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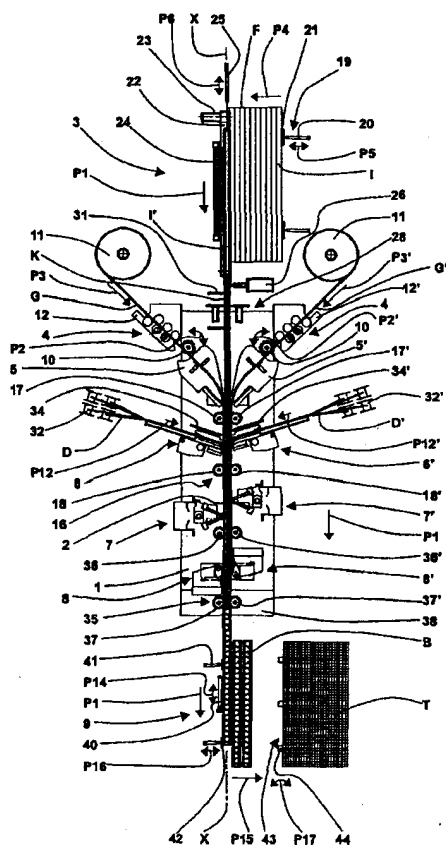
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(54) Title: METHOD AND DEVICE FOR PRODUCING STRUCTURAL ELEMENTS

(54) Bezeichnung: VERFAHREN UND ANLAGE ZUM HERSTELLEN VON BAUELEMENTEN



(57) Abstract: The invention relates to a method for continuously producing structural elements (B) comprising two flat and parallel wire netting mats (M, M') consisting of crossing longitudinal and transversal wires which are welded at the points where they are jointed to each other by straight web wires (S, S') maintaining said wire netting mats at a predefined space from each other and of insulating elements arranged therebetween and crossed by the web wires. The inventive method consists in placing in parallel two wire netting mats in a production channel (2) at a distance with respect to each other corresponding to a desired thickness of the structural element. An insulation plate (I, I') made of a heat insulating material is arranged in the space between the parallel wire netting mats and several web wires are simultaneously inserted through at least one of the wire netting mats and a the insulating element from at least one alternate side in a an opposite direction to the diagonal on the planes which are perpendicular to the planes of the wire netting mats, said web wires being then welded to the wires (L, L'; Q, Q') of the netting mats. A device for carrying out said method and the thus produces structural element are also disclosed.

(57) Zusammenfassung: Verfahren zum kontinuierlichen Herstellen von Bauelementen (B), die aus zwei parallelen, flachen Drahtgittermatten (M, M') aus einander kreuzenden und an den Kreuzungspunkten miteinander verschweissten Längs- und Querdrähten, aus die Drahtgittermatten in einem vorbestimmten, gegenseitigen Abstand haltenden, geraden Stegdrähten (S, S') sowie aus einem zwischen den Drahtgittermatten angeordneten, von den Stegdrähten durchdrungenen Isolierkörper bestehen, bei welchen zwei Drahtgittermatten in einem der gewünschten Dicke des Bauelementes entsprechenden gegenseitigen Abstand in einem Produktionskanal (2) in parallele Lage gebracht werden, in den Zwischenraum zwischen den parallelen Drahtgittermatten eine Isolierplatte (I, I') aus wärmeisolierendem Material eingeführt wird und gleichzeitig mehrere Stegdrähte von zumindest einer Seite her alternierend gegensinnig schräg in senkrecht zu den Ebenen der Drahtgittermatten verlaufenden Ebenen durch zumindest eine der beiden Drahtgittermatten

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Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

Method and device for producing structural elements

The invention concerns an installation for the continuous production of components consisting of two parallel, flat wire mesh mats of intersecting longitudinal wires and transverse wires welded together at the points of intersection, straight spacing wires keeping the wire mesh mats at a predetermined distance from one another and an insulating body arranged between the wire mesh mats and transversed by the spacing wires, comprising at least one curved guiding device for one wire mesh web arranged on one side of a production channel situated on the production line and leading tangentially to the production channel, comprising a drivable feed device for gradually drawing the endless wire mesh web standing on edge off a supply reel and for introducing the wire mesh web into the respective guiding device, a supply device for supplying the wire mesh web, an aligning device for aligning the wire mesh web and a cutting device for cutting the wire mesh mat of predetermined length off the endless wire mesh web being provided upstream of each guiding device, comprising a plurality of supply devices for equipping the insulating body with spacing wires arranged at least on one side of the production channel and pivotable about a vertical axis in order to vary the angle of insertion of the spacing wires, comprising a plurality of downstream welding devices for simultaneously welding both ends of all of the spacing wires to corresponding longitudinal wires of the wire mesh mats, comprising trimming devices for cutting off the projecting ends of the spacing wires arranged downstream of the welding devices and comprising a transverse conveying device for conveying the finished components out of the production channel.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is solely for the purpose of

providing a context for the present invention. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

- 5
- The invention is an installation for the continuous production of components consisting of two parallel, flat wire mesh mates of intersecting longitudinal wires and transverse wires welded together at the points of intersection, straight spacing wires keeping the wire mesh mats at a predetermined distance from one another and an insulating body arranged between the wire mesh mats and
- 10
- traversed by the spacing wires, comprising at least one curved guiding device for one wire mesh web arranged on one side of a production channel situated on the production line and leading tangentially to the production channel, comprising a drivable feeding device for gradually drawing the endless wire mesh web
- 15
- standing on edge off a supply reel and for introducing the wire mesh web into the respective guiding device, a supply device for supplying the wire mesh web, an aligning device for aligning the wire mesh web and a cutting device for cutting the wire mesh mat of predetermined length off the endless wire mesh web being provided upstream of each guiding device, comprising a plurality of supply
- 20
- devices for equipping the insulating body with spacing wires arranged at least on one side of the production channel and pivotable about a vertical axis in order to vary the angle of insertion of the spacing wires, comprising a plurality of downstream welding devices for simultaneously welding both ends of all of the spacing wires to corresponding longitudinal wires of the wire mesh mats,
- 25
- comprising trimming devices for cutting off the projecting ends of the spacing wires arranged downstream of the welding devices and comprising a transverse conveying device for conveying the finished components out of the production channel, characterised in that the cutting device for the wire mesh webs for cutting a section of the required length out of the wire mesh web has at least two
- 30
- stationary knives arranged at the required distance from one another on a cutting bar which can reciprocate relative to the wire mesh web and at least two cutting knives arranged at the required distance from one another on a knife bar which can reciprocate relative to the wire mesh web and cooperating with the stationary knives, wherein the stationary knives and the cutting knives can be positioned in

the direction of the longitudinal wires in order to trim the ends of the longitudinal wires.

5 In at least one embodiment, the invention provides an installation of the type stated in above, that enables the production of structural elements with different construction using wire mesh webs in a continuous production process.

10 The special construction of the cutting blades is simple and results in the essential advantage that structural elements of predetermined size can succeed without distance, wherein trimming of the mats can be provided simultaneously.

15 Optionally each trimming device is provided in a manner known per se with a plurality of pivotable upper knives and a plurality of pivotable lower knives cooperating therewith for simultaneously cutting off at least one projecting end of spacing wire, and that each upper knife has a securing lug for fixing the associated mesh wires and can be pivoted into a working position and then each lower knife can be pivoted in such a manner that it is guided by at least one deflecting lug in order to cut off the projecting ends of the spacing wires.

20 A further feature resides in that a tilting device may be arranged downstream of the transverse conveying device arranged at the end of the production channel and serving to discharge the finished component from the production line, the said tilting device bringing the components conveyed out of the production line standing on edge into a horizontal position and depositing them on a component
25 stack.

Further features and advantages of the invention are explained in detail below using embodiments, with reference to the drawings.

30 Fig. 1 is a schematic top view of a plant according to the invention,

Fig. 2 is a schematic top view of a detail of a further embodiment of a plant according to the invention,

Fig. 3 is a schematic side view of a transport device for the wire mesh mats and the insulating bodies,

Figs. 4a and 4b show various types of transport disks,

Fig. 5a is a schematic side view of a wire mesh mat cutting device,

Fig. 5b is a further embodiment of a wire mesh mat cutting device,

Fig. 6 is a schematic horizontal section of a web wire feed device with a piercing device,

Fig. 7a is a schematic horizontal section of a detail of a trimming device,

Figs. 7b and 7c schematically illustrate instantaneous positions of the progress of the top and bottom blade of the trimming device, and

Fig. 8 is an axonometric view of a structural element produced with a plant according to the invention.

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The task of the plant according to the invention, illustrated in Fig.1, is to produce a structural element B, illustrated in Fig.8, comprising two parallel, flat wire mesh mats M, M', that are made up from intersecting longitudinal and transversal wires L, L' and Q, Q' respectively, welded together at the intersections, from straight web wires S, S' holding the two wire mesh mats M, M' at a predetermined distance from one another, said web wires welded at each end to a wire of the two wire mesh mats M, M', as well as from an at least partly inherently stable insulating body W, for example an insulating plate from plastic material arranged between the wire mesh mats M, M' at a predetermined distance from them.

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The plant illustrated in Fig.1 has a base 1, on which a horizontal production channel 2, indicated only schematically and determining the production line X-X, is provided, preferably centrally. At the entry of the production channel 2 there is a feed device 3 for the insulating material, to supply the insulating body W.

Viewed in the direction of production P1, on both sides of the production channel 2 there is a wire mesh track feed device 4, 4', a wire mesh mat cutting device 5, 5', a web wire feed device 6, 6', a web wire welding device 7, 7' and a trimming device 8, 8'. In addition, at the outlet of the production channel 2 a transverse transporting device 9 is provided for the structural element.

With the aid of a feed device, for example of a feed roller 10, 10' of the wire mesh track feed device 4, 4', that can be driven corresponding to the double arrow P2, P2', two upright standing wire mesh tracks G and G' are removed corresponding to the directions of arrows P3, P3', while the distances of the longitudinal wires L, L' and of the transversal wires Q, Q' of each wire mesh track G, G' to one another, i.e. the so called longitudinal wire pitches and the transversal wire pitches, as well as the width of each wire mesh track G, G' can be freely selected within a certain range. Each wire mesh track feed device 4, 4' has a straightening device 12, 12', that straightens the respective wire mesh track G, G' and comprises a plurality of straightening rollers 13, 13', provided in two rows offset relative to one another (Fig.2) and adjustable eccentric rollers 14 (Fig.2). The task of the feed rollers 10, 10' is to feed step-by-step the wire mesh tracks G, G' for further processing to the wire mesh mat cutting devices 5, 5' situated downstream, in the direction of arrows P3, P3' and after completing the production transport outward the remaining pieces of the wire mesh tracks G, G' no longer required against the direction of arrows P3, P3' from the straightening rollers 13, 13'. Each feed roller 10, 10' can be pivoted between a working position, in which they are engaged with the wire mesh track G, G' to be pushed in and an idle position, in which they are not engaged with the wire mesh track G, G'.

As it is described later in Figs.5a and 5b, the wire mesh mat cutting devices 5, 5' separate wire mesh mats M, M' with a specific length from the endless wire mesh tracks G, G'. The straightened wire mesh mats M, M' are introduced into the production channel 2 by slightly curved guiding devices 15, 15' (Fig.2) that comprise, for example, several interposed curved strips and are fixed on the base 1 by means of brackets and holders and deform the straightened wire mesh mats M, M' only elastically and terminate tangentially into opposite situated longitudinal

sides of the production channel 2, in such a manner that the wire mesh mats acquire therein a parallel position at a distance from one another, the distance corresponding to the desired thickness of the structural element B to be produced. In the production channel 2 both wire mesh mats M, M' are reliably
 5 guided over their entire width and held always accurately at this defined distance with the aid of spacer elements, that can be, for example, spacer plates and a plurality distance guides superposed in the vertical direction.

With the aid of a transport device 16 for the wire mesh mats, that has basically
 10 two pairs of feed elements 17, 17' and 18, 18' situated opposite one another on the two sides of the production channel 2, both wire mesh mats M, M' are transported step-by-step in the guiding devices 15, 15' and along the production channel 2 in the direction of production P1 to the processing stations 6, 6'; 7, 7'; 8, 8'; 9 situated downstream. The first pair of feed elements 16, 16' is provided in
 15 the parallel exit region of the guiding devices 15, 15'. The distance of the first pair 17, 17' of the feed element from the wire mesh mat cutting devices 5, 5' as well as the distance of the two pairs 17, 17' and 18, 18' of the feed device from one another has to be smaller than the wire mesh mat M, M' with the shortest length required for the production of the structural element B so that to ensure a reliable
 20 conveying of the wire mesh mats M, M' though the transport device 16 for the wire mesh mat. The feed device 3 for the insulating material, illustrated in Fig.2 on a larger scale, serves the purpose of feeding the insulating plates I, reciprocal joining of the insulating plates I to form an insulating material track K and separating the insulating body W from the insulating material track K. The feed
 25 device 3 for the insulating material has a push-in device 19, that in accordance with arrow P4 laterally feeds insulating plates I intended to form the insulating body W of the structural element B towards the production line X-X of the plant. The push-in device 19 essentially comprises two work cylinders 20, the piston rods of which are moved in accordance with the double arrow P5 and at their
 30 ends have a pressure plate 21. In the production line X-X a conveyor belt 22 is provided, that with the aid of a conveying drive 23 can be driven in the direction of production P1 and moves the insulating plate I in this direction along the production line X-X. The feed movement P4 of the insulating plate I is limited with the aid of a transversely displaceable stop frame 24 and the position of the

insulating plates I is accurately determined in the production line X-X. On the inlet side of the conveyor belt 22 a feed device 25, for example a work cylinder is provided. The piston rod of the work cylinder 25 can be moved in accordance with the double arrow P6 and on its end face has a pressure plate that suits the insulating plate I. The insulating plate I', situated on the conveyor belt 22, is additionally moved forward with the aid of the feed device 25 in accordance with arrow P1, so that to move the insulating plate I' relative to the insulating material track K already formed and thus to join the insulating plate I' in a form-locking and force-locking manner with the end of the insulating material track K and to produce an endless, continuous insulating material track K. Under form-locking joint a joint of the insulating plates I, I' is understood, which at the position of the joint of the two insulating plates I, I' does not have intermediate spaces or projections in the lateral direction. Under a form-locking joint a joint of the insulating plates I, I' is meant, whereby the position of the joint does not dissolve under tensile and pressure loads.

To join the insulating plates I' with the insulating material track K already formed, a joining device 26 is provided in the exit region of the conveyor belt 22. The joining device 26 can be displaced in the directions of the double arrow P7 transversely to the production line X-X and parallel to the production line X-X in accordance with the directions of the double arrow P8. According to this embodiment the insulating plates I, I' used in this case have flat end faces F on their narrow sides. To produce an endless insulating material track K, the insulating plate I' is joined with the insulating material track K, for example by heat welding, with the aid of joining device 26, constructed as a heating appliance. The heating appliance essentially comprises a heating plate and a heat transformer required for the heating of the heating plate. The endless insulating material track K is produced in the following manner: The insulating plate I', situated on the conveyor belt 22, is moved forward in the direction of arrow P6 with the aid of the feed device 25 until the insulating plate I' abuts against the heating plate abutting against the end face of the insulating material track K. Following this the heating plate is heated with the aid of the heat transformer, until the abutting end faces of the insulating material track K and of the insulating plate I' become soft. The heating plate is then quickly pulled out in

the direction of the double arrow P7 from the intermediate space between the insulating plate I' and the insulating material track K and the insulating plate I' is somewhat moved forward in the direction of production P6 with the aid of the feed device 25 to press the heated end faces against one another and thus weld the insulating plate I' to the insulating material track K and consequently join them in a form-locking and force-locking manner. Because during the joining operation the insulating material track K is transported by the conveyor belt 22 step-by-step in the direction of production P1 corresponding to the cycle of the entire production plant, during the heating up the joining device 26 is also moved with it step-by-step according to the direction of the double arrow P8 and after the withdrawal of the heating plate it is moved back to the initial position in the corresponding reverse direction of the double arrow P8.

According to a further embodiment, for the production of an endless insulating material track K the insulating plate I' is joined with the insulating material track K by adhesion with aid of a joining device 26 constructed as an adhesive appliance. The adhesive appliance has, for example, a spray nozzle together with a storage container, filled with a suitable adhesive. The adhesive has to be suitable to bond the material of the insulating plates I, I' and have a drying time harmonised with the production speed so that to ensure a reliable joining of the insulating plate I' with the insulating material track K. For the purpose of spraying the adhesive onto the end face F of the insulating plate I' the adhesive appliance can be displaced both in the horizontal and vertical directions. To accelerate the application of the adhesive, within the scope of the invention a plurality of adhesive appliances can be used simultaneously. Within the scope of the invention it is also feasible to spray simultaneously a plurality of insulating plates I'. In this embodiment the endless insulating material track K is produced in the following manner: Immediately prior to the supply of the insulating plate I to the production line X-X, adhesive is applied to one end face F of the insulating plate I. First the insulating plate I' is pushed laterally into the production line X-X in the direction of arrow P4 with the aid of the push-in device 19 and placed on the conveyor belt 22. Following this the insulating plate I' is moved somewhat forward in the direction of production P1 with the aid of the feed device 25 so that to press the end face, that has the adhesive, of the insulating plate I' against the end face of the

insulating material K and consequently join the insulating plate I' with the insulating material track K in a form-locking and force-locking manner.

5 Within the scope of the invention the insulating plates I, I' may have a groove on one end face F and a tongue on the opposite situated end face F', whereby the groove and tongue are so formed, that the tongue of one insulating plate I fits in a form-locking and force-locking manner into the groove of a following other insulating plate I'. By virtue of the relative movement in the direction of arrow P6
10 the tongue of the insulating plate I' engages the groove of the last element of the insulating material track K already formed. The configuration of the tongues and grooves are so harmonised, that a form-locking and force-locking clamped joint is produced, that ensures both the alignment of the insulating plates I, I' that are to be joined and their firm joining with one another. The joining device 26 is out of action in this embodiment.

15 Within the scope of the invention it is possible to provide the end face of the insulating plates I, I', having the tongue and groove, with an adhesive, to ensure a secure joint of the insulating plates. For the purpose of forming the insulating material track K, within the scope of the invention the adjacent end faces of the
20 insulating plates I, I' may have other form-locking and force-locking interacting clamping joint elements that have, for example, a dovetail-like construction.

It is understood, that the embodiments presented within the scope of the general concept of the invention can be modified, particularly with regard to the
25 configuration and execution of the devices to join the insulating plates I, I' to form the endless insulating material track K. When using the appropriate adhesive, the end face F of the insulating plate I, I' as well as the end face at the end of the insulating material track K can be provided with adhesive.

30 Furthermore, within the scope of the invention it is possible to provide one or both flat end faces F of the insulating plates I, I' that are to be joined with a self-adhesive film. The film can be applied to the insulating plates I, I' already during production and is appropriately protected by a removable film.

A transport device, for example a conveyor chain 27, that extends over the entire production line X-X, joins the conveyor belt 22 and can be driven in accordance with the direction of production P1, moves the insulating material track K and the insulating body W in the production line X-X corresponding to the cycle in the direction of the production P1.

The feed device 3 for the insulating material has a cutting device 28 for the insulating material track, that can be displaced transversely to the production line X-X in accordance with the double arrow P9 and parallel to the production line X-X in accordance with the double arrow P10. The cutting device 28 separates the insulating body W from the insulating material track K in a selectable length and has at least one separating disk 30 that can be driven by means of a cutting drive 29. To increase the cutting capacity, a further cutting drive 29' together with a separating disk 30 may be used. During cutting the cutting device 28 moves synchronously together with the feeding movement of the conveyor chain 27 in correspondence with the direction of production P1 and after the completed cutting returned to the initial position, while these movements are carried out in accordance with the double arrow P10. The movement towards the cutting position and the corresponding return movement from the cutting position are carried out in accordance with the double arrow P10.

Within the scope of the invention it is possible to use other cutting methods and devices for separating the insulating body W from the insulating material track K. These methods and devices have to be adapted to suit the properties of the insulating materials and ensure that the cut will result in an as smooth as possible edge and the properties of the material of the insulating body are not impaired, for example melted. As a cutting device for the insulating material track in particular a cutting wire, that can be moved transversely to the insulating material track K and heated with the aid of a heat transformer, can be used.

Because during the separation of the insulating material track K the cutting device 28 is also moved by the conveyor chain 22 step-by-step corresponding to the cycle of the entire production plant in accordance to the direction of production P1, the cutting device 28 is moved with it during the cutting also step-by-step in

accordance with the corresponding direction of the double arrow P10 and after completing the cutting returned in the corresponding opposite direction of the double arrow P10 to the initial position. The conveyor chain 27 moves the insulating body W, separated from the insulating material track K, in accordance with the direction of production P1 to the subsequent processing devices of the plant.

Because the conveyor chain 27 must not reach into the movement paths of the joining device 26 and of the cutting device 28, the insulating material track K is supported in this region by at least two support elements 31, that can be moved from the movement path of the joining device 26 and of the cutting device 28 with the aid of a work cylinder in accordance with the double arrow P11.

Within the scope of the invention it is also possible to provide additional clamping elements grasping the insulating material track K, said additional clamping elements additionally fixing the insulating plate I' during joining with the insulating material track K already formed.

On both sides of the production channel 2 a web wire feed device 6, 6' is provided downstream from the guiding devices 15, 15', with which several wires D, D' can be simultaneously unwound step-by-step from the wire supply reels 32, 32' from both sides of the production channel 2 in accordance with arrows P12, P12', straightened by means of a straightening device 33, introduced in the horizontal direction into the intermediate space between the two wire mesh mats M, M', pushed through the insulating body W like a nail and separated from the wire supply. The pushing through of the insulating body W is considerably facilitated by heating the tips of the web wires S, S', while the heating is carried out, for example, by a heating device operating with inductance.

Within the scope of the invention it is further possible to provide all feed devices 6, 6' for the web wires successively on one side of the production channel 2 in the direction of production P1.

Within the scope of the invention it is possible to feed web wires S, S', already cut to length, in vertical rows to the production channel 2 from the side at selectable angles relative to the wire mesh mats M, M'. The tips of the web wires can be pre-heated in this case also with the aid of appropriate heating equipment.

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The insulating body W is passed through by a plurality of rows of straight web wires S, S', each row comprising a plurality of wires arranged at a distance from one another in the vertical direction. The ends of the web wires S, S' lie on the corresponding longitudinal wires L, L' of the two wire mesh mats M, M' and with a projection E, E' slightly protrude laterally past the longitudinal wires L, L' to ensure a reliable welding with the corresponding longitudinal wires L, L' of the wire mesh mats M, M'. As the embodiment of the structural element B, illustrated in Fig.8, shows, each web wire S, S' is welded to the longitudinal wires L, L' while, as this is illustrated in Fig.7b, all web wires S1, S1' along a pair of longitudinal wires L1, L1' lie in a plane Z-Z of the web wires that is common with the pair of longitudinal wires L1, L1' and the direction of the web wires S1, S1' zig-zags in the plane Z-Z, resulting in a latticework-like arrangement of the web wires S1, S1'. The angle of the web wires S1, S1' relative to the longitudinal wires L1, L1', can be selected. In the case of an upright standing structural element B a plurality of web wire planes Z-Z extend horizontally, parallel to and at a distance parallel from one another, i.e. the web wires S, S' form a matrix-like structure in the insulating body W and consequently also in the structural element B to be produced, said structure imparting the necessary rigidity to the structural element B. The angle of insertion, at which the web wires S, S' are inserted into the intermediate space between the two wire mesh mats M, M', can be adjusted by pivoting the web wire feed device 6, 6' in accordance with the double arrow P13 (Fig.6), while the angles of the two web wires S and S' relative to the wire mesh mats M, M' have the same value but different algebraic signs to achieve the lattice-like bracing of the structural element B.

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The material and the construction of the insulating body W have to be such, that during the following further transport in the direction of production P1 the insulating body W fixes the web wires S in their position inside the insulating body W in an immovable manner. The number and the insertion angle of the web wires

S, S' in the plane Z-Z of the web wires as well as the vertical distances of the planes Z-Z of the web wires relative to one another is chosen in accordance with the static requirements placed on the structural element B.

- 5 In some applications it may be necessary to produce the insulating body W of the structural element B from such hard materials, which cannot be penetrated by the web wires S, S' without deforming them. In this conjunction in the form of examples hard plastic materials, like polyurethane, lightweight concrete with expanded or foamable polystyrene as light additive, gypsum cardboard plates or
10 cement-bonded hard plates, containing plastic waste, wood chip or wood shavings, mineral or vegetable, fibrous materials can be used. In these cases a pre-piercing device 34, 34' is arranged upstream to each web wire feed device 6, 6', the pre-piercing devices, as Fig.6 schematically shows, form the corresponding channels C, C' in the insulating body W to accommodate a web
15 wire S, S' each.

- With the aid of the second pair of feed element 18, 18' of the transport device 16 for the wire mesh mat, both wire mesh mats M, M' are moved forward step-by-step and synchronously with the insulating body W moved by the conveyor
20 chains 27, 27', complete with the web wires S, S', to the web wire welding devices 7, 7' provided downstream, in which each end of the web wires S, S' is welded to the longitudinal wires L, L' of the wire mesh mats M, M' with the aid of a pair of welding jaws pivotable in the plane Z-Z of the web wires. The welding jaws are constructed as a pair of interacting, two-armed, pivotable lower and upper
25 welding jaw levers, the ends of which, that are facing the wire mesh mats M, M' and pivot in the plane Z-Z of the web wires have at least one welding electrode to weld at least one web wire S, S' to a longitudinal wire L, L' of the wire mesh mat M, M'.

- 30 The web wire welding devices 7, 7' are offset relative to one another on the outside of the two wire mesh mats M, M' and can be displaced in the longitudinal direction and transversely to the production channel 2. Within the scope of the invention, when viewed in the feed direction P1 of the wire mesh mats M, M', two

or more web wire welding devices 7, 7' may be provided consecutively for each lateral side.

5 The structural element B, that is now inherently stable, is further conveyed step-by-step by a downstream provided structural element conveying device 35, that has basically a pair of conveying elements 36, 36' and 37, 37', positioned opposite one another on the two sides of the production channel 2.

10 When handling the structural element B the protrusions of the web wires S, S', projecting past the wire mesh mats M, M', represent a considerable risk for injuries, hinder the stacking of the structural elements to be transported and therefore have to be severed, so that the web wires S, S' would be terminate possibly flush with the longitudinal wires L, L'. With the aid of the first pair of conveying element 36, 36' the structural element B is conveyed to the trimming
15 devices 8, 8', provided offset on opposite sides of the production channel 2, that cut the web wire protrusions E, E', laterally projecting past the corresponding longitudinal wires L, L' of the wire mesh mats M, M' flush with the longitudinal wires L, L'. To increase the productivity of the plant, within the scope of the invention on each lateral surface of the structural element B to be trimmed a
20 plurality of additional trimming devices 8, 8' may be provided consecutively, when viewed in the direction of production P1.

The completed trimmed structural element B is moved out from the production channel 2 with the aid of the second pair 37, 37' of conveying element of the
25 structural element conveying device 35 and transferred to the transverse conveying device 9 for the structural element for the purpose of transporting and stacking a plurality of structural elements B.

30 The distance between the second pair 18, 18' of the feed device of the transport device 16 for the wire mesh mat and the first pair 36, 36' of the structural element conveying device 35 as well the distance between the pairs of the conveying elements 36, 36' and 37, 37' has to be always smaller than the shortest wire mesh mats M, M' used for the production of the structural element B, so that to ensure a reliable conveying of the wire mesh mats M, M' between the feed device

16 of the wire mesh mats and the structural element conveying device 35 as well as by them.

For the continuous production of the structural element B it is absolutely
5 necessary to feed both wire mesh tracks G and G', the wire mesh mats M, M' as well as the insulating material track K or the single insulating plates I reliably and without any disturbance to the individual processing stations 5, 5'; 6, 6'; 7, 7'; 8, 8'; 9. To ensure this, the wire mesh track feed rollers 10, 10', the feed element
10 pairs 17, 17'; 18, 18' of the wire mesh mat transport device 16, the feed element pairs 36, 36'; 37, 37' of the structural element conveying device 35 as well as the conveyor chains 27, 27' are driven by a central main feed drive 38, while all elements 17, 17'; 18, 18'; 36, 36'; 37, 37' and the feed rollers 10, 10' are connected with one another by articulated drive shafts 39, 39' (Fig.2). The feeding steps are carried out step-by-step, because the introduction of the web
15 wires S, S', the welding of the web wires S, S' with the wires of the wire mesh mats M, M' as well as the trimming of the protrusions E, E' of the web wires are carried out while the wire mesh mats M, M', the insulating body W and the structural element B are at standstill. In this conjunction the length of the feed steps can be chosen in accordance with the pitch of the transverse wires or a
20 multiple of the transverse pitch by an integral number.

By widening the production channel 2 and the guiding devices 15, 15', as well as by lateral displacing, individually or all of the feed elements 17, 17'; 18, 18', the conveying elements 36, 36'; 37, 37' as well as the elements 6, 6'; 7, 7'; 8, 8' of the
25 processing stations transversely to the production line X-X, structural elements B with various, pre-determined widths can be produced.

The completed structural element B is laterally conveyed from the production line X-X with the aid of the structural element transverse conveying device 9. The
30 structural element B is fed first along the production line X-X by a transporter 40, having an appropriate gripping device, to a transverse conveyor 41. The transporter 40 may be, for example, a work cylinder, the piston rod of which can be moved in accordance with the double arrow P14. The transverse conveyor 41 comprises, for example, two work cylinders, the piston rods of which can be

moved in accordance with the double arrow P16 and have a pusher plate 42 each. The transverse conveyor 41 moves the completed structural elements B from the production line X-X in accordance with arrow P15 to a tilting device 43 (only schematically shown), that has a plurality of transoms 44 that can pivot in accordance with the double arrow P17. The structural elements B, produced in the upright position in the production plant, are brought to a horizontal position with the aid of the tilting device 43 and placed on a stack T of structural elements.

The plant illustrated in Fig.2 comprises, when viewed in the direction of production P1, an insulating material feed device 3, a wire mesh track feed device 4 and a wire mesh mat feed device 45.

The wire mesh mat M is constructed in accordance with the embodiment of Fig.1. The feeding of the already pre-fabricated wire mesh mats M' is carried out with the aid of the wire mesh mat feed device 45 in the following manner: With the aid of a transporter 47, that can be pivoted in accordance with double arrow P18, wire mesh mats M' are consecutively removed from a stack 46 of mats and placed in a receiving rail 48. The wire mesh mats M' are fed consecutively, in accordance with arrow P19, with the aid of a push-in device 49 via a dressing device 50 to a feed device 51, a feed roller for example, that is driven in accordance with the double arrow P20. The push-in device 49 may comprise, for example, a work cylinder, the piston rod of which can be moved in accordance with the double arrow P21 and has a gripping device 52 to grasp the wire mesh mat M'. The dressing device 50 for the wire mesh mats has an inlet guide 53 for the wire mesh mat M', a plurality of dressing rollers 54 positioned in two rows offset relative to one another, and eccentric rollers 55. The feed roller 51 moves the wire mesh mats M' consecutively step-by-step to the production line X-X, where they are fed along the production line X-X to the processing devices 6, 6'; 7, 7' and 8, 8', provided downstream, at a distance and parallel to the insulating material track K and together with it with the aid of feed element pairs 17, 17'; 18, 18' in accordance with the direction of production P1.

Within the scope of the invention it is possible to provide a second stack of mats with pre-fabricated wire mesh mats M instead of the wire mesh track G and to feed the mats using a wire mesh track feed device 4.

- 5 The feed device for the wire mesh mats M, M' and the insulating body W, schematically illustrated in Fig.3, has a conveyor chain 27 that is driven by the main feed drive 38 in accordance with arrow P22, the conveyor chain defining the transport path of the insulating body W within the production channel 2. The conveyor chain 27 carries a plurality of carriers 56, each of them provided with a carrier dog 57. The carrier dogs 57 have an angular, hooked or spike-like construction to produce a reliable connection with the underside of the insulating body W and consequently to avoid any slip between the insulating body and the carriers 56 during the feeding of the insulating body W.
- 10
- 15 For a reliable conveying of the insulating body W the feed device has a further upper conveyor chain 27' with corresponding carriers 56' and carrier dogs 57', that engage the upper side of the insulating body W.

The feed elements 17, 18 of the transport device 16 for the wire mesh mats, only schematically illustrated in Fig.3, have a shaft 58 inclined relative to the vertical, that is driven by an angular drive 60 via a clutch 59 and is mounted in a bearing 61 opposite. The angular drive 60 is driven by the main feed drive 38 via the drive shaft 39. Each shaft 58 is provided with a plurality of transport disks 62, which can be adjusted relative to one another and can be rotated on the shaft 58 for the purpose of adjustment and after adjustment can be firmly fixed on the shaft 58 by means of a clamping element 63.

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As it is illustrated in Fig.4, the transport disks 62 have a plurality of recesses 64 evenly distributed on their circumference to engage the mesh with a selectable depth, so that flattened teeth 65 will result. The number of the recesses 64 to engage the mesh is so chosen according to the pitch of the transversal wires of the wire mesh mats M, M', that the transversal wires Q, Q' of the wire mesh mats M, M' will be reliably grasped by the transport disks 62 and a slip-free feed of the wire mesh mats M, M' will be ensured. By virtue of the inclined positioning of the

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shafts 58 the transport disks 62 of each feed element 17, 17'; 18, 18' engage not only one, but several transversal wires Q, Q' of the wire mesh mats M, M', so that the traction force will be distributed to several wires and as a result of this the wires will not be too strongly stressed during the feeding of the wire mesh mats M, M'. In addition, the inclined positioning of the shafts 58 ensures a continuous and slip-free transportation of the wire mesh mats M, M' of consecutive structural elements B, while the consecutive wire mesh mats can be at a distance in the region of abutment, these distances occurring, for example, when pieces are cut out from the wire mesh tracks G, G'.

The conveying elements 36, 36'; 37, 37' of the structural element conveying device 35 are similarly constructed as the feed elements 17, 17'; 18, 18' of the transport device 16 for the wire mesh mats. Only the transport disks 66, illustrated in Fig.4b, have recesses 64 to engage the mesh with smaller depth.

The feed rollers 10, 10' for the wire mesh tracks G, G' have essentially the same elements as the feed elements 17, 18 of the transport device 16 for the wire mesh mats, illustrated in Fig.3. The only difference is that, as is illustrated in Fig.4b, the recesses 64 of the transport disks 66 to engage the mesh are considerably deeper, so that they have pointed teeth 67. By shaping the teeth 67 in this manner, it will be ensured that the teeth 67, laterally engaging the non-guided wire mesh track G, G', will reliably grasp the transversal wires Q, Q' of the wire mesh tracks G, G' and forward the wire mesh tracks G, G' slip-free.

With the plant according to the invention it is possible to produce construction elements B, in which case the wire mesh mats M, M' have different constructions, i.e. various pitches of the longitudinal wires and/or pitches of the transversal wires as well as different diameters of the longitudinal and/or transversal wires.

However, the various pitches of the transversal wires have to be integral multiples and can be, for example, 50, 100 or 150 mm. A further restriction is that the positioning of the web wires S, S' has to be such, that despite these different pitches and diameters of the wires they can be securely welded to the longitudinal wires of both wire mesh mats M, M'.

With the plant according to the invention it is possible to produce structural elements B, in which case one and/or both wire mesh mats M, M' protrude past the insulating body W on one or both sides extending parallel to the direction of production P1. To achieve this, either the carrier dogs 57 are raised or extended, 5 or the conveying path of the conveyor chain 27 is so raised, that the bottom lateral side of the insulating body W, extending parallel to the direction of production P1, is correspondingly raised, due to which one and/or both wire mesh mats M, M' form the desired protrusion on this side. The conveyor path of the conveyor chain 27', arranged on the top side of the insulating body W, has to be 10 correspondingly lowered or the carrier dog 57' correspondingly lowered or extended.

For the production of structural elements B, in which case the insulating body W protrudes past both wire mesh mats M, M' on one or both sides extending parallel 15 to the direction of production P1, the conveyor path of the bottom conveyor chain 27 is so lowered or possibly the conveyor path of the top conveyor chain 27 is so raised, that the bottom, or possibly the top lateral surface of the insulating body W, extending parallel to the direction of production P1, is correspondingly lowered or raised, resulting in the desired protrusion of the insulating body W past both 20 wire mesh mats M, M' on one or both sides. The continuous production of the structural elements B with the aid of the plant according to the invention is so carried out, that the wire mesh mats M, M' of consecutive structural elements B are separated only by a negligibly narrow separating gap between the longitudinal wires of consecutive wire mesh mats M, M' and the corresponding 25 associated insulating bodies W of consecutive structural elements B also follow one another without significant gaps.

However, within the scope of the invention structural elements B can also be produced, in which case one and/or both wire mesh mats M, M' protrude past the 30 insulating body W on one or both sides extending perpendicularly to the direction of production P1. Should one or both wire mesh mats M, M' protrude past both sides of the insulating body W, the insulating bodies W of adjacent structural elements B are fed by the conveyor belt 22 to the production channel 2 with correspondingly chosen distances and forwarded there keeping these distances.

When an endless insulating material track K is used, during the separation of the insulating body W a piece, corresponding to this distance, has to be separated from the insulating material track K. At the same time both separating gaps between the wire mesh mats M, M' of consecutive structural elements B are
5 positioned either exactly opposite one another or are laterally offset relative to one another.

For the production of structural elements B, in which case the insulating bodies W protrude past the wire mesh mats M, M' on one or both sides, extending
10 perpendicularly to the direction of production P1, the wire mesh mats M, M' are forwarded in the production channel with a pre-determined distance. To produce such a selectable distance between the wire mesh mats M, M' of consecutive structural elements B, during the production of the wire mesh mats M, M' a piece, corresponding to this distance, is cut out from the endless wire mesh tracks G, G'
15 by the wire mesh mat cutting devices 5, 5'. The size of the distance is limited by the fact, that it has to be ensured that the gaps between the wire mesh mats M, M' of consecutive structural elements B can be bridged over by the inclined standing shafts 58 of the transport device 16 for the wire mesh mats and of the structural element conveying device 35 to ensure a slip-free feed of the wire
20 mesh mats M, M' of consecutive structural elements B. Fig.5a schematically shows a wire mesh mat cutting device 5, 5', that carries out a separating operation and thus separates the wire mesh mats M, M' in succession continuously from the wire mesh track G. The wire mesh mat cutting device 5, illustrated in Fig.5a, has a cutting beam 68, moving in the case of the upright
25 standing wire mesh track G in the vertical direction parallel to the wire mesh track G and provided on one side of the wire mesh track G. On the other side of the wire mesh track G a blade beam 69 is provided, that also moves vertically, parallel to the wire mesh track G. The cutting beam 68 can be moved in the directions of the double arrow P23 and the blade beam 69 in the directions of the
30 double arrow P24 towards the wire mesh track G and away from it. For the cutting of the wire mesh track G the cutting beam 68 has a counter blade 70. The blade beam 69 carries a cutting blade 71, that during the separating operation interacts with the opposite situated counter blade 70. In Fig.5a the counter blade 70 is shown already in its cutting position, whereas the cutting blade 71 is shown

while moving towards the wire mesh track G. The cutting beam 68 and the blade beam 69 can be positioned towards and away from the feed direction P3 of the wire mesh track feed device. Within the scope of the invention it is possible to use a plurality of counter blades and cutting blades instead of one counter blade and one cutting blade to cut either individually each longitudinal wire L of the wire mesh track or groups of them.

Fig.5b shows a further embodiment of a wire mesh mat cutting device 5, 5', that makes it possible to cut out a selectable piece from the wire mesh track G in one cutting operation, the length of which piece, viewed in the feed direction P3, preferably corresponds to the distance of adjacent transversal wires, the so called transversal wire pitch, or an integral multiple of the transversal wire pitch, while simultaneously a trimming of the ends of the longitudinal wires is carried out. The wire mesh mat cutting device illustrated has a cutting beam 72, that in the case of the upright standing wire mesh track G moves in the vertical direction parallel to the wire mesh track G and is provided on one side of the wire mesh track G. On the other side of the wire mesh track G a blade beam 73 is provided, that also moves vertically, parallel to the wire mesh track G. The cutting beam 72 can be moved in the directions of the double arrow P23 and the blade beam 73 in the directions of the double arrow P24 towards or away from the wire mesh track G. For the cutting out of a piece from the wire mesh track G the cutting beam 72 has two counter blades 74, that can be positioned to suit the position of the transversal wires Q of the wire mesh track G, while in addition the reciprocal distance of the two counter blades 74 can be adjusted to suit the length of the piece to be cut out. The blade beam 73 carries two cutting blades 75, that can be adjusted to suit the position of the transversal wires Q of the wire mesh track G, the distance of which from one another can be adjusted to suit the length of the piece to be cut out and during the cutting out of a piece interact with the opposite situated counter blade 70. In Fig.5b the counter blades 74 are shown already in their cutting position, while the cutting blades 71 are still moving towards the wire mesh track G. The cutting beam 72 and the blade beam 73 can be positioned towards and against the direction P3 of the wire mesh track feed. Within the scope of the invention it is possible to use also in this embodiment a plurality of counter blades and cutting blades instead of one counter blade and one cutting

blade to cut either pieces individually for each longitudinal wire L of the wire mesh track or groups of them.

5 The web wire feed device 6, schematically illustrated in Fig.6, has a base plate 76, that carries a non-return lock 77, a guide rail 78 extending in the direction towards the structural element B and a cutting device 79. On the guide rail 78 there is a slide 80, that can be displaced in accordance with the double arrow P25 by a drive (not illustrated), e.g. a work cylinder, crank mechanism, motor drive or the like. For the feeding of a wire D, forming the web wire S, a vertical 10 drawing beam 81 with a feed clamp 82, acting as a wire feed device, as well as with a laterally protruding adjusting rail 83, is provided.

The feed clamp 82 has two wedge-shaped drawing jaws 84, firmly joined with the drawing beam 81, two displaceable wedge-shaped clamping jaws 85 interacting 15 with the drawing jaws 84, as well as a spring 86 that presses the clamping jaws 85 against the drawing jaws 84. The non-return lock 77, provided on the base plate 76, has a similar construction to the feed clamp 82, and has two wedge-shaped locking jaws 87 that are firmly joined with the base plate 76, two 20 displaceable wedge-shaped clamping jaws 88 that interact with the locking jaws 87, as well as a spring 89 that presses the clamping jaws 88 against the locking jaws 87. On the protruding end of the adjusting rail 83 a vertical pre-piercing beam 90 is provided, that can be displaced in accordance with the double arrow P26 with the aid of driving means (not illustrated) e.g. a work cylinder, adjusting spindle or the like, and can be fixed on the adjusting rail 83. At least one pre- 25 piercing needle 91 is provided on the pre-piercing beam 90 in such a manner, that it extends perpendicularly towards the adjusting rail 83 with its free, protruding end perpendicularly to the pre-piercing beam 90 in the direction towards the structural element B. The cross-section of the pre-piercing needle 91 is preferably round, while the diameter of the pre-piercing needle 91 is at least 30 equal to the diameter of the web wire S that is to be passed through the insulating body, but preferably greater than the diameter of the web wire S. At its free end the pre-piercing needle 91 has a wear-resistant, preferably hardened, tip 92.

The described web wire feed device 6 operates in the following manner: The pre-piercing needle 91 is displaced towards the structural element B by the feeding movement of the slide 80 in that direction of the double arrow P25 which points toward the structural element B. At the same time the tip 92 penetrates the
5 insulating body W and forms during the feed movement a mounting channel C in the insulating body W. The feed movement of the slide 80 is terminated when the tip 92 completely penetrates the insulating body W and exits on the opposite situated side of the insulating body W. To facilitate the penetration of the
10 insulating body W, the pre-piercing needle 92 or only its tip 92, may be pre-heated by, for example, an induction coil or with a heat cartridge similarly to a soldering iron.

Simultaneously with the feed movement of the pre-piercing needle 91 in that direction of the double arrow P25 which points toward the structural element B,
15 by virtue of the feed movement of the slide 80, the wire D is uncoiled with the aid of the feed clamp 82 off a supply reel 32 (not illustrated) via a straightening device 33 having a vertical 93 and a horizontal 93' straightening device and is pushed forward in accordance with arrow P12 along an insertion line defined by the drawing jaws 84 and their feed movement. By virtue of the feed movement of
20 the slide 80 and consequently of the feed clamp 82 towards the structural element B, the clamping jaws 85 are pressed against the web wire S due to the wedge-shaped construction of the drawing jaws 84 housing them, in addition to the effect of the spring 86, and move the web wire forward. For the purpose of increasing the frictional contact with the web wire S, the clamping jaws 85 have
25 additionally teeth on that side which faces the web wire S.

At the same time during its advancement the web wire S pushes the clamping jaws 88 of the non-return lock 77 against the spring 89 of the non-return lock 77 and towards the wider end of the wedge-shaped opening of the locking jaws 87,
30 so that the locking jaws 87 practically do not provide any resistance to the feed movement of the web wire S. Through a cutting nozzle 94, that is aligned with the insertion line, of the cutting device 79, the web wire S is passed through a mounting channel C formed in the insulating body W during the previous operation with the aid of the pre-piercing needle 91. The feed movement of the

web wire S is continued until the front end of the web wire S just protrudes past the plane of the wire mesh mat M and consequently in the next operation can be welded to the corresponding wires L and Q of the wire mesh mat M.

- 5 The length of the feed path of the pre-piercing needle 91 and of the web wire S are exactly the same. After completing the feed movement the web wire S is separated from the wire D with the aid of a cutting blade 95 of the cutting device 79. The slide 80 returns to its initial position, while the pre-piercing needle 91 is pulled out from the mounting channel C and the clamping jaws 85 of the feed
- 10 clamp 82 release the wire D, while at this stage the clamping jaws 88 of the non-return lock 77 hold the wire D firmly in its position and prevent its rearward movement in the direction of the supply reel 32.

- 15 Within the scope of the invention it is also possible to take a web wire S, already cut to length and straightened, from a storage hopper and introduce it with the aid of the web wire feed device 6 along the insertion line into the pre-formed mounting channel C. In this case the straightening device 33, the non-return lock 77 and the cutting device 79 remain out of action.

- 20 The base plate 76 is mounted in the pivoting point 96 pivotably corresponding to the double arrow P13, so that any angle can be set between the web wires S and the pre-piercing needle 91 on the one hand and the longitudinal wires L, L' of the wire mesh mats M, M' on the other.

- 25 During the production of the structural elements B the web wires S, S' are fed in most cases from both opposite situated sides of the structural element B, so that a web wire feed device 6, 6' is provided on each side of the structural element B to be produced. For the sake of clarity only a second pre-piercing needle 97 and a further web wire S' are illustrated in Fig.6. The pre-piercing needle 97 moves in
- 30 accordance with the double arrow P27, while the web wire S' is moved in accordance with the double arrow P12'. The movement of the pre-piercing needle 97 towards the structural element B and the passing of the web wire S' through the insulating body W is carried out simultaneously and jointly.

The pre-piercing needle 97 and the web wire S' are illustrated in a momentary position of its feed movement, shortly prior to their final positions. The pre-piercing needle 97 forms mounting channels C' for the web wires S' on this side of the insulating body W.

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For the simultaneous insertion of a plurality of web wires S per work cycle, on the advancing beams 81 a plurality of feed clamps 82 are provided superposed at selectable distances in the planes Z-Z of the web wires, and in the corresponding positions a plurality of associated non-return locks 77 and cutting devices 79 are stationarily provided superposed on the base plate 76. For the forming of the corresponding mounting channels C on the pre-piercing beam 90 a plurality of pre-piercing needles 91 are provided superposed in the corresponding planes Z-Z of the web wires. Each pre-piercing needle 91 is situated in the horizontal plane Z-Z of the web wires together with the insertion line of the associated feed clamp 82, the associated cutting nozzle 94 and the associated non-return lock 77 (Fig.7b). When inserting the pre-cut web wires into the mounting channel C, each pre-piercing needle 91 is also in the corresponding horizontal plane Z-Z of the web wires together with the associated inserting device. For the purpose of adapting them to suit various insulating body W thicknesses, all pre-piercing needles 91 are displaced in the longitudinal direction by means of a drive device (not illustrated), e.g. an adjusting spindle, drive chain or the like and fixed in their working position in the pre-piercing beam 90 by means of a clamping device, for example with the aid of a clamping screw.

25 For the simultaneous insertion of a plurality of web wires S' per work cycle corresponding devices are provided on the other side of the production channel 2 superposed in the planes Z-Z of the web wires.

30 The tools for the forming of the mounting channels for the web wires S, S' may be constructed as solid piercing or hollow needles or also as rotating drills and have a wear-resistant, for example hardened, tip. The tips of the piercing or hollow needles can be preferably pre-heated, so that to facilitate a piercing through the insulating body W.

Within the scope of the invention it is possible to construct the pre-piercing needle as a hollow needle and fasten it on the feed clamp 82 coaxially with the web wire S, S' on the insertion line of the web wire S, S'. The inside diameter of the hollow needle is just as large that the web wire S, S' can be pushed through it. By virtue
5 of this arrangement the hollow needle and the web wire S, S' are moved forward simultaneously and coaxially by the feed clamp 82, while the hollow needle forms the mounting channel C simultaneously with the feed of the web wire S, S'. In this embodiment the hollow needle has to be first withdrawn with the aid of the feed clamp 82 to its initial position, before the web wire S, S', introduced into the
10 insulating body W, can be separated from the wire supply D with the aid of the cutting device 70.

The trimming device 8, only schematically shown in Fig.7a, has cutting beams 98 that can pivot in accordance with the double arrow P28, the cutting beam running
15 parallel to the wire mesh mats M, M' of the structural element B and carrying a plurality of top blades 99, provided in the region of each plane Z-Z of the web wires. In the embodiments illustrated the wire mesh mats M, M' of the structural element B are arranged standing upright, so that in Fig.7a the plane Z-Z of the web wire coincides with the plane of the drawing and the cutting beam 98
20 extends vertically. In addition, the trimming device 8 has a blade beam 100, that can pivot in accordance with the double arrow P29, the blade beam extending parallel to the wire mesh mats M, M' of the structural element B and carrying a plurality of bottom blades 101 in the region of each plane Z-Z of the web wires.

25 As Figs.7a, 7b and 7c show, each top blade 99 has two clearances 102 for each of the transversal wires Q of the wire mesh mat M, so that it will be possible to pivot the top blade 99 into its working position between the longitudinal wires L of the wire mesh mat M without being hindered by the transversal wires. The dimensions and distances of the clearances 102 are chosen according to the
30 pitch of the transversal wires of the wire mesh mats M. In addition, each top blade 99 has two catch lugs 103, that on their underside have a triangular guiding and centring recess 104 for the longitudinal wires L.

Each bottom blade 101 has two repelling lugs 105, which, when the bottom blade 101 pivots into the cutting position, prevent the bottom blade 101 being pushed under the longitudinal wires L of the wire mesh mats M and fouling them.

5 Between the two repelling lugs 105 there is the cutting edge 106 to separate the protrusion E of the web wire. The top blade 99 and the bottom blade 101 are made from hardened material, while in addition the flanks of the cutting edge 106 are ground.

10 The trimming device 8 operates in the following manner: According to Fig.7b the top blade 99 and the bottom blade 101 are in their respective initial positions outside of the structural element B. With the aid of correspondingly driven pivoting devices, the cutting beam 98, and consequently all top blades 99, are pivoted out from their initial positions shown in Fig.7b, together in accordance with the double arrow P28 towards the structural element B and into a position
15 illustrated in Fig.7c. In this position the catch lugs 103 grasp between the mesh wires L1; Q of the wire mesh mat M in such a manner, that the longitudinal wire L1, to which the web wire S1 to be trimmed is welded, will be firmly positioned in the guiding and centring recesses 104 of the catch lugs 103 of the top blade 99. The guiding and centring recesses 104 are so constructed, that during the
20 pivoting of the top blade 99 the longitudinal wire L1 will be securely held and guided as well as the top blade 99 forms a support for the longitudinal wire L1 by securely holding it. The inward pivoting of the top blade 99 is not hindered by the transversal wires Q, because they have sufficient gap in the clearances 102 of the top blade 99 (Fig.7). For the time being the bottom blade 101 remains in its
25 initial position.

In a subsequent step of the operation the cutting beams 100 and consequently all bottom blades 101 pivot from their initial positions, shown in Fig.7b, together with the aid of correspondingly driven pivoting devices towards the structural element
30 B in accordance with the double arrow P29 to a cutting position illustrated in Fig.7c, guided by the repelling lugs 105. On this occasion the cutting edge 106 comes into contact with the protrusion E of the web wire to be separated.

However, the cutting position shown in Fig.7c does not signify any disruption of the movement P29 of the blade beam 100; it is only a momentary representation of the process. The bottom blade 101 keeps moving in accordance with the double arrow P29 towards the structural element B and by doing so separates the protrusion E of the web wire. After the separation of the protrusion E of the web wire the cutting beam 98 pivots with all top blades 99 and the blade beam 100 with all bottom blades 101 back to their initial positions. The structural element B, trimmed by now, is moved forward horizontally in the direction of production P1, so that further vertical rows of untrimmed web wires are brought into the operating range of the trimming device 8.

The trimming device 8' is constructed analogously with the trimming device 8 and separates the protrusions E' of the other web wires synchronously with the trimming device 8.

The structural element B, illustrated axonometrically in Fig.8, comprises an outer and an inner wire mesh mat M and M', respectively, provided parallel at a predetermined distance from one another. Each wire mesh mat M and M' comprises a plurality of longitudinal wires L and L' and a plurality of transversal wires Q and Q', that intersect and are welded to one another at the intersections. The distance of the longitudinal wires L, L' from one another and of the transversal wires Q, Q' from one another is chosen in accordance with the static requirements placed on the structural element B. The distances chosen are preferably the same, for example in the range of 50 to 150 mm, so that the adjacent longitudinal and transversal wires form square meshes. Within the scope of the invention the meshes of the wire mesh mats M, M may also be rectangular and have, for example, short lateral sides of 50 mm and long lateral sides in the range of 75 to 100 mm.

The diameter of the longitudinal and transversal wires L, L' and Q, Q', respectively, can also be chosen to suit the static requirements and are preferably within the range of 2 to 6 mm. Within the scope of the invention the surface of the wires L, L'; Q, Q' of the wire mesh mats M, M' may be smooth or serrated.

Both wire mesh mats M, M' are joined with one another by a plurality of web wires S, S' to form an inherently stable mesh body A. At their ends the web wires S, S' are welded to the wires of both wire mesh mats M, M', while within the scope of the invention the web wires S, S' are welded to the respective longitudinal wires L, L' or to the transversal wires Q, Q', as illustrated in Fig.8. The web wires S, S' are arranged obliquely in alternate opposing directions, i.e. lattice-like, thus reinforcing the mesh body A against shearing stress.

10 The distances of the web wires S, S' to one another and their distribution in the structural element B depend from the static requirements placed on the structural element and can be, for example, 200 mm along the longitudinal wires and 100 mm along the transversal wires. Appropriately, the distance of the web wires S, S' from one another in the direction of the longitudinal wires L, L' and the transversal wires Q, Q' are a multiple of the pitch of the mesh. The diameter of the longitudinal wires L, L' and of the transversal wires Q, Q' is preferably in the range of 3 to 7 mm, while in the case of structural elements with thin longitudinal and transversal wires the diameter of the web wires S, S' is preferably chosen to be greater than the diameter of the longitudinal and transversal wires.

20 The spatial mesh body A, formed from the two wire mesh mats M, M' and the web wires S, S', does not only have to be inherently stable, but in its preferred application as a wall and/or roof element it also has to satisfy the function of a spatial reinforcing element, i.e. absorb shearing and compressive forces. For this reason, as it is customary for reinforcing mats, both the longitudinal and transversal wires are welded to one another, and the web wires S, S' are welded to the wires L, L'; Q, Q' of the wire mesh mats M, M' while adhering to a minimum strength of the welding joints. To enable to satisfy the function of a spatial reinforcing element, the wires L, L'; Q, Q' of the wire mesh mats M, M' and the web wires S, S' have to be made from suitable materials and have the appropriate mechanical strengths, so that they could be used as reinforcing wires for the wire mesh mats M, M' to be used as reinforcing mesh mats or as reinforcing wires joining the two wire mesh mats M, M'.

An insulating body W is provided in the intermediate space between the wire mesh mats M, M' at a predetermined distance from the wire mesh mats, the cover surfaces of the insulating body extending parallel to the wire mesh mats S, S'.

5 The insulating body W serves the purpose of heat insulation and sound proofing and is made, for example, from synthetic foam materials like polystyrene or polyurethane foam, foam materials based on rubber and India rubber, lightweight concrete, like autoclaved concrete or aerated concrete, porous synthetic materials, porous materials based on rubber or India rubber, compressed slag, gypsum cardboard plates, cement-bound compressed plates made from wood
10 shavings, jute, hemp and sisal fibres, rice husk and straw waste, mineral and glass wool, corrugated cardboard, compressed waste paper, bonded brick splinters and molten reusable plastic waste. Within the scope of the invention the insulating body W can be also made from bio-synthetic materials, like alga foam, produced from foamed alga or alga cellulose.

15

The insulating body W may be provided with pre-drilled holes to accommodate the web wires S, S'. The insulating body W may also be provided on one or both sides with a plastic or aluminium coating, serving as a vapour barrier. The position of the insulating body W in the structural element B is determined by the
20 obliquely positioned web wires S, S' penetrating through the insulating body W.

The thickness of the insulating body W is freely selectable and is, for example, in the range of 20 to 200 mm. The distances of the insulating body W to the wire mesh mats M, M' are also freely selectable and are, for example, in the range of
25 10 to 30 mm. The construction element B can be produced in any length and width, while due to the manufacturing method a minimum length of 100 cm and standard widths of 60 cm, 100 cm, 110 cm and 120 cm have proved themselves as advantageous.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. Installation for the continuous production of components consisting of two parallel, flat wire mesh mates of intersecting longitudinal wires and transverse wires welded together at the points of intersection, straight spacing wires keeping the wire mesh mats at a predetermined distance from one another and an insulating body arranged between the wire mesh mats and traversed by the spacing wires, comprising at least one curved guiding device for one wire mesh web arranged on one side of a production channel situated on the production line and leading tangentially to the production channel, comprising a drivable feeding device for gradually drawing the endless wire mesh web standing on edge off a supply reel and for introducing the wire mesh web into the respective guiding device, a supply device for supplying the wire mesh web, an aligning device for aligning the wire mesh web and a cutting device for cutting the wire mesh mat of predetermined length off the endless wire mesh web being provided upstream of each guiding device, comprising a plurality of supply devices for equipping the insulating body with spacing wires arranged at least on one side of the production channel and pivotable about a vertical axis in order to vary the angle of insertion of the spacing wires, comprising a plurality of downstream welding devices for simultaneously welding both ends of all of the spacing wires to corresponding longitudinal wires of the wire mesh mats, comprising trimming devices for cutting off the projecting ends of the spacing wires arranged downstream of the welding devices and comprising a transverse conveying device for conveying the finished components out of the production channel, characterised in that the cutting device for the wire mesh webs for cutting a section of the required length out of the wire mesh web has at least two stationary knives arranged at the required distance from one another on a cutting bar which can reciprocate relative to the wire mesh web and at least two cutting knives arranged at the required distance from one another on a knife bar which can reciprocate relative to the wire mesh web and cooperating with the stationary knives, wherein the stationary knives and the cutting knives can be positioned in the direction of the longitudinal wires in order to trim the ends of the longitudinal wires.

2. Installation according to claim 1, characterised in that each trimming device is provided in a manner known per se with a plurality of pivotable upper knives and a plurality of pivotable lower knives cooperating therewith for
5 simultaneously cutting off at least one projecting end of spacing wire, and that each upper knife has a securing lug for fixing the associated mesh wires and can be pivoted into a working position and then each lower knife can be pivoted in such a manner that it is guided by at least one deflecting lug in order to cut off the projecting ends of the spacing wires.
10
3. Installation according to claim 1 or 2, characterised in that a tilting device is arranged downstream of the transverse conveying device arranged at the end of the production channel and serving to discharge the finished component from the production line, the said tilting device bringing the components
15 conveyed out of the production line standing on edge into a horizontal position and depositing them on a component stack.
4. An installation for the continuous production of components substantially as hereinbefore described with reference to the accompanying drawings.
20

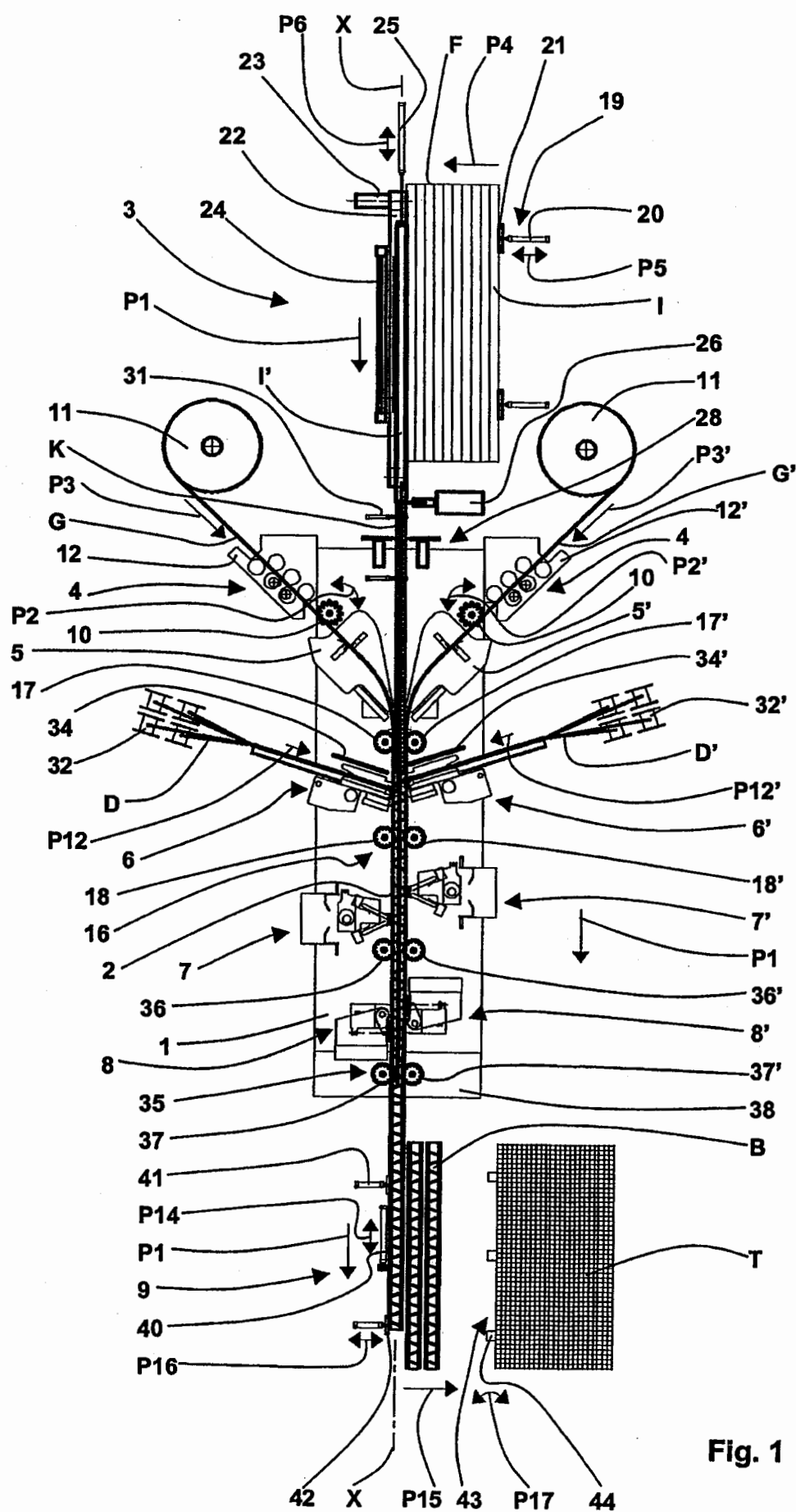


Fig. 1

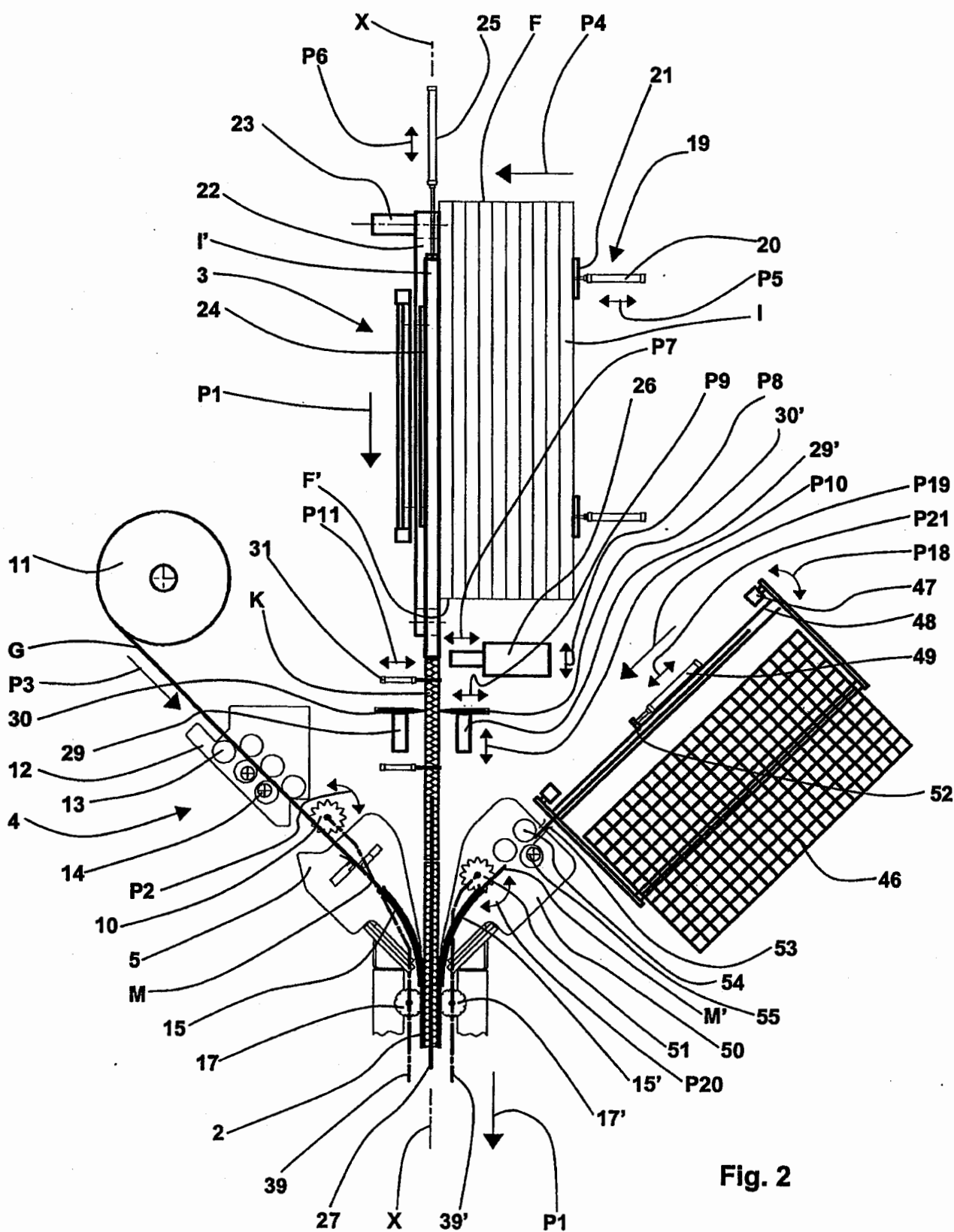


Fig. 2

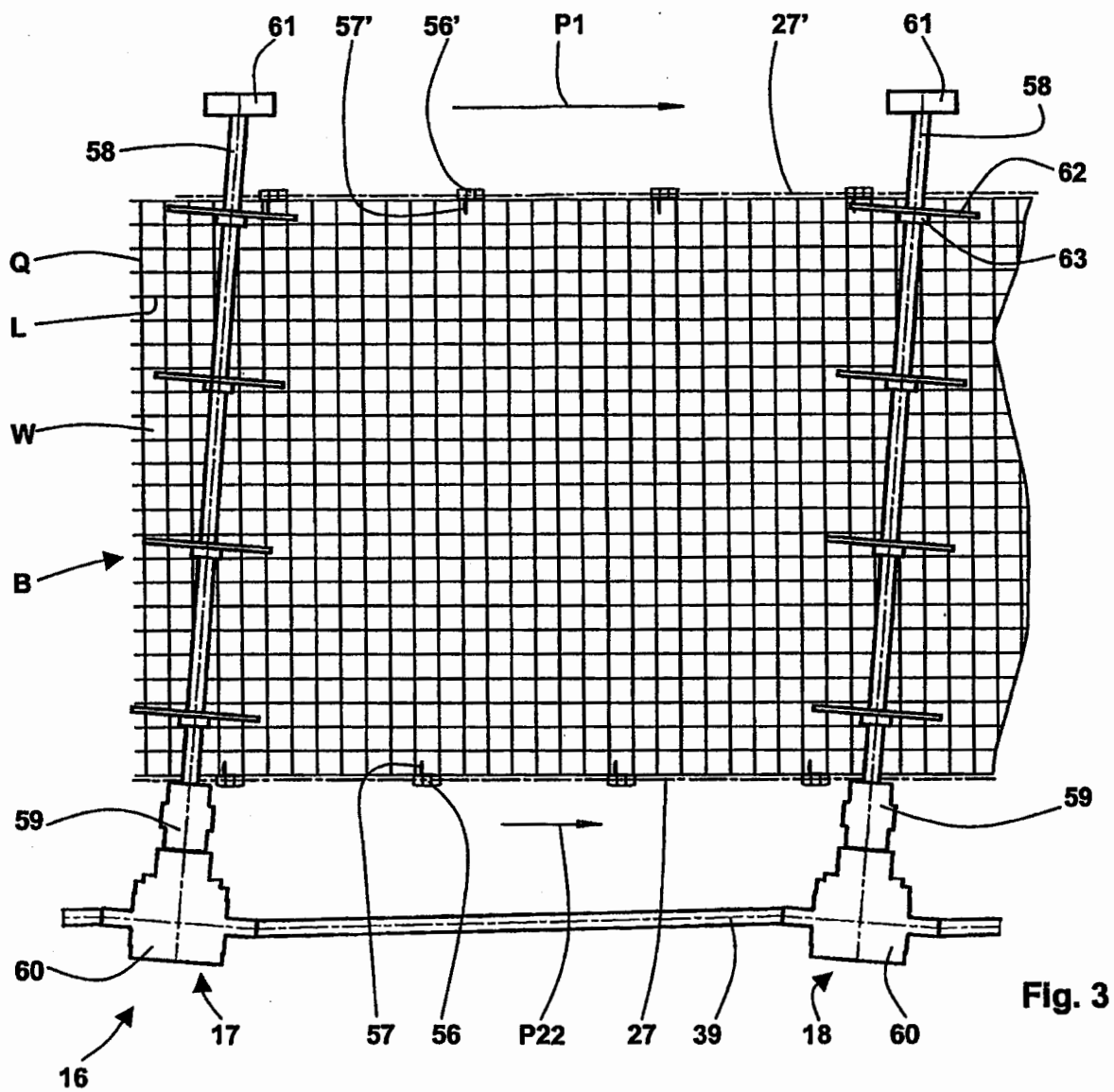


Fig. 3

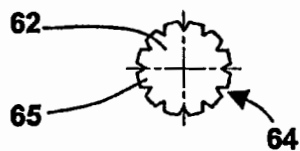


Fig. 4a

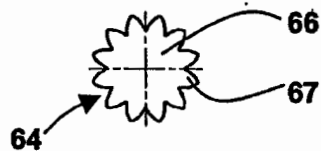


Fig. 4b

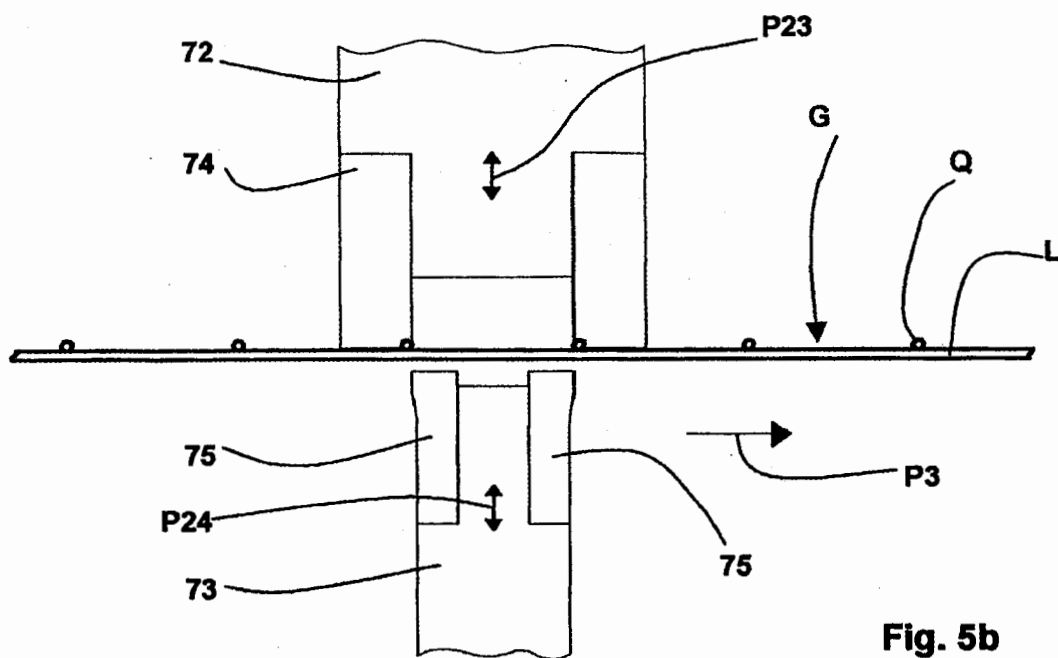


Fig. 5b

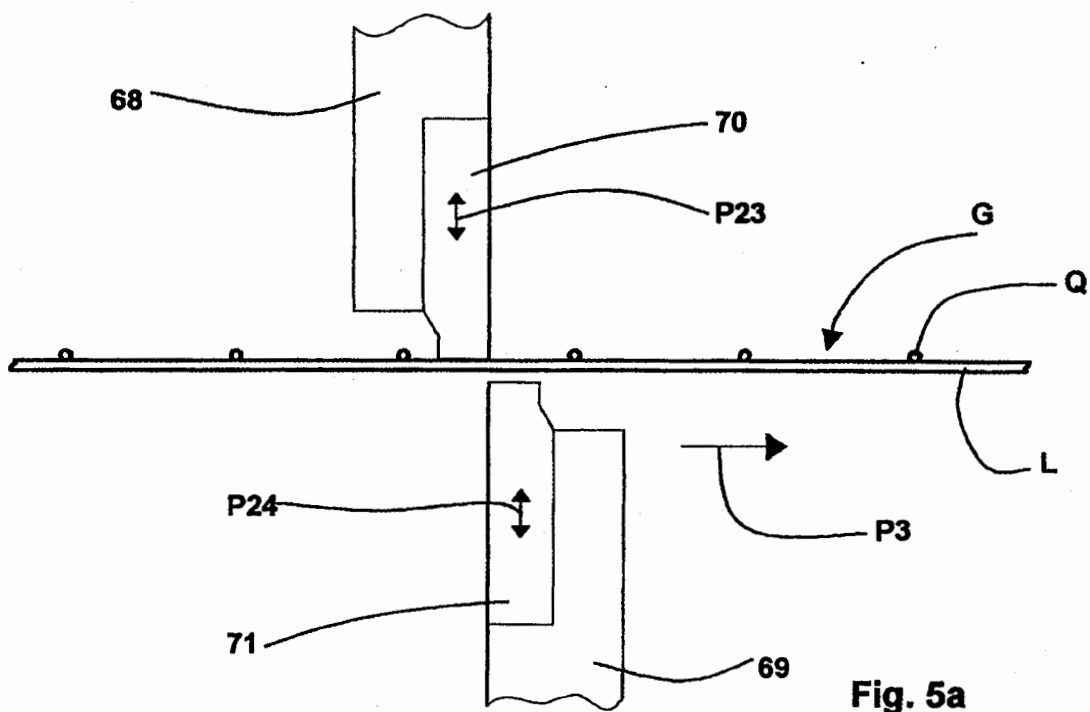
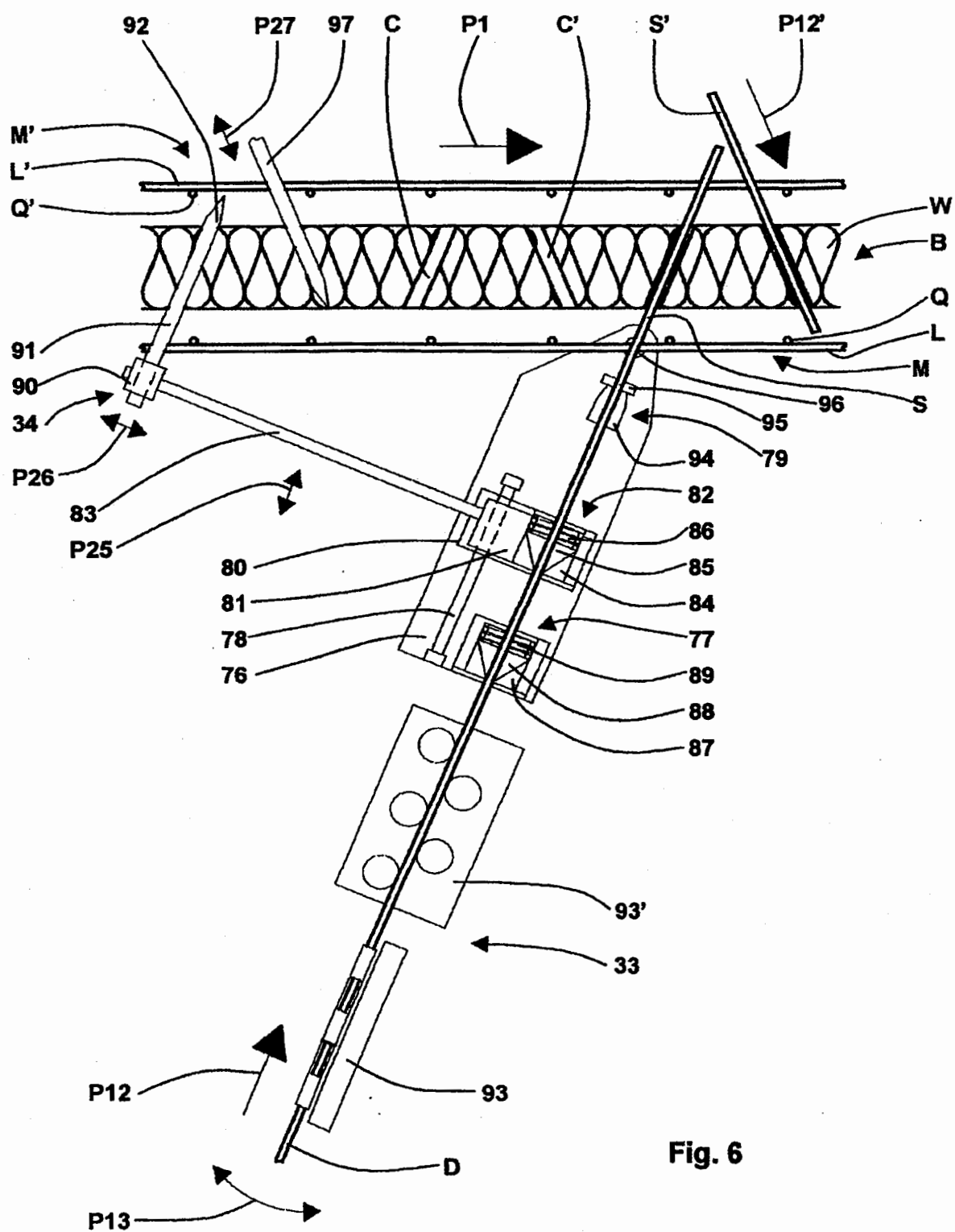
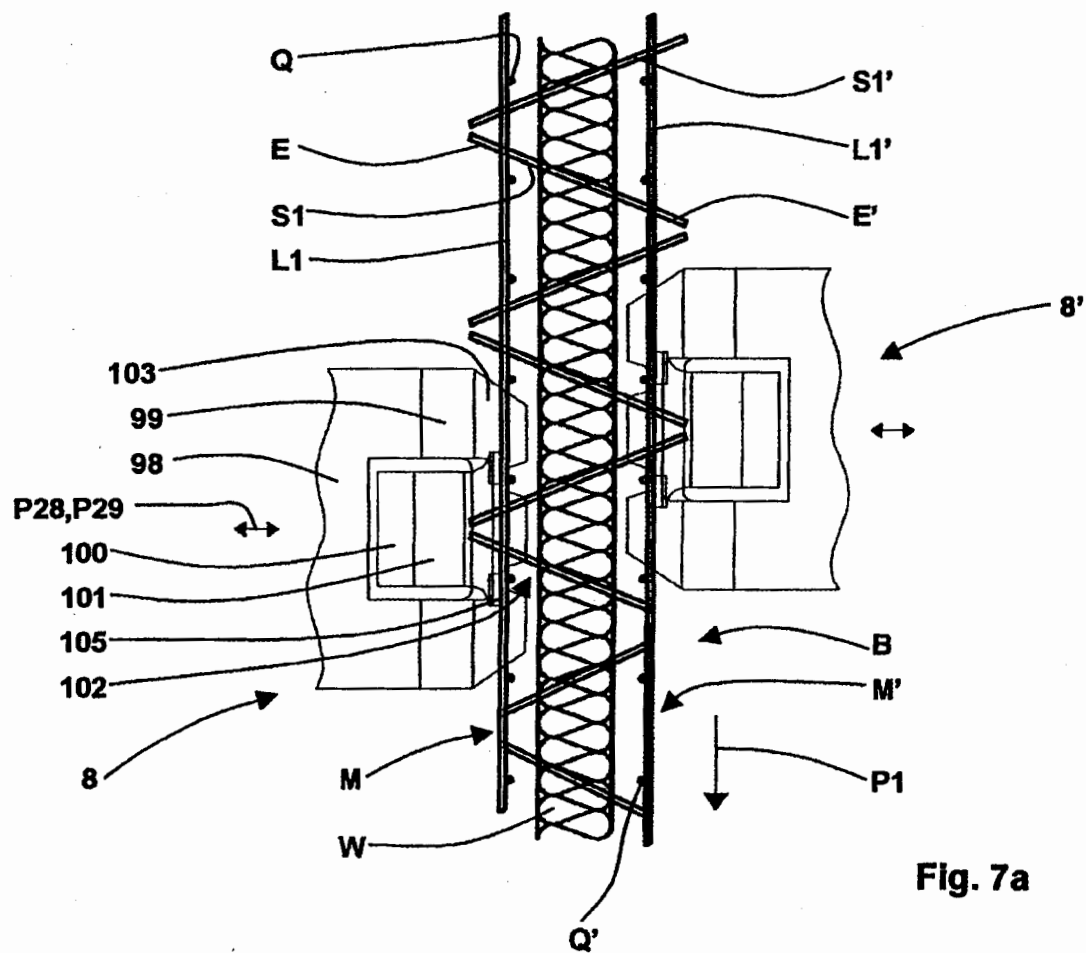
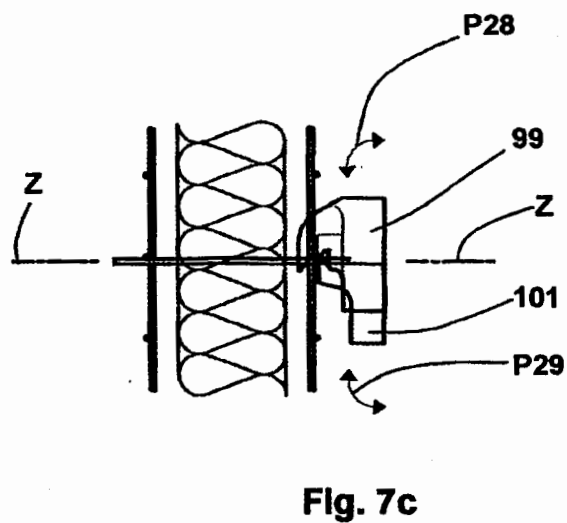
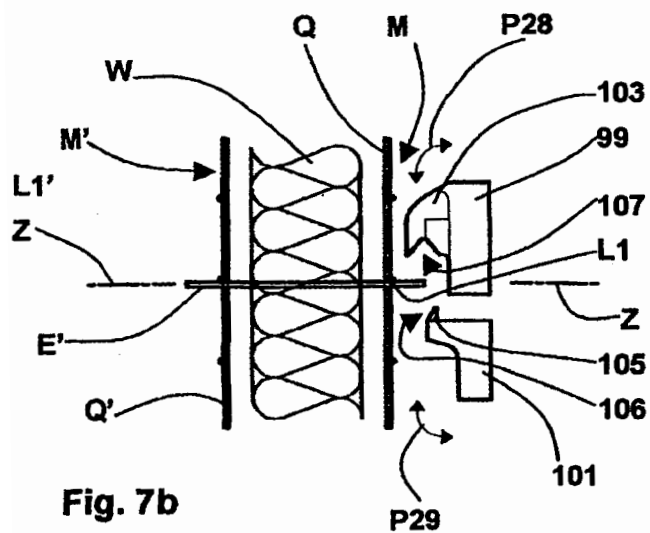


Fig. 5a





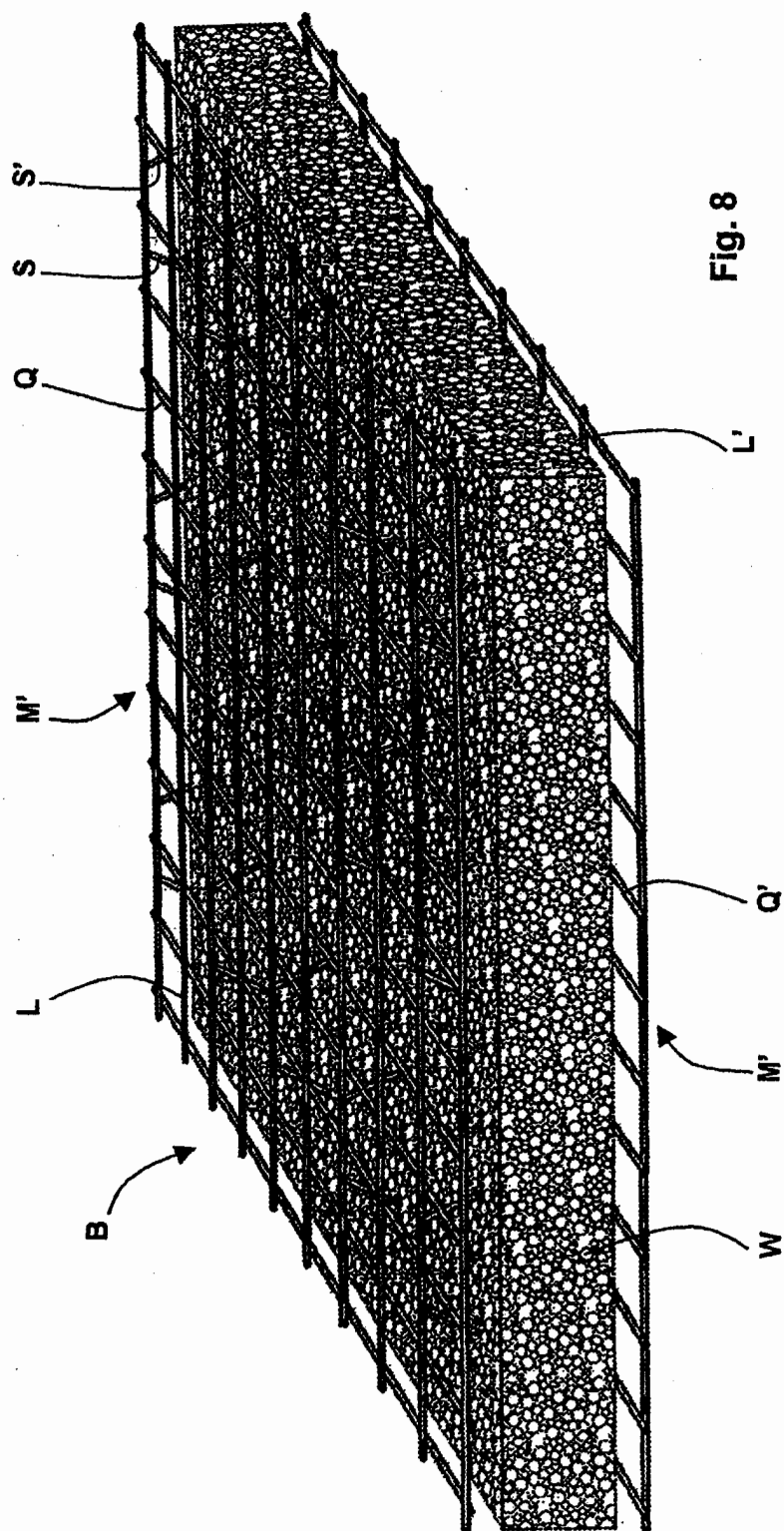


Fig. 8