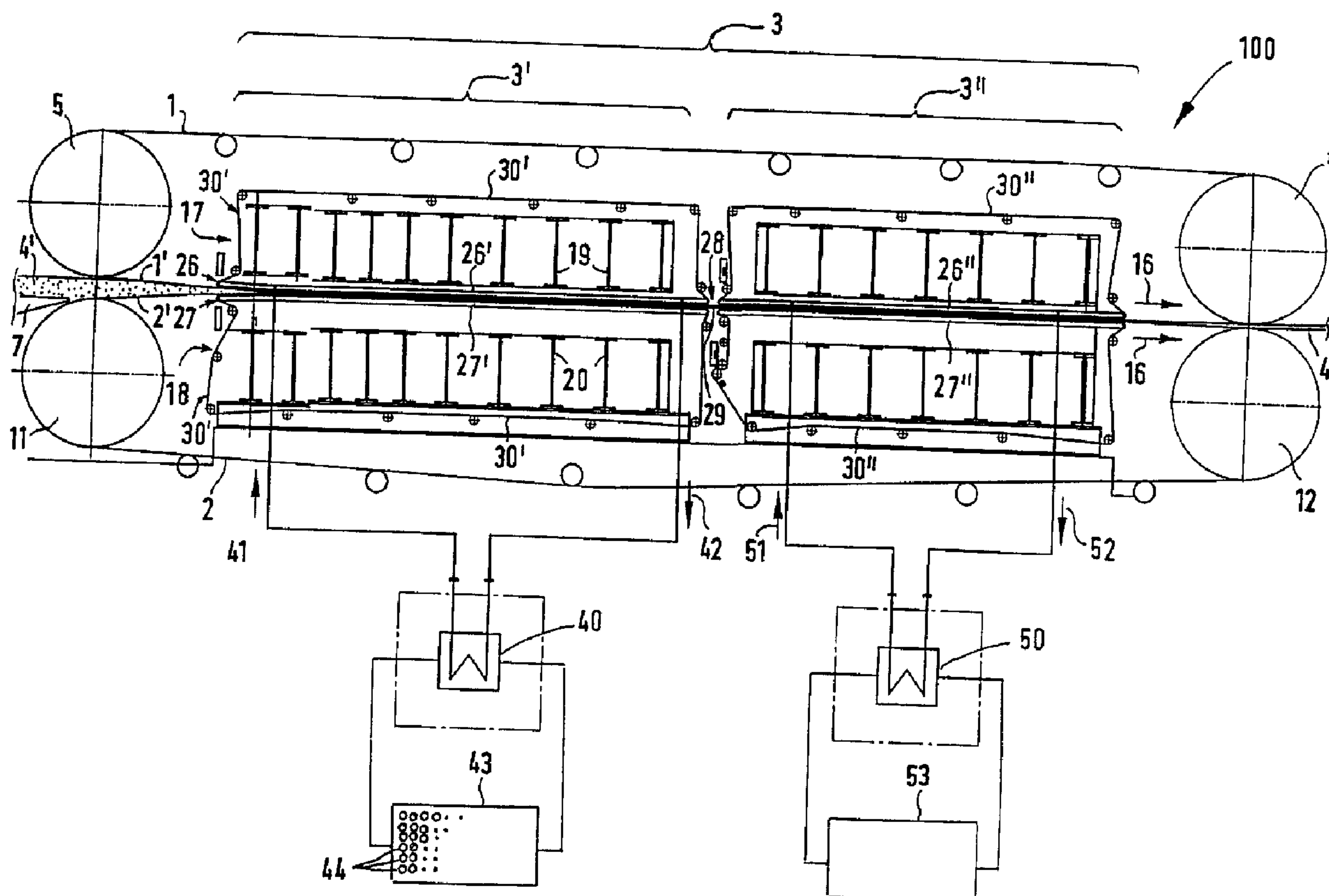




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(54) Titre : PROCEDE ET PRESSE A DEUX RUBANS POUR LA PRODUCTION EN CONTINU DE MATERIAUX
(54) Title: PROCESS AND DOUBLE-BELT PRESS FOR THE CONTINUOUS PRODUCTION OF BOARD MATERIALS



(57) Abrégé/Abstract:

A double-belt press has a press line in whose downstream section a heat-transfer medium is conducted to forming belts through channels in the supporting plates, the channels running transversely to the panel. This heat-transfer medium is not heated, but rather partially releases its heat in a heat exchanger for use in another assembly. In this way, the heat balance of the installation



(57) **Abrégé(suite)/Abstract(continued):**

which includes the double-belt press is improved. The forming belts are supported on roller chains. The roller chains are subdivided in the direction of travel of the panel, thus reducing the transport of heat from the upstream section of the press line to the downstream section.

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Abstract

A double-belt press has a press line in whose downstream section a heat-transfer medium is conducted to forming belts through channels in the supporting plates, the channels running transversely to the panel. This heat-transfer medium is not heated, but rather partially releases its heat in a heat exchanger for use in another assembly. In this way, the heat balance of the installation which includes the double-belt press is improved. The forming belts are supported on roller chains. The roller chains are subdivided in the direction of travel of the panel, thus reducing the transport of heat from the upstream section of the press line to the downstream section.

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PROCESS AND DOUBLE-BELT PRESS FOR THE CONTINUOUS PRODUCTION
OF BOARD MATERIALS

The invention relates to a process for the
continuous production of particle board and a double-belt
5 press for use in the process.

Such a process and such a double-belt press are
known, for example, from DE 21 57 746 C3 or DE 39 04 982 C1.
Provided in the press line are supporting plates, on which
the forming belts are supported via co-running roller
10 chains. The supporting plates are braced by strong bearers
which are arranged transversely to the track above and below
the respective supporting plates and are held together by
spindles outside the width of the track.

Provided in the supporting plates, extending
15 transversely to the track, are bores which form channels for
carrying a heat-transfer medium, generally a thermal oil.
The channels follow one another frequently in the direction
of travel of the track. Successive channels are
interconnected by U-shaped pipe elbows mounted at the edges
20 of the supporting plates, so that the heat-transfer medium
follows a zig-zag course transverse to the track, thus
improving the uniformity of the heat transfer. A plurality
of successive transverse bores in the direction of travel of
the track form a group fed in common with heat-transfer
25 medium.

In producing board materials, particularly
particle boards and similar materials, a substantial amount
of

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heat must be introduced into the feed material in the first zone of the press line, in order to carry out the curing reaction of the binder. In this context, the moisture contained in the feed material serves to transfer the heat into the material and plastify it. In a downstream, i.e. subsequent, section situated toward the end of the press line, the heat input no longer needs to be so great, but rather, the primary concern here is the maintenance of the spacing between the forming belts perpendicular to the track for a given time during which the material is cured, so that a calibrated board panel emerges from the press line. By maintaining the thickness in the downstream section, bonds which have been introduced within the board material are not torn apart again by premature relief of pressure before curing is complete, which would weaken or even destroy the board material.

In the installation known from DE 39 04 982 C1, the forming belts between which the board material is formed are supported, rolling via roller chains, on the flat supporting surface of a supporting structure located in the press line above the upper forming belt and below the lower forming belt. Even if the supporting structure is no longer to be positively heated in the downstream region of the press line, a substantial amount of heat is transferred into the downstream section of the press line by the advancing forming belts with the roller chains and the web of board material.

Thus, a large part of the quantity of heat introduced into the board panel in the first zone of the press line is transported by the board panel, the forming belts and, in particular, the roller chains into the downstream

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section of the press line, and is radiated there into the surroundings, unused. Often no heat input is required any longer for the board panel itself in the downstream zone of the press line. On the contrary, it is sometimes even
5 desirable to already cool the board panel in the press to a certain extent.

In order to have sufficient heat available in the first zone of the press line, it is necessary to operate there to an extent with an excess of heat which can no
10 longer be used in the downstream part of the press line, and increases the energy costs.

The object of the invention is to reduce the energy costs of an installation including the double-belt press.

15 According to one aspect the invention provides a process for the continuous production of particle boards from board materials composed of particles held together by a binder cured under heat and pressure in a double-belt press, comprising the steps of: sprinkling particles that
20 have been provided with binder onto a horizontal run of a conveyor belt to form a feed material; curing said feed material under heat and pressure in a press line between an upper run of a metallic, continuously circulating, lower forming belt and a lower run of a metallic, continuously
25 circulating, upper forming belt, moving in synchronicity in the direction of travel of the double-belt press to form a panel composed of the board materials; transferring heat and pressure necessary for forming in the press line from supporting structure to the forming belts and thence to the
30 feed material, the heat being introduced into the supporting structure by a heat-transfer medium conducted through

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channels therein; wherein the heat-transfer medium for a downstream section of the press line is not heated, and in this section, heat transferred to the heat-transfer medium in the upstream region of the press line is extracted from the heat-transfer medium and employed outside of the press line.

Using the invention, the heat transported into the downstream section from the upstream section by the board material being formed, the two forming belts and the chains can at least partially be kept from getting lost, thus improving the heat balance in the overall installation. In this context, there is also an additional effect which improves the environmental compatibility of the operation of the double-belt press: the extraction of heat from the heat-transfer medium of the downstream section is synonymous with cooling it. Thanks to the reduced temperature in the downstream zone of the press line resulting from the withdrawal of heat, the evaporation of formaldehyde originating from the binder and the escape of other organic vapors which can be inflammable, e.g. from waxes, are reduced.

In many cases, it is possible to dispense with a greater input, or even any input of heat in the downstream section, since the forming belts with their higher temperature continue to transport heat into the interior of the board.

In a particular embodiment the heat extracted in the downstream section of the press line is used at another point in the process for manufacturing the board materials themselves, for example, for pre-heating or drying the

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particles from which the panel of board material is formed, or for heating water and/or thermal oil.

In another embodiment of the process, the heat obtained in the downstream region of the press line can be used, for example, for heating the factory installation in which the double-belt press is installed, or even the associated offices, that is to say, outside of the actual board material manufacturing process.

According to another aspect the invention provides a double-belt press for the continuous production of particle boards and the like from board materials composed of particles held together by a binder cured under heat and pressure, comprising: an upper and a lower metallic forming belt circulating continuously in a vertical plane, of which an upper run of the lower forming belt and a lower run of the upper forming belt overlies one another in a press line, and are supported against supporting plates and press together a feed material in the press line under the action of heat and pressure to form a panel composed of the board materials; channels provided in the supporting plates, through which a heat-transfer medium can be conducted; wherein the channels of a downstream section of the press line can be supplied with unheated heat-exchange medium and are connected to a heat exchanger in which heat extracted from the heat-transfer medium of the downstream section is transferrable to another assembly not belonging to the press line.

In this connection, the "other assembly" in which the recovered heat is employed can be the already mentioned aggregate, upstream of the double-belt press, for forming

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and pre-treating the feed material, or the heat exchanger for warming water and/or thermal oil or a similar device.

In this context, the downstream section of the press line is provided with completely unheated heat-
5 transfer medium.

In a specific embodiment there is the possibility of utilizing the heat obtained in the downstream section of the press line.

In another aspect for achieving the objective of
10 reducing the energy costs, the transfer of heat into the downstream section of the press line is reduced in that, in each case, a continuous roller chain or a group of such roller chains side-by-side is not used for the entire press line and for each forming belt, but rather, a chain
15 separation is carried out at a suitable location in the press line, so that the first section of the press line has its own roller chains and the downstream section of the press line has further roller chains separate from them. The portion of heat otherwise transported into the
20 downstream section of the press line by continuous roller chains thereby remains largely in the first section of the press line and does not become lost through the downstream transport. A temperature drop of 20°C or more in the downstream section of the press line can be achieved solely
25 by the separation of the roller chains. Meanwhile, the first section of the press line can be kept at the necessary temperature with a reduced application of heat.

Thus, according to this aspect there is provided a double-belt press for the continuous production of particle
30 boards from board materials composed of particles held together by a binder cured under heat and pressure,

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comprising: two metallic forming belts circulating continuously in a vertical plane, of which an upper run of a lower forming belt and a lower run of an upper forming belt overlies one another in a press line, are supported against supporting plates and press together a feed material in the press line under the action of heat and pressure to form a panel composed of the board materials; channels in the supporting plates, through which a heat-transfer medium can be conducted; continuous roller chains co-advancing between the forming belts and the supporting plates in the press line and transferring the pressure and heat from the supporting plates to the forming belts, and of which, roller chains of a downstream section are separate from the roller chains of a previous section of the press line which are disposed on the same line in the direction of travel; wherein separating points of the roller chains on at least one side of the panel are disposed at an angle other than 90° with respect to the direction of travel.

The chain separation in double-belt presses is implied by itself from U.S. 4,334,468, however, in that case, it is only from the aspect of being able to supply or extract different amounts of heat to and from successive sections of the press line in the direction of travel, but not from the aspect of heat utilization.

In a double-belt press of another type, which is used for drying fiber webs and is known from WO 97/39187, one belt

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is heated with vapor and the other is cooled with water. Running between the fiber web and the cooled belt is a felt web into which the water condensed on the cooled belt passes. The heat from the cool water is transferred
5 in a heat exchanger to another water which, with its then increased temperature, can be used as process water in a paper or cardboard machine.

10 The separation of the roller chain into a front section and at least one following section also has significance, independently of the question of the other use of the heat recovered in the last section of the press line.

15 Namely, in this manner, gaseous components of the board material can already be partially evaporated prior to reaching the actual end of the press line. This applies not only to water vapor, formaldehyde and the like, but also to the combustible vapors mentioned, for example, from waxes and the like used in the board material which,
20 if they are only able to emerge altogether in large quantity at the actual end of the press line, have already ignited there and led to fire accidents. In addition, the mere reduction of the vapor pressure at the separating point by partial discharge to the side, which
25 is possible due to the short-term "breathing out" of the board panel as a consequence of the temporary absence of the support of the forming belts at the separating points and therewith accompanying reduction in the resistance to flow for the vapor, has great practical significance,
30 just like the temperature reduction achieved in the final section of the press line.

However, according to the present invention, the separating points of the roller chains on at least one

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side of the panel are not disposed on a straight line running at 90° with respect to the direction of travel, transversely to the panel.

It may be that the separating points on at least
5 one side of the panel can be disposed on a straight line which, however, runs at an angle other than 90° with respect to the direction of travel; the angle can be different on both sides, as well.

However, according to another embodiment, the
10 separating points do not need to lie on a straight line, but rather - viewed in the direction of travel - can be in different positions, so that the roller chain field is jagged or lacerated, so to speak, at its boundaries situated in the longitudinal direction. In this way, abrupt
15 alterations in pressure are avoided at one point - viewed in the direction of travel - simultaneously over the entire width of the panel.

In a particular design the successive roller chain fields are, as it were, interlocked like a zipper.

20 Viewed in the direction of travel, the separating point at the final section of the press line can lie at the same point for the respective upper forming belts and for the respective lower forming belts. However, then the upper forming belt and the lower forming belt bulge simultaneously
25 outwards and there is a momentary "breathing out" of the panel on both sides, which is unacceptable for the formation and maintenance of the bonds developing in the panel.

An important refinement of the invention, both with and without recovery of heat, is that the interruptions

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in the roller chains both sides of the panel are staggered in the direction of travel of the panel.

This makes it possible to prevent the formation of an outward bulge of the panel on both sides between the forming belts, and the partial discharge of, for instance, trapped gases can take place to an extent by increments, first upwards and the other time downwards.

It is of no significance whether the separating point in the roller chains of the upper forming belt is situated ahead of or behind the separating point of the lower forming belt in the direction of travel of the panel.

Experiments have shown that particle boards produced according to the invention exhibit significantly better technological values than particle boards produced according to known methods.

Brief Description of the Drawings

Figs. 1 and 2 show longitudinal sections through double-belt presses constructed according to the principles of the invention;

Figs. 3 to 6 are schematic views from above of different configurations of separating points in the roller chains;

Figs. 7 and 8 are sections taken along lines VII-VII and VIII-VIII, respectively, in Figs. 8 and 7 of a separating point of the roller chains in enlarged scale;

Fig. 9 is a view, partially in section, of a portion of an individual roller chain.

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Detailed Description of the Drawings

The double-belt press of Fig. 1, designated as a whole by 100, is used for producing particle boards, wood fiber boards and other board-like materials which are made of particles bonded together by a binder which is cured under heat and pressure. It includes an upper forming belt 1 of smooth closed sheet steel of approximately 2 to 3 mm thickness and a similar lower forming belt 2. Between forming belts 1, 2, a panel 4 made of a feed material 4' composed of particle material provided with binder is pressed together in a press line 3, resulting in one of the aforesaid materials after pressing.

Upper forming belt 1 runs over rollers or drums 5, 6 arranged transversely to the panel and can be hydraulically tensioned between these drums 5, 6. Correspondingly, forming belt 2 runs over drums 11, 12, arranged transversely to panel 4, which likewise produce hydraulic tension of forming belt 2. Forming belts 1, 2 are driven via the drums.

Forming belts 1, 2 run through the device in the direction indicated by arrows 16. In press 3, lower run 1' of upper forming belt 1 and upper run 2' of lower forming belt 2 move in synchronicity and closely one upon the other at a spacing which corresponds to the thickness of panel 4. Feed material 4' deposited on the left side (as viewed in the drawing) onto a conveyor belt, not

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shown, is drawn into press line 3 and pressed together between runs 1', 2' of forming belts 1, 2. From the conveyor belt, feed material 4' passes over onto a rolling tray 7 which transfers the feed material to lower forming belt 2 shortly before the highest point of drum 11. The emerging, ready-pressed and cured panel 4 of board material is cut up on the right-hand side of the drawing by suitable devices, not shown, and transported away.

10

Provided in press line 3, in the inner region of forming belt 1 above its lower run 1' is an upper supporting structure 17 which co-operates with a lower supporting structure 18 provided in the inner region of lower forming belt 2 underneath its upper run 2'. Supporting structures 17, 18 brace the regions of forming belts 1, 2 which face panel 4, against panel 4, and press them together with great force.

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Supporting structures 17, 18 are each made of individual bearers 19, 20 which, in each case, are arranged in pairs lying one above the other above and below forming belts 1, 2 and panel 4. Each pair of bearers 19, 20 is clamped together by strong spindles, not shown, situated laterally outside of press line 3, so that individual compression members are formed that are self-contained force-wise.

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Between bearers 19, 20 and forming belts 1, 2 are strong supporting plates 26, 27 which transfer the force exerted by individual bearers 19, 20 in a planar manner to forming belts 1 and 2 and thus to panel 4. Supporting plates 26, 27 have through-channels over the width running transversely to panel 4, through which a heat-transfer medium can be conducted. The channels closely follow one another in direction of travel 16 and are interconnected at the ends by pipe elbows, so that a shared heat-transfer medium flows through groups of channels in a meandering path.

Arranged between the mutually facing sides of supporting plates 26, 27 and forming belts 1, 2 are roller chains 30', 30" upon which forming belts 1, 2 roll on supporting plates 26, 27, the roller chains orbiting continuously in a vertical longitudinal plane around supporting plates 26, 27 within forming belts 1,2. The rollers of roller chains 30', 30" transfer both the pressure and the heat from supporting plates 26, 27 to forming belts 1, 2 and thus to panel 4 which is forming. Therefore, forming belts 1, 2 experience a purely rolling support in press line 3.

Press line 3 is split into two sections 3' and 3" which follow one another in direction of travel 16 of panel 4 and which also have separate supporting plates 26', 27'

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follow one another in direction of travel 16 of panel 4 and which also have separate supporting plates 26', 27' and 26", 27", respectively. In first section 3', heat is fed to supporting plates 26', 27' by the heating of the heat-transfer medium, the heat giving rise to vapor generation in compressed feed material 4' that contains a certain amount of moisture. The vapor develops first near forming belts 1, 2, because they exhibit the highest temperature, and spreads in feed material 4', causing rapid heating of the entire volume of feed material 4' (steam impact) and thereby the curing of the binder present in it. The heat-transfer medium, for example a thermal oil, is heated in a heat exchanger 40 and circulated, so that the most recently heated transfer medium is supplied in the direction of arrow 41 at the start of first section 3' and is removed again from the channels in supporting plates 26', 27' in the direction of arrow 42 at the end of the first section, and fed back in a closed circulation into heat exchanger 40. As illustrated, the heat exchanger, on its part, can be acted on by a further heat-transfer medium heated in a heating aggregate 43 having registers 44, or else can itself contain the heating.

In downstream section 3", i.e. the following section of press line 3 in direction of travel 16 of panel 4, the mechanical pressure must be maintained until the binder has cured and the vapor pressure is sufficiently reduced, since otherwise the bonds just formed in the binder

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5 apart again. Circulating through supporting plates 26",
27" of this section is likewise a heat-transfer medium,
such that it is fed at the start of section 3" in the
direction of arrow 51 and removed again at the end of
section 3" in the direction of arrow 52.

10 Here as well, the heat-transfer medium flows through a
heat exchanger 50, in which, however, no heat is supplied
to it, but on the contrary, a part of the heat supplied
in first section 3' and reaching downstream section 3"
through the movement of forming belts 1, 2 and panel 4 is
extracted again. The extracted heat relieves the vapor in
panel 4 and thus reduces the vapor pressure prevailing
therein.

15 The heat extracted in heat exchanger 50 is used in a
separate assembly 53, not connected directly to press
line 3 and indicated only symbolically in the drawing, be
it for heating purposes, or be it used at a point prior
20 to the process sequence on the left-hand side of the
drawing for heating the particles, for drying the
particles, for heating water and/or pre-heating thermal
oil or for similar purposes. In this way, the heat
balance of the overall installation is improved and there
25 is also a benefit to the environment, in so far as the
escape of substances such as formaldehyde and the like is
reduced due to the lowering of temperature and vapor

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pressure in the final region of press line 3.

5 The channels formed in the supporting plates transverse
to panel 4 can be variably connected in groups following
one another in direction of travel 16. Accordingly, the
circumstance that heat is exclusively removed in section
3" of press line 3 is a feature of the exemplary
embodiment; however, it is entirely possible to envision
mixed forms in which a certain amount of heat is still
10 supplied at the beginning of section 3" and it is only
completely at the end that it is cooled, i.e. heat is
extracted.

15 A further heat-transfer medium which is not heated can
also be conducted through second section 3" if supporting
plates 26, 27 and roller chains 30 are formed
continuously over the entire length of press line 3.

20 However, in the exemplary embodiments shown in Figs. 1
and 2, sections 3', 3" are largely separated from one
another not only with regard to their supply with heat-
transfer medium, but also mechanically and from the
standpoint of heat conduction. Namely, in first section
3', the separate supporting plates 26', 27' already
25 mentioned lie opposite one another above and below panel
4, reach from the inlet up to separating points 28, 29 at
the end of first section 3' and are orbited by associated

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continuous roller chains 30', as will be described later with reference to Fig. 9, and of which a number, for example 40, run over the width of panel 4 directly side-by-side but independently of one another in the direction of arrows 16 in press line 3, and which together form a roller chain field which is shearable in its plane in direction of travel 16.

In Fig. 1, supporting plates 26", 27", separate from supporting plates 26', 27', start at separating points 28, 29 and extend to the end of press line 3, i.e. to the end of downstream section 3" of the press line, and are orbited by their own roller chains 30". Separating points 28, 29 at which forming belts 1, 2 pass from first section 3' into downstream section 3" are only made as short in direction of travel 16 as is constructionally possible. However, because of the necessary reversal of direction of roller chains 30', 30" over a radius, the unsupported sections at separating points 28, 29 cannot be made arbitrarily short, and amount to approximately 150 mm, which still has no effect on the loss of the board material. Numeral 28 designates the separating point between roller chains 30', 30" above panel 4, i.e. for forming belt 1, 29 designates the separating point for roller chains 30', 30" below panel 4, i.e. for forming belt 2. Separating points 28, 29 lie on straight lines running transversely to panel 4, i.e. all roller

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chains 30' and all roller chains 30" are in each case reversed in direction in the region of supporting plates 26', 27' and 26", 27", respectively, at the same points - viewed in direction of travel 16 - around the edges of supporting plates 26', 27' and 26", 27".

Due to the separation at separating points 28, 29, upstream roller chains 30' remain wholly in first section 3' and cannot transfer any heat into downstream section 3".

The heat which nevertheless reaches the downstream section through forming belts 1, 2 and panel 4 during steady-state operation is partially extracted in heat exchanger 50 from the heat-transfer medium flowing through supporting plates 26", 27" and supplied for further use.

In embodiment 100 in Fig. 1, viewed in direction of travel 16 of panel 4, separating points 28, 29 lie one above the other at the same point.

However, in exemplary embodiment 200 in Figure 2, separating point 28' for roller chains 30', 30" of upper forming belt 1 is offset in direction of travel 16 with respect to separating point 29' of lower forming belt 2. Therefore, 28' and 29' do not lie one above the other,

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but are spaced in direction of travel of panel 4 by an amount which is at least so large that a short stretch 25 remains between separating points 28' and 29', in which panel 4 is supported by roller chains 30', 30" from both sides, as in the remainder of press line 3. The direction of the offset plays an insignificant role. It is only important that the unsupported sections above and below do not lie at the same point, and that vapors of all kinds can be discharged from the board material not all at once, but rather in two steps.

Incidentally, apart from the heat recovery which is just omitted in Fig. 2, the exemplary embodiments of Figs. 1 and 2 are otherwise in agreement. This is intended to illustrate that the separation of the chains can have significance even without heat recovery.

Figs. 3 through 6 schematically depict various configurations in the region of separating points 28, 28', 29, 29'. Only ten side-by-side roller chains 30', 30" are indicated in each case, although the number over the total width of panel 4 is actually generally substantially greater.

Fig. 3 shows the standard situation in which separating point 28 runs along a straight line 31 extending transversely to panel 4, i.e. perpendicular to direction

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of travel 16. Above and below panel 4, separating points 28, 29 can lie one above the other as illustrated in Fig. 1, but they can also be staggered in the direction of travel, as indicated at 29' in Fig. 3 and represented in Fig. 2.

According to Fig. 4, separating point 28 can also extend along a straight line 32 which makes an angle other than 90° with direction of travel 16. Here as well, separating points 28, 29' above and below panel 4 can either lie directly one above the other or adopt different angles from one another, as shown in the drawing.

The configuration shown in Fig. 5 differs from those of Figs. 3 and 4 in that each roller-chain pair 30' 30", lying on the same longitudinal line has, so to speak, its own separating point, and that the separating points of adjacent roller chains are staggered in direction of travel 16. Thus, the separating points of individual roller-chain pairs 30', 30" intermesh like a zipper. As indicated by broken line 33', this configuration can also have an offset in the longitudinal direction above and below panel 4.

According to Fig. 6, the configuration with roller-chain pairs 30', 30" intermeshing like a zipper can also form over the width of panel 4 a separating zone along a line

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34 which adopts an angle other than 90° with respect to direction of travel 16.

5 The embodiment of Fig. 5 is further explained with reference to Figs. 7 and 8. The edges of supporting plates 26', 26" adjacent in direction of travel 16 are rounded off, so that roller chains 30' and 30", respectively, pass around this radius and are conducted upwards out of the region of engagement with forming belt 10 1, as can be seen in Fig. 8.

The rounded-off, mutually facing edges of supporting plates 26', 26" do not lie on a common straight line, but rather each individual roller chain 30', 30" has its own 15 pair of rounded-off edge regions 35, 37 and 36, 38, respectively, each of which is only as wide as roller chain 30' or 30". Furthermore, on supporting plate 26' are edge regions 35 projecting in direction of travel 16, and in between in each case is a set-back edge region 36. 20 In the case of supporting plate 26", lying opposite projecting edge region 35 of supporting plate 26' is an edge region 37 disposed further ahead in the direction of travel, while edge region 36 of supporting plate 26' is assigned a further set-back edge region 38 of supporting 25 plate 26". In this context, edge regions 38 engage between adjacent edge regions 35, 35, so that the chain fields of supporting plates 26', 26" are interlocked like

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a zipper. In the exemplary embodiment, the spacing of the forward edges of edge regions 35 and 36 - viewed in direction of travel 16 - corresponds according to size to the width of an individual roller chain 30' or 30". The same applies to edge regions 37, 38, because distance 39 between the mutually opposite regions of roller chains 30' and 30" in direction of travel 16 is always the same for side-by-side roller chains 30' and 30".

Fig. 9 shows the construction of an individual roller chain 30', 30". Each roller chain 30, 30" includes three side-by-side rollers 68a, 68b and 68c per chain pivot 65, between which extend lines of links 61 and 62 having straight links 61a, 61b, 61c and 61d. However, these links are not provided one behind the other in a "lane" parallel to direction of travel 16, but a given number are offset one behind the other to the same side, and after a predetermined number of links, the direction of offset is reversed. Thus, for example, link 61a is offset upwards with respect to link 61. Link 61b is again offset upwards with respect to link 61a. However, link 61c is offset downwards again with respect to link 61b and is followed by four further links, each offset downwards, up to link 61d, from which, in the drawing to the right, an upwards offset takes place again. Therefore, string of links 61 formed by the totality of links 61a, 61b, 61c, and 61d takes a zigzag course within roller chain 30',

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30", so that the joints left by any two rollers is overlapped by some of the following rollers.

5 Allocated to line of links 61 is a correspondingly formed
line of links 62, whose links are offset with respect to
the longitudinal central plane of roller chain 30', 30"
in the opposite direction to line of links 61. As already
mentioned, each member of roller chain 30', 30" includes
10 three rollers 68a, 68b and 68c which alter periodically
in their width and which, taken together, make up an
individual roller chain having mutually parallel, lateral
boundary faces 63 and 64. The three rollers 68a, 68b and
68c of a chain member are held together by a roller pin
65 whose head 66 is accommodated in a countersink 67 and
15 which does not project beyond boundary surfaces 63 and
64.

20 Mutually adjacent roller chains 30', 30" abut against
each other with their end faces 63 and 64, so that no
significant spacing remains at these locations, and
pressure and temperature are transferred essentially
uniformly to forming belts 1, 2 via the entire chain
surface. The joints between the individual rollers on a
roller pin 65 are periodically rolled over by rollers of
25 subsequent roller pins 65, resulting in an essentially
uniform engagement of the pressure transfer surfaces in
press line 3.

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CLAIMS:

1. A process for the continuous production of particle boards from board materials composed of particles held together by a binder cured under heat and pressure in a double-belt press, comprising the steps of:

sprinkling particles that have been provided with binder onto a horizontal run of a conveyor belt to form a feed material;

curing said feed material under heat and pressure in a press line between an upper run of a metallic, continuously circulating, lower forming belt and a lower run of a metallic, continuously circulating, upper forming belt, moving in synchronicity in the direction of travel of the double-belt press to form a panel composed of the board materials;

transferring heat and pressure necessary for forming in the press line from supporting structure to the forming belts and thence to the feed material, the heat being introduced into the supporting structure by a heat-transfer medium conducted through channels therein;

wherein the heat-transfer medium for a downstream section of the press line is not heated, and in this section, heat transferred to the heat-transfer medium in the upstream region of the press line is extracted from the heat-transfer medium and employed outside of the press line.

2. The process as recited in Claim 1, wherein the heat extracted in the downstream section of the press line is employed at another point in the process.

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3. The process as recited in Claim 1, wherein the heat extracted in the downstream section is employed outside of the process.

4. A double-belt press for the continuous production of particle boards and the like from board materials composed of particles held together by a binder cured under heat and pressure, comprising:

an upper and a lower metallic forming belt circulating continuously in a vertical plane, of which an upper run of the lower forming belt and a lower run of the upper forming belt overlies one another in a press line, and are supported against supporting plates and press together a feed material in the press line under the action of heat and pressure to form a panel composed of the board materials;

channels provided in the supporting plates, through which a heat-transfer medium can be conducted;

wherein the channels of a downstream section of the press line can be supplied with unheated heat-exchange medium and are connected to a heat exchanger in which heat extracted from the heat-transfer medium of the downstream section is transferrable to another assembly not belonging to the press line.

5. The double-belt press as recited in Claim 4, wherein the other assembly is an assembly connected upstream of the double-belt press.

6. The double-belt press as recited in Claim 4, wherein the other assembly is an assembly independent of or separate from the process for continuous production of particle boards from board materials composed of particles held together by a binder cured under heat and pressure.

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7. The double-belt press as recited in Claim 4, 5 or 6 wherein located between the forming belts and the supporting plates in the press line are co-advancing, continuous roller chains which transfer the pressure and heat from the supporting plates to the forming belts, and wherein roller chains of the downstream section are separate from the roller chains of an upstream section of the press line which are disposed on the same line in the direction of travel.

8. A double-belt press for the continuous production of particle boards from board materials composed of particles held together by a binder cured under heat and pressure, comprising:

two metallic forming belts circulating continuously in a vertical plane, of which an upper run of a lower forming belt and a lower run of an upper forming belt overlies one another in a press line, are supported against supporting plates and press together a feed material in the press line under the action of heat and pressure to form a panel composed of the board materials;

channels in the supporting plates, through which a heat-transfer medium can be conducted;

continuous roller chains co-advancing between the forming belts and the supporting plates in the press line and transferring the pressure and heat from the supporting plates to the forming belts, and of which, roller chains of a downstream section are separate from the roller chains of a previous section of the press line which are disposed on the same line in the direction of travel;

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wherein separating points of the roller chains on at least one side of the panel are disposed at an angle other than 90° with respect to the direction of travel.

9. The double-belt press as recited in Claim 7 or 8, wherein the separating points of the roller chains on at least one side of the panel are disposed on a straight line running at an angle other than 90° with respect to the direction of travel.

10. The double-belt press as recited in Claim 8 or 9, wherein the angles on both sides of the panel are different.

11. The double-belt press as recited in any one of Claims 7 to 10, wherein the separating points of roller chains adjacent to one another in the transverse direction of the panel are disposed on at least one side of the panel at different positions when viewed in the direction of travel.

12. The double-belt press as recited in Claim 11, wherein the separating points of at least one roller chain viewed in the direction of travel are set back with respect to the roller chains adjacent in transverse direction, and the roller chain of the other section disposed on the same line in the direction of travel engages in the gap.

13. The double-belt press as recited in any one of Claims 7 to 11, wherein the separating points of the roller chains on the two sides of the panel are staggered in the direction of travel of the panel.

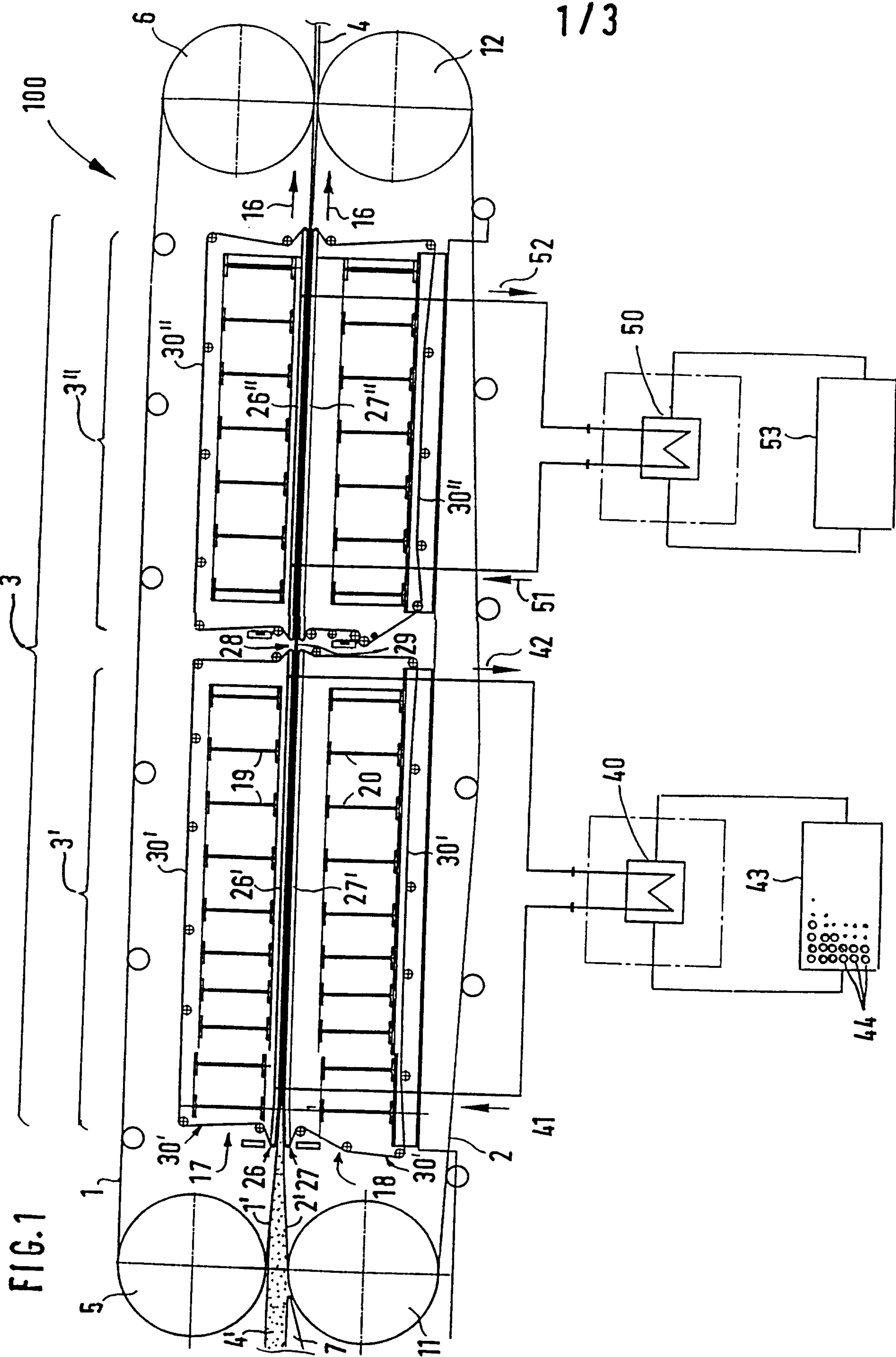
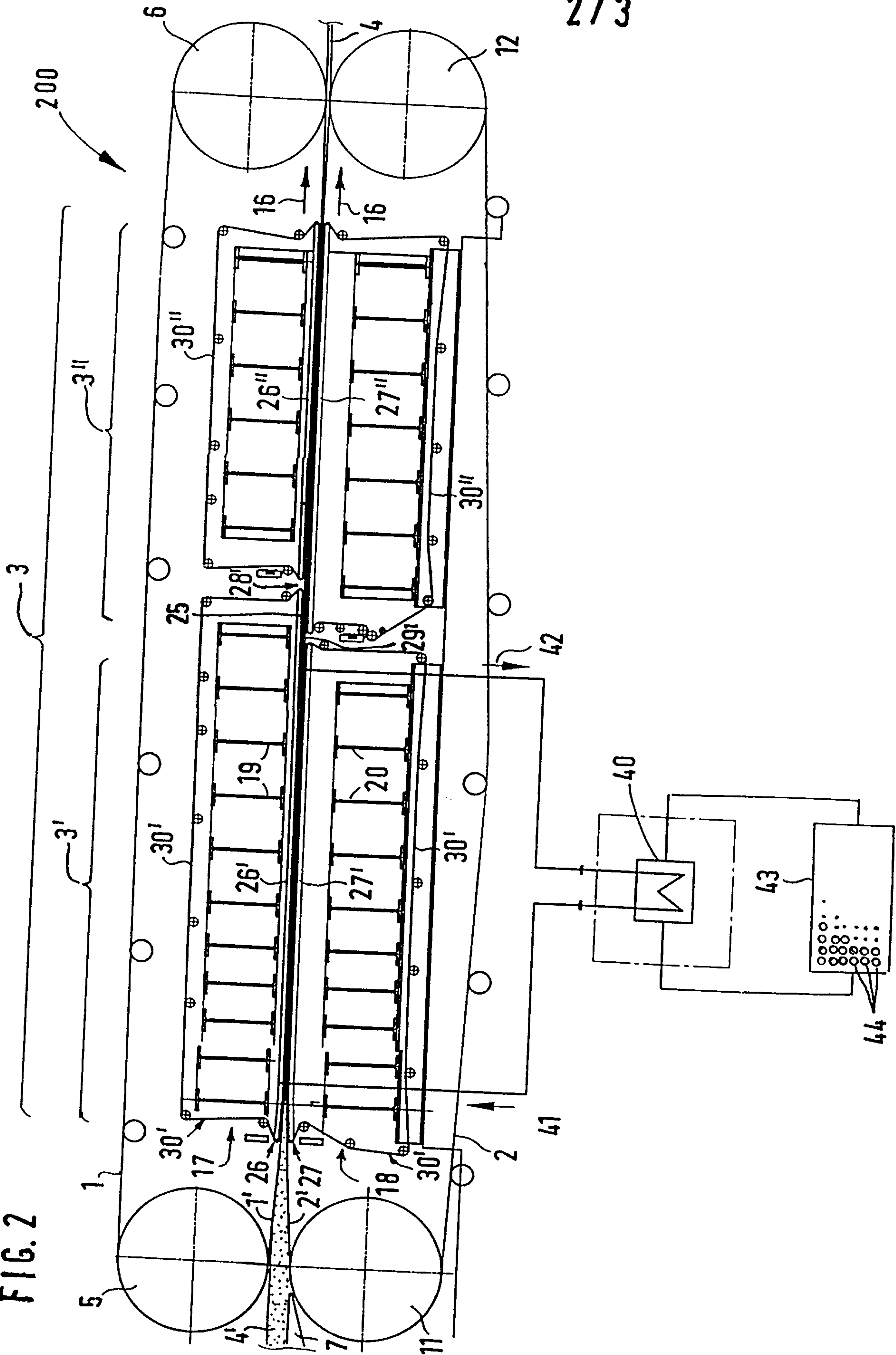


FIG. 2



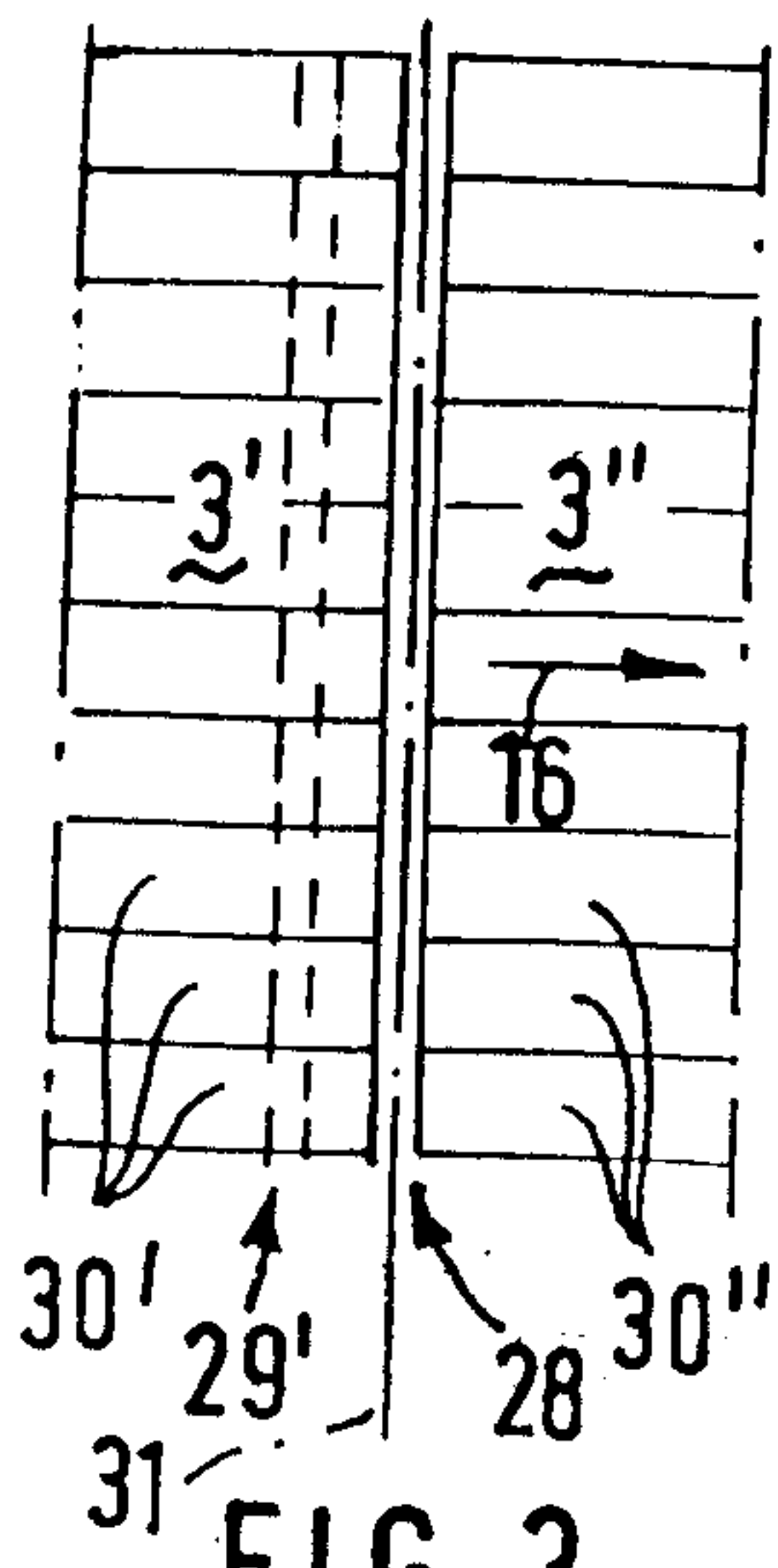


FIG. 3

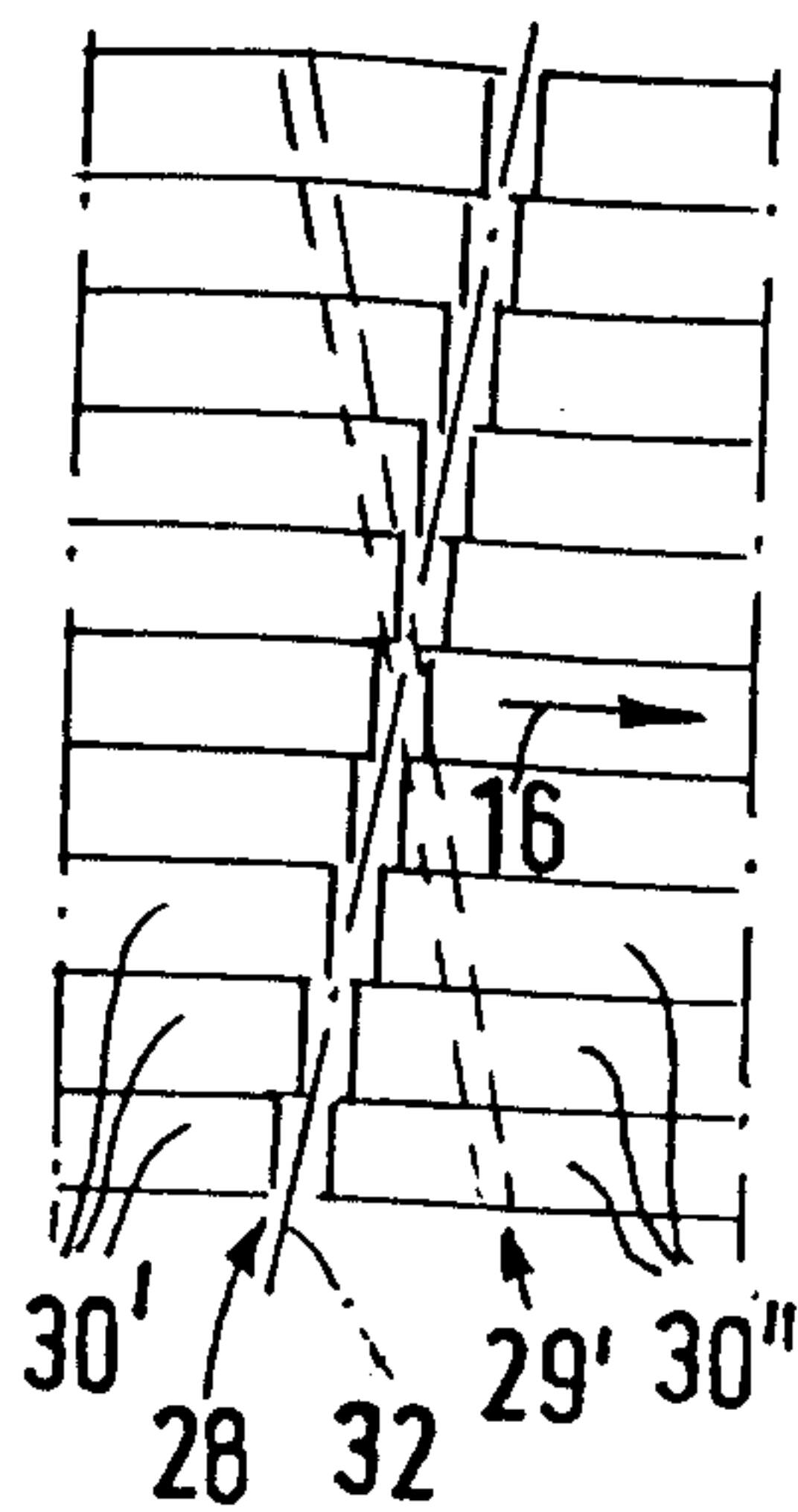


FIG. 4

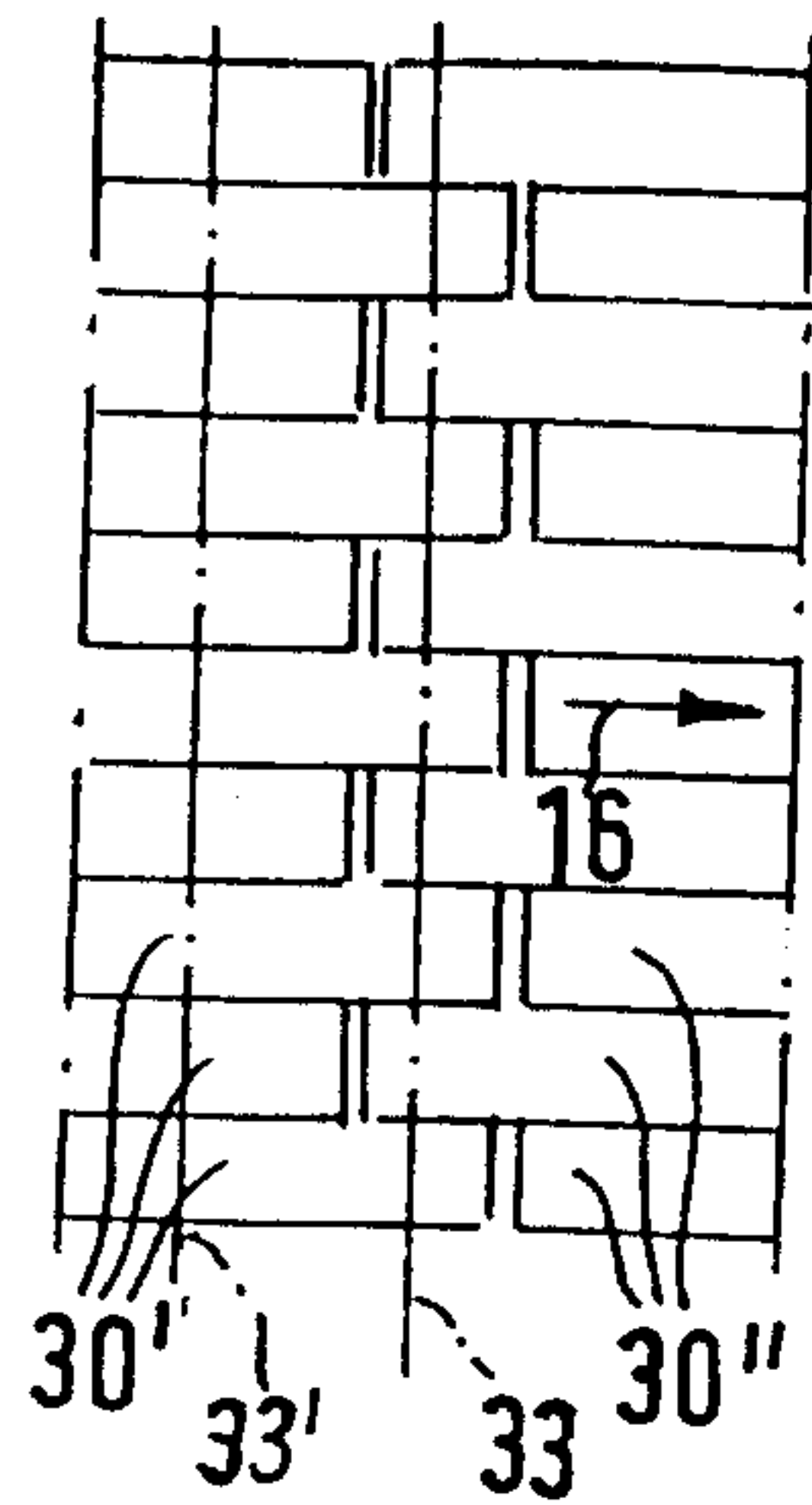


FIG. 5

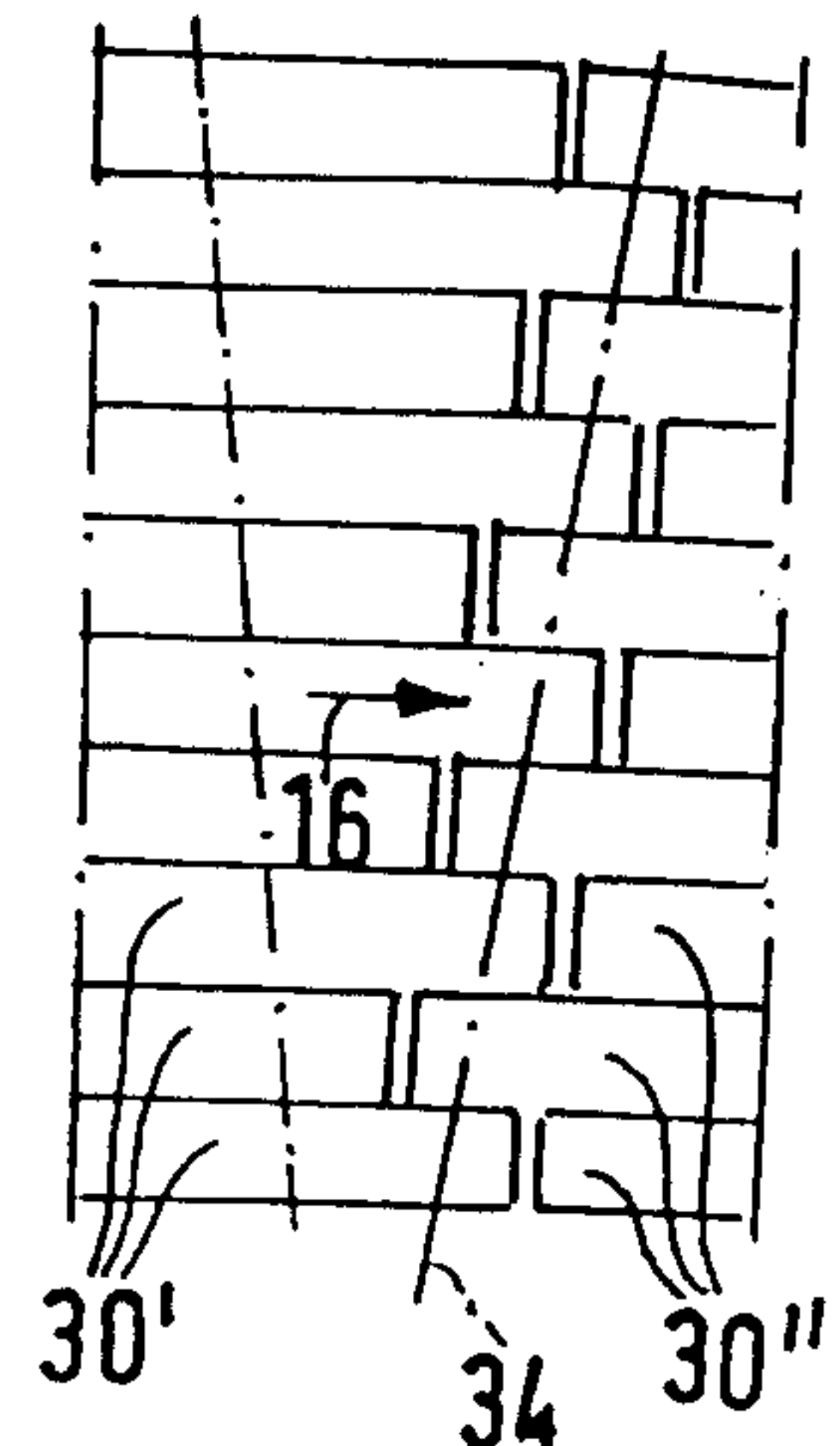


FIG. 6

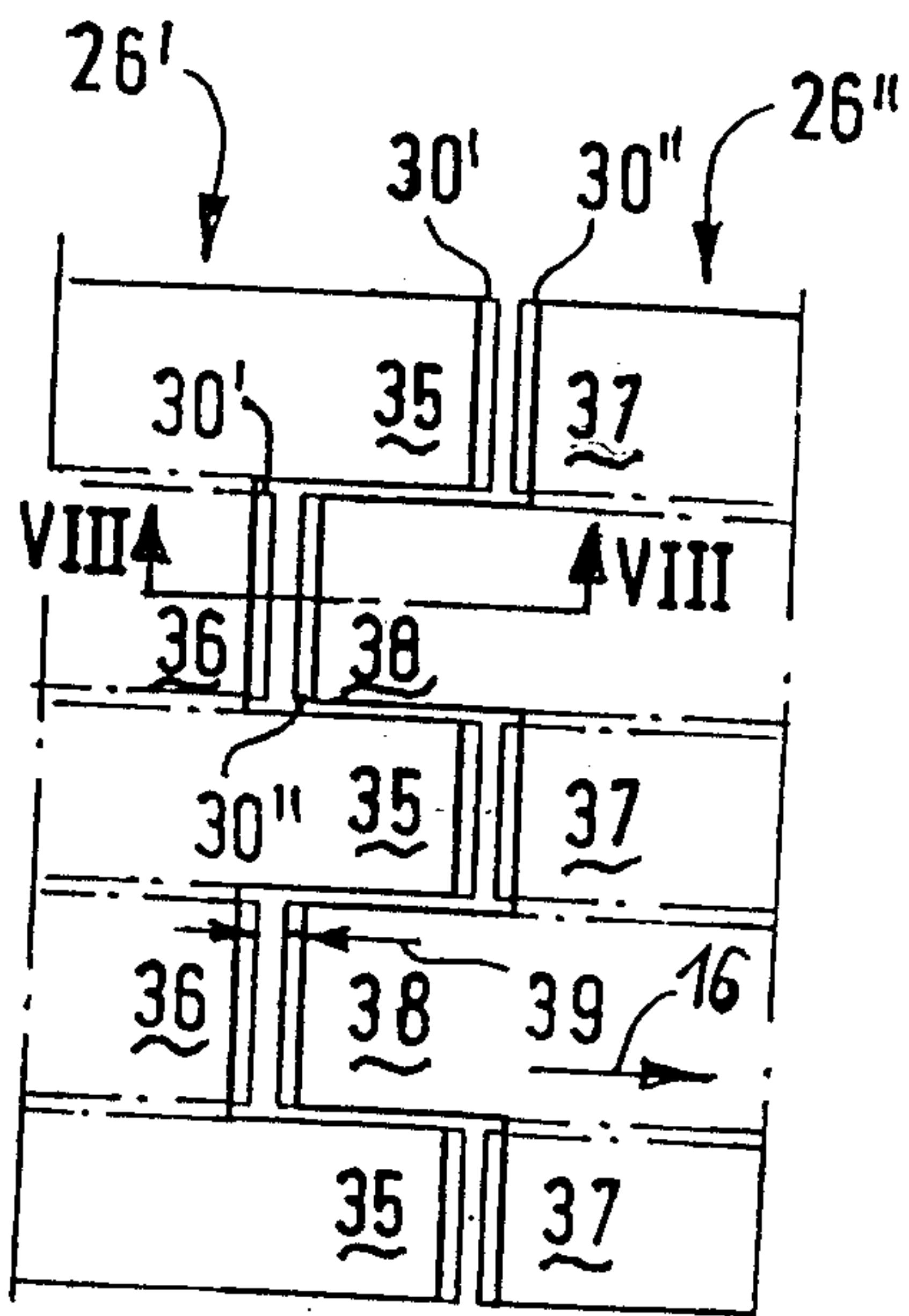


FIG. 7

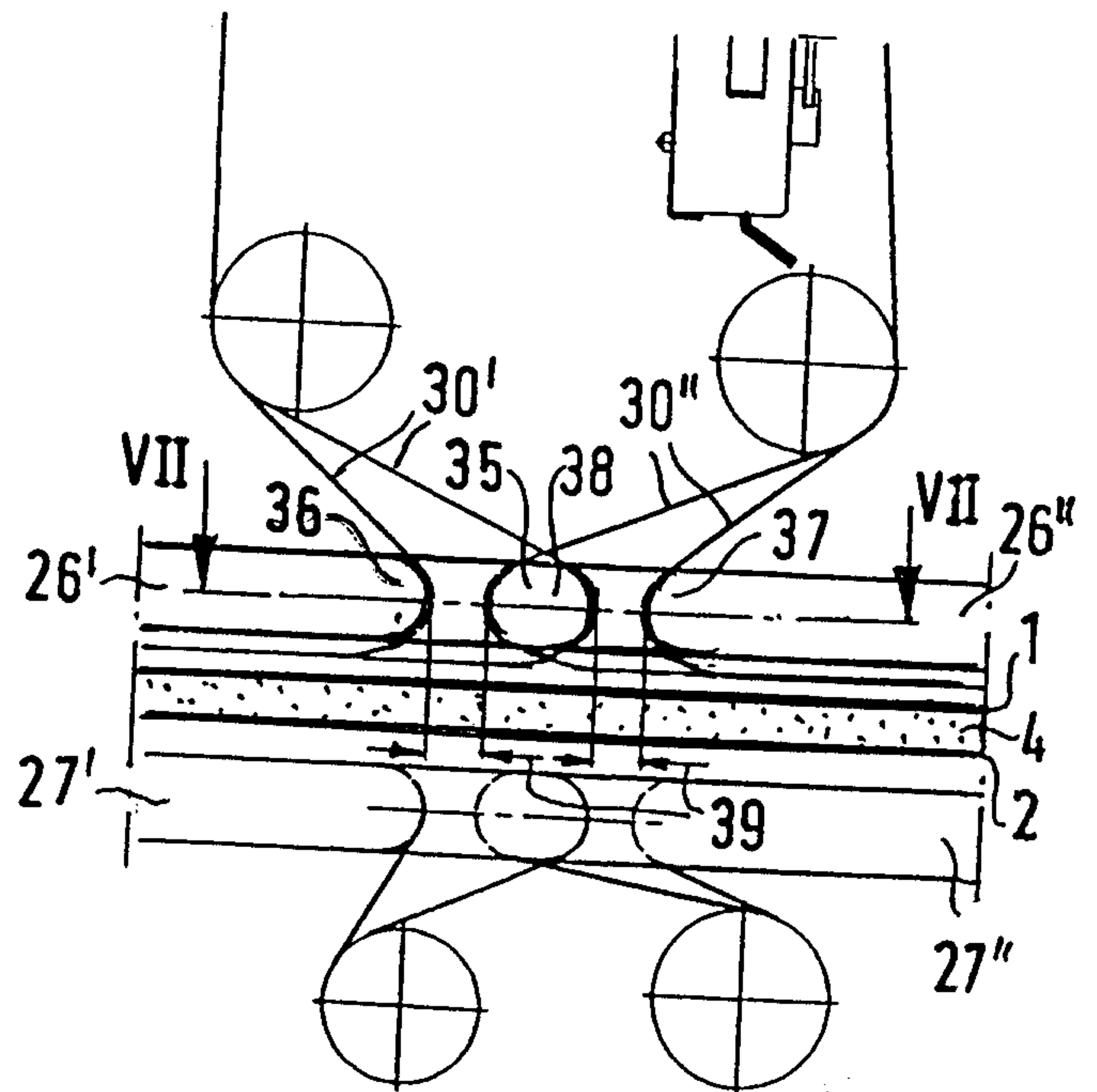


FIG. 8

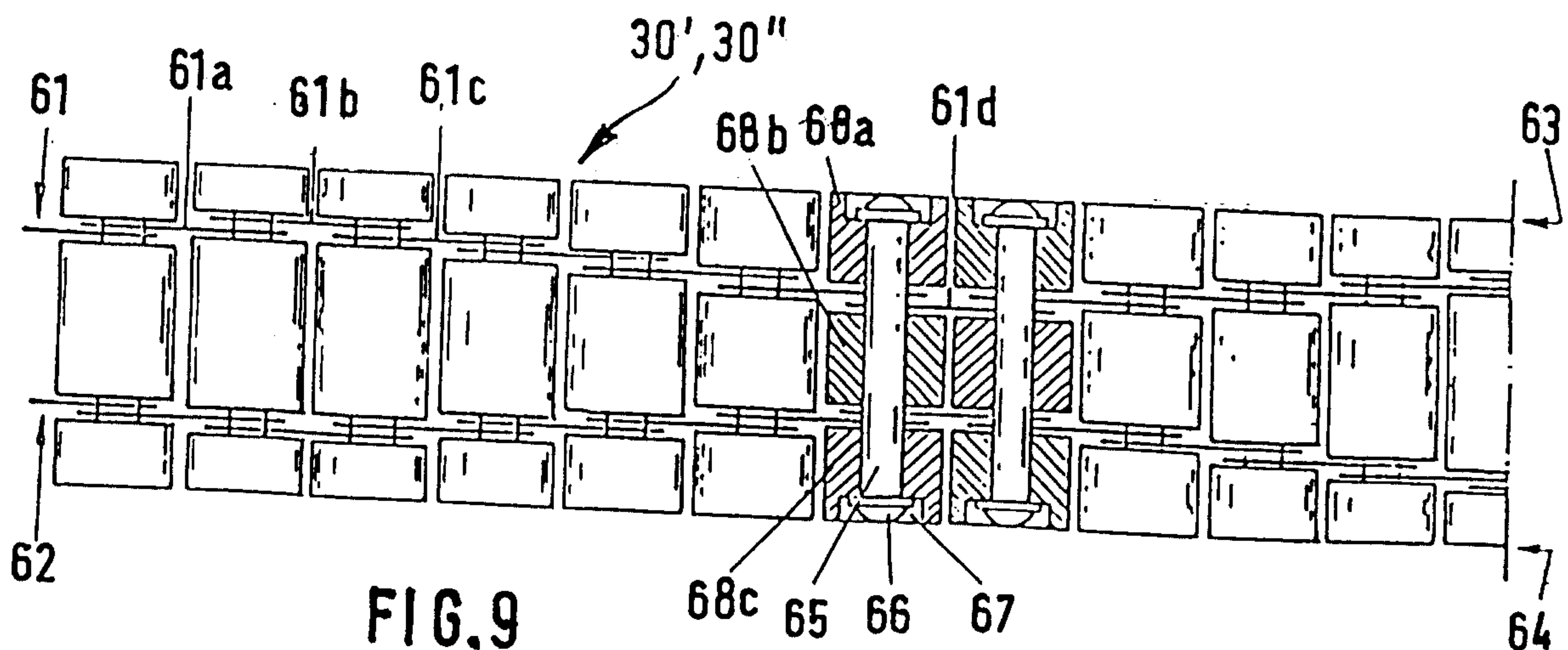


FIG. 9

