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(54) **CUTTING AND SPLITTING MACHINE**

(57) The invention relates to a cutting and splitting machine for cutting sawlog and splitting them to chopped wood, comprising a housing (2), a cutting section (3) further comprising a circular saw for cutting sawlog, a splitting section (4) further comprising a pair of vertical guides (5), a vertically movable rectangular frame (6) with splitting knives (7) arranged in guides, at least one hydraulic cylinder (8) for moving the rectangular frame (6), a fixed guard (9) mounted under the rectangular frame, the splitting section further comprising a movable guard (10) telescopically movably connected to the fixed guard (9). When the rectangular frame is in its lower position during the operation of the machine, the fixed guard is retracted

into the movable guard, when it is in its upper position during the operation of the cutting and splitting machine, the fixed guard is extracted out of the movable guard, thus the effective height of the guard prevents chopped wood from entering the area between the rectangular frame with the splitting knives and the chopped wood discharge conveyor. The movable guard reduces the need for space under the rectangular frame with the splitting knives when it is in its lower position. As a consequence, a lower cutting and splitting machine can be configured, i.e. having a lower centre of gravity, a lower operating point and a lower sawlog infeed.

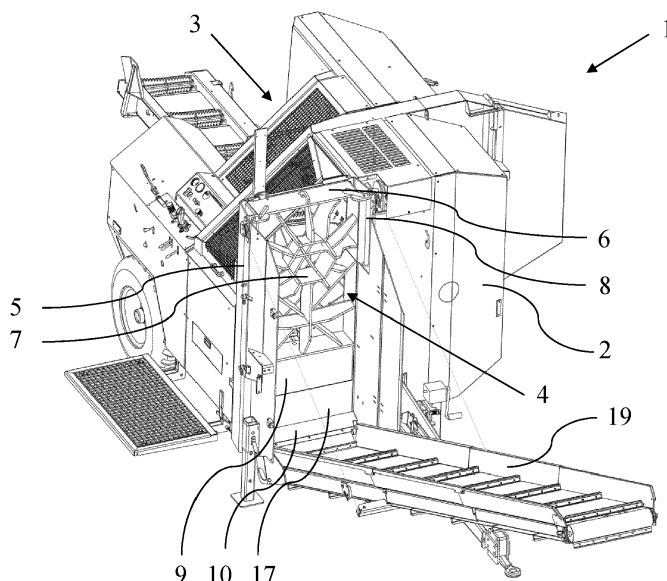


Figure 1

Description

Field of Invention

[0001] The invention relates to a cutting and splitting machine for cutting sawlog into individual pieces and splitting sawlog pieces into chopped wood.

Prior art

[0002] The cutting and splitting machine has a section for cutting sawlog into individual pieces and a section for splitting sawlog pieces into chopped wood. As sawlog have different diameters, the splitting unit is usually configured as a rectangular frame with different arrangements of the splitting knives. By moving the frame vertically and/or horizontally in the machine housing, the choice of knife is adapted to a respective sawlog thickness. A splitting trough is usually V-shaped, so that the centre of the sawlog is vertically aligned in cross-section with the tapered bottom of the trough.

[0003] In the case of a horizontal arrangement of a rectangular frame with splitting knives, the horizontal movement selects the appropriate knife and the vertical movement centres the knife based on the thickness of the sawlog. This variant allows a low machine height and a low distance of the splitting trough from the ground, but has a disadvantage in that the machine width is larger and the guidance of the rectangular frame with the splitting knives is complicated, as it has to be moved in both vertical and horizontal directions.

[0004] In the vertical arrangement of the rectangular frame with the splitting knives, the frame thus needs to be adjusted to the thickness of the sawlog only in height, i.e. by vertically moving the rectangular frame. Such a variant allows for a small machine width and also a relatively low machine operating position, but has a disadvantage lying in that a piece of chopped wood can get wedged between the knife and the chopped wood discharge conveyor, blocking the movement of the rectangular frame with the splitting knives.

[0005] Prior art discloses a cutting and splitting machine having a vertically movable rectangular frame with splitting knives, under which a guard is arranged to prevent a piece of chopped wood from entering the area between the rectangular frame with the splitting knives and the chopped wood discharge conveyor. This prevents unwanted blocking of the movement of the rectangular frame and has a disadvantage in that the height of the machine is increased and so is the height of the machine operating position.

[0006] The cutting and splitting machine can be configured as a stationary machine as part of a line for processing sawlog into chopped wood or as a mobile machine that can be moved by tractor to a work site, e.g. to a temporary sawlog storage area. Tractordrawn traction of the cutting and splitting machine is usually associated with narrow and uneven paths, requiring

small machine dimensions and a low machine centre of gravity for safe driving. In any case, it is also desirable to keep the operating position of the machine as low as possible. A short distance of the platform, from which the operator controls and operates the machine, from the ground makes it easier for the operator to climb the platform, no steps are needed.

Technical problem

[0007] The technical problem is how to configure a smooth-running cutting and splitting machine with a vertically movable rectangular frame with splitting knives, which will have a relatively low height and low centre of gravity, and consequently a low operating point and a low sawlog infeed.

Solution to the technical problem

[0008] The technical problem is solved with a cutting and splitting machine comprising:

a machine housing,
a cutting section arranged in the housing and further comprising a circular saw for cutting sawlog into pieces,
a splitting section comprising:

- a pair of vertical guides mounted on the housing on each side of the splitter trough,
- a vertically movable rectangular frame provided with splitting knives for splitting pieces of sawlog into chopped wood and arranged in the guides,
- at least one hydraulic cylinder to move the rectangular frame with the splitting knives in the guides,
- a fixed guard mounted directly on the rectangular frame with the splitting knives below its outer bottom edge,

wherein the splitting section further comprises a movable guard telescopically movably connected to the fixed guard.

[0009] When the rectangular frame with the splitting knives is in its lower position during the operation of the cutting and splitting machine, the fixed guard is retracted into the movable guard. When the rectangular frame with the splitting knives is in its upper position during the operation of the cutting and splitting machine, the fixed guard is extracted out of the movable guard, thus the effective height of the guard prevents chopped wood from entering the area between the rectangular frame with the splitting knives and the chopped wood discharge conveyor. The movable guard reduces the need for space under the rectangular frame with the splitting knives when it is in its lower position. As a consequence, a lower cutting and splitting machine can be configured, i.e. having

a lower centre of gravity, a lower operating point and a lower sawlog infeed.

Figure 1: Cutting and splitting machine in perspective view

Figure 2: Cutting and splitting machine in side view

Figure 3: Rectangular frame with cutting knives in vertical guides, from the chopped wood discharge side

Figure 4: Rectangular frame with cutting knives in vertical guides, from the chopped wood infeed side

Figure 5: Fixed guard

Figure 6: Movable guard

Figure 7: Rectangular frame with cutting knives and a fixed guard, from the chopped wood discharge side

Figure 8: Rectangular frame with cutting knives, a fixed guard and a movable guard connected with the machine frame, from the chopped wood infeed side

[0010] The invention is described in more detail in the following.

[0011] The technical problem is solved with a cutting and splitting machine 1 comprising:

a machine housing 2,
a cutting section 3 arranged in the housing and further comprising a circular saw for cutting sawlog into pieces,
a splitting section 4 comprising:

- a pair of vertical guides 5 mounted on the housing on each side of the splitter trough,
- a vertically movable rectangular frame 6 provided with splitting knives 7 for splitting pieces of sawlog into chopped wood and arranged in the guides,
- at least one hydraulic cylinder 8 to move the rectangular frame 6 with the splitting knives in the guides 5,
- a fixed guard 9 mounted directly on the rectangular frame with the splitting knives below its outer bottom edge,

wherein the splitting section further comprises a movable guard 10 telescopically movably connected to the fixed guard 9.

[0012] The fixed 9 and movable 10 guards are preferably made of bent sheet metal. The fixed guard has a pair of fixed guard guides 11, on which the movable guard 10 is vertically movable by means of a pair of movable guard guides 14. Each of the pair of fixed guard guides has a lower stop 12 at the lower end, which is capable of engaging a first attachment piece 13 formed at the upper end of each of the pair of the movable guard guides. The lower stop 12 limits the maximum extraction of the movable guard 10 from the fixed guard 9. Each of the pair of guides 14 of the movable guard has a vertical

guide-limiting groove 15 which can engage a second attachment piece 16 mounted on the machine frame. The guide-limiting groove 15 defines the extreme positions of movement of the movable guard relative to the fixed guard.

[0013] When the rectangular frame 5 with the splitting knives is in its upper position, the movable guard 10 is extracted from the fixed guard 9, the two first attachment pieces 13 of the movable guard resting on the lower stops 12 of the fixed guard. As the rectangular frame 5 with the cutting knives is lowered, two second attachment pieces 16 slide in the guide-limiting grooves 15 of the movable guard until they reach the upper edge 15a of the guide-limiting grooves. When the rectangular frame with the splitting knives is lowered further, the movable guard 10 starts to move relative to the fixed guard 9 until the final retracted position is reached. When lifting the rectangular frame with the splitting knives, the process is reversed, with the force of gravity forcing the movable guard into the lower position.

[0014] The cutting and splitting machine may further comprise a deflector 17 mounted on the guides 5 of the rectangular frame with the splitting knives, which serves to guide and facilitate the discharge of chopped wood, for example onto a conveyor belt. If the cutting and splitting machine is used with a chopped wood discharge conveyor, it is recommended that it is placed as close to the machine as possible so that chopped wood is discharged from the splitting area as quickly as possible.

[0015] Said at least one hydraulic cylinder 8 is detachably connected to the rectangular frame 6 with the splitting knives, and the two second attachment pieces 16 are also separable from the movable guard by means of a lever arm 18 with a lever mechanism, thereby releasing the rectangular frame with the splitting knives and allowing it to be replaced if necessary.

[0016] The cutting and splitting machine according to the invention may be further equipped with a discharge conveyor 19 hingedly connected to the machine frame.

Claims

1. A cutting and splitting machine (1) comprising:

a machine housing (2),
a cutting section (3) arranged in the housing and further comprising a circular saw for cutting sawlog into pieces,
a splitting section (4) comprising:

- a pair of vertical guides (5) mounted on the housing on each side of the splitter trough,
- a vertically movable rectangular frame (6) provided with splitting knives (7) for splitting pieces of sawlog into chopped wood and arranged in the guides,

- at least one hydraulic cylinder (8) to move the rectangular frame (6) with the splitting knives in the guides (5),
- a fixed guard (9) mounted directly on the rectangular frame with the splitting knives below its outer bottom edge,

characterized in that

the splitting section further comprises a movable guard (10) telescopically movably connected to the fixed guard (9).

2. The cutting and splitting machine according to claim 1, **characterized in that** the fixed guard (9) has a pair of fixed guard guides (11), on which the movable guard (10) is vertically movable by means of a pair of movable guard guides (14).
3. The cutting and splitting machine according to claim 2, **characterized in that** each of the pair of fixed guard guides (11) has a lower stop (12) at the lower end, which is capable of engaging a first attachment piece (13) formed at the upper end of each of the pair of the movable guard guides (14).
4. The cutting and splitting machine according to claim 2 or 3, **characterized in that** each of the pair of guides (14) of the movable guard has a vertical guide-limiting groove (15) which can engage a second attachment piece (16) mounted on the machine frame.
5. The cutting and splitting machine according to any of preceding claims, **characterized in that** the fixed (9) and movable (10) guards are made of curved sheet metal.
6. The cutting and splitting machine according to any of preceding claims, **characterized by** comprising a deflector (17) mounted on the guides (5) of the rectangular frame (6) with the splitting knives.
7. The cutting and splitting machine according to any of preceding claims, **characterized in that** said at least one hydraulic cylinder (8) is detachably connected to the rectangular frame (6) with the splitting knives, and the two second attachment pieces (16) are detachable from the movable guard by means of a lever arm (18) with a lever mechanism.
8. The cutting and splitting machine according to any of preceding claims, **characterized by** being equipped with a discharge conveyor (19) hingedly connected to the machine frame.

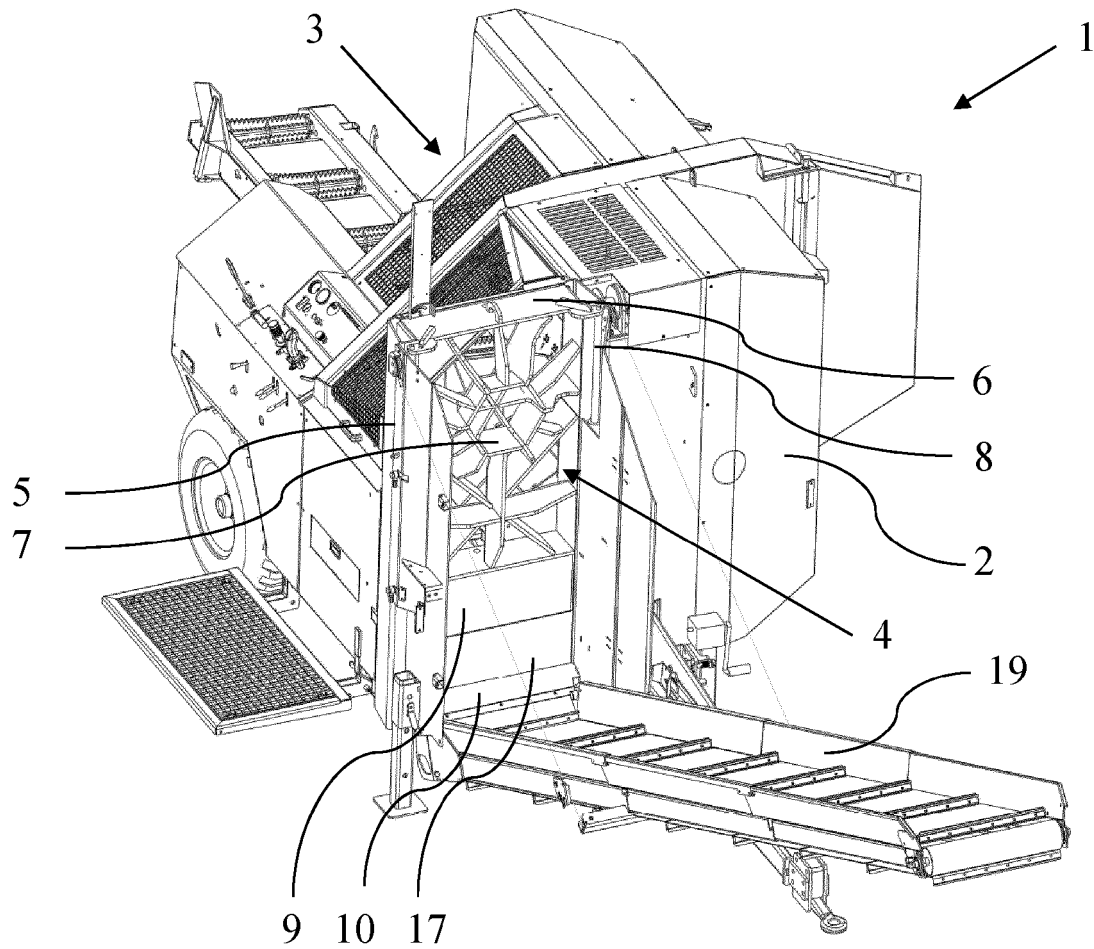


Figure 1

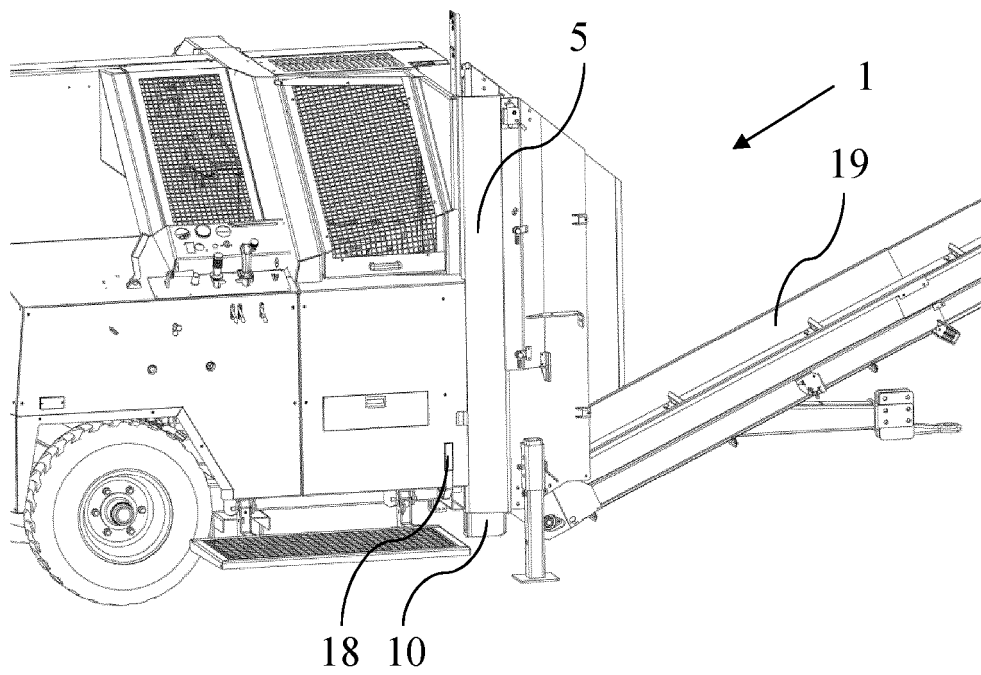


Figure 2

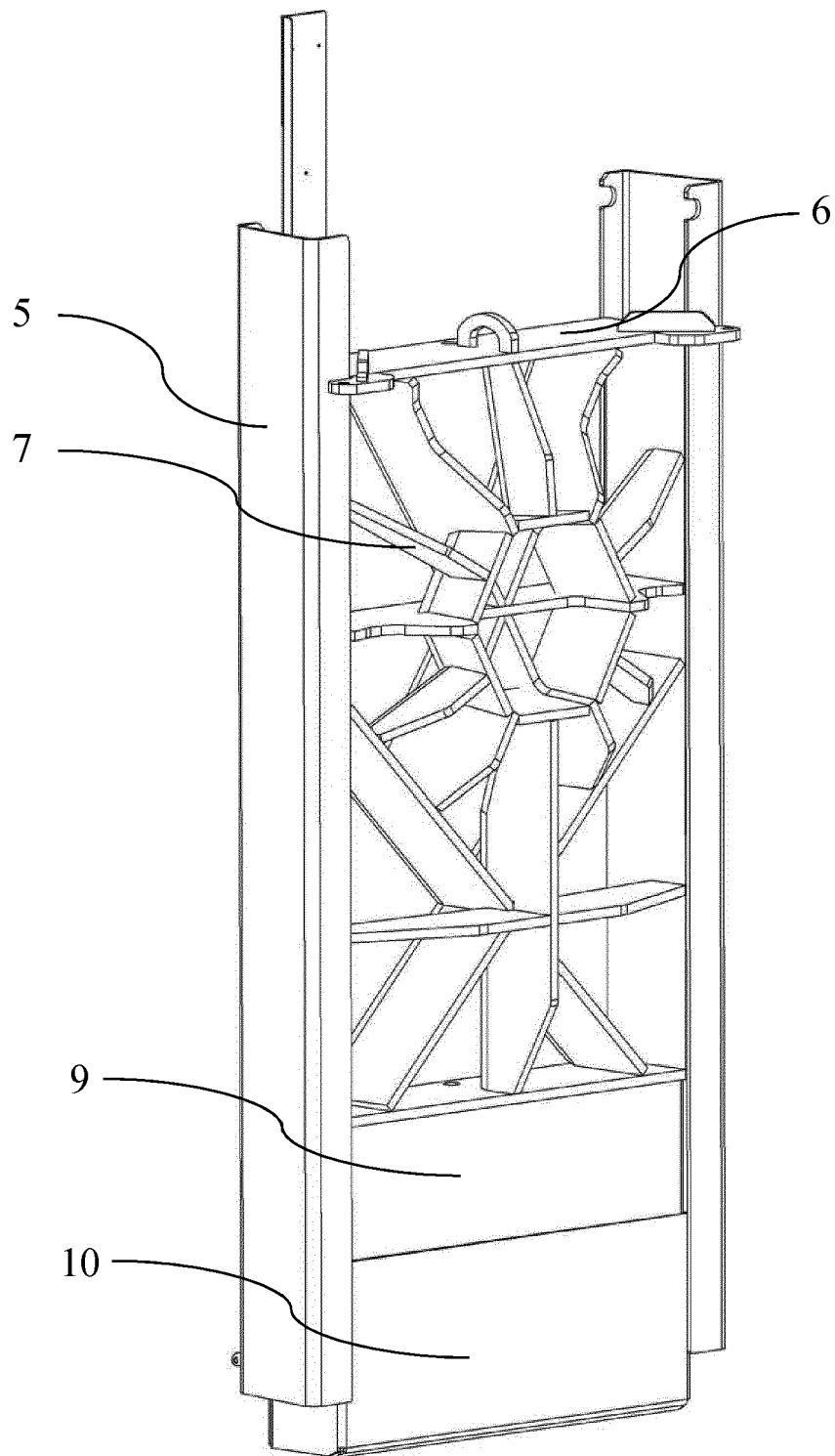


Figure 3

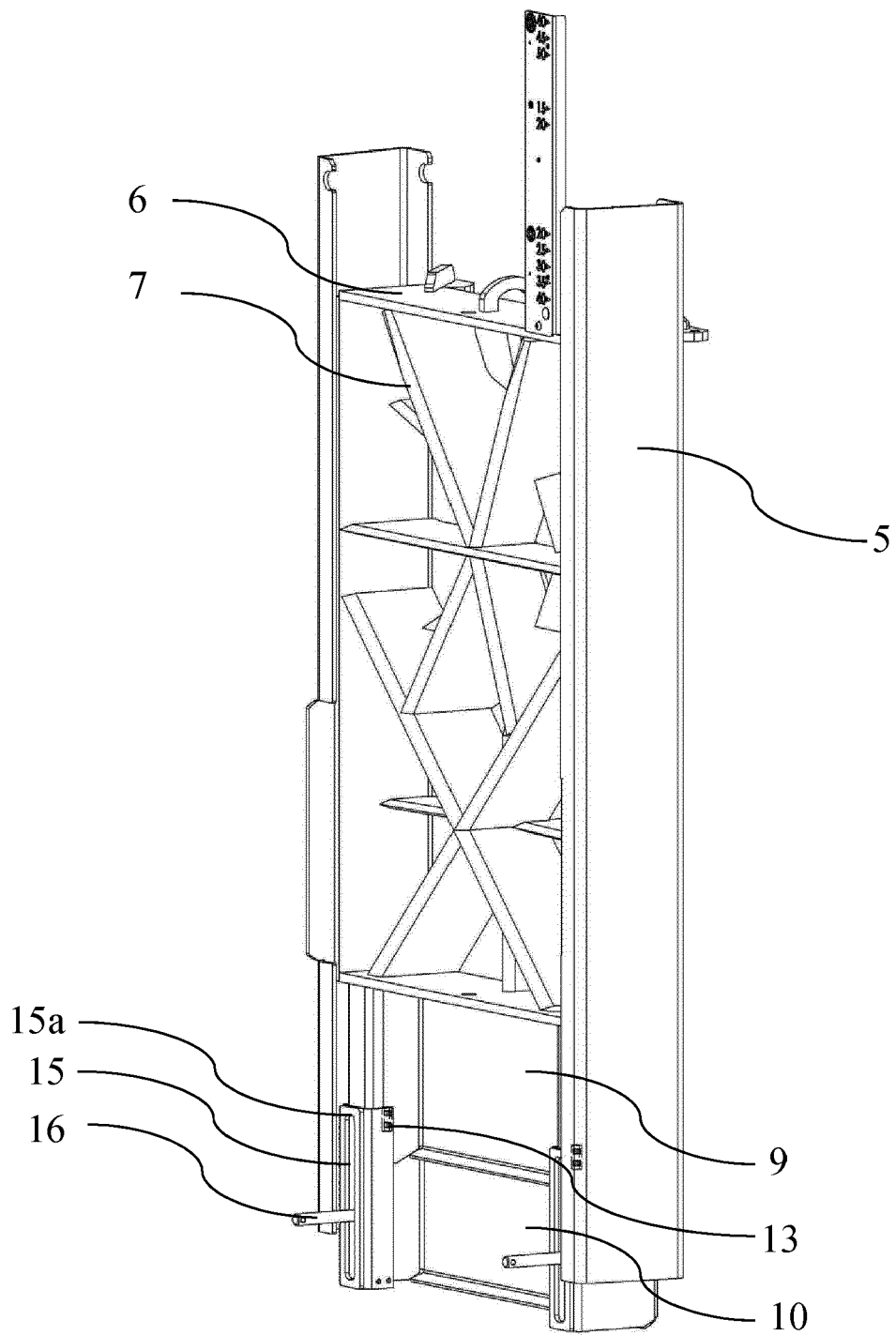


Figure 4

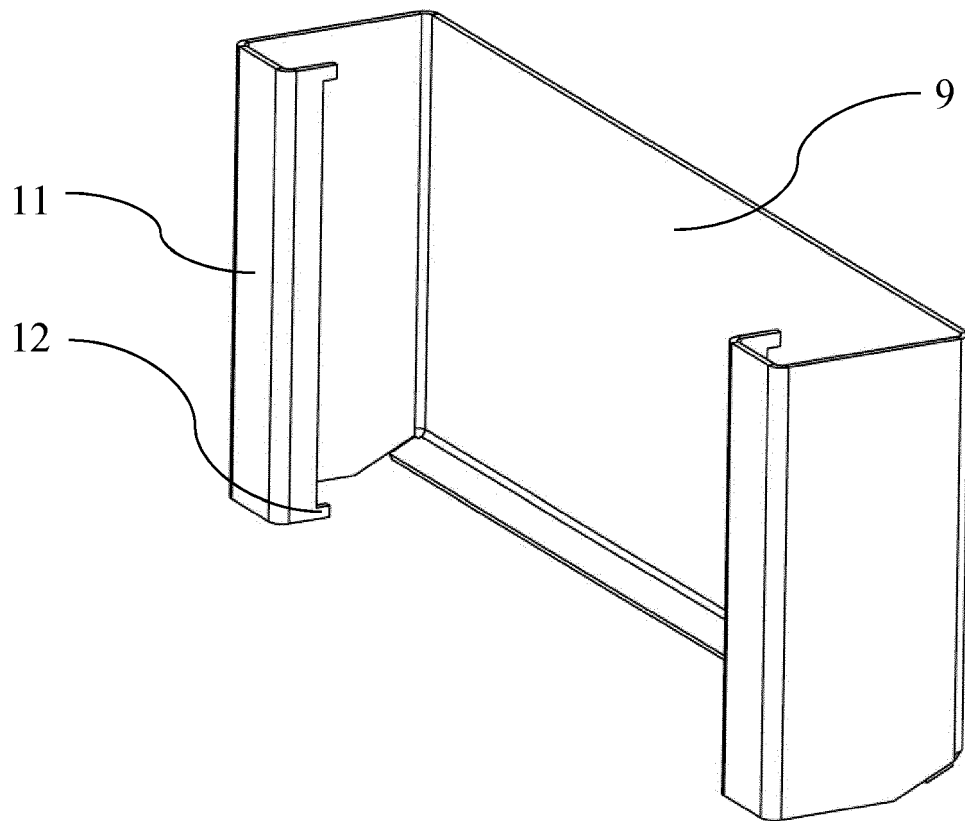


Figure 5

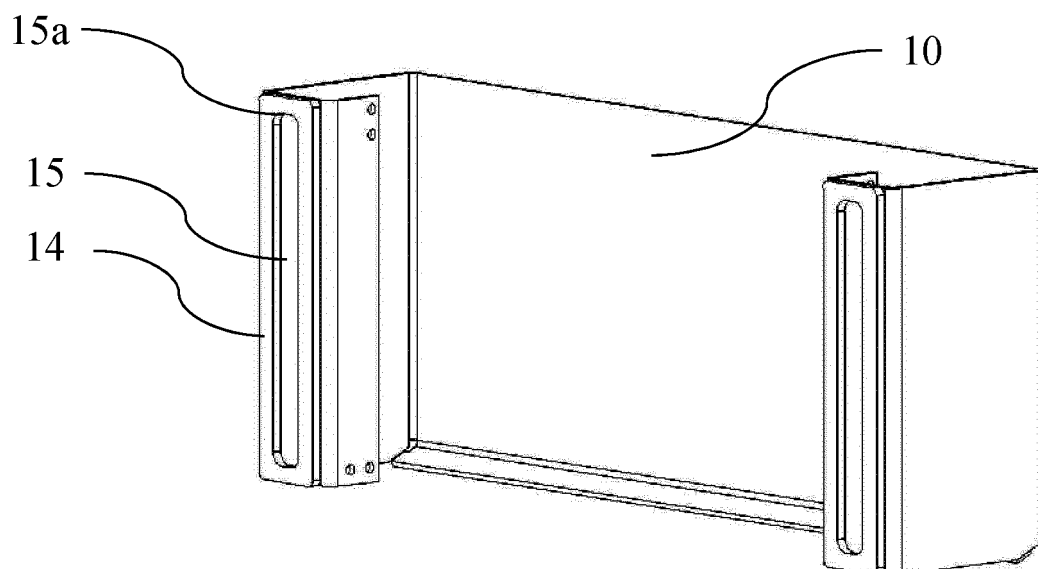


Figure 6

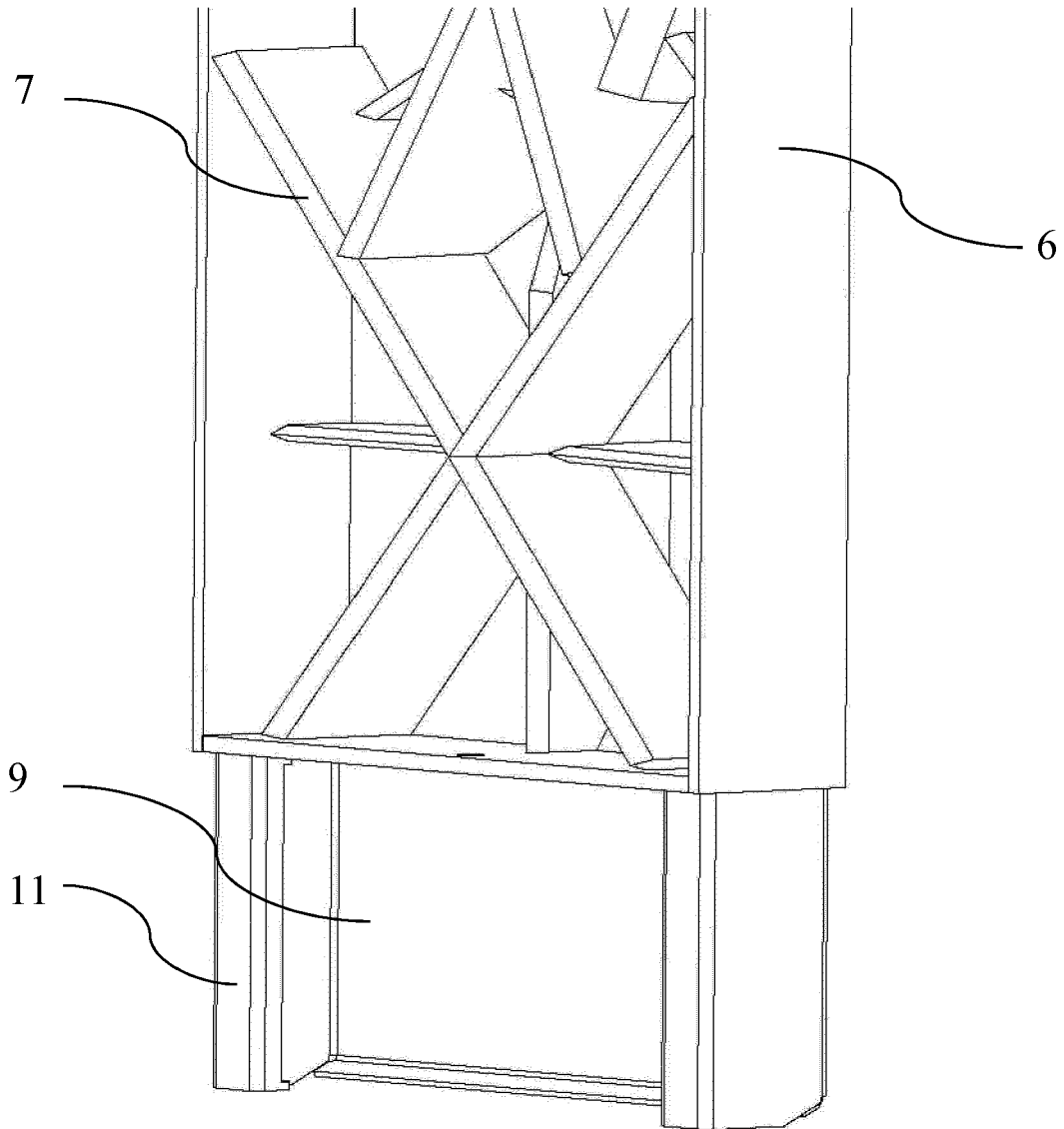


Figure 7

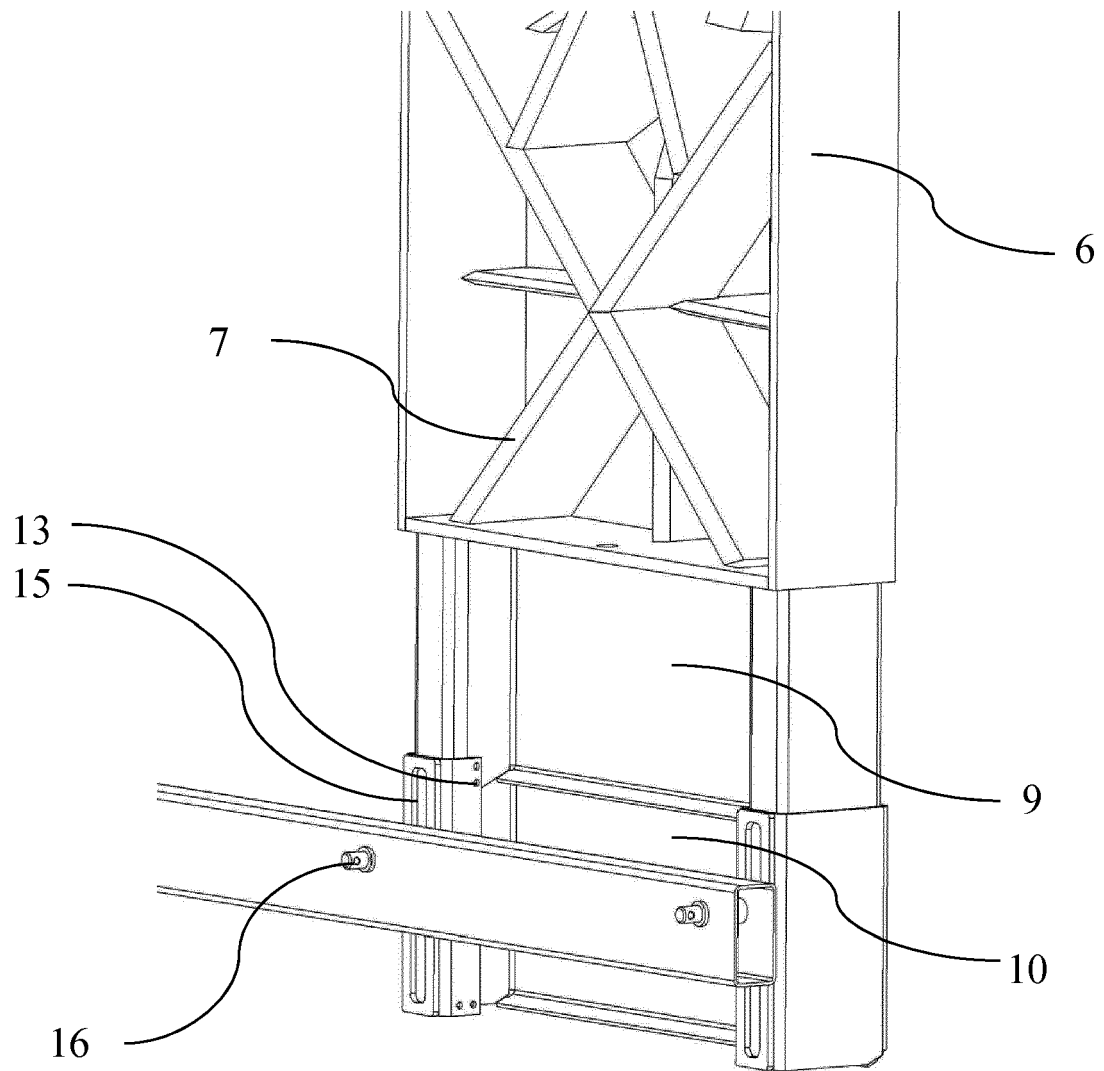


Figure 8



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 2373

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 205 467 A2 (YLISTARON TERÄSTAKOMO OY [FI]) 16 August 2017 (2017-08-16) * claims * * figures *	1-8	INV. B27L7/00 B27L7/06
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			TECHNICAL FIELDS SEARCHED (IPC)
			B27L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		26 August 2022	Hamel, Pascal
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 22 16 2373

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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