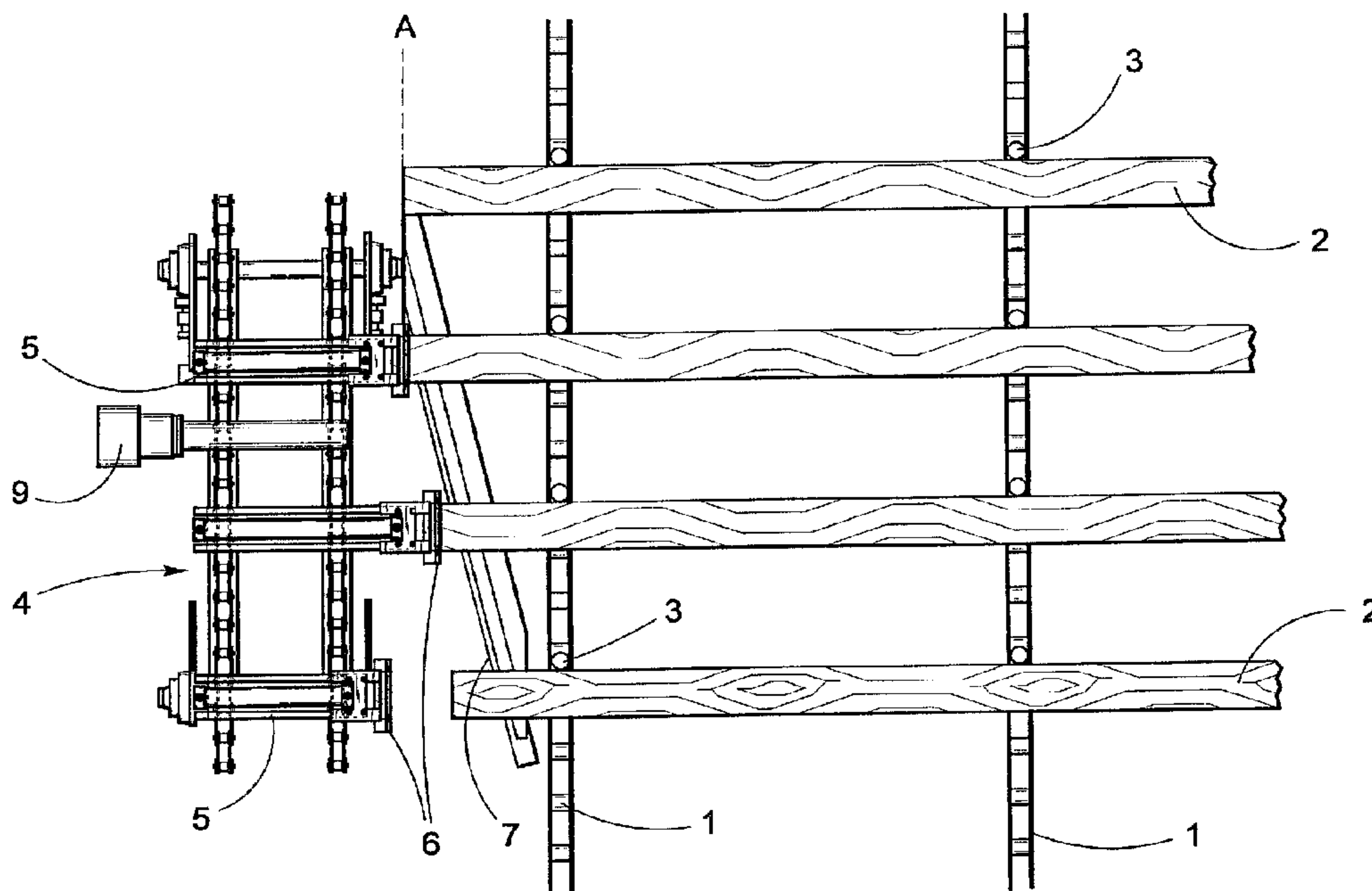




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(54) Titre : INSTALLATION DESTINEE AU DEPLACEMENT DU BOIS D'OEUVRE
(54) Title: DEVICE FOR DISPLACING TIMBER PIECES



(57) Abrégé/Abstract:

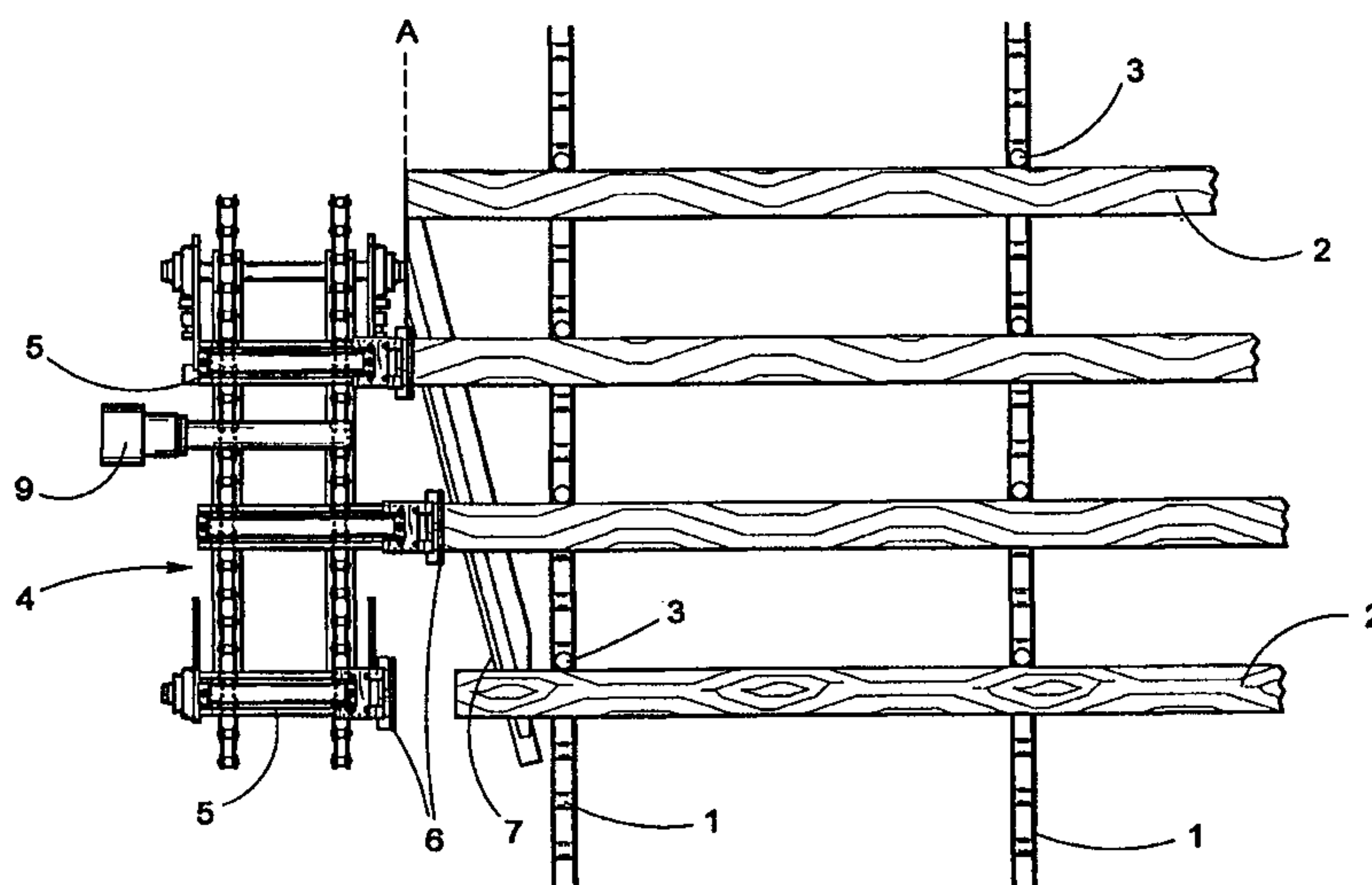
The present invention relates to an arrangement for displacing timber pieces (2) in the direction of a longitudinal axis in order to adjust the positions of said pieces, wherein the arrangement includes a cross conveyor (1) which is fitted with dogging elements (3) and which functions to convey said timber pieces in their cross direction, and which arrangement also includes abutment elements (6) which are intended to abut one end surface of respective timber pieces (2) and therewith displace said timber pieces longitudinally during a part of the transportation of said timber pieces by means of said cross conveyor (1), wherein said abutments (6) are driven synchronously with the cross conveyor (1) around an endless path (4), and wherein each abutment element moves in front of respective dogging elements (3) on the cross conveyor (1) along part of its feed path. The abutment elements (6) are mounted on displacing devices (5) disposed transversely to the endless path (4) and moveable around said path, and the displacing devices (5) are adapted to displace the abutments (6) transversely to movement around said path and in the longitudinal direction of said timber pieces so as to also move said timber pieces (2) in the direction of their longitudinal axes.



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(54) Title: DEVICE FOR DISPLACING TIMBER PIECES**(57) Abstract**

The present invention relates to an arrangement for displacing timber pieces (2) in the direction of a longitudinal axis in order to adjust the positions of said pieces, wherein the arrangement includes a cross conveyor (1) which is fitted with dogging elements (3) and which functions to convey said timber pieces in their cross direction, and which arrangement also includes abutment elements (6) which are intended to abut one end surface of respective timber pieces (2) and therewith displace said timber pieces longitudinally during a part of the transportation of said timber pieces by means of said cross conveyor (1), wherein said abutments (6) are driven synchronously with the cross conveyor (1) around an endless path (4), and wherein each abutment element moves in front of respective dogging elements (3) on the cross conveyor (1) along part of its feed path. The abutment elements (6) are mounted on displacing devices (5) disposed transversely to the endless path (4) and moveable around said path, and the displacing devices (5) are adapted to displace the abutments (6) transversely to movement around said path and in the longitudinal direction of said timber pieces so as to also move said timber pieces (2) in the direction of their longitudinal axes.

DEVICE FOR DISPLACING TIMBERPIECES

The present invention relates to an arrangement for moving
pieces of timber in the direction of their longitudinal axes
5 in order to adjust the positions of said pieces.

Pieces of timber are aligned in a sawmill by moving or dis-
placing the timber pieces in the direction of their longitu-
dinal axes, so as to bring one end or the other of a piece of
10 timber into alignment with an anvil abutment surface or with
cross-cutting saws. The timber concerned consists of boards
or planks.

Boards, or planks, pass through a root-sorting procedure in
15 which the butt-end or thick-end of the board is cut away, and
also through a top-sorting procedure in which the top-end of
the timber is cut away to remove faults in the timber and to
enhance its quality, and also to cut the timber to a length
that corresponds to given module measurements, etc.

20

In one known method of effecting these operations, the timber
is moved in the direction of its longitudinal axis into con-
tact with a fixed stop fender, whereafter the timber is moved
into contact with a fixed saw blade without further movement
25 in its longitudinal direction.

According to another method, the timber is moved into contact
with one of several raisable stop fenders and then into con-
tact with a fixed saw blade, so as to enable the timber to be
30 cut to different lengths.

According to another method, the timber is first moved into
contact with a fixed stop fender, whereafter one of several

mutually adjacent saw blades, a so-called trimmer, is activated and the timber cut into different lengths.

It is also desirable to be able to cut a piece of timber into
5 selected lengths. For instance, it is sometimes desirable to cut away the butt-end of the timber in lengths that correspond to removing a butt-end fault. In this case, the root sorter usually moves the timber longitudinally by manually pulling the timber into a correct cutting position relative
10 to a fixed saw blade.

There are also other reasons for moving timber longitudinally when sorting said timber. One reason is cutting off angular faults in conjunction with root sorting.

15

The present invention is not restricted to displacing timber in the direction of its longitudinal axis for any particular reason, but can be applied in all instances where it is necessary to displace timber longitudinally.

20

However, the invention finds particular application where timber shall be displaced longitudinally with great precision and where it shall be possible to displace the timber through any desired distance.

25

Swedish Patent Specification 7908652-6 teaches an arrangement in which timber can be moved longitudinally through any desired distance, i.e. an arrangement in which longitudinal alignment of the timber is continuously variable.

30

The arrangement taught by this patent specification includes a number of fixed abutments that define an angle with the cross-conveyor that conveys the timber transversely to its

longitudinal axis. As the pieces of timber are conveyed in their cross-direction on the cross-conveyor, they are displaced in the direction of their longitudinal axes by virtue of one end surface of respective timber pieces sliding
5 against the abutments. According to this prior patent publication, the abutments can be swung out of the path of the timber that has been moved longitudinally by said abutments.

One serious drawback with the use of fixed abutments in comparison with fixed or moveable stop fenders that are situated
10 parallel with the conveying direction of the cross-conveyor is that a tilted or canted abutment according to this known arrangement will readily result in canting of the timber, so that the timber is no longer perpendicular to the conveying
15 direction. Canting occurs as a result of friction against the abutment in combination with canting or tilting of the abutment relative to the conveying direction of the cross-conveyor. Such canting results in a cut that is not perpendicular to the longitudinal axis of the timber. This problem
20 is particularly evident with timber of small dimensions.

Swedish Patent Specification 9201379-6 teaches an arrangement for moving timber in the direction of its longitudinal axis when adjusting the position of the timber. This known arrangement includes a cross-conveyor that is provided with
25 dogging elements and that functions to transport timber in its cross-direction, and further includes abutments which abut one end surface of the timber and therewith move the timber in the direction of its longitudinal axis as the timber
30 is conveyed by means of the cross-conveyor. The abutments are driven synchronously with the cross-conveyor along an endless path which is located in a vertical plane and which defines an angle with the conveying direction of the cross-

conveyor. Each abutment moves in front of a respective dogging element of the conveyor along the upper part of said path, and each abutment can be lifted at any position along said path to a position in which the abutment is no longer in
5 contact with the end surface of the timber, so that the piece of timber concerned is no longer moved axially.

One drawback with the arrangement known from Swedish Patent Specification 9201379-6 is that it is mechanically complicated and expensive to produce. The arrangement is also in-
10 flexible, because the endless path extends at a fixed angle relative to the conveying direction of the conveyor and cannot be changed to obtain a different maximum length displacement of the timber without making substantial changes to the
15 construction of the arrangement.

The above drawbacks with the arrangement taught by Swedish Patent Specification 9201379-6 are eliminated by means of the present invention, according to which the abutments are
20 mounted on displacing elements that function to move the abutments transversely to movement along said path and in the longitudinal direction of the timber for movement of the timber in its longitudinal direction.

25 The invention will now be described with reference to a non-limiting exemplifying embodiment thereof and with reference to the accompanying drawings, in which **Fig. 1** is a plan view of an inventive arrangement and also shows schematically a timber cross-conveyor; **Fig. 2** illustrates the inventive ar-
30 rangement in larger scale; **Fig. 3** illustrates a displacing device of the arrangement in **Fig. 2**; and **Fig. 4** is an end view of the arrangement shown in **Fig. 1**.

Fig. 1 thus shows an arrangement for moving timber longitudinally in order to adjust the position of the timber. The arrangement includes a known cross-conveyor 1 provided with dogging elements and functioning to convey pieces of timber 2 in their cross-direction. The cross-conveyor conveys the timber from above and downwards in the figure, horizontally in practice. The cross-conveyor 1 includes mutually parallel chains that carry the dogging elements 3.

10 Arranged parallel with part of the cross-conveyor 1 is an endless path 4 which is located in a vertical plane and formed by a chain conveyor that is driven synchronously with the cross-conveyor. The endless path 4 carries a number of displacing devices 5, for instance pneumatic cylinders, which are disposed transversely to the longitudinal direction of the endless path, and therewith parallel with the pieces of timber on the cross-conveyor. The displacing devices 5 are mounted on the endless path 4 at the same distance apart as the spacing between the dogging elements 3 on the cross-conveyor 1. The end of respective displacing devices 5 that lies proximal to the cross-conveyor 1 is provided with abutments 6 with which one end of the timber pieces 2 is intended to abut. The endless path 4 is driven synchronously with the cross-conveyor 1 such that the abutments 6 will lie immediately in front of the dogging elements 3 as seen in the conveying direction, so as to enable a piece of timber 2 to be fed forwards on the cross-conveyor in abutment with the dogging elements 3 and lie with at least a part of its end surface opposite to an abutment 6 on the endless path 4.

30

The timber displacing devices 5 mounted on the endless path 4, e.g. pneumatic cylinders, can be moved reciprocatingly in the cross direction of the endless path, so as to move the

abutments 6 and therewith also the timber pieces 2 in their longitudinal directions. The extent to which the pieces of timber are moved longitudinally is determined by an adjuster or by some automated function that determines how much of
5 each piece of timber shall be cut-off. This determination decides the extent to which the pieces of timber 2 are moved longitudinally by the displacing device 5 and therewith also the abutment 6. The size of the cut on the piece of timber concerned is fed by the adjuster into a computer which then
10 controls the relevant timber displacing device so as to displace said timber to a corresponding extent.

When the timber has been advanced by the conveyor 2 to the vicinity of the endless path 4, the position of the timber 2
15 has already been adjusted, so that the end of the timber lies along a given end-line A. The displacement devices 5 are controlled so that when the abutments 6 first come into line with the pieces of timber 2 on the cross conveyor 1, the pistons of said devices will be withdrawn so that respective
20 abutments 6 will be located to the left of the end-line A as seen in Fig. 1.

The displacing devices 5 cannot be adjusted directly to desired longitudinal positions, but are extendible towards the
25 cross conveyor 1 or withdrawable therefrom. A guide strip 7 which delimits movement of respective devices 5 and abutments 6 towards the cross conveyor extends from the position in which the abutment 6 first comes into line with the pieces of timber 2 on the conveyor 1. The guide strip 7 has roughly the
30 same length as the extension of the endless path 4 and is disposed obliquely relative to the cross conveyor 1, such that said strip will be level with the end-line A at the place where the abutment 6 first comes into line with the

timber pieces 2 on the cross conveyor, whereas the other end of the guide strip will be situated closer to the cross conveyor and thus at a greater distance from the endless path 4. This enables timber 2 on the cross conveyor 1 to be moved axially away from the endless path by a respective abutment 6. The timber will not therefore be moved axially further than to the guide strip 7, said axial movement of the timber 2 being effected by a respective abutment 6. As before mentioned, the timber displacing device 5 shall be capable of displacing the timber 2 through a given distance. This given axial displacement of the timber is achieved by causing the abutment 6 to be withdrawn by the displacement device in response to a control signal when desired displacement of said timber has been effected, therewith enabling the timber 2 to be advanced by the cross conveyor and its dogging elements without further axial movement of the timber, because the abutment 6 is no longer in abutment with said timber 2 and able to influence the same. The timber can now be advanced by the cross conveyor to a downstream cross-cutting saw and therewith cut to a desired length from one end of the timber piece. Movement of each individual piece of timber in its longitudinal direction can thus be adjusted, by causing the abutment to leave said timber at any chosen position along the endless path.

25

As before mentioned, the timber displacing devices 5 may be pneumatic cylinders to which compressed air is delivered in order to bring respective abutments 6 into engagement with adjacent pieces of timber. In this respect, compressed air is supplied to the pneumatic cylinders of the timber displacing devices when respective timber pieces have passed the beginning of the guide strip 7, wherewith the piston of the pneumatic cylinder is extended until a guide means 8 on its abut-

30

ment 6 comes into abutment with the guide strip 7. Consequently, as the abutment 6 moves along the guide strip 7 synchronously with movement of a respective piece of timber, the abutment 6 will continue to be extended as a result of
5 the abutment of the guide means 8 on the guide strip 7 until the piece of timber has been moved axially to the extent desired, at which point the supply of compressed air to the pneumatic cylinder is immediately switched off and the abutment 6 is no longer extended. The pneumatic cylinder may
10 include a return spring for restoring the piston of the pneumatic cylinder to its starting position, and therewith also said abutment, i.e. total withdrawal of the abutment. Alternatively, the pneumatic cylinder may include a reversal valve that functions to reverse the direction of the compressed air
15 delivered to said valve, such as to return the piston of said cylinder to its starting position.

As an alternative to a pneumatic cylinder, the displacing device 5 may include an electrically extendible slide which
20 is returned to its starting position with the aid of spring means. Another conceivable alternative is to use a hydraulic piston-cylinder device instead of a pneumatic piston-cylinder device.

25 Fig. 2 illustrates an embodiment of an endless path 4 which is comprised of two mutually parallel chains that carry a number of displacing devices 5 in mutually spaced relationship. The displacing devices 5 are provided with an abutment 6 on one end. Also mounted on the endless path 4 is a swivel
30 connection 9 by means of which compressed air and electricity can both be delivered to respective displacing devices 5 for manoeuvring and displacing said devices.

Fig. 3 illustrates a displacing device 5 and associated abutment 6 mounted on a chain 10. The underside of the abutment 6 carries the guide means 8, which lies against the guide rail 7 when the displacing device 5 has been extended to displace axially a piece of timber that lies against the abutment 6. Provided between the two parts of the endless chain 10 is a carrier 11 for supporting the electrical and compressed-air lines 12 that extend from the swivel connection to respective displacing devices 5 for manoeuvring said devices.

10

Fig. 4 is an end view of the endless path 4, and shows the upper and the lower part of the path with chain 10, sprocket wheel 13, and also shows displacing devices 5 mounted on the chain. The sprocket wheel or chain wheel 13 may conveniently be connected so as to be driven by the same motor as that which drives the cross conveyor 1 and may also be connected by a drive shaft to a driving sprocket wheel of said conveyor, so as to synchronous movement between the cross conveyor and the endless path.

20

The invention enables different sawmills to readily adapt the arrangement to a maximum cut-off length, by changing the angular setting of the guide strip 7 while leaving remaining parts of the apparatus unchanged. By making the inventive arrangement longer or shorter in modules with respect to the pitch of the dogging element chains, the arrangement can be adapted to requirements with respect to precision and speed.

25

CLAIMS

1. An arrangement for displacing timber pieces (2) in the direction of a longitudinal axis in order to adjust the positions of said pieces, wherein the arrangement includes a cross conveyor (1) which is fitted with dogging elements (3) and which functions to convey said timber pieces in their cross direction, and which arrangement also includes abutment elements (6) which are intended to abut one end surface of respective timber pieces (2) and therewith displace said timber pieces longitudinally during a part of the transportation of said timber pieces by means of said cross conveyor (1), wherein said abutments (6) are driven synchronously with the cross conveyor (1) around an endless path (4), and wherein each abutment element moves in front of respective dogging elements (3) on the cross conveyor (1) along part of its feed path, **characterised** in that the abutment elements (6) are mounted on displacing devices (5) disposed transversely to the endless path (4) and moveable around said path; and in that the displacing devices (5) are adapted to displace the abutments (6) transversely to movement around said path and in the longitudinal direction of said timber pieces so as to also move said timber pieces (2) in the direction of their longitudinal axes.

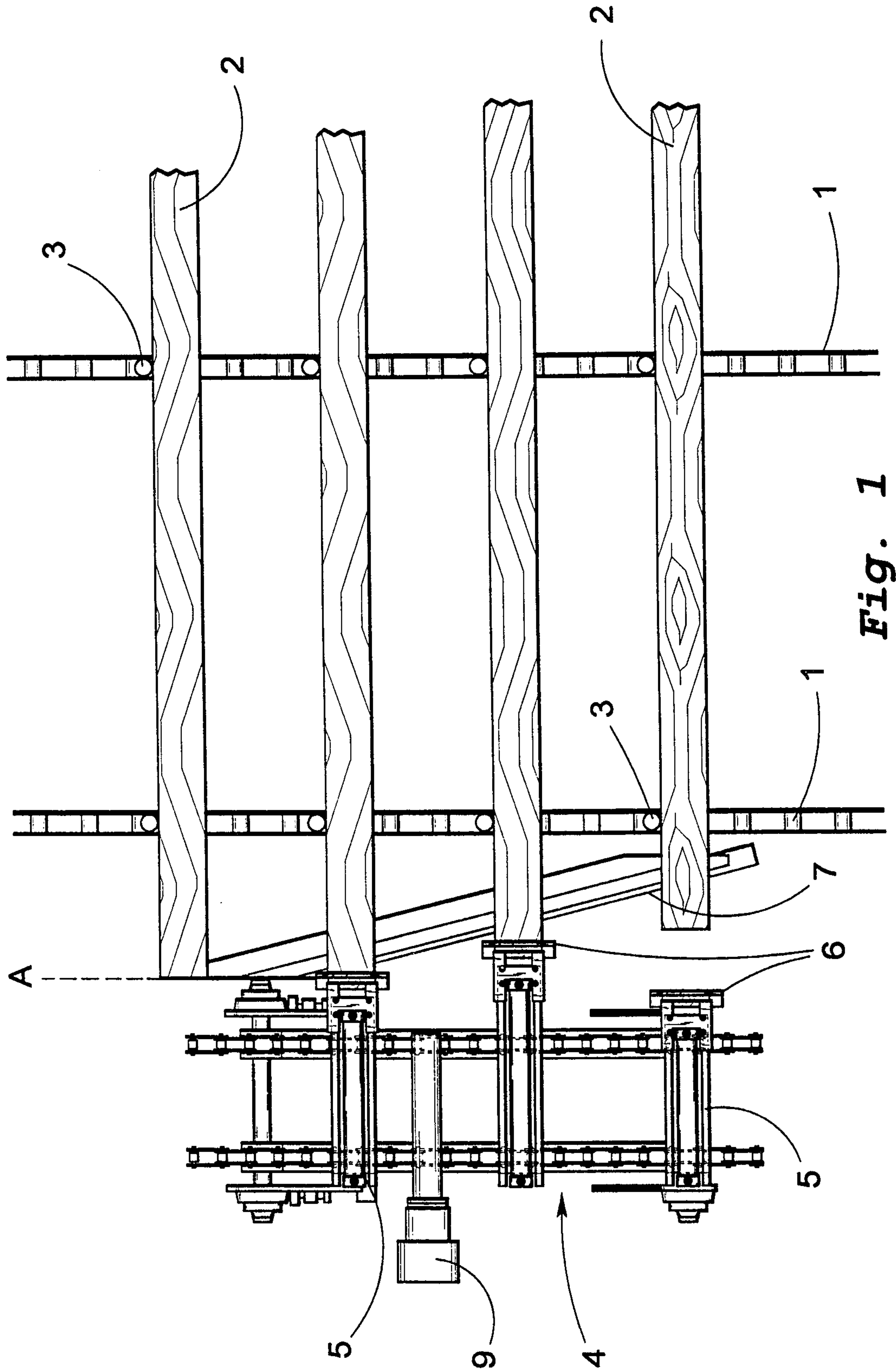
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2. An arrangement according to Claim 1, **characterised** by an obliquely mounted guide strip (7) which functions to limit movement of the abutments (6) by the displacing devices (5) in the longitudinal direction of said timber pieces, wherein said guide strip (7) is inclined so that its distance from the endless path (4) increases successively in the conveying direction of the cross conveyor (1).

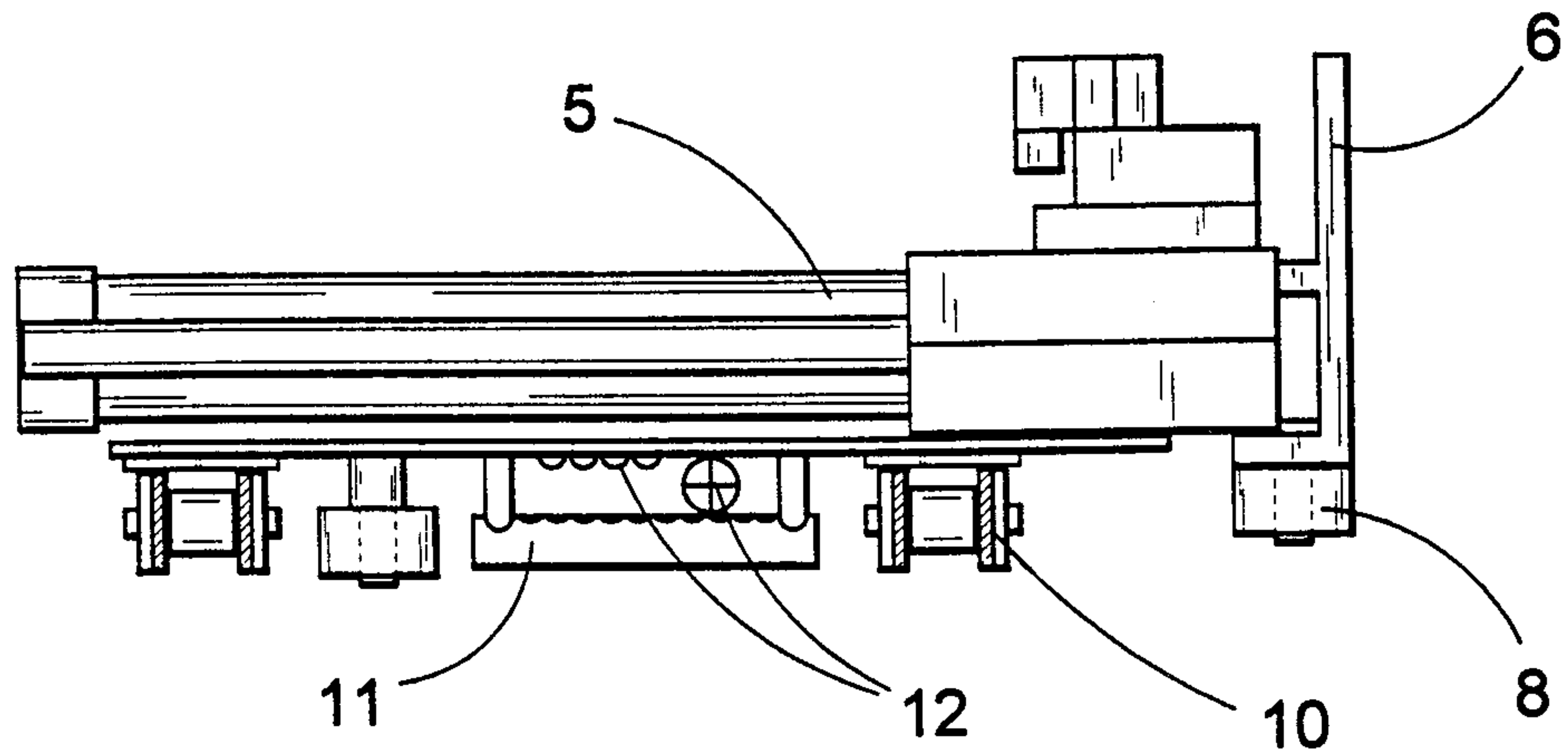
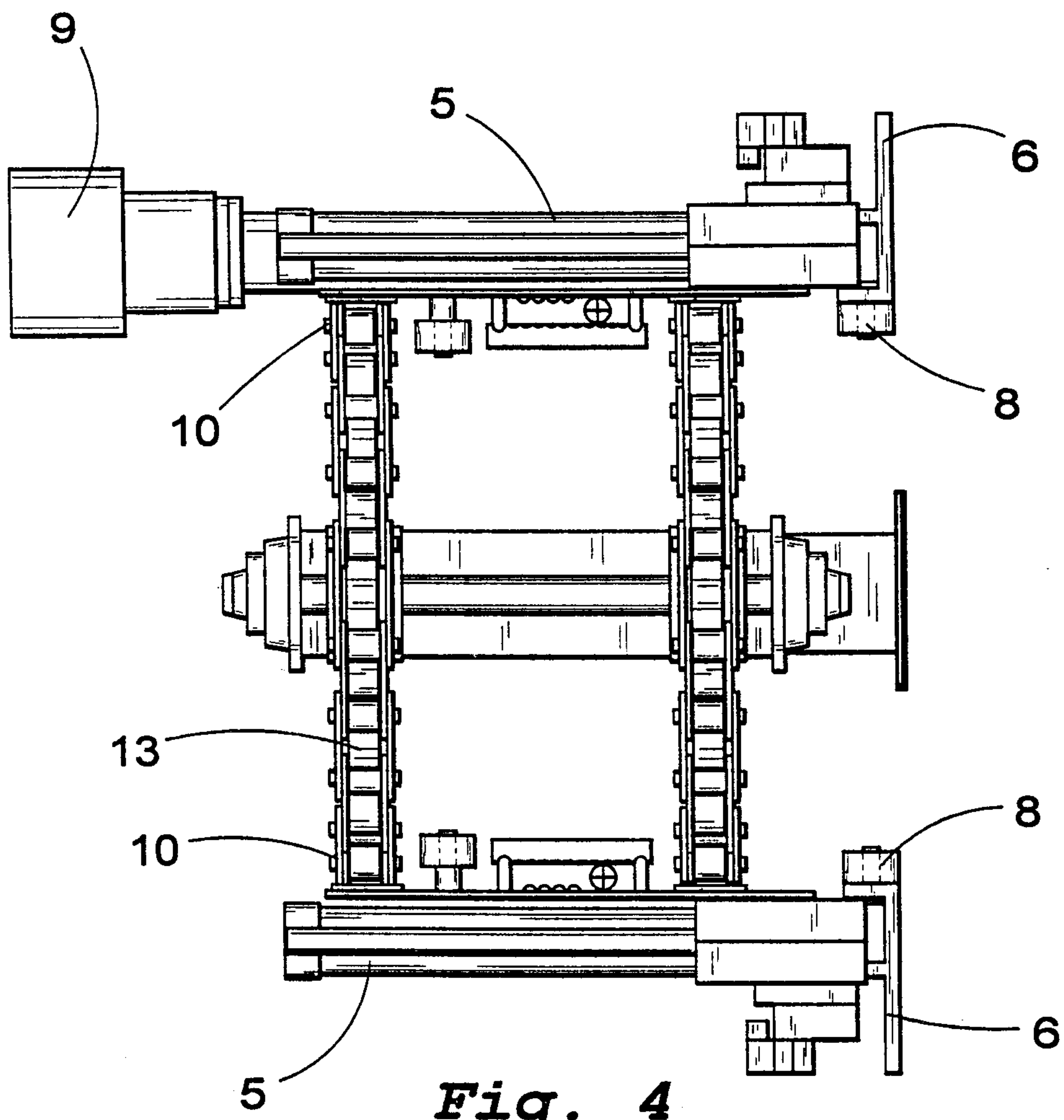
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3. An arrangement according to any one of the preceding Claims, **characterised** in that the displacing devices (5) include a guide means (8) for abutment with the guide strip (7), wherein the displacing devices function to displace the
5 abutment element (6), and therewith the timber piece (2), at the beginning of the guide strip (7) until said guide means (8) comes into abutment with the guide strip (7), at least at the beginning of said guide strip in the conveying direction.
- 10 4. An arrangement according to Claim 3, **characterised** in that the displacing devices (5) are adapted to be withdrawn to a position in which the control means (8) is distanced from the guide strip (7) in response to an applied control signal; and in that the timber piece (2) is conveyed further in the con-
15 veying direction of the cross conveyor (1) without further displacement of said timber piece in its longitudinal direction.
5. An arrangement according to any one of the preceding
20 Claims, **characterised** in that the displacing devices (5) have the form of pneumatic cylinders mounted on the endless path (4) with the same spacing therebetween as that between the dogging elements (3) on the cross conveyor (1).
- 25 6. An arrangement according to Claim 5, **characterised** by a swivel connector (9) mounted on the endless path (4) supplying compressed air, and possibly also electric current, to all pneumatic cylinders mounted on said endless part.
- 30 7. An arrangement according to any one of Claims 2-6, **characterised** in that the guide strip (7) can be adjusted to different angles in relation to the cross conveyor (1) and to the endless path (4).

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*Fig. 3**Fig. 4*

