disk (9).

15. Vertical splitting machine for wood panels, consisting of:

- a fixed support structure (1), defining a substantially vertical plane (2) to support the panels to be split, 5
- a structure to act as a traverser carriage (3), comprising a vertical upright (3) that is horizontally mobile above the plane (2) of the fixed structure (1) and having its upper and lower extremities fitted to slide in a horizontal direction on the fixed structure (1), 10
- a carriage (4) fitted to slide vertically along said upright (3),
- an operating head (5), comprising at least one motorised circular blade (8), carried by said carriage (4) and moveable with respect to it closer to and farther away from the aforementioned support plane (2) of the panel (L) to be split along a direction (X) orthogonal to the support plane (2), 15 20

in which said circular blade (8) is supported to turn inside a principle cover (5a) of said operating head (5), and protrudes from said principal cover (5a) to engage a panel (L) to be split, following a movement of the operating head (5) in the direction of the panel (L), 25

in which the part of said circular blade (8) that protrudes from the principal cover (5a) of the operating head (5) is protected by an auxiliary safety cover (11), fitted to slide into the principal cover (5a) along said orthogonal direction (X) and pushed by spring devices towards an extracted position, said auxiliary cover (11) having a front surface (11a) destined to enter into contact with the panel (L) to be split when the operating head (5) approaches the panel (L), in such a way that further proximity to the panel (L) causes the auxiliary cover (11) to retract into the principal cover (5a), with the consequent protrusion of the circular blade (8) through a slit (11c) created in said front surface (11a) of the auxiliary cover (11), 30 35 40

characterised in that said auxiliary cover (11) is fitted to slide over said principal cover (5a) outside the latter and is shaped in such a way that any possible access to the circular blade (8) is excluded when it is in its extracted condition. 45

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FIG. 1

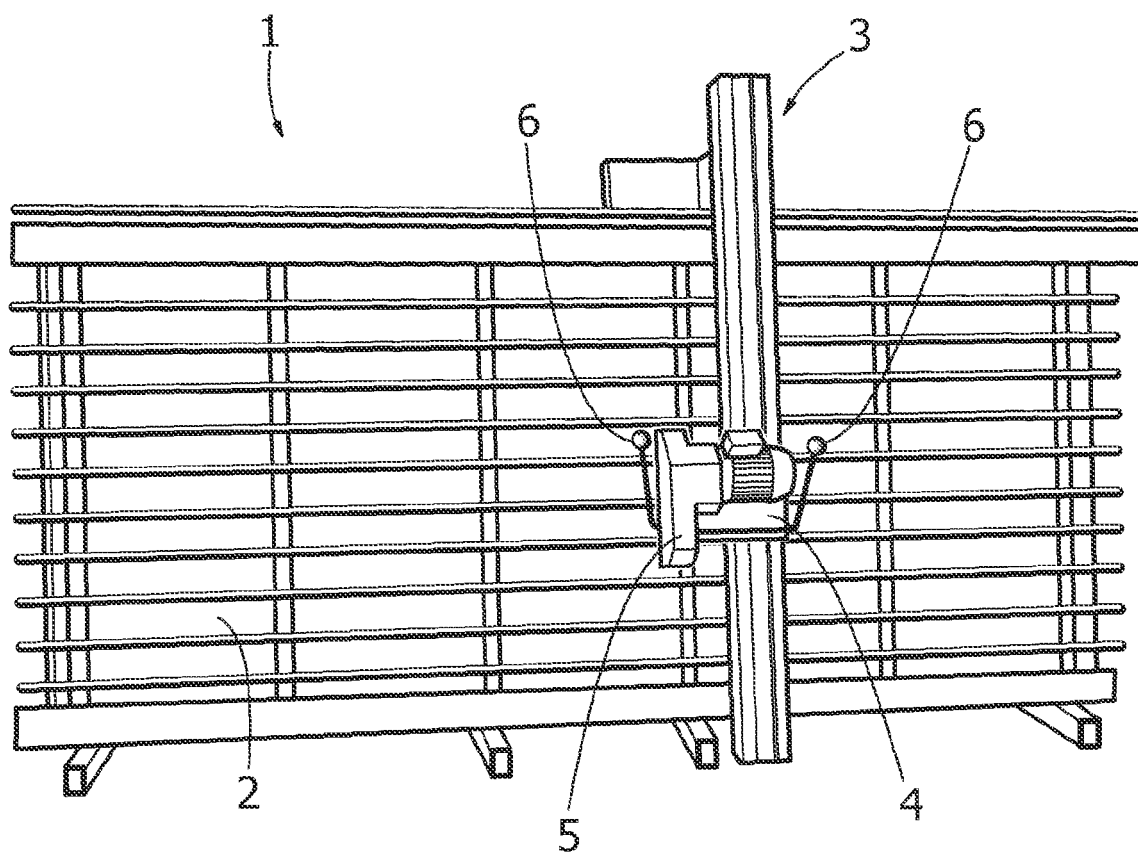


FIG. 2

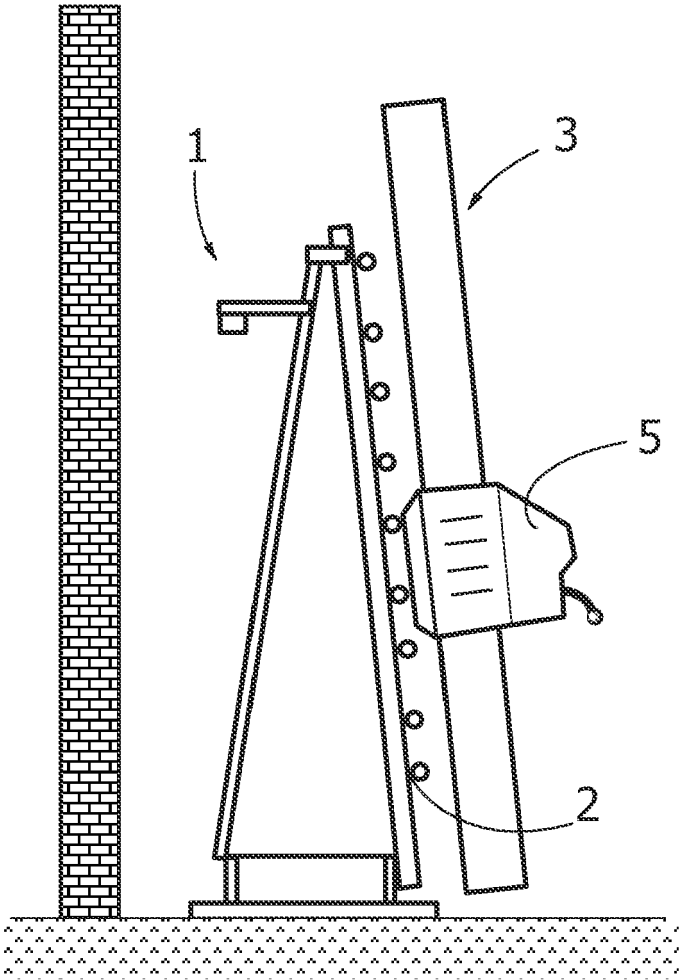


FIG. 3

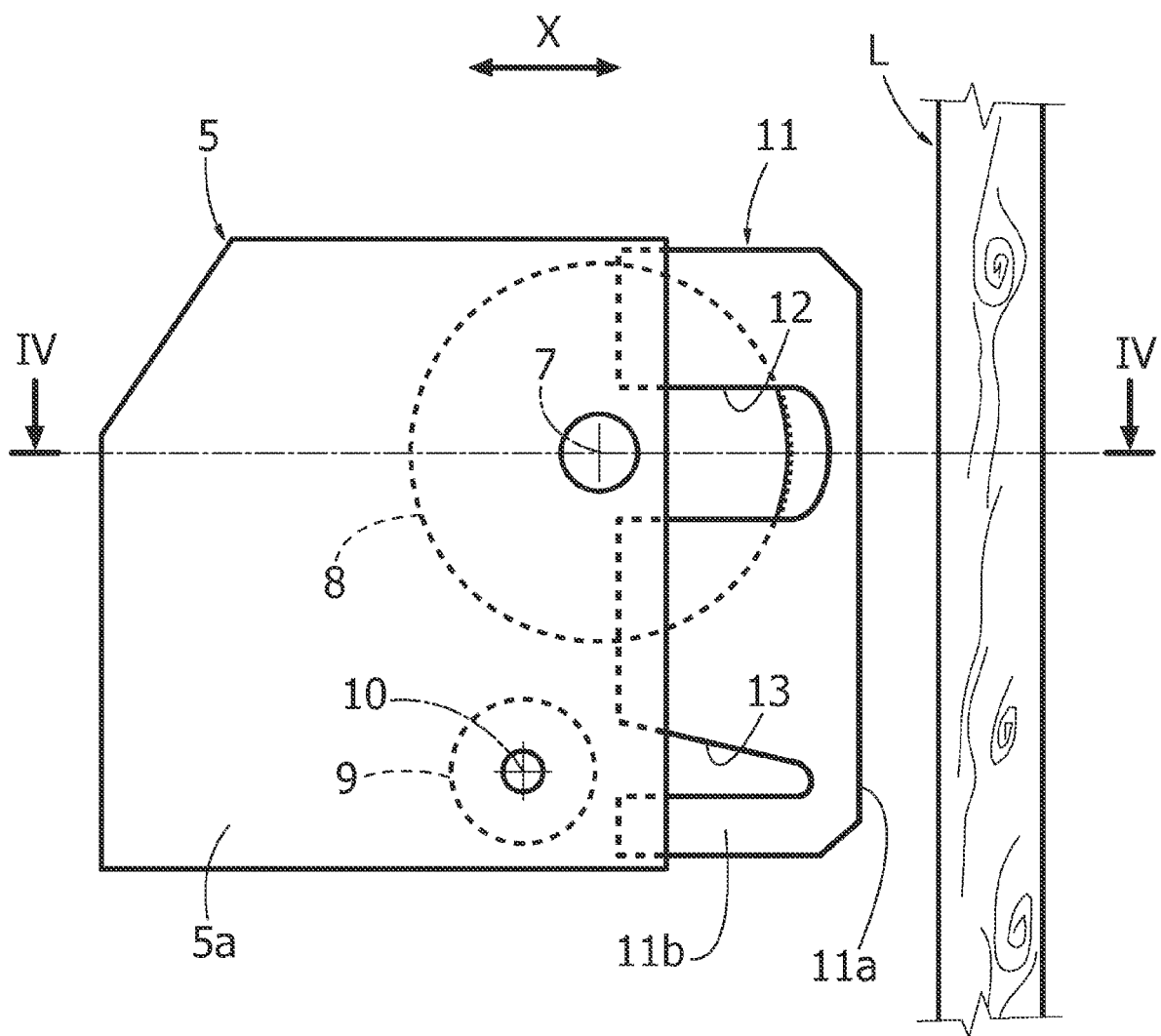
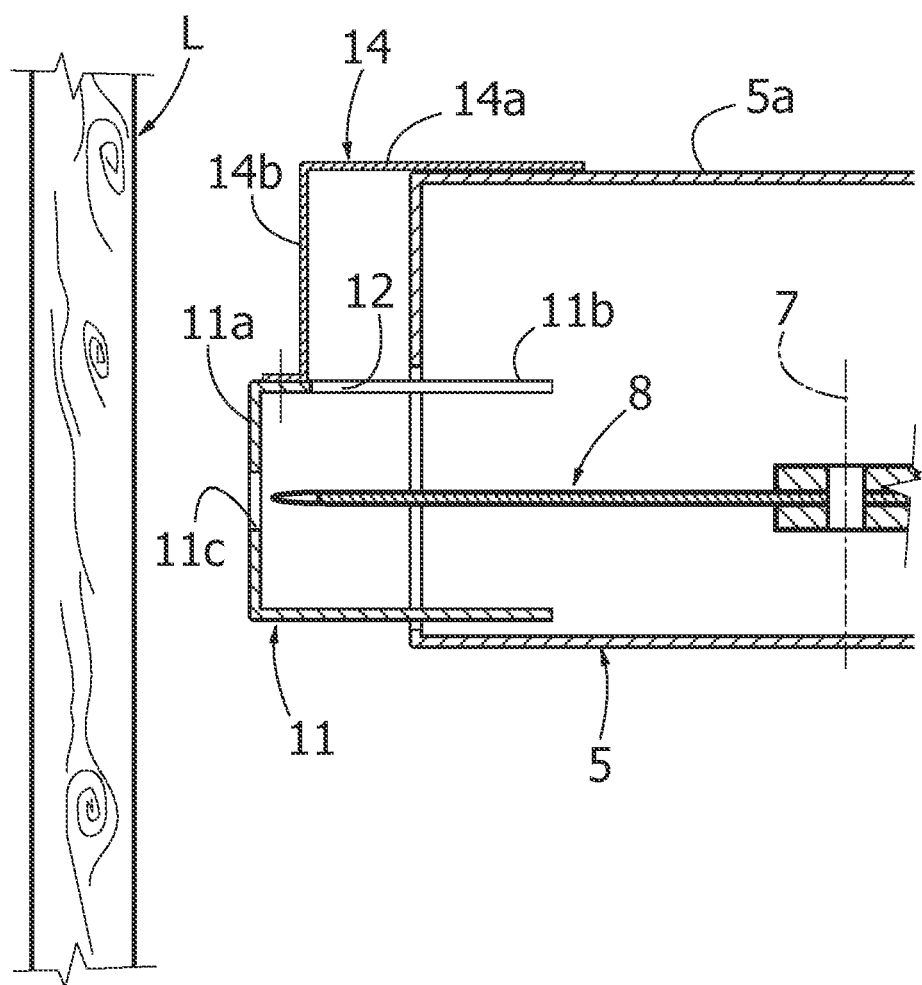


FIG. 4



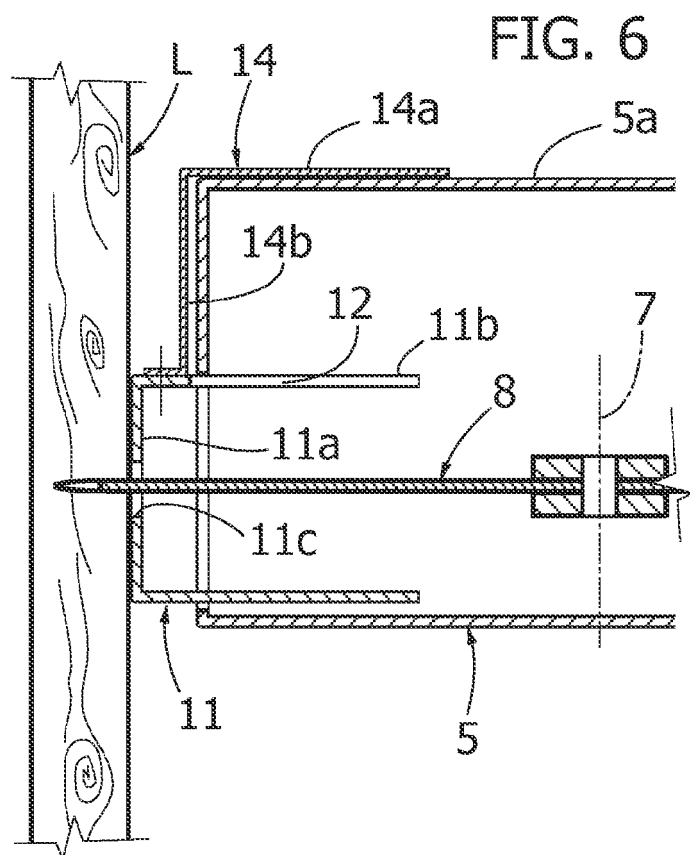
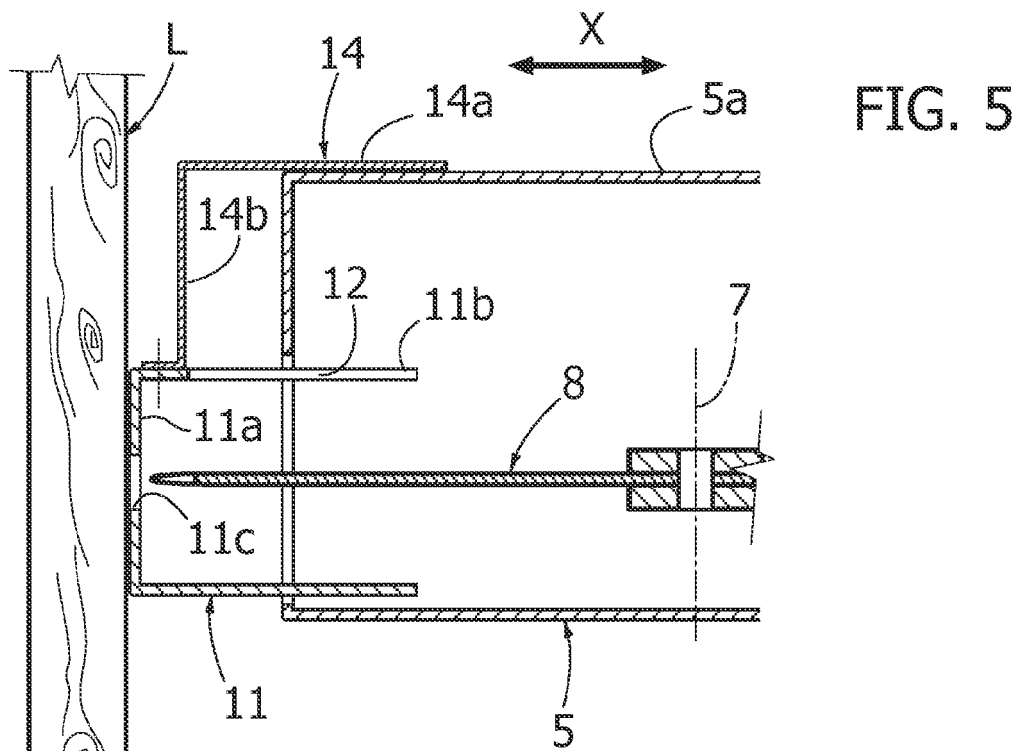


FIG. 7

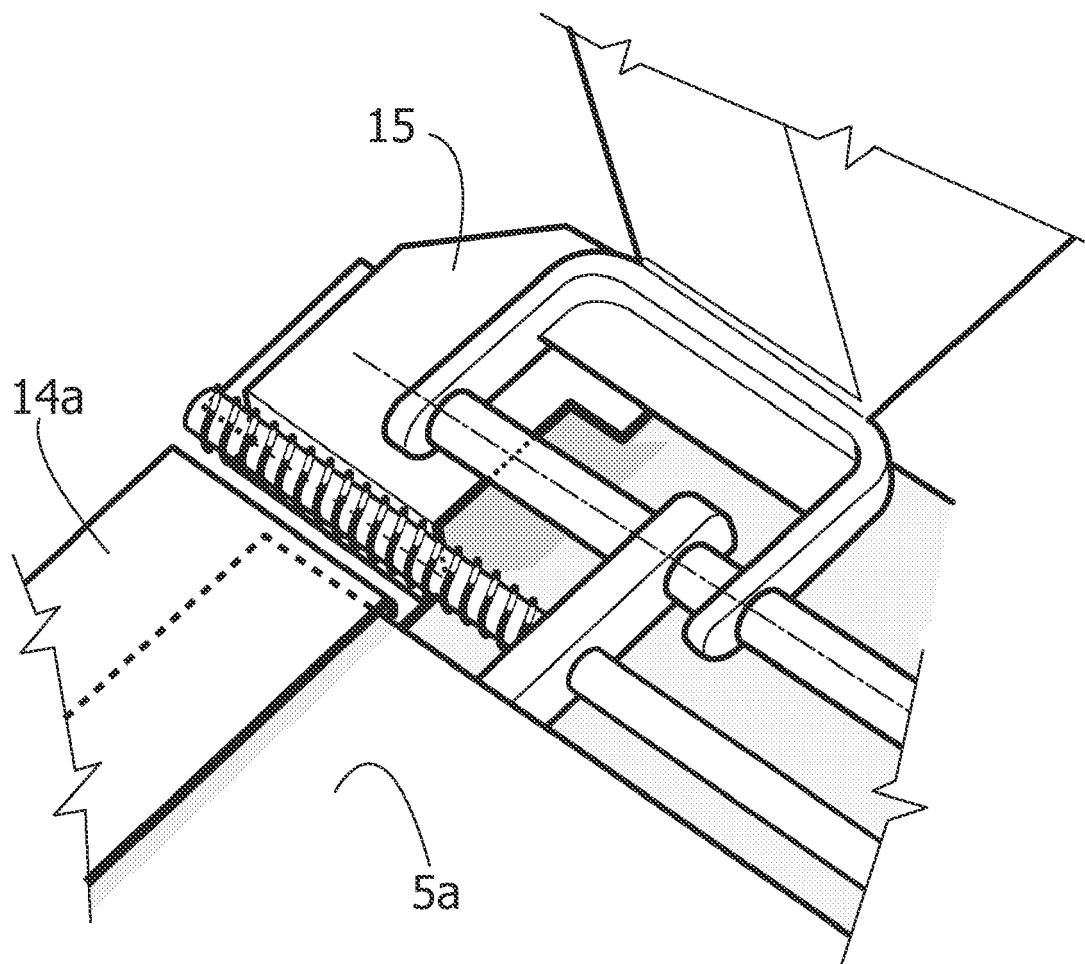


FIG. 8

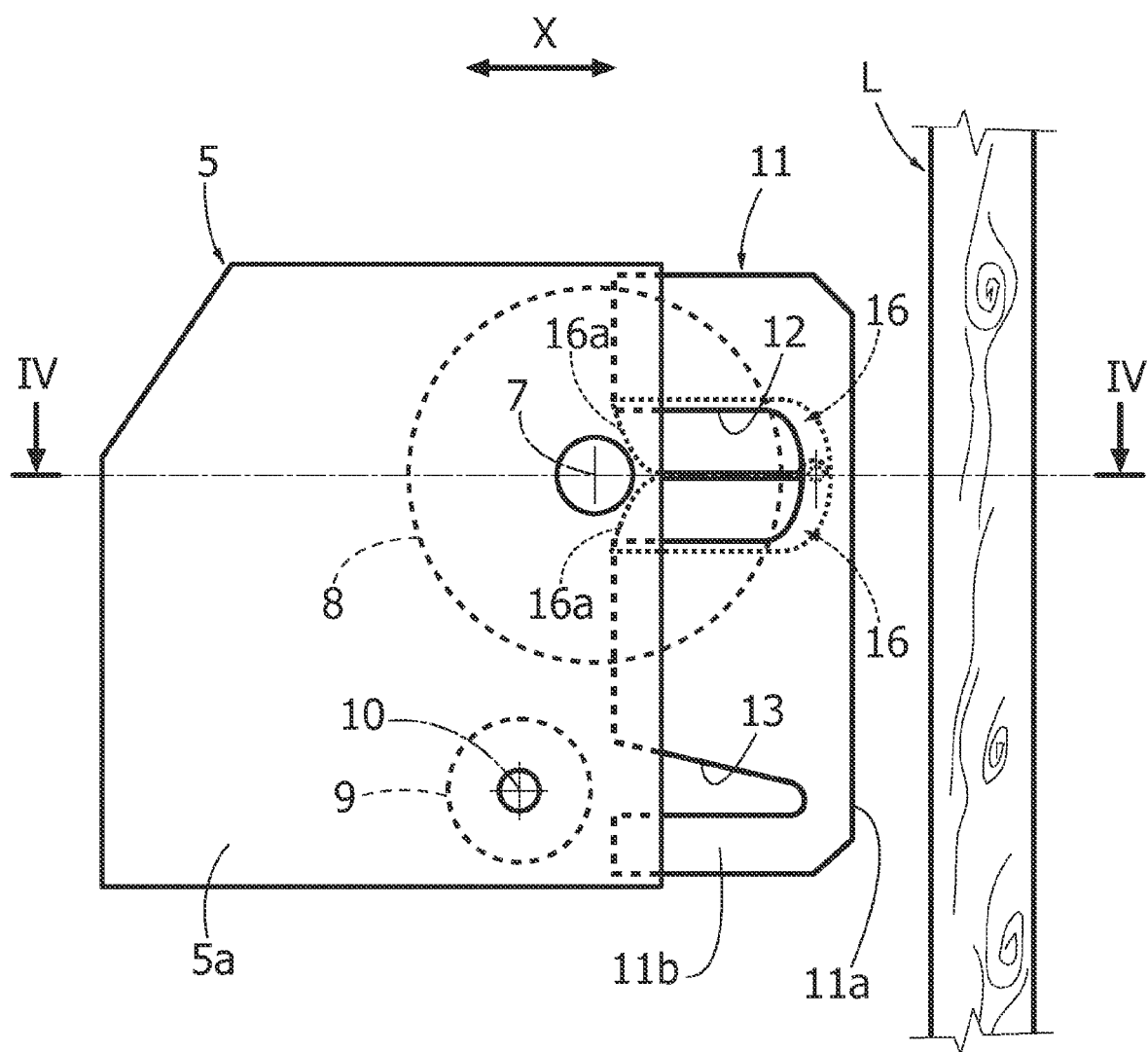


FIG. 9

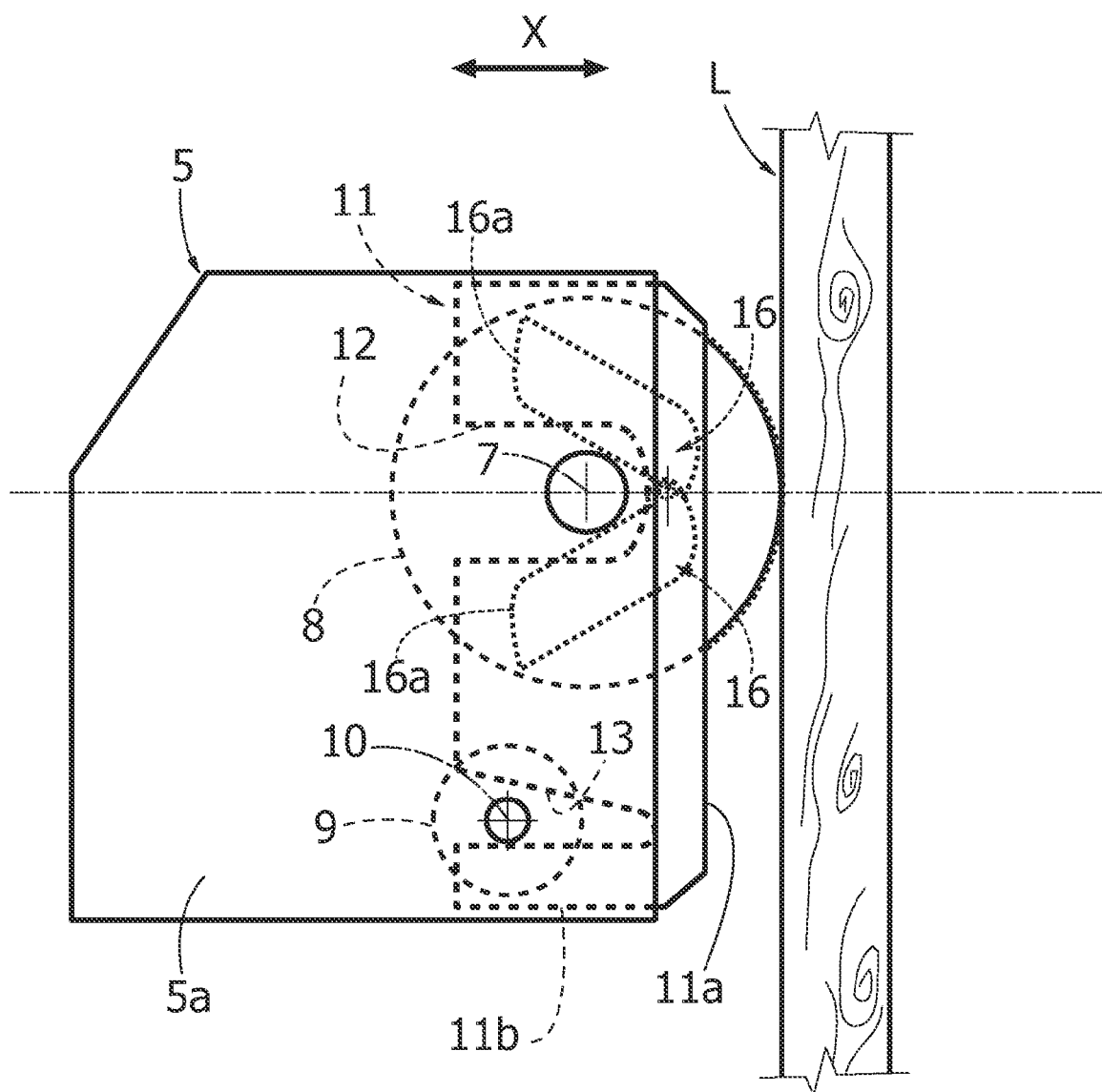


FIG. 10

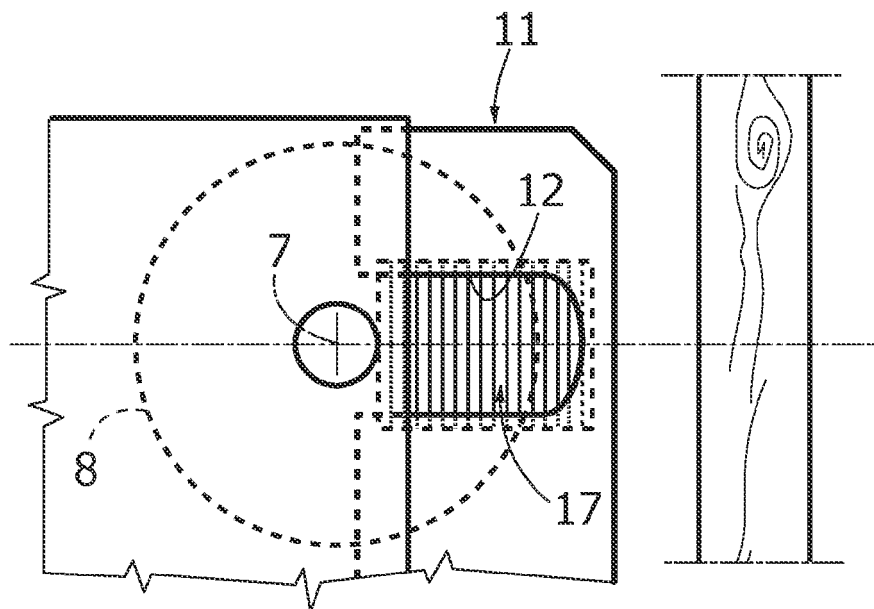


FIG. 11

