Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2647331 C 2014/12/09

(11)(21) **2 647 331**

(12) **BREVET CANADIEN**
CANADIAN PATENT

(13) **C**

(86) **Date de dépôt PCT/PCT Filing Date:** 2007/04/24
(87) **Date publication PCT/PCT Publication Date:** 2007/11/08
(45) **Date de délivrance/Issue Date:** 2014/12/09
(85) **Entrée phase nationale/National Entry:** 2008/11/03
(86) **N° demande PCT/PCT Application No.:** AT 2007/000203
(87) **N° publication PCT/PCT Publication No.:** 2007/124525
(30) **Priorité/Priority:** 2006/05/03 (AT A 760/2006)

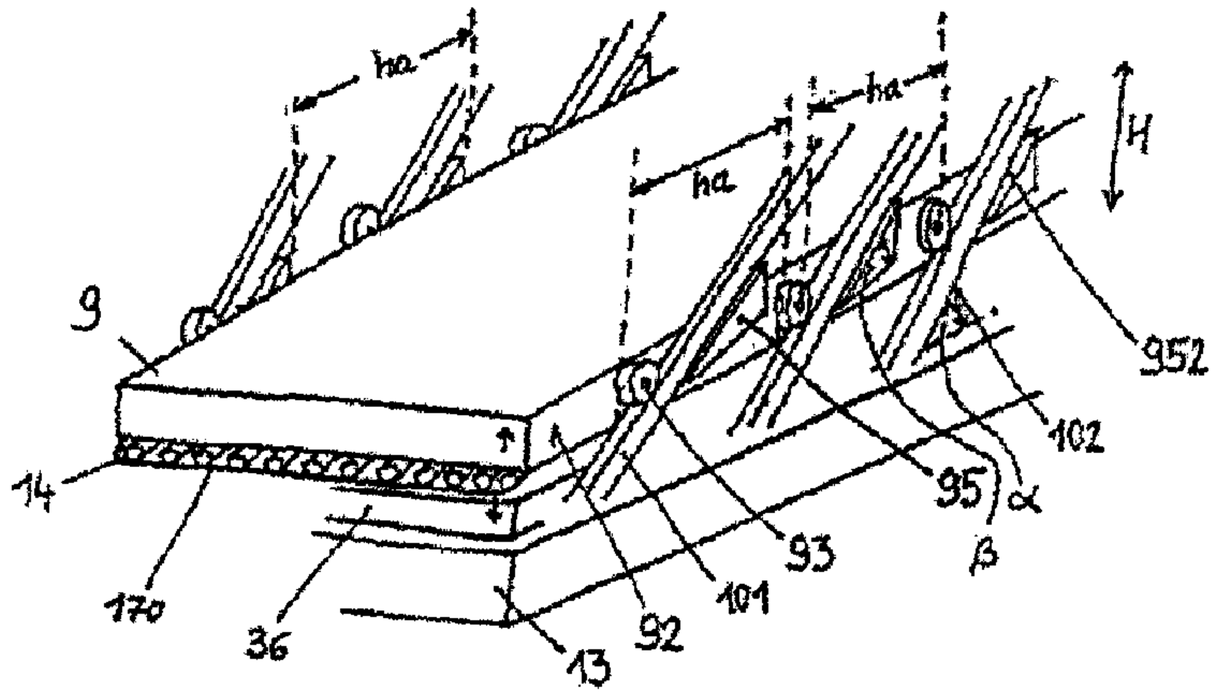
(51) **Cl.Int./Int.Cl.** ***B30B 1/00*** (2006.01)

(72) **Inventeur/Inventor:**
WEIRER, WOLFGANG, AT

(73) **Propriétaire/Owner:**
WEIRER, WOLFGANG, AT

(74) **Agent:** MARKS & CLERK

(54) **Titre : MONTAGE DE PRESSAGE DE PIECES, EN PARTICULIER DE PIECES EN BOIS**
(54) **Title: ASSEMBLY FOR PRESSING PRESSING PARTS, ESPECIALLY THOSE MADE OUT OF WOOD**



(57) **Abrégé/Abstract:**
The invention relates to an assembly for pressing pressing parts, especially those made of wood, comprising a pressing unit, a pressing table, and a counter-pressure plate functioning as a pressure-absorption plate. The invention further comprises pressure elements facing the pressing parts. The pressure-absorption plate features roller carriers located equidistantly along longitudinal lateral flanks of the pressure-absorption plate. The roller carriers allow movement of the pressure- absorption plate on parallel, equidistant guide rails which are connected to a frame carrier of the pressing unit and have maximum ascent angles of 30° relative to the pressing table. A drive allows height adjustment of the pressure-absorption plate. Furthermore, locking wedges, corresponding to the guide rails, have wedge angles corresponding to the ascent angles of the guide rails for force closed wedging of the pressure- absorption plate and the guide rails to prevent lifting of the pressure-absorption plate during pressurization of the pressure elements.

Abstract

The invention relates to an assembly for pressing pressing parts, especially those made of wood, comprising a pressing unit, a pressing table, and a counter-pressure plate functioning as a pressure-absorption plate. The invention further comprises pressure elements facing the pressing parts. The pressure-absorption plate features roller carriers located equidistantly along longitudinal lateral flanks of the pressure-absorption plate. The roller carriers allow movement of the pressure-absorption plate on parallel, equidistant guide rails which are connected to a frame carrier of the pressing unit and have maximum ascent angles of 30° relative to the pressing table. A drive allows height adjustment of the pressure-absorption plate. Furthermore, locking wedges, corresponding to the guide rails, have wedge angles corresponding to the ascent angles of the guide rails for force closed wedging of the pressure-absorption plate and the guide rails to prevent lifting of the pressure-absorption plate during pressurization of the pressure elements.

Assembly for pressing pressing parts, especially those made out of wood

The invention relates to a new arrangement for pressing of pressed parts, especially those made out of wood, preferably for pressing of wooden lamellae into large elements for timber constructions, with a press unit with a press table to support the pressed parts to be connected to each other, and a counter-pressure plate that is arranged above the press table which can be moved up and down, where for the application of compressive force onto the material to be pressed made with the pressed parts, a plurality of pressure elements, particularly arranged side-by-side, such as hoses, bags, balloons, pads or suchlike, are arranged underneath the counter-pressure plate, which can particularly be inflated with pressure fluid, particularly compressed air, and be pressurized from a pressure fluid source, particularly a compressed air source.

When pressure-bonding bulky and/or large-surface press parts with dimensions from e.g. up to 3 m width and up to 16 m length with a thickness of e.g. 0.1 to 0.5 m, it is extremely difficult to apply the necessary compacting pressure evenly and then uniformly maintain same across the entire surface of the press parts to be connected to each other, once the compacting pressure is reached. Such presses furthermore have a complex design and are actually still not user-friendly and energy-efficient.

An object of the invention is to apply uniform pressure onto the entire surface of the material to be pressed formed with the press parts, on the one hand, and on the other to obtain a press device with low energy consumption with concurrent high operational comfort. The subject matter of the invention thus is an arrangement of the type mentioned at the outset with the characterizing features described herein.

According to an aspect of the invention, there is provided an arrangement for pressing of pressed parts, especially those made out of wood, preferably for pressing of wooden lamellae into large elements for timber constructions, with a press unit with a press table to support the pressed parts to be connected to each other, and a counter-pressure plate which can be moved up and down is arranged above the press table, where for the application of compressive force onto the pressed parts, a plurality of pressure elements, particularly arranged side-by-side, such as hoses, bags, balloons, pads or suchlike, are arranged between the counter-pressure plate and the, which can particularly be inflated with pressure fluid, particularly compressed air, and be pressurized from a pressure fluid source, particularly a compressed air source, characterized in that

- the counter-pressure plate of the press unit designed with preferably side-by-side pressure elements, if necessary, laterally, adjacently arranged I-profile beams, is formed with a heavy, pressure-absorption plate, which is rigid and torsionally stiff across its entire surface area and on the side facing the aforementioned material to be pressed and/or the pressed parts forming the same,

- which along both of their longitudinal sides and/or longitudinal lateral flanks has carrier rollers that are preferably arranged and/or supported and horizontal distances between each other and can be moved with these carrier rollers on arranged parallel to each other guide rails with an upward slope and which are arranged at the same horizontal distances between each other, and are tied to the lateral frame members of the press unit, at an acute angle of maximums 30° with reference to the main extension of press table and material to be processed and/or the pressed parts for the same, and which can be vertically moved and adjusted by means of a preferably hydraulic drive on the aforementioned sloping guide rails.

With the provided plurality of expandable pressurizing elements pressurized with compressed air as taught by the invention, a large surface area can be uniformly pressurized. High pressure can be supplied, since the pressure elements used can be made pressure resistant easily up to 10 bar and even higher, so that a high uniform pressure across a large surface can ultimately be achieved. With a relatively simple design of the arrangement, this high surface pressure achieved can be a multiple of the pressure that can be achieved with a vacuum forming press, way a maximum surface pressure of approximately 10N/cm^2 is achievable.

Furthermore, the new arrangement is also more simply constructed and easier to operate, particularly when compared to the arrangement described in AT 406133 B:

All that is needed is to provide the necessary compressed air for generating the compacting pressure and introduce it into the pressure elements. The decompression of the press is carried out by venting the compressed air from the pressure elements into the environment, while maintaining the height of its counter-pressure plate and/or pressure-absorption plate. The necessary compacting pressure can be built-up rapidly and kept constant over extended periods of time. It is not necessary to having to absorb the weight of the respective material to be pressed with the pressure elements, because the pressure elements are arranged above the material to be pressed and press against the material to be pressed from the pressure-absorption plate. Because of its mobility on the inclined guide rails, the pressure-absorption plate is supported vertically adjustable in the pressing unit at can be lifted and lowered such that the pressure elements and an optional pressure plate which seals these towards the materials to be pressed s act in a preferably merely slight bearing against the pressed goods. In order to apply the necessary compacting pressure, it is then only necessary to pressurize the pressure elements and/or their pressure medium with their respective pressure.

While it was previously necessary to provide e.g. tie bars between the pressing table and the pressure-absorption plate in order to ensure the position invariance between these two components to each other during the press operation, it has now been provided that a high-stability location of the pressure-absorption plate is securely assured through force closure by means of locking wedges, rails or suchlike, which are arranged on this pressure-absorption plate and cooperate through force closure with the top sides on the bottom side of the guide rails.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure-absorption plate is equipped with locking wedges that are arranged and respectively assigned at the same horizontal distances from each other as the carrier rollers and the guide rails with the locking surfaces on the top facing the underside of the guide rails with a wedge angle which at least essentially agrees with the ascent angle of the guide rails for a force-closed wedging of pressure-absorption plates with the guide rails to prevent the lifting of the pressure-absorption plate at the start of and during the pressure application by means of the pressure fluid filling the pressure elements.

The pressing table and the pressure-absorption plate are designed appropriately rigid and torsionally stiff so that they can absorb the tensile, compressive, and shear forces that occur during the pressure application without any negative impact on the material to be pressed .

Aspects of the invention provide for an advantageous spacing between the locking wedges, guide rails and carrier rollers, a preferred range for the ascent angle of the guide rails, a particularly favorable ascent angle of the lock surfaces of the locking wedges for the deadlock of

the pressure-absorption plate during application of pressure on the pressure elements, a favorable intermediate position for feeding press material to the press unit between same and the pressing table, as well as a protective foil which covers the pressure elements against the material to be pressed .

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that at each height adjustment of the pressure-absorption plate, so long as this lies completely upon its carrier rollers on the guide rails, the top face lock surfaces of the locking wedges are arranged at a small distance, preferably below 1 cm, from the underside of the guide rails.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the guide rails have an ascent angle from 10 to 20°, particularly approximately 15°.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the ascent angle of the lock surfaces of the locking wedges is 0.05 to 0.25° greater than the ascent angle of the guide rails.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements facing the press table, which is coated if necessary with Teflon composite or at least with a metal plate, and/or the material to be pressed terminate in a pressure plate for pressure distribution.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements facing the material to be pressed and/or the pressed parts forming the same, and/or facing a pressure plate that may be present, are covered with a shared textile, composite, or metal film, preferably with a low residual surface roughness.

Further aspects of the invention provide for a preferred geometrical arrangement of the pressure elements below the pressure-absorption plate, how the pressure elements can be filled with pressure fluid efficiently, preferred material characteristics of the pressure element walls,

preferred tubing for use with same, advantageous sizing for the same, and an effective configuration of the pressure elements on the surface.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements are formed with hoses that are preferably mounted or held in the longitudinal dimension of the pressure-absorption plate next to one another and above the shared film and/or above a pressure plate that may be present, or are affixed suspended or in a similar fashion on the pressure-absorption plate.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements provided with a compressor connection are provided with at least one valve for rapid pressure release.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements, which are preferably inflatable and are impervious to the pressed medium, have flexible and/or deformable wall areas, which are however essentially not elastic or elastic to only a very limited extent.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that fabric-sleeved hoses, particularly hoses with a structure similar to fire hoses, are provided as the pressure elements.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure elements essentially have the same dimensions as each other, and in particular are formed with the same diameters and otherwise have the same dimensions.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that more than 50% and particularly more than 60 to 70%, of the surface of the pressure-absorption plate and/or a pressure plate that may be provided is covered by the pressure elements.

Further aspects of the invention provide for the feeding and/or supply of the pressure fluid to the pressure elements, in particular compressed air, as well as the labor and cost-saving control of introducing the pressure fluid.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that each or a number of the pressure elements can be supplied with a pressure medium, particularly compressed air, independently of one another in order to adjust a respectively desired identical pressure in the individual pressure elements.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that all pressure elements are connected to a compressed air distributor unit that is supplied by a compressed air source, or can be supplied with compressed air from only one compressed air source.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the pressure medium, particularly compressed air, supplied for adjusting the pressure elements, has a control unit with an input unit for adjusting the duration of pressure application and/or the pressing duration and/or pressing pressure.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that a device for maintaining constant pressing pressure is connected to the control unit, by which means the application of compressed air can be regulated and any pressure that is set can be fully maintained for a predefined period of time.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the inlet valves and outlet valves provided on the pressure elements and/or connected therewith are similarly controllable by means of the control unit.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the lift of the pressure-absorption plate and/or the pressure plate can be adjusted to approximately 5 to 15% of the maximum press clearance and/or the maximum adjustable distance between the press table and the pressure-absorption plate.

Further aspects of the invention provide for a favorable adjustment for the size of the clearance between the pressing table at the pressure-absorption plate and/or its pressure elements of the respective material to be pressed to be pressed, the structure of the framework of the press unit, naturals stabilizers for the material to be pressed in the press unit and a favorable arrangements of the material to be pressed feed and discharge opening of the press unit.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the press table and the pressure-absorption plate and/or the ride rails supporting the same form are mounted in and/or on a number of side-by-side (steel) frames, forming a longitudinal loadbearing structure extending transverse to the direction of feed, and/or are supported and/or received by this structure.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that at least one pressure application device, particularly a pressure pad or similar device, is arranged and/or mounted on or along at least one longitudinal side of the press unit and can be brought into proximity to and/or placed upon and/or hold together this unit, and which can preferably be loaded with compressed air.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the feed opening and the discharge opening of the press unit are provided on its narrow sides.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the press unit has an upstream feeding unit and a conveying unit for the material to be pressed, wherein if necessary the feeding unit, has a feed and/or joining unit for the pressed parts arranged on its sides and/or an adhesive and/or glue application unit to apply adhesive and/or glue layers to the pressed parts.

Further aspects of the invention provide for the consolation of the main components of the press assembly as taught by the invention, on the loading and unloading of the material to be pressed within this assembly and on the movement of the pressed table itself.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the feeding unit and/or the conveying unit is or are in the form of a roller conveyor, an air film conveyor, or a belt conveyor.

According to another aspect of the invention, there can be provided an arrangement as described herein, characterized in that the press table can be slid in and out of the press unit on rails, and can preferably be slid between a positioning unit and/or feeding unit positioned upstream of the press unit and an unloading unit positioned downstream from the press unit.

According to an aspect of the present invention, there is provided an arrangement for pressing of pressed parts, the arrangement comprising:

a press unit with a press table to support a material to be pressed and/or the pressed parts to be connected to each other; and

a counter-pressure plate, which can be moved up and down, arranged above the press table, wherein for an application of compressive force onto the material to be pressed and/or the pressed parts, a plurality of pressure elements, which can be

pressurized from a pressure fluid source, are arranged between the counter-pressure plate and the material to be pressed and/or the pressed parts,

wherein the press unit further comprises guide rails equidistantly arranged and in parallel with one another, the guide rails being tied to lateral frame members of the press unit at an upward slope with a maximum ascent angle of 30° with respect to a plane of the press table and the material to be pressed and/or the pressed parts, and

wherein the counter-pressure plate of the press unit is formed with a heavy, pressure-absorption plate, which is rigid and torsionally stiff across its entire surface area and on a side facing the material to be pressed and/or the pressed parts, and

wherein carrier rollers that are arranged along longitudinal sides and/or longitudinal lateral flanks of the pressure-absorption plate, are carrier rollers that can be moved on the guide rails to allow the counter-pressure plate to be vertically moved and adjusted by means of a drive on the guide rails.

Further advantages of the inventions can be derived from the following description and the embodiments of the invention that are described and/or illustrated in the drawings.

The invention will now be described in greater detail, for example, by means of the drawings.

Figure 1 shows a schematic arrangement as taught by the invention;

Figure 2 shows a schematic plan view of the invention;

Figure 3 shows a schematic side elevation of an arrangement as taught by the invention;

Figure 4 is a detailed view of the press unit;

Figure 5 is a schematic longitudinal/side elevation of the press unit as taught by the invention;

Figure 6 is an oblique view of the pressure-absorption plate;

Figure 7 is a detail of the press unit;

Figs. 8a and 8b show different pressure elements schematically; and

Figure 9 is a schematic illustration of an embodiment of an arrangement for pressing as taught by the invention.

Figure 1 is a schematic illustration of an entire arrangement for pressing of press parts 1, 4 as taught by the invention, in which a press unit 6 with successively arranged frame members 60 is supplied with press parts, preferably made out of wood, that are to be connected to each other into a wall panel or suchlike by means of a feeding unit 5, which are removed by means of a conveying unit 7 after the pressing process.

Such pressing arrangements are particularly used for the manufacture of large-surface and in particular also bulky material to be pressed. The material to be pressed can e.g.

have dimensions of 16 m long, 3 m wide and 0.5 m high, resulting in a total weight of 10 to 12 t for the material to be pressed from the wood parts that are to be pressure-bonded to each other.

The wood parts to be pressure-bonded are e.g. longitudinal lamellae 1 and transverse lamellae 4, which are preferably used in a planed form.

According to Figure 1, the longitudinal lamellae 1 are provided with bonding and/or glue layers in a bonding and/or gluing unit 2 and are loaded onto the feeding unit 5 by means of a loading unit 3 located on the side of the feeding unit 5, and are then arranged here on the same with the traverse lamellae which are advanced from the other side in the respective desired form, e.g. as a stack with the reference symbol 36, which is not directly shown in Figure 1, which is then moved into the press unit 6 through the opening 33. The feeding of same is facilitated, if a roller, air-film or belt conveyor or a similar conveyor unit is used as the feeding unit 5, for transferring heavy and bulky loads into the press unit 6 in a suitable manner. In a similar manner as the feeding unit 5, also the conveying unit 7 with discharge opening 34 arranged behind the press unit 6, is designed. Conveyor units for the stacked press parts 1 and 4 into and/or from the press unit 6, which are provided to be pressure-bonded to material to be pressed 36, are not represented.

According to a preferred embodiment of the invention, press parts 1, 4 are respectively loaded onto a multiplex or steel plate 35 in the desired arrangement, as shown in Figure 3. This plate 35 rests during the formation of the stack 36 on the feeding unit 5, which can be a roller table, for example. After the stack 36 has been formed from press parts 1 the 4, plate 35 and the press parts 1 and 4 resting upon it can be pushed or pulled on the pressing table 13 by sliding, by means of chain conveyors, for example. Then the press operation is performed in press unit 6. Thereafter, the bed plate 35 with the material to be pressed 36 resting upon it can be pulled out or pushed by means of a conveyor device onto conveying unit 7.

In the arrangement as taught by the invention it is no longer necessary that in order to obtain a relatively small lift of the pressure-absorption plate 9, which is not detailed here but shown in Figure 3, that the material 1, 4 to be pressure-bonded must be moved on more or fewer back plates 35 with stacks 36 and/or pressed parts 1, 4 sandwiched on top of each other into the press unit 6 in order to optimally utilize the available clear span of the press unit 6 in this manner, which resulted in that the press lift remained small up to this time in that the height adjustment of the extremely heavy counter-pressure plate 9 of press unit 6 could be kept within distances as small as possible, as was the case in the press arrangement known from AT 406133 B.

Figure 2 shows – with otherwise constant reference number symbols – as a schematic plan view in Figure 3 and as a schematic side elevation, the longitudinal parts 1 and the transverse parts 4 of the press material 36 as well as the loading unit 5 and the conveying unit 7, respectively developed as a roller table.

From Figure 3, the basic configuration of the new press unit 6 is also evident: Within a sequence of frame elements with rising vertical beams 10 on both sides of the pressing table 13, the pressure-absorption plate 9 is which is resistant to bending and degradation and formed with I-Beams 91 welded to each other on the side, which is always arranged parallel to pressing table 13. Same is supported on both sides with a plurality of carrier rollers 93 arranged along its longitudinal lateral flanks on a plurality of guide rails 101 sloping upward with an ascent angle a. The pressure-absorption plate 9 is held in position by means of hydraulic cylinders 96 which are respectively located above it and be moved on the guide rails 101 parallel to the I-beams whether to each other with the pressing table 13 formed with a support plate.

Figure 4 shows – with otherwise constant reference number symbols – a a schematic part section diagonal in relation to the direction of conveyance of the stacks 36 of the press unit 6 show in in Figure 11. Each of the frame member 60 is formed from two lateral frame beams 10, an upper beam 11 and a lower beam 12, which supports the pressing table 13. The beams 10, 11, 12 are connected to each other by welding and/or screwing and/or riveting into rigid individual frame member 60, which frame member 60 are connected by means of longitudinal beams into a rigid support and/or framework of the press unit 6. Along the length of the press unit 6, a plurality of such frame member 60 are arranged and the beams 12 carry the pressing table plate 13, and/or support same, N./or in combination with the support plate form the pressing table 13.

The pressure-absorption plate 9, as particularly shown in Figure 5 – with otherwise constant reference number symbols – is formed with a large number of adjacent I-beams 91 welded to each other, is very heavy and in spite of its high area propagation is completely rigid and torsionally stiff. On both longitudinal lateral flanks 92 carrier and/or traversing rollers 93 are mounted with spacing ha between each other. The pressure-absorption plate 9 can be moved with and/or on same on guide rails 101, which are tied to the upright beams 10 of the frame member 60, here with an ascent angle a of approximately 15° sloping upward aligned parallel to each other. These guide rails 101 have the same horizontal distance ha from each other as the roller carriers 93 on the pressure-absorption plate 9. The pressure-absorption plate 9 serving as the counter-pressure plate can be moved on the guide rails 101 by means of – in this case four – hydraulic cylinders 96 successively arranged at a distance of each other.

Looking at Figure 6, where – with otherwise constant reference number symbols – the pressure-absorption plate 9 with its traversing and/or carrier rollers 93 is shown resting on the guide rails 101 before the application of pressure, in greater detail. If pressure fluid is used to fill the above described pressure elements 14, thus especially compressed air, these pressure elements 14 push down against the potentially present pressure plate or against its common sheething 170 and ultimately against the press parts 1, 4 and/or material to be pressed 36, on the one hand, and on the other upward against the pressure-absorption plate 9 and lift same very slightly upward. At this moment, each of the locking wedges tied, e.g. welded onto pressure-absorption plate 9, which are arranged at the same horizontal distances ha in relation to each other as the carrier rollers 93, make contact with their top face lock surfaces 952, which essentially have the same ascent angles Beta (ß) as the ascent angles a of the guide rails 101, the undersides 102 of the guide rails 101 and engage with them in force closure, whereby the pressure-absorption plate 9 is extremely securely located in exactly this position and acts fully upon the counter-pressure plate without any necessity of any other anchorage of same for position stabilization e.g. by means of anchor bracing or suchlike during the time when pressure is introduced into the pressure elements 14. In addition, the pressure-absorption plate 9 can respectively be individually adjusted to the respective height of the material to be pressed 36, 1, 4 and take-up any height within the support frame 9 of press unit 6, and no longer is – as previously – restricted to one or only very few height position/s.

Now, back again to Figure 4: Covered on the outside by textile or metal sheathing 170, the pressure elements 14 are tied onto the pressure-absorption plate 9, which, can be moved by means of the hydraulic cylinders 96 on the inclined guide rails 101, as already previously described. These pressure elements 14 are preferably inflatable and push down in the direction of the arrow and away from the pressure-absorption plate 9. During an/or after the completion of the pressurization, the pressure elements 14 relax and the dropping down and/or moving down of the pressure-absorption plate 9 resulting from relieving the force closure between the also already previously described locking wedges 95 and the guide rails 101, is prevented by the hydraulic cylinders 96 keeping said pressure-absorption plate in its exact position. The lift of the pressure-absorption plate 9 is denoted with H.

As can be seen very clearly from Figure 4, the pressure elements 14 are so to speak suspended on the pressure-absorption plate 9 and/or are attached to it in a manner which is not represented in detail. With 14', the pressure elements 14 are illustrated in the form in the unpressurized state before and/or after pressure application. With 14, the pressure elements are denoted in their pressurized form; depending on the pressure application, the pressure elements 14 and/or an optionally provided pressure plate at its bottom end or a, as previously mentioned, e.g. textile sheathing 170, is lowered as needed.

In order to reduce the compressed air volume required for the expansion of the pressure elements 14 and thus the time for pressurization and/or the positioning stability of the pressure elements 14, rounded filler bodies 15, e.g. wooden or plastic roads are arranged around the edges of the pressure elements 14. In the pressing position, the pressure elements 14 with the tubular and/or round cross-section have an elliptical shape because of their deformation under pressure.

With respect to their form, the pressure elements 14 have flexible and/or deformable wall areas. Advantageously, fiber-reinforced (plastic) hoses are used that are practically flat and/or nearly flat without pressure, just as represented with 14', and which adopt a specified form in each case and/or insofar as they are squeezed in between the press table 13 and/or material to be pressed 14 and pressure-absorption plate 9, attempt to return into the actual specified form.

Pillow-shaped, pad-shaped, bag-shaped or differently shaped pressure elements 14 can be used instead of hoses; important is that same are designed appropriately pressure fluid sealed, particularly airtight and have adequate pressure resistance.

The pressure elements 14 are advantageously arranged side-by-side in the longitudinal direction of the press unit 6. Between the individual pressure elements 14, advantageously spaces can run to keep the pressure elements 14 in position. The spaces and/or the pressure elements 14 with their filler bodies 15 can have the same height in the unpressurized position of the pressure elements 14.

Figure 7 shows – with otherwise constant reference number symbols – a pressurized pressure element 14 in a press unit 6 as a longitudinal section. A closure element 25 is provided in the end area of the pressure elements 14, by means of which decompression is possible, if necessary. On the other end of the tubular pressure elements 14 is a connection 26 for the supply of compressed air from a compressed air source 27 and/or a compressor. A control unit 28 regulates the compressed air source 27 and/or the inlet valve on connection 26 of the pressure element hose 14. If necessary, the control unit 28 can also regulate the closure 25, namely for bleeding compressed air when the press operation is completed.

The lift H of the pressure-absorption plate 9 with regard to the clear height of the pressroom can advantageously be small; according to an advantageous embodiments version it is provided that this lift H is approximately 5 to 15% of the maximum press clearance and/or the maximum distance between the press table 13 and the underside of the pressure elements 14.

The surface of the pressure absorption plate 9 should favorably be occupied more than 50% with pressure elements 14, particularly more than 60 to 70%. In this manner, a particularly uniform and appropriately high and uniform surface pressure is achievable. the big advantage of the new press unit 6 is that the lift H of the pressure-absorption plate 9 is no longer limited, since same is essentially movable along the guide rails 101 parallel to the press table 13. The advantage thus is that only one dimension of the pressure elements 14 with the same cross-section is required. From an economical perspective it is naturally favorable to provide small press strokes, such as a lift of approximately 5 cm, for example, which is also favorable in terms of operational safety.

The assembly of the press parts 1, 4 to be connected on the feeding unit and/or on the bed plate 35 can be facilitated by means of different machines; such devices have not been detailed in the drawing, however, and are obvious for a person skilled in the art.

Fig. 8a and 8b show a plan view of different embodiments of the pressure elements 14. In the left area of Fig. 8a U-shaped and the right area snaky pressure elements 14 are arranged, which are represented with appropriate closures 25 and/or compressed air connections 26.

Fig. 8b represents a plan view of schematic below-shaped and/or square and wrecked angular and/or round or similar formed pressure elements 14; in principle, the pressure elements 14 can have any form of cross-section and/or form of volume. Longitudinal tubular shapes and hoses with an essentially circular or elliptical cross-section have proven to be particularly advantageous, however. Advantageously, fire hoses or those hoses with a similar structure are used. As already mentioned above, it is advantageous if the pressure elements 14 are supported by the pressure-absorption plate 9.

From an operational point of view it is further advantageous if a device for keeping the compacting pressure constant is connected to the control unit 28, by means of which the pressurization with compressed air can be adjusted over extended press periods. Depending on circumstances, in special cases it may be beneficial, if for the adjustment of a desired, possibly different pressure in individual pressure elements 14, same are supplied independently of each other with compressed air and are respectively provided and/or connected with a compressed air source 27, which is controlled from control unit 28.

The individual pressure elements 14 are advantageously reciprocally identically sized and/or designed with the same diameter and/or have the same dimensions. The form and type of the embodiment of a stack 36 to be pressure-bonded from longitudinal lamellae 1 and traverse lamellae 4 is optional; these lamellae can also be supplemented through flat wooden boards, if necessary. In principle it is possible to encase the press unit 6 with the guide rails 101 and provide cladding for thermal insulation, if necessary, and/or heat the press interior.

Figure 9 shows an embodiment of an arrangement as taught by the invention, in which the press table 13 between the feeding unit 5 and a loading and/or conveying unit 7 connecting to the press unit 6, can be moved on rails 56, as shown in Figs. 1 to 3. Between the feeding unit 5 and the press unit 6, a glue application unit 2 is arranged, under which the press table 13 loaded with the material to be pressed stack 36 can pass through.

The press table 13 is rigidly designed and can be reinforced by means of reinforcing braces, or suchlike, if necessary. It carries the material to be pressed 36. The pressure-absorption plate 9 along with the pressure elements 14 arranged underneath it can be lowered along the guide rails 101, until the pressure elements 14 bear against the material to be pressed 36 or are arranged just above the material to be pressed 36. When the pressure-absorption plate 9 is adjusted in the respectively desired defined distance to the press table 13 and/or to the material to be pressed 36, the above described pressure elements 14 are pressurized with pressure fluid, whereby the sheathing 170 covering same and/or covering its underside and or and optionally provided pressure plate 17, is pushed down against the material to be pressed 36. Through the pressurization of the pressure elements 14, the pressure-absorption plate 9 is pushed up, the already described carrier rollers 93 are lifted very slightly above the top side of the guide rails 101, and in its position the inclined top face lock surfaces 952 of the locking wedges 95 are force-closed with the undersides 102 of the guide rails 101, whereby an extremely stable location on the pressure-absorption plate 9 is totally secure at any pressure. Of the completion of the press operation, the pressure elements 14 are depressurized, the pressure elements 14 relax, the carrier rollers 93 are supported again on the guide rails 101 and the pressure application [sic] plate 9 is held in position by the hydraulic cylinders. The material to be pressed 36 is now unloaded and can be conveyed by means of the press table 13 into the conveying unit 7.

In the outline manner, the machine set-up time has been minimized, and a quick transport of the material to be pressed 36 in two and/or from the press unit 6 is assured. Only the pressure which is introduced into the pressure elements 14 and exerted by the same represents the compacting pressure exerted to the press parts 1, 4 of the material to be pressed . The control and the feeding of the already previously described pressure-absorption plates-hydraulic cylinders 96 is centrally performed with appropriate hydraulic pressure fluids, in particular with compressed air.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An arrangement for pressing of pressed parts, the arrangement comprising:

a press unit with a press table to support a material to be pressed and/or the pressed parts to be connected to each other; and

a counter-pressure plate, which can be moved up and down, arranged above the press table, wherein for an application of compressive force onto the material to be pressed and/or the pressed parts, a plurality of pressure elements, which can be pressurized from a pressure fluid source, are arranged between the counter-pressure plate and the material to be pressed and/or the pressed parts,

wherein the press unit further comprises guide rails equidistantly arranged and in parallel with one another, the guide rails being tied to lateral frame members of the press unit at an upward slope with a maximum ascent angle of 30° with respect to a plane of the press table and the material to be pressed and/or the pressed parts, and

wherein the counter-pressure plate of the press unit is formed with a heavy, pressure-absorption plate, which is rigid and torsionally stiff across its entire surface area and on a side facing the material to be pressed and/or the pressed parts, and

wherein carrier rollers that are arranged along longitudinal sides and/or longitudinal lateral flanks of the pressure-absorption plate, are carrier rollers that can be moved on the guide rails to allow the counter-pressure plate to be vertically moved and adjusted by means of a drive on the guide rails.

2. The arrangement according to claim 1, wherein the material to be pressed and/or the pressed parts are made out of wood.

3. The arrangement according to claim 1 or 2, wherein the material to be pressed and/or the pressed parts are wooden lamellae, and wherein the

arrangement is for pressing the wooden lamellae into large elements for timber constructions.

4. The arrangement according to any one of claims 1 to 3, wherein the pressure elements are arranged side-by-side.

5. The arrangement according to any one of claims 1 to 4, wherein the pressure elements are arranged laterally.

6. The arrangement according to any one of claims 1 to 5, wherein the pressure elements are hoses, bags, balloons or pads.

7. The arrangement according to claim 6, wherein the pressure elements are hoses, and wherein the hoses are fabric-sleeved hoses.

8. The arrangement according to claim 7, wherein the fabric-sleeved hoses have a structure similar to fire hoses.

9. The arrangement according to any one of claims 1 to 8, wherein the pressure elements can be inflated with pressure fluid.

10. The arrangement according to claim 9, wherein the pressure fluid is compressed air.

11. The arrangement according to any one of claims 1 to 10, wherein the pressure fluid source is a compressed air source.

12. The arrangement according to any one of claims 1 to 11, wherein the counter-pressure plate comprises adjacently arranged I-profile beams.

13. The arrangement according to any one of claims 1 to 12, wherein the carrier rollers are equidistantly arranged.

14. The arrangement according to any one of claims 1 to 13, wherein the drive is hydraulic.

15. The arrangement according to any one of claims 1 to 14, wherein the pressure-absorption plate is equipped with locking wedges that are arranged and respectively assigned at the same horizontal distances from one another as the carrier rollers and the guide rails, wherein a top of the locking wedges has locking surfaces facing an underside of the guide rails with a wedge angle, and wherein the wedge angle corresponds to the ascent angle of the guide rails for a force-closed wedging of the pressure-absorption plate with the guide rails to prevent lifting of the pressure-absorption plate at the start of and during pressure application by means of pressurization of the pressure elements.

16. The arrangement according to any one of claims 1 to 15, wherein at each height adjustment of the pressure-absorption plate, while lying completely upon the carrier rollers on the guide rails, the locking surfaces of the locking wedges are arranged at a small distance from the underside of the guide rails.

17. The arrangement according to claim 16, wherein the distance is below 1 cm.

18. The arrangement according to any one of claims 1 to 17, wherein the ascent angle is from 10 to 20°.

19. The arrangement according to claim 18, wherein the ascent angle is approximately 15°.

20. The arrangement according to any one of claims 1 to 19, wherein the wedge angle of the locking surfaces of the locking wedges is 0.05 to 0.25° greater than the ascent angle of the guide rails.

21. The arrangement according to any one of claims 1 to 20, wherein the pressure elements facing the press table and/or the material to be pressed and/or the pressed parts, terminate in a pressure plate for pressure distribution.

22. The arrangement according to claim 21, wherein more than 50% of a surface of the pressure plate is covered by the pressure elements.

23. The arrangement according to claim 21 or 22, wherein more than 60 to 70% of the pressure plate is covered by the pressure elements.

24. The arrangement according to any one of claims 21 to 23, wherein a lift of the pressure plate can be adjusted to approximately 5 to 15% of a maximum press clearance and/or a maximum adjustable distance between the press table and the pressure-absorption plate.

25. The arrangement according to any one of claims 1 to 24, wherein the press table is coated with polytetrafluoroethylene composite or a metal plate.

26. The arrangement according to any one of claims 1 to 25, wherein the pressure elements facing the material to be pressed and/or the pressed parts are covered with a shared textile, composite, or metal film.

27. The arrangement according to claim 26, wherein the shared textile, composite or metal film has a low residual surface roughness.

28. The arrangement according to any one of claims 1 to 27, wherein the pressure elements are formed with hoses that are held next to one another in the longitudinal dimension of the pressure-absorption plate above the press table or are affixed suspended on the pressure-absorption plate.

29. The arrangement according to any one of claims 1 to 27, wherein the pressure elements are formed with hoses that are mounted on the pressure-absorption plate.

30. The arrangement according to any one of claims 1 to 29, wherein at least one pressure element is provided with a compressor connection and is provided with at least one valve for rapid pressure release.

31. The arrangement according to any one of claims 9 to 30, wherein the pressure elements, which are impervious to the pressure fluid, have flexible and/or deformable wall areas which are substantially inelastic.

32. The arrangement according to any one of claims 1 to 31, wherein the pressure elements are inflatable.

33. The arrangement according to any one of claims 1 to 32, wherein the pressure elements have substantially the same dimensions as each other.

34. The arrangement according to claim 33, wherein the pressure elements have the same diameters as each other.

35. The arrangement according to any one of claims 1 to 34, wherein more than 50% of a surface of the pressure-absorption plate is covered by the pressure elements.

36. The arrangement according to claim 35, wherein more than 60 to 70% of the surface of the pressure-absorption plate is covered by the pressure elements.

37. The arrangement according to any one of claims 9 to 36, wherein at least one pressure element can be independently supplied with the pressure fluid in order to adjust a respectively desired identical pressure in each pressure element.

38. The arrangement according to any one of claims 1 to 37, wherein each pressure element is connected to a corresponding compressed air distributor unit

that is supplied by a corresponding compressed air source, or each pressure element can be supplied with compressed air from one compressed air source.

39. The arrangement according to any one of claims 9 to 38, wherein the pressure fluid supplied for adjusting the pressure elements, has a control unit with an input unit for adjusting duration of pressure application and/or pressing duration and/or pressing pressure.

40. The arrangement according to claim 39, wherein a device for maintaining constant pressing pressure is connected to the control unit, whereby application of compressed air can be regulated and any pressure that is set can be fully maintained for a predefined period of time.

41. The arrangement according to claim 39, wherein inlet valves and outlet valves provided on the pressure elements and/or connected therewith are controllable by the control unit.

42. The arrangement according to any one of claims 1 to 41, wherein lift of the pressure-absorption plate can be adjusted to approximately 5 to 15% of the maximum press clearance and/or the maximum adjustable distance between the press table and the pressure-absorption plate.

43. The arrangement according to any one of claims 1 to 42, wherein the press table and the pressure-absorption plate and/or the guide rails are mounted in and/or on a number of side-by-side frames which form a longitudinal loadbearing structure extending transverse to direction of feed, and/or are supported and/or received by the longitudinal loadbearing structure.

44. The arrangement according to claim 43, wherein the side-by-side frames are made of steel.

45. The arrangement according to any one of claims 1 to 44, wherein at least one pressure application device is arranged and/or mounted on or along at least

one longitudinal side of the press unit and can be brought into proximity to and/or placed upon and/or hold together the press unit.

46. The arrangement according to claim 45, wherein the at least one pressure application device is a pressure pad.

47. The arrangement according to claim 45 or 46, wherein the at least one pressure application device can be loaded with compressed air.

48. The arrangement according to any one of claims 1 to 47, wherein a feed opening and a discharge opening of the press unit are provided on narrow sides of the press unit.

49. The arrangement according to any one of claims 1 to 48, wherein the press unit has an upstream feeding unit and a conveying unit for the material to be pressed and/or the pressed parts, and wherein the feeding unit has a loading unit for the material to be pressed and/or the pressed parts arranged on a side of the feeding unit, and/or an adhesive and/or glue application unit to apply adhesive and/or glue layers to the material to be pressed and/or the pressed parts.

50. The arrangement according to any one of claims 1 to 49, wherein the feeding unit and/or the conveying unit is or are in form of a roller conveyor, an air-film conveyor, or a belt conveyor.

51. The arrangement according to claim 49 or 50, wherein the press table can be slid in and out of the press unit on rails.

52. The arrangement according to claim 51, wherein the press table can be slid between the feeding unit and the conveying unit which is positioned downstream from the press unit.

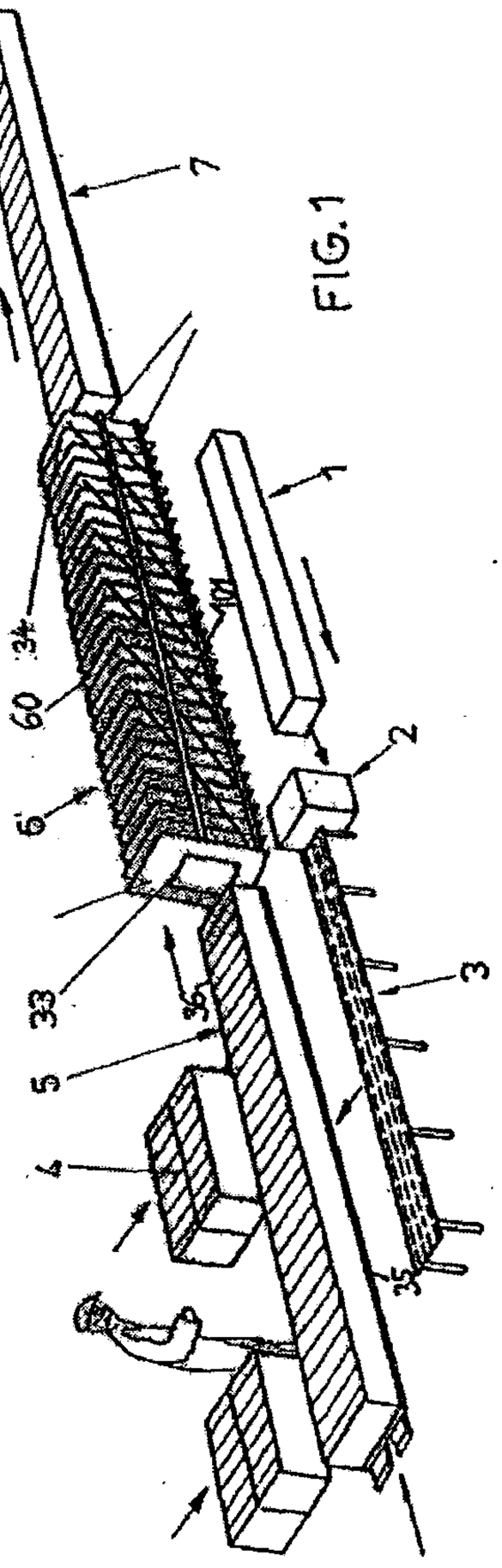


FIG. 1

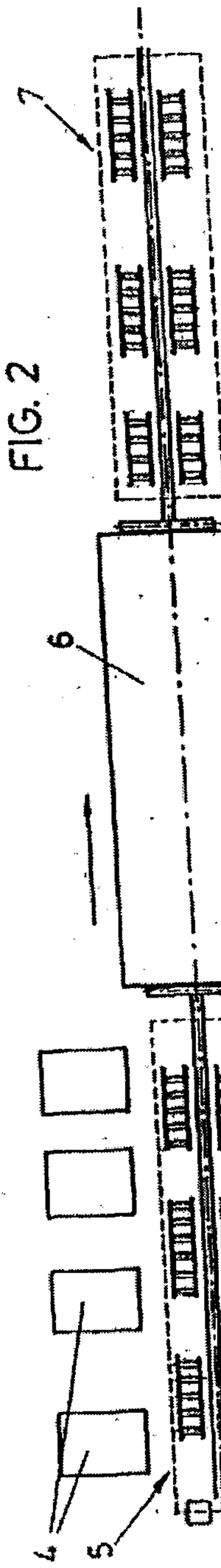


FIG. 2

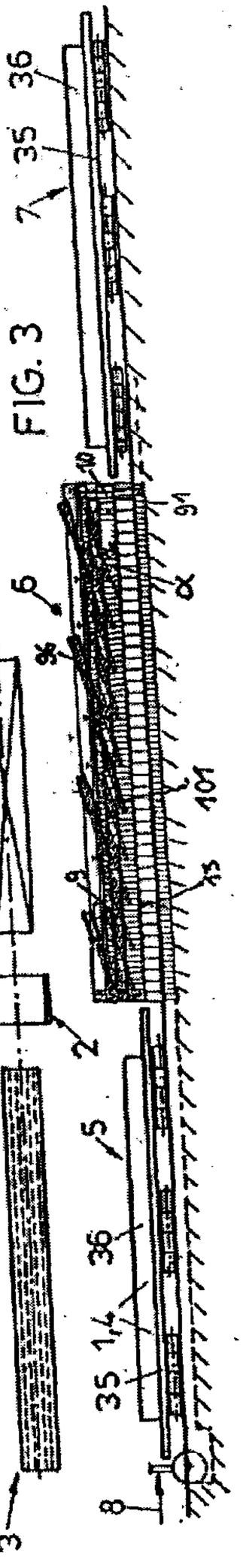


FIG. 3

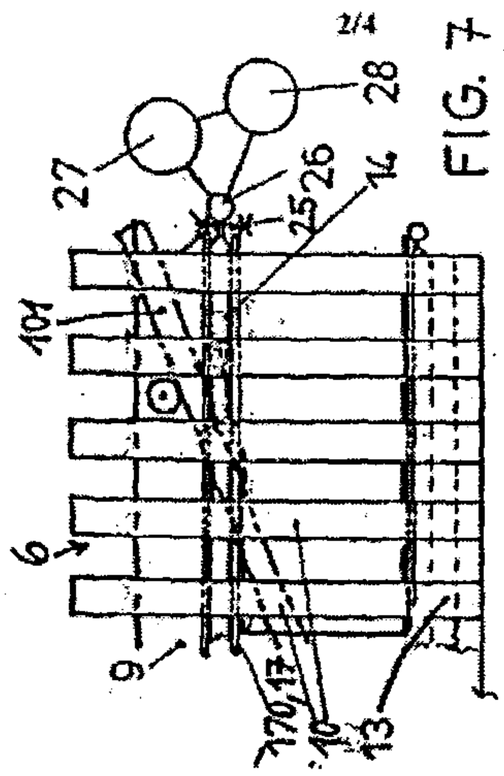


FIG. 7

FIG. 4

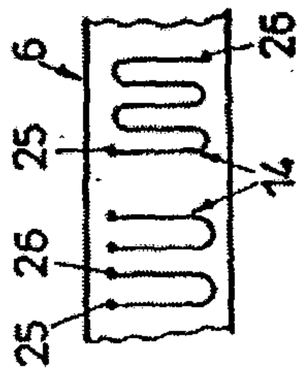


FIG. 8a

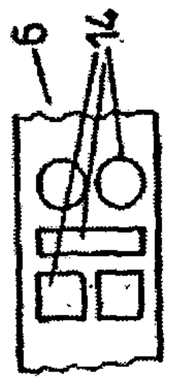
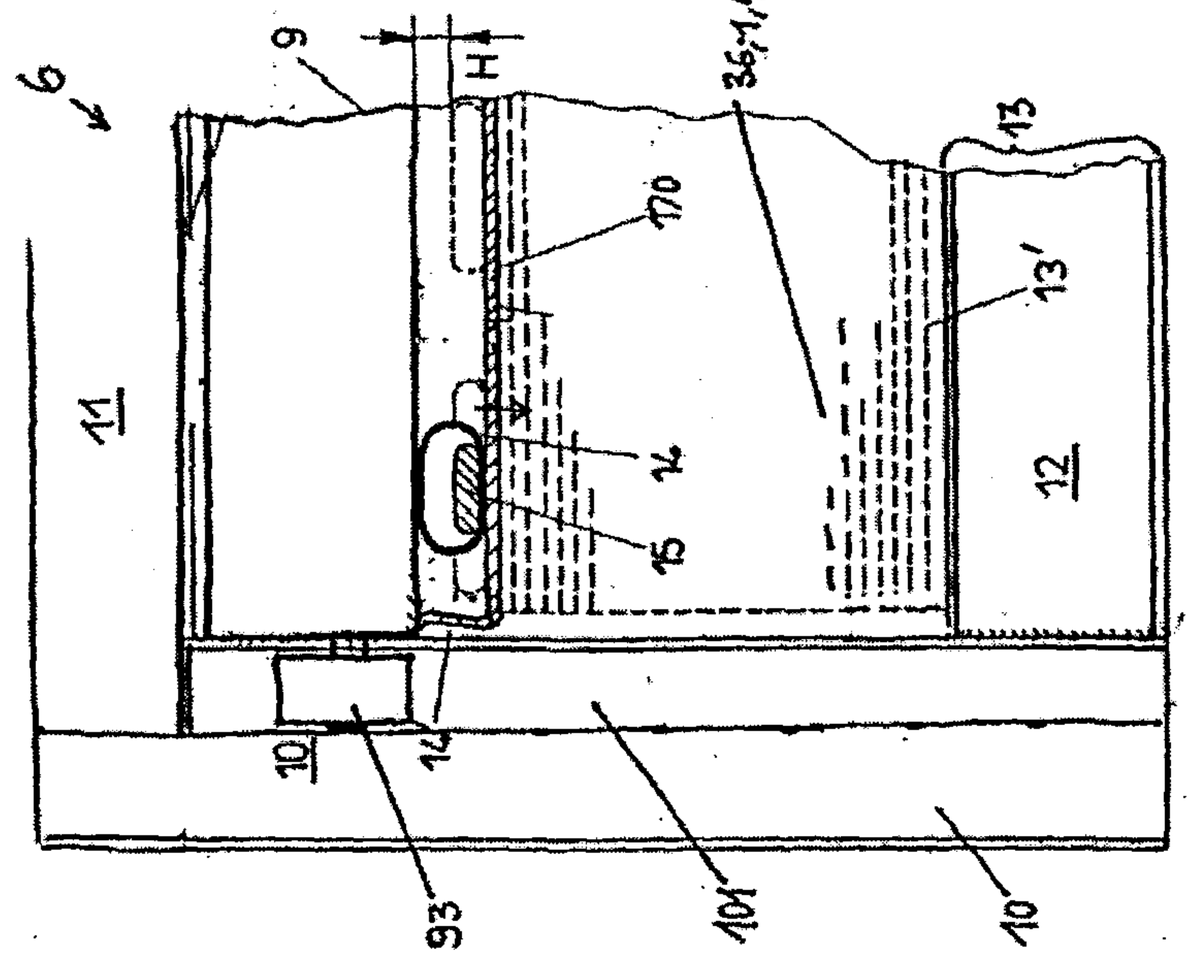


FIG. 8b



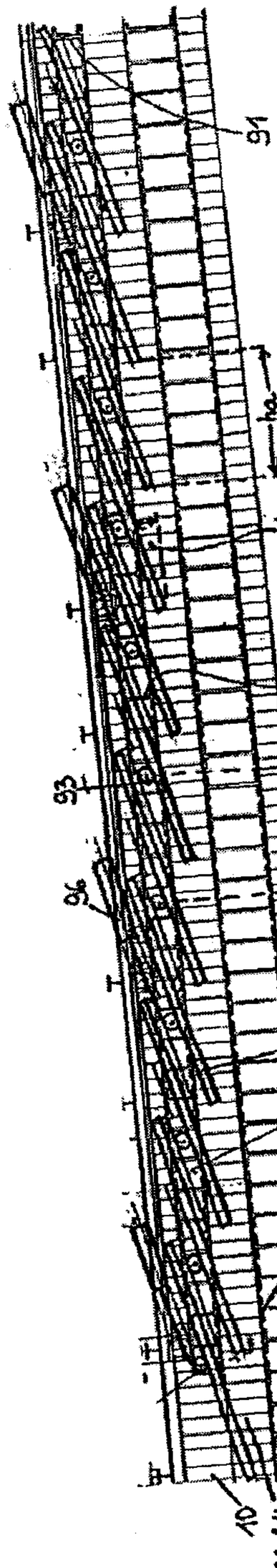

91
ha
ha
ha
α
91
93
92
13
36,14
10
11
101

Fig. 5

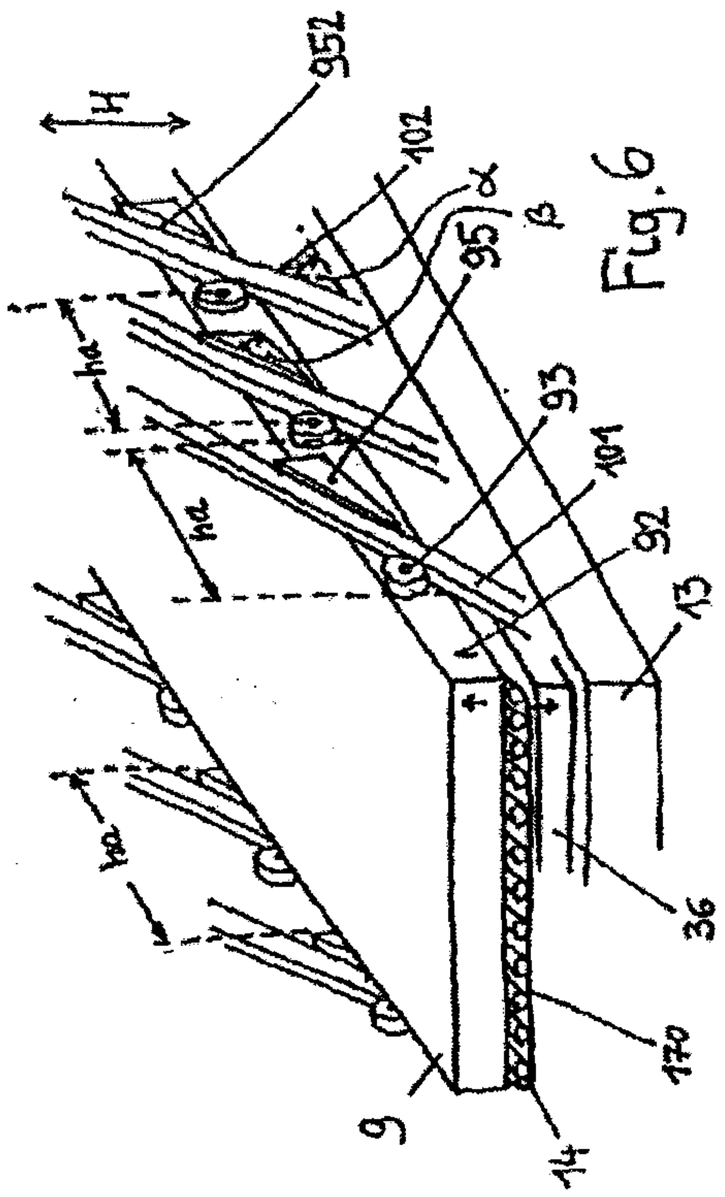

H
952
102
95
α
β
93
101
92
13
36
170
9
14
ha
ha
ha

Fig. 6

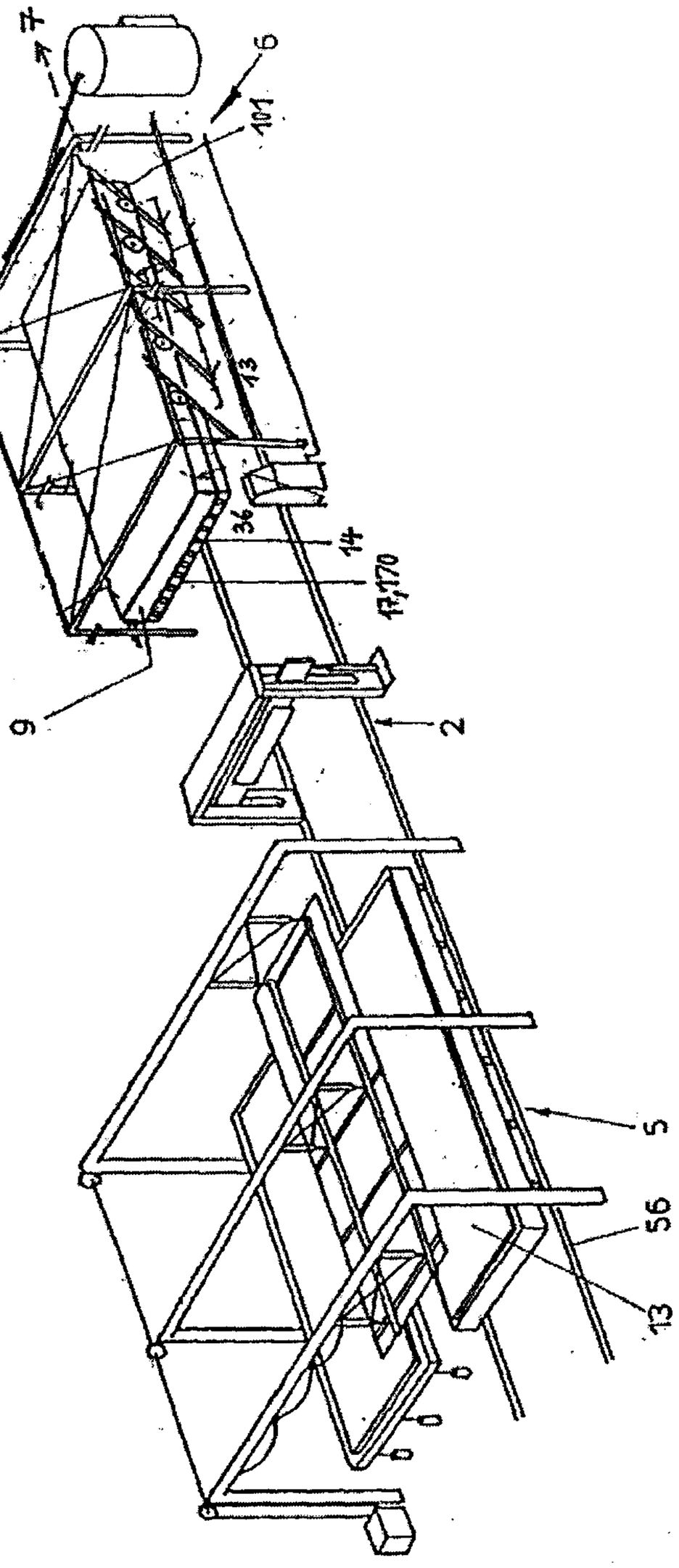
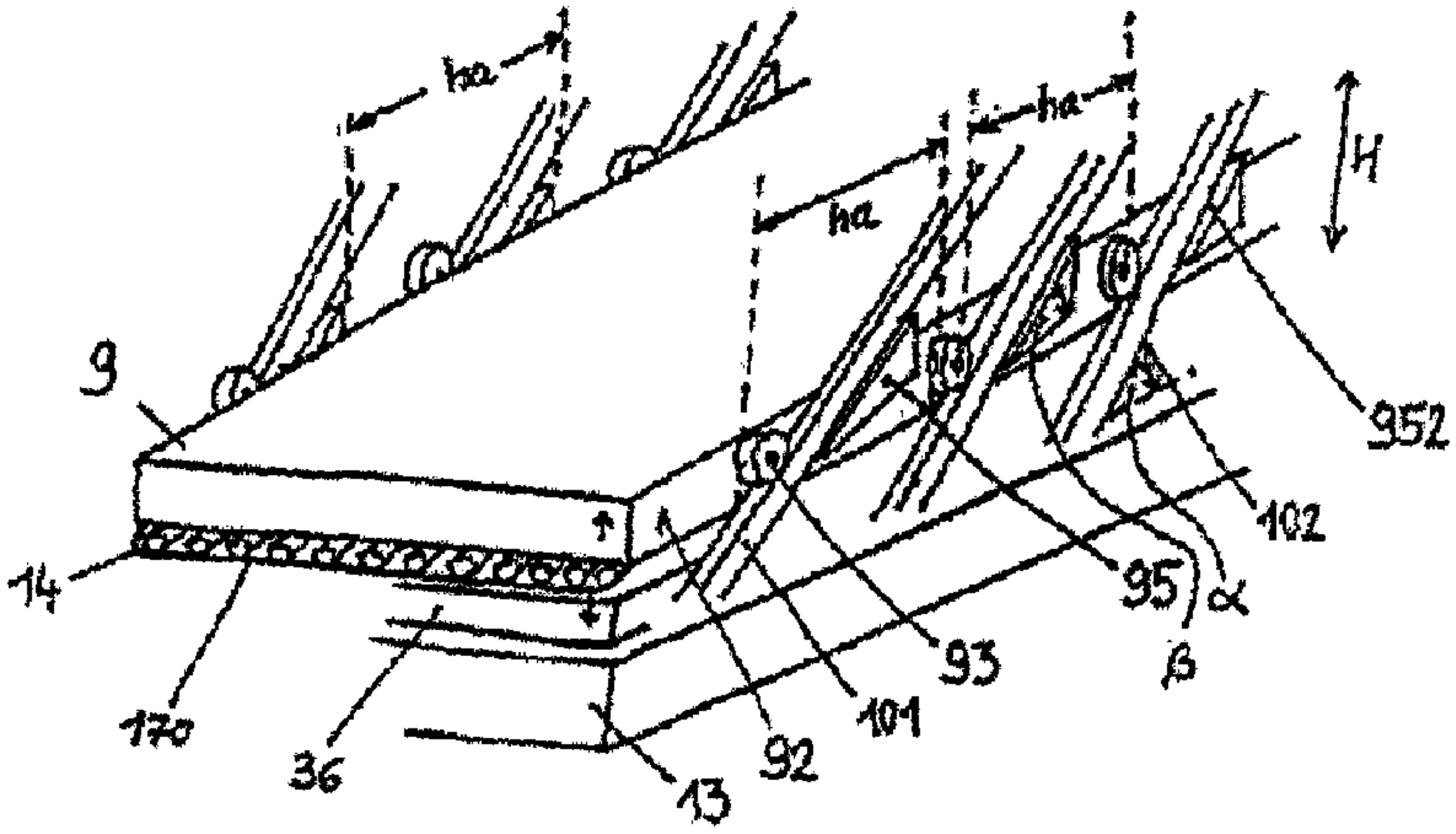


FIG. 9


ha
ha
ha
H
9
952
102
14
95
α
β
93
170
101
36
92
13