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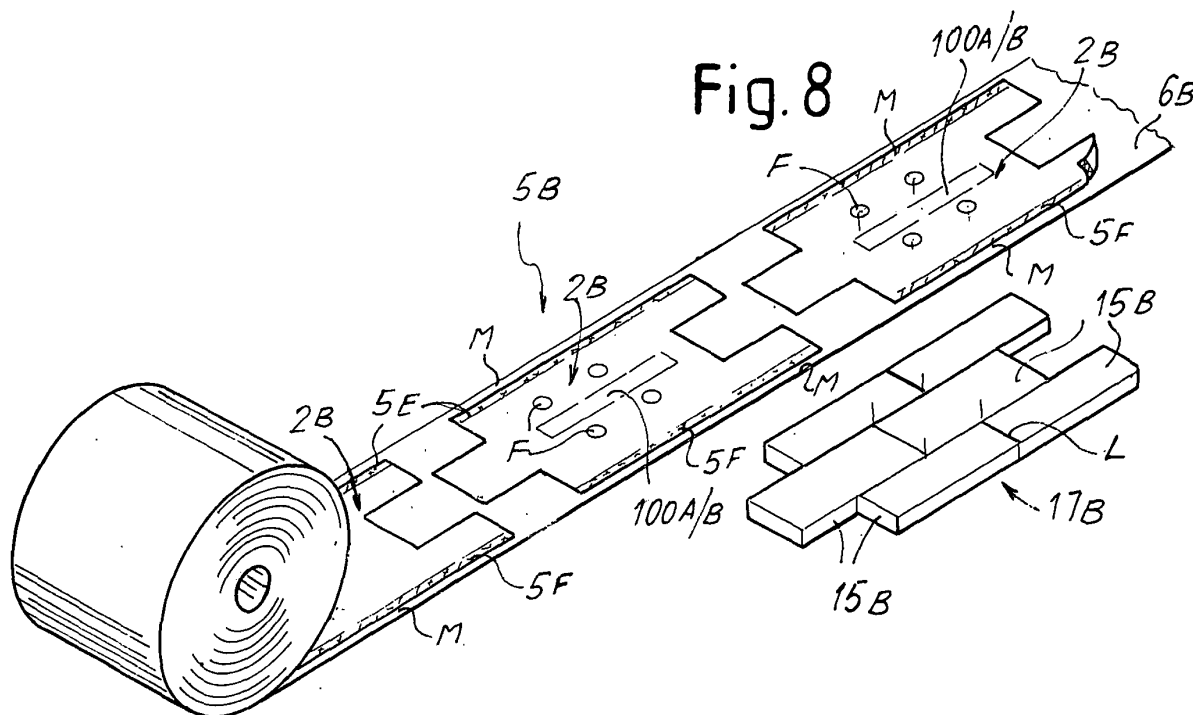
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(54) **Adhesive film for panels of mosaics tesserae and panels using said film**

(57) The continuous adhesive film (5; 5A; 5B; 5C) for panels of prearranged mosaic tesserae comprises a first shaped sheet or layer (4; 4A; 4B; 4C) detachable from a

second supporting sheet or layer (6; 6A; 6B; 6C;). Said first shaped sheet (4; 4A; 4B; 4C) is shaped to adapt to the shape of said panel of mosaic tesserae (17; 17A; 17B; 17C; 17D) to which it is to be applied.



Description

Technical field

[0001] The invention relates to a film for producing a panel of pre-arranged mosaic tesserae and a relative assembly of pre-arranged tesserae for laying mosaics.

Prior art

[0002] Mosaic articles produced with tesserae or small tiles even of very small dimensions, such as in the order of a few tens of millimeter per side, for tiling walls or floors for decorative purposes, have been known from time immemorial.

[0003] These tesserae have a decorated side, which can, for example, be colored, shiny, enameled, which generally forms an ornamental pattern applied in view on the wall or floor.

[0004] US-B-4543765 describes a system for laying flooring of the parquet type. This system provides for a layer of pressure sensitive adhesive on at least a portion of the visible surface of the flooring, in turn covered by a flexible and removable protective support. This flooring is made of wood and the protective support can be a plastic or paper film and can comprise perforations to air the adhesive. The laying method described herein provides for the preparation of the floor on which the parquet flooring is to be positioned by spraying a second adhesive between the flooring and the floor, laying a panel comprising part of the flooring held together by the protective support and fixing said panel to the floor by applying pressure thereto, then, after the second adhesive has set, manually tearing off the protective support from the surface of the flooring.

[0005] The flexible and removable protective support described herein is composed of a single film, optionally made of plastic, to which the adhesive is applied and which is subsequently positioned manually on a wooden parquet flooring panel.

[0006] The drawbacks of a plastic film of this type lies in the fact that it is perforated with aeration perforations before the adhesive is distributed on the film, and therefore the perforations can become clogged with said adhesive. Moreover, the perforations are particularly efficient when they are positioned on the joints between the various wooden elements; however, in this embodiment it is not possible to precisely predetermine this positioning and only a few perforations are actually in this position.

[0007] These drawbacks are particularly relevant in the production of panels produced with small mosaic tesserae, generally made of stone or marble and having a surface that is less smooth and porous than wood, so that the adhesive to be used is more pasty and application of the tesserae is particularly tricky.

[0008] Another drawback is that the protective film, in the case in which it is a plastic film, during manufacture is subjected to stresses which influence the application

process, so that laying is even more inaccurate.

[0009] All in all, the laying system described above is lengthy and laborious, unsuitable to be implemented automatically and continuously, especially for articles of the mosaic type, i.e. with tesserae of even very small dimensions, for example in the order of a few millimeters, which require particular care, precision and dexterity.

[0010] US-B-5445696 and US-B-5252166 describe an assembly for packaging mosaic tesserae comprising two plastic sheets between which said tesserae are enclosed.

[0011] Also described is a method for laying said assembly, essentially consisting in gradually detaching the first sheet during application of the assembly on a surface treated with a suitable adhesive, so that the tesserae held together by the second sheet adhere to the surface. After the adhesive has set and the tesserae are fixed solidly to the wall the second sheet can be removed manually from the tesserae.

[0012] The main drawback of this system is that the tesserae are packaged by hand and this is a particularly slow process, requiring dexterity and experience by the operator in all stages of implementation.

[0013] To attempt to overcome the aforesaid drawbacks, the use of machines to at least partly automate the production of a panel of mosaic tesserae is known.

[0014] The patent IT-B-01244110 describes a process for producing panels of mosaic tesserae in which the visible face of the tesserae is facing upward and the panel is placed on a support made of a sheet or mesh made of paper or another material after spreading the lower face of the panel and/or the upper face of the support with adhesive; subsequently, a flow of hot air is provided to heat the lower surface of the panel and dry the adhesive.

[0015] This procedure is used to automate application of a sheet or mesh of paper to a panel of tesserae on the concealed side of said tesserae, and has the aforesaid drawbacks for this type of application.

[0016] The patent EP-B-1179439 describes a machine for producing panels of mosaic tesserae wherein at least one film or support is applied to the visible face of the tesserae arranged inside a frame comprising feed means and application means to apply the film or support in co-operation with the feed movement of the frame, wherein the application devices comprise cutting means to cut a part of the film and a rotating drum with suction perforations on the outer surface thereof to hold, at least temporarily, the cut part of film and release it on the mosaic tesserae of the panel.

[0017] One drawback of this type of machine is that the construction and use thereof is particularly complex, in particular as it requires a pneumatic circuit for suction of the film through the perforations produced on the rotating drum.

[0018] Another drawback lies in the fact that it is not possible to precisely control feed of the film, especially of films with considerable dimensions, and therefore the

finished product can have flaws and irregularities, such as creases or bubbles in the film, compromising adhesion of the tesserae to said film and the quality of the finished product.

[0019] To date, notwithstanding the developments in technology, this poses a problem and the need exists to produce simple and inexpensive machines for producing panels of mosaic tesserae in an even faster and less expensive way, at the same time producing an improved and high quality finished product.

Objects and summary of the invention

[0020] The object of the present invention is to produce an adhesive film for panels of prearranged mosaic tesserae and a relative assembly of tesserae for laying mosaics, improved with respect to the current ones, of high quality and with innovative characteristics, which are at the same time less expensive and faster to produce and to lay and with a more pleasing appearance than those currently present on the market.

[0021] According to a first aspect, the present invention relates to a continuous adhesive film comprising a first sheet or layer detachable from a second sheet or support wherein the first sheet is shaped to adapt to the shape of a panel of prearranged mosaic tesserae to which it is to be applied.

[0022] Although it is possible to hypothesize the use of various materials to produce said sheets, i.e. paper or fabric, according to a particularly advantageous embodiment of the invention, the first sheet is a plastic film, preferably made of transparent, semi-transparent or translucent material; advantageously, the second sheet is also made of plastic, flexible and transparent or is opaque, i.e. silicone paper or kraft paper; it would also be possible for the first and/or second sheet to be produced with more than one film or layer each, even made of different materials so that the film as a whole has specific thicknesses, i.e. from a minimum of 1 micron up to 500 microns, preferably between 40 microns and 250 microns, even more preferably between 140 microns and 250 microns.

[0023] The plastic has particularly high tensile strength and therefore makes it simpler to remove the sheet after the article has been laid. The use of a transparent, semi-transparent or translucent sheet allows the visible face of the tesserae to be viewed through said sheet, to allow manual corrections to any decorative pattern reproduced on the tesserae.

[0024] The adhesive between the first sheet and the second sheet or support is a detachable adhesive which can be acrylic-based, rubber-based or another suitable adhesive.

[0025] In a particularly advantageously embodiment of the invention, said first shaped sheet consists in supporting and protective elements, detachable and approximately reproducing the geometrical shape of the panel to which they are to be applied, positioned in succession

along the direction in which the adhesive film unwinds, hereinafter simply called "labels"; these supporting and protective labels can be produced, for example, by means of die-cutting said film.

[0026] The supporting and protective label can therefore have a regular geometrical shape, such as a square or rectangle, or any other shape, for example reproducing a letter of the alphabet or a design with complex edges or the like, to approximately reproduce the geometrical shape of the panel to which it is to be applied.

[0027] In an advantageous variant of embodiment of the invention, the adhesive film is perforated with at least one through opening, or preferably perforated with a plurality of through openings suitable to create an aeration system that facilitates adhesion of the tesserae to the walls and reduces the drying time.

[0028] These through openings on the adhesive film can be of any shape, preferably although not exclusively circular, and of extremely small dimensions or at least sufficiently small to prevent the tesserae from becoming detached from the label and passing therethrough; moreover, it must be noted that these through openings are made on the first and on the second sheet already glued to each another, to thus prevent the glue from clogging them.

[0029] In another embodiment, at least one non-adhesive tear-off strip can be provided on the shaped element or label of the adhesive film in a predetermined position, i.e. along at least part of the edge thereof, to facilitate manual detachment of the label from the tesserae after they have been laid and the adhesive has set on the wall.

[0030] In a further embodiment, each shaped label of the first sheet can be provided with printing, to supply commercial information, such as a trademark, a logo or the like, or to supply information regarding the traceability of the product or to prevent counterfeiting, i.e. holograms or alphanumerical strings, optionally with colors that react to infrared or ultrasound.

[0031] In particular, this printing is positioned precisely and in a predetermined position on the shaped label of the adhesive film so that it is completely visible and without only part of the printing being reproduced on a single label; in particular, printing comprising alphanumerical codes or bar codes or the like can be positioned without the risk of this printing being unusable due to interruptions or because it is incompletely reproduced.

[0032] It would also be possible for further components or elements to be applied to the adhesive label, in particular although not exclusively in a predetermined position.

[0033] The continuous film comprising the shaped label produced detachable from the first adhesive sheet is particularly advantageous for automatic and continuous application to mosaic tesserae tiles by means of a machine described hereunder, although it would also be possible for it to be applied manually by an operator or in another way.

[0034] One advantage of a continuous film according

to the invention is offered by the fact that it is particularly inexpensive and simple to produce.

[0035] Another advantage is that transport and handling are simple, as reels of film of a predetermined length can be produced according to the number of labels to be used; moreover, there is no need to attach any further component or element to the reel of film, as it comprises all that is required for application; in particular, the detachable adhesive and any strips for gripping are already included in the film.

[0036] A further advantage is offered by the fact that it is particularly easy to apply further components or elements to the adhesive label, as their position can be determined precisely, without the risk of separating said further components or elements, making them unusable.

[0037] According to another aspect, the invention relates to an assembly of prearranged tesserae for laying mosaics comprising a panel of prearranged tesserae produced with a plurality of tesserae with the visible face glued to a supporting and protective element or adhesive label, wherein said label and the panel have any shape, i.e. square, rectangular, circular, the shape of a letter of the alphabet or the like.

[0038] In a particularly advantageous embodiment of the invention, the adhesive label is applied to this assembly so that any aeration openings are positioned along the joints between the various tesserae and preferably at the crossing points of said joints.

[0039] In another embodiment, the assembly has a label with at least one non-adhesive tear-off strip in a predetermined position, i.e. along at least part of an edge of said panel, to facilitate gripping and manual detachment of the label from the tesserae, once the assembly of tesserae has been laid and has set on the wall.

[0040] In a further embodiment, the assembly has printing in a predetermined position, as described with reference to the continuous film above, so that it is completely legible on the visible face thereof.

[0041] One advantage of an assembly for mosaics according to the invention is offered by the fact that any aeration openings positioned precisely on the joints between the various tesserae allow a considerable decrease in the setting time of the adhesive when the assembly is positioned on the wall.

[0042] Another advantage is offered by the fact that it can be produced automatically and continuously by means of a continuous film of the aforesaid type, with the characteristics and advantages of said film already described above.

[0043] A further advantage is that it is extremely simple to lay, especially in the case in which the assembly has an irregular shape or edges that are not rectilinear and must be laid interlocking with adjacent panels.

Brief description of the drawings

[0044] The invention will be more apparent by following the description and accompanying drawing, which shows

a non-limiting practical embodiment of said invention. More specifically, in the drawing, where the same numbers indicate the same or corresponding parts:

5 Figure 1 shows a schematic representation in an axonometric view of a machine according to one embodiment of the invention:

Figure 2 shows an enlarged detail of Figure 1;
10 Figure 2A shows an enlarged detail of Figure 2;
Figure 3 shows an axonometric view of the machine in Figure 1;

Figure 4 shows another enlarged detail of Figure 1;
Figure 4A shows an enlarged detail of Figure 4;

15 Figure 5 shows another enlarged detail of Figure 1;
Figure 6 shows a further enlarged detail of Figure 1;
Figure 7 shows part of a continuous adhesive film and a relative panel of tesserae;

Figure 8 shows another continuous adhesive film and relative panel;

20 Figure 9 schematically shows a step of applying a label to a panel of tesserae;

Figure 10 shows an assembly of tesserae according to the invention.

Detailed description of some preferred embodiments of the invention

[0045] In the drawings, in which the same numbers correspond to the same parts in all the various figures, a machine according to the invention is indicated generically with the numeral 1, see Figure 1. This machine 1 comprises a central unit 3 for applying or peeling a continuous film 5, see also Figure 4, with at least one distribution element 7 which is produced with a rectangular shaped flat metal blade which stretches sloping towards a conveyor belt 8 along the direction of feed of the continuous film 5.

[0046] The purpose of the distribution blade 7 is to facilitate movement of the continuous film 5; however, it would also be possible to utilize any other means that allows an approximately flat movement of the film up to the peeling point.

[0047] This distribution blade 7 comprises a tail end 9, see also Figures 2 and 4, downstream of the path of the film 5, for peeling said film 5 which can be easily shaped to optimize said peeling; the end 9 can also be replaceable, for example as a function of the strength of the type of film 5 being processed.

[0048] A revolving screen M is used as an interface between machine and user.

[0049] Figure 2 shows the distribution blade 7 with the head end 10 thereof hinged to a cylinder 31 mounted idle on the frame 3A - shown partially for simplicity - of the unit 3. Also provided is a first calibration mechanism 29, spaced with respect to the cylinder 31, which allows manual adjustment of the slope of the distribution blade 7; optionally, this mechanism can also allow a tilting or tipping movement of said blade 7.

[0050] In this way a distribution blade 7 which improves the peeling step is produced, as it can be adjusted time by time to graze panels of different height, at the same time improving movement of the film 5, as it can offset deviations in feed caused by friction and stresses on the film, decreasing frictions.

[0051] Figure 2A shows in greater detail the calibration mechanism 29 comprising a manual adjustment element of the type with a knob 29A and threaded guide 29B which slides freely inside an elongated slot 29D of a stop 29C produced on the frame 3A of the central unit 3; a helical spring 29F, coaxial with the threaded guide 29B, rests with a first upper end on the stop 29C and with a second lower end on a projection 29E of the distribution blade 7; the projection 29E has a threaded slot inside which the rod 29B is screwed.

[0052] In this configuration, an operator can turn the knob 29A to adjust the slope of the distribution blade 7 and preload of the spring 29F by screwing the rod 29B into the slot in the projection 29E; optionally, the mechanism can be adjusted so that the blade 7 can perform small tilting or tipping movements to compress the spring 29F.

[0053] Different configurations of the calibration mechanism 29 would also be possible, such as a configuration in which the positions of the projection 29E of the blade 7 and the stop 29C are inverted, or a configuration comprising two helical springs coaxial with the rod 29B and opposite to said blade 7.

[0054] According to the configuration shown in Figure 2, two calibration mechanisms 29 are provided, positioned opposite each other on the blade 7; it is in any case clear that both the number and the position of said mechanisms can vary.

[0055] The central unit 3, see Figure 2, has a series of mechanical drive elements of the continuous film 5 upstream of the distribution element 7.

[0056] In particular, the film 5 is fed to the machine 1 from an unwinding roller 12 to pass over a guide roller 11 and over a tension compensating roller 13; subsequently, a return roller 14 spreads the film 5 on the distribution blade 7 which moves to the tail end 9 thereof where peeling actually takes place, as will be described in greater detail hereunder.

[0057] The label 4 is applied to the tesserae 15 of a panel 17, see also Figure 4, which moves on the conveyor belt 8; instead, the support 6 moves under the distribution blade 7 to a motor roller 19, the purpose of which is to impart the pulling strength on the film 5.

[0058] A plurality of guide cylinders 21 keyed idle onto respective shafts, in particular three in number in Figure 2, are pushed by means of springs - not shown in the Figure for simplicity - towards the motor roller 19, to improve adhesion and grip of said motor roller 19 on the support 6.

[0059] Moreover, a guide roller 23 can be provided to facilitate subsequent winding of the support 6 on a rewinding roller 25.

[0060] In this embodiment, the rewinding roller 25 is mounted idle on the axle thereof and the periphery of the reel of the support 6 formed on the rewinding roller 25 rests on two further rollers 27A and 27B, one motorized and the other idle, the purpose of which is to keep the peripheral speed of the material accumulated constant as the reel increases in size, in order to facilitate winding preventing stresses or variations in speed that could damage the support 6 or have repercussions on peeling taking place further upstream.

[0061] Moreover, a calibration mechanism 39 is provided to raise the rewinding roller 25 as the reel increases, comprising a stop 39C of the frame 3A resting inferiorly on which are both vertical guides 39B inside which a support 39E of the roller 25 moves, and a helical guiding spring 39F coaxial with the guides 39B which pushes the support 39F of the roller 25 upward.

[0062] In this configuration, the rewinding roller 25 is raised along the guides 39B as the reel increases, while its weight compresses the guide spring 39F.

[0063] An alignment roller 38 is mounted idle on the support 39E of the rewinding roller 25 to control and facilitate winding of the support 6.

[0064] It is clear that once the central unit 3 of the machine 1 has been loaded with a continuous film 5, the subsequent reels of film can be fed joining the tail end of the film being processed with the head end of a new reel on the unwinding roller 9. In this way the machine 1 is able to operate continuously, with machine halts only when it is necessary to modify the type of film being processed.

[0065] An adjustment system is also provided, indicated as a whole with 33 - see Figures 2 and 4 - which allows feed of the continuous film 5 to be synchronized with the speed of the conveyor belt 8 by means of sensors of the feeler type 35, capable of ascertaining the position of each label 2 on the first sheet 4 of the film 5 determining the variation in thickness of the first sheet 4 in movement by detecting the edges of the label 2, and position sensors 37, to detect the position of the respective panel 17 moving on the conveyor belt on which each label is to be positioned.

[0066] In the form of embodiment described, the feelers 35 are fixed in an adjustable way to a guide 34 fixed to the blade 7; instead, the position sensors 37 are of the optical type and positioned at the side of the conveyor belt 8 in proximity to the peeling point.

[0067] In this way it is possible to automatically check that the label 4 is positioned on the respective panel of tesserae 17 precisely, stopping feed of the film 5 until the respective panel 17 has reached the peeling point.

[0068] Side bars 36 are positioned along the two edges of the conveyor belt 8 to create an adjustable space on said conveyor belt 8 to facilitate positioning of the panel thereon by an operator. These side bars 36 can be adjusted manually using a screw mechanism 32 with an adjustment knob 32A and can both be movable, or one can be movable and the other can be fixed.

[0069] Advantageously, a single inverter motor 40 - shown in Figure 1 - is used both for movement of the panel 17 and for feed of the film 5.

[0070] The system for transmitting motion to the conveyor belt 8, of the film 5 and of the optional processing units, is shown in Figure 3 and preferably comprises a first drive pulley 43, for movement of the belt 8, connected to the motor 40 and a first belt 45 which transfers motion to a second pulley 47, suitable to move a brush 75 of the cleaning unit 70 - described in greater detail hereunder - and a third transmission pulley 49, connected in turn to a fourth transmission pulley 51 by means of an electro-mechanical clutch, not shown in the Figures for simplicity; the transmission pulley 51 is connected by means of a second belt 54 to a fifth feed pulley 53, keyed onto which is the motor roller 19 for feed of the film 5, and to a sixth rewinding pulley 55, keyed onto which is the rewinding roller 25 for rewinding of the support 6 of the film 5.

[0071] By means of the electromechanical clutch it is possible to connect or disconnect the transmission of the conveyor belt 8 from the transmission of the adhesive film 5 automatically using the machine programming software.

[0072] In other words, movement of the conveyor belt 8 can be synchronized with movement of the adhesive film 5 so that each label 4 of the adhesive film 5 can be halted on the distribution blade 7 to wait for the respective panel 17 to which it is to be applied; vice versa, it would also be possible to temporarily halt movement of the conveyor belt 8 to wait for the respective label which is to be applied.

[0073] In another embodiment, two motors are used, one to control movement of the adhesive film 5 and the other to control movement of the conveyor belt 8; in this case there is no need to provide a clutch as each of these motors can be halted temporarily. The system for transmitting motion to the optional processing units preferably remains similar to the previous one.

[0074] Figure 4 shows an enlarged detail of Figure 1 illustrating in particular a pressing unit 60 positioned downstream of the central peeling unit 3 in the direction of feed of the conveyor belt 8, the purpose of which is to press the label 4 applied to the tesserae of the panel 17.

[0075] The pressing machine 60 comprises a metal supporting rod 63 positioned above and transverse to the direction of movement of the conveyor belt 8, and fixed to said support 63 is a flexible pressing flap 65, made of plastic, nylon or the like, which grazes the panel of tesserae 17 to which the label 4 has been applied, or bends when it passes by, to eliminate any flaws, such as small bubbles or creases, which can occur during application of the label to the tesserae of the panel.

[0076] The pressing flap 65 is fixed in an adjustable way to the frame 3A of the machine by means of a second calibration mechanism 69 - similar to the first calibration mechanism 29 of the distribution blade 7 - to manually adjust the height of the flap 65 with respect to the conveyor belt 8 and give it a tilting or tipping movement.

[0077] Figure 4A shows the calibration mechanism 69 comprising a knob 69A which, unlike the calibration mechanism 29 of the distribution blade 7, has a threaded hole 69G inside which a threaded guide 69B can be screwed; in turn the threaded guide 69B slides freely inside an elongated slot 69D of a stop 69C produced on the frame 3A of the central unit 3, and the tail end thereof is fixed to the supporting rod 63; a helical screw 69F, coaxial with the threaded rod 69B, rests with a first lower end on the metal supporting rod 63 of the flap and with a second upper end on the stop 69C of the frame 3A.

[0078] In this configuration, the distance of the flap 65 from the conveyor belt 8 is adjusted manually by rotating the knob 69A so that it grazes the belt 8 and bends when each panel of tesserae 17 passes by; preload of the spring 69F is also adjustable. Optionally, this mechanism can be adjusted so that the flap 65 can tilt against the force of the spring 69F.

[0079] The difference between the calibration mechanism 29 of the distribution blade 7 and the mechanism 69 of the flap 65 consists mainly of the fact that in the mechanism 29 of the blade 7 the threaded guide 29B is integral with the knob 29A and adjustable with respect to the blade 7, while in the mechanism 69 of the flap 65 the threaded guide 69B is integral with the flap 65 and adjustable with respect to the knob 69A; these mechanisms are in any case similar and can replace each other.

[0080] In the configuration shown in Figure 4 two calibration mechanisms 69, are provided, positioned opposite each other on the supporting rod 63; it is however clear that both the number and the position of these mechanisms can vary.

[0081] Figure 5 shows an enlarged detail of Figure 1 which illustrates in particular a cleaning unit 70, positioned in the direction of movement of the conveyor belt 8 upstream of the central peeling unit 3. This cleaning unit 70 comprises a casing 73 inside which a brush 75, made of extremely flexible clustered nylon tufts, rotates and grazes the surface of the tesserae of the panel 17 to raise residues or dusts that have deposited on the panel 17 during previous processing operations.

[0082] A suction duct 77 - shown partially to simplify the drawing - connects the inner space of the casing 73 to a containment unit 75 inside which is a fan - not shown in the figure - the purpose of which is to suck residues or dusts raised by the brush 75 into the containment unit 75.

[0083] Rotation of the brush 75 is obtained by a belt transmission system produced on a swiveling arm 76 comprising a pulley 78 integral with said brush 75, keyed onto which is a third transmission belt 81, to transmit the motion imparted by a seventh pulley 83, in turn integral with the shaft on which the second pulley 47 is keyed - see Figure 3.

[0084] In this way, the brush 75 can rotate with the same rotation speed imparted by said motor 40.

[0085] The cleaning unit 70 also comprises a calibration mechanism 79, the purpose of which is to adjust the distance and optionally to allow slight tilting of the brush

75 with respect to the panel 17.

[0086] In particular, operation of this mechanism 79 is identical to the mechanism 69 of the flap 65 replacing the stop 69C of the flap 65 with a stop 79C; in this way the brush 75 can be manually adjusted by rotating the knob 79A to graze the panel of tesserae 17; the brush 75 can also advantageously tilt against the force of the spring.

[0087] Figure 6 shows an enlarged detail of Figure 1 in particular illustrating a drying unit 90, positioned upstream of the cleaning unit 70, the purpose of which is to dry the panel 17 of tesserae coming from a cutting system, in general a water jet cutting system, which has divided it into a plurality of tesserae.

[0088] The drying unit 90 described in the figure preferably comprises two fans 91 - see also Figure 1 - smaller and lighter than an embodiment with only one fan, in fluid connection with a container 93 inside which are heating elements 95 to heat the flow of air generated by the fans 91 and at least one air delivery slot 97 directed at the conveyor belt 8 on which the panels of tesserae move. The fans 91 are moved by respective motors 91A and the air is fed from outside through respective holes 91 B and is then pushed into a inner circuit of the container 93 and heated by the elements 95 to be delivered through the slot 97 and lap the panel of tesserae 17 positioned on the conveyor belt 8.

[0089] The flow of air through the slot 97 can be adjusted by varying the supply power of the motors 91A to optimize the jet of air as a function of the panel being processed.

[0090] It is clear that the processing units described above can be utilized individually or in combination with each other and preferably in the sequence described above.

[0091] It would also be possible to utilize said processing units alone or in combination on other machines for applying adhesive labels to panels of mosaic tesserae.

[0092] Figure 7 shows a continuous film 5A comprising a first sheet 4A applied to a second sheet or support 6A.

[0093] The first sheet 4A of the film 5A consists of labels 2A approximately reproducing the geometrical shape of the respective panels 17A to which they are to be applied; in the embodiment shown in this Figure the panel 17A and the label 2A have a substantially rectangular shape.

[0094] These protective labels 2A are produced in succession in the direction of unwinding of the adhesive film 5A - for example by die cutting - and are spaced from one another by a spacer strip 5H.

[0095] Also provided along the opposite edges of each label 2A are respective tear-off strips 5E and 5F and a tab 5G not glued or glueable on the support 6A; moreover, there are through openings F produced so that they are positioned at the level of the crossing points of the joints L between tesserae 15.

[0096] The tear-off strips 5E and 5F and the tab 5G on the first sheet 4 can be produced by distributing a sub-

stance, such as colored ink which prevents the adhesive from adhering, during production of the film and before distributing the adhesive between the two sheets 4A and 6A.

[0097] A logo printed on the label 2A comprises a graphic part, in approximately the central part and represented schematically with broken lines, indicated with 100A in Figure 7, and a letter and/or bar code or the like, represented schematically by a rectangle with broken lines and indicated with 100B, at one end thereof.

[0098] Figure 8 shows a variant of embodiment for a continuous film 5B comprising shaped labels 2B in succession and a panel 17B to which said labels 5B are to be applied.

[0099] In particular, the continuous film 5B is unwound from a reel and comprises a supporting sheet 6B to which a series of these labels 2B are applied detachably; the panel 17B comprises tesserae 15B, each of which is elongated in shape, approximately rectangular.

[0100] Also in this case, each label 2B is provided with printing 100A and/or a letter and/or bar code or the like 100B, opposite tear-off strips 5E and 5F, and aeration openings F produced so that they are positioned at the level of the crossing points of the joints L between tesserae 15B of this panel 17B.

[0101] In this particular embodiment, it must be noted how the labels 2B are produced with outer margins M on the first sheet 4B of the film 5B; vice versa, on the first sheet 4A of the film 5A the labels 2A do not have any kind of outer margin.

[0102] In fact, it is possible to decrease processing waste saving material by eliminating the outer margins M or by providing suitable margins M as a function of the specific case.

[0103] The two conformations of the label 2A and 2B respectively and of the panel 17A and 17B respectively described above are in any case represented purely by way of example, as they can be, according to the invention, of any type and shape.

[0104] Figure 9 schematically shows by way of example, the step to peel and apply a label 2C of an adhesive film 5C to a relative panel 17C.

[0105] It must be noted that the adhesive film 5C is similar to the one described in Figure 8, with the sole difference that in this case it comprises labels 2C without any outer margin M.

[0106] The peeling step takes place by feeding the continuous film 5C, see the arrow F1, and then gradually separating the label 2C from the support 6C - at the peeling point - and progressively applying said label 2C to the panel 17C. After the second sheet 6C has been separated from the first sheet 4C, it continues towards a storage area, see arrow F2.

[0107] The Figure also indicates the distance d2 between one label 2C and the next and the distance d1 between one panel 17B and the next.

[0108] It must be noted that the labels 2C can be produced on the first sheet of film 5C by means of an auto-

matic process, such as die-cutting, while the panels 17B are instead positioned by an operator on the conveyor belt; consequently, while the distance d2 between consecutive labels remains constant, the distance d1 between the various panels can vary even considerably, so that the adjustment system - described above with reference to the machine for applying labels - can advantageously halt feed of the film 5C until the respective panel 17B has reached the peeling point.

[0109] Figure 10 shows an embodiment of an assembly C of prearranged mosaic tesserae according to the invention wherein the panel 17D and the relative label 2D respectively with the shape of the letter A are represented by way of example.

[0110] In particular, the panel 17D comprises a panel of prearranged tesserae 17D, applied to the visible side of which is a shaped label 2D having printing 100A/B, opposite tear-off strips 5E and 5F, the tab 5G in a specific position and the aeration openings F preferably produced to be positioned at the level of the crossing points of the joints L between the tesserae 15.

[0111] The label 2D can be produced with more than one film or layer; each film or layer can be made of different materials, such as different transparent, semi-transparent, translucent plastics, paper, cardboard or the like.

[0112] Advantageously, the aeration openings F can be circular perforations; these openings can also be of any other shape, such as elongated perforations, indicated by way of example in the figure with F2, or approximately L- or X-shaped, indicated respectively with F3 and F4, to be positioned along at least part of the joints L.

[0113] Further components or elements can also easily be provided in said assembly of tesserae in a predetermined position on the label, as explained above.

[0114] It is clear that the assembly of mosaic tesserae and also the individual tesserae described above can have any shape and dimension; moreover, this assembly can advantageously and preferably be produced with a machine that performs a process on a film of the type described above, although it would also be possible for said assembly of mosaic tesserae to be produced in another way.

[0115] It is understood that the above illustration merely represents possible non-limiting embodiments of the invention, which may vary in forms and arrangements without departing from the scope of the concept underlying the invention. Any reference numerals in the appended claims are provided purely to facilitate reading thereof in the light of the description above and of the accompanying drawings and do not in any way limit the scope of protection.

Claims

1. A continuous adhesive film (5; 5A; 5B; 5C) for panels of prearranged mosaic tesserae, **characterized in**

that it comprises a first shaped sheet or layer (4; 4A; 4B; 4C) detachable from a second supporting sheet or layer (6; 6A; 6B; 6C;), said first shaped sheet (4; 4A; 4B; 4C) being shaped to adapt to the shape of said panel of mosaic tesserae (17; 17A; 17B; 17C; 17D) to which it is to be applied.

2. Film (5; 5A; 5B; 5C) as claimed in claim 1, **characterized in that** said first sheet (4; 4A; 4B; 4C) comprises labels (2; 2A; 2B; 2C; 2D) in succession in the direction of unwinding of said film (5; 5A; 5B; 5C) and approximately reproducing the geometrical shape of said panel of tesserae (17; 17A; 17B; 17C; 17D) to which they are to be applied.

3. Film (5; 5A; 5B; 5C) as claimed in claim 1 or 2, **characterized in that** said protective labels (2; 2A; 2B; 2C; 2D) are spaced from one another by a spacer strip 5H.

4. Film (5; 5A; 5B; 5C) as claimed in claim 1 or 2 or 3, **characterized in that** said protective labels (2; 2A; 2B; 2C; 2D) are produced by die-cutting on said first sheet (4; 4A; 4B; 4C).

5. Film (5; 5A; 5B; 5C) as claimed in claim 1 or 2 or 3 or 4, **characterized in that** it comprises at least one tear-off strip (5E; 5F) not glued in a specific position on said label (2; 2A; 2B; 2C; 2D).

6. Film (5; 5A; 5B; 5C) as claimed in any one of the preceding claims, **characterized in that** it comprises at least one tab (5G) not glued in a specific position on said label (2; 2A; 2B; 2C; 2D).

7. Film (5; 5A; 5B; 5C) as claimed in claim 5 or 6, **characterized in that** it comprises a substance distributed on said first sheet (4; 4A; 4B; 4C) to prevent said first sheet (4; 4A; 4B; 4C) from adhering to said support (6; 6A; 6B; 6C) producing said at least one tear-off strip (5E; 5F) or said tab (5G), before distributing the adhesive between said first and second sheet during production of said film (5; 5A; 5B; 5C).

8. Film (5; 5A; 5B; 5C) as claimed in claim one or more of the preceding claims, **characterized in that** it comprises through perforations (F).

9. Film (5; 5A; 5B; 5C) as claimed in claim 8, **characterized in that** said through perforations are arranged to be positioned at the level of joints (L) between said tesserae (15, 15A) of said panel of tesserae (17; 17A; 17B; 17C; 17D) or at the level of crossing lines of said joints (L).

10. Film (5; 5A; 5B; 5C) as claimed in one or more of the preceding claims, **characterized in that** it comprises a logo printed on said labels (2; 2A; 2B; 2C; 2D)

in a predetermined position.

11. Film (5; 5A; 5B; 5C) as claimed in one or more of the preceding claims, **characterized in that** it comprises outer margins M to delimit said label (2; 2A; 2B; 2C; 2D) on said first sheet (4; 4A; 4B; 4C). 5

12. Film (5; 5A; 5B; 5C) as claimed in one or more of the preceding claims, **characterized in that** it has a thickness ranging from a minimum of 1 micron to 500 microns, preferably from 40 microns to 250 microns, even more preferably from 140 microns to 250 microns. 10

13. An assembly (C) of prearranged mosaic tesserae comprising a panel of prearranged tesserae (17; 17A; 17B; 17C; 17D) with the visible face glued to a label (2; 2A; 2B; 2C; 2D), made of transparent, translucent or semi-transparent plastic film, comprising at least one tear-off strip (5E; 5F) in a predetermined position to facilitate gripping and tearing of said label (2; 2A; 2B; 2C; 2D), after said assembly has been laid on after they have been laid on a wall with an adhesive and the adhesive has set. 15
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14. Assembly of prearranged tesserae as claimed in claim 13, **characterized in that** said it comprises printing (100A; 100B) in a predetermined position on said label (2; 2A; 2B; 2C; 2D). 30

15. Assembly of prearranged tesserae as claimed in claim 13 or 14, **characterized in that** it comprises aeration perforations (F; F2; F3; F4) on said label (2; 2A; 2B; 2C; 2D). 35

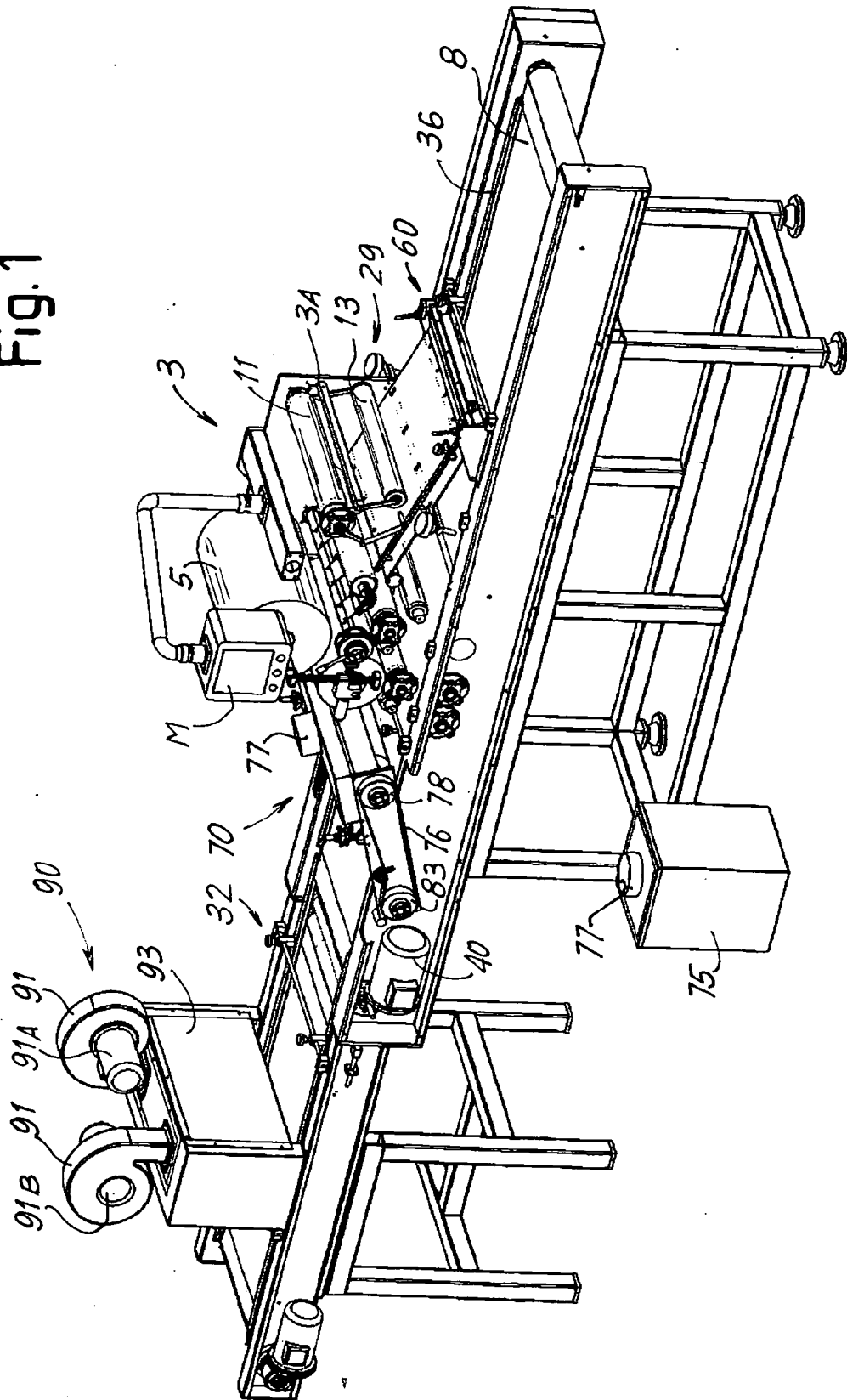
16. Assembly of prearranged tesserae as claimed in claim 15, **characterized in that** said aeration perforations (F; F2; F3; F4) are arranged at the level of the joints (L) between said tesserae (15; 15A) or of the crossing lines of said joints (L). 40

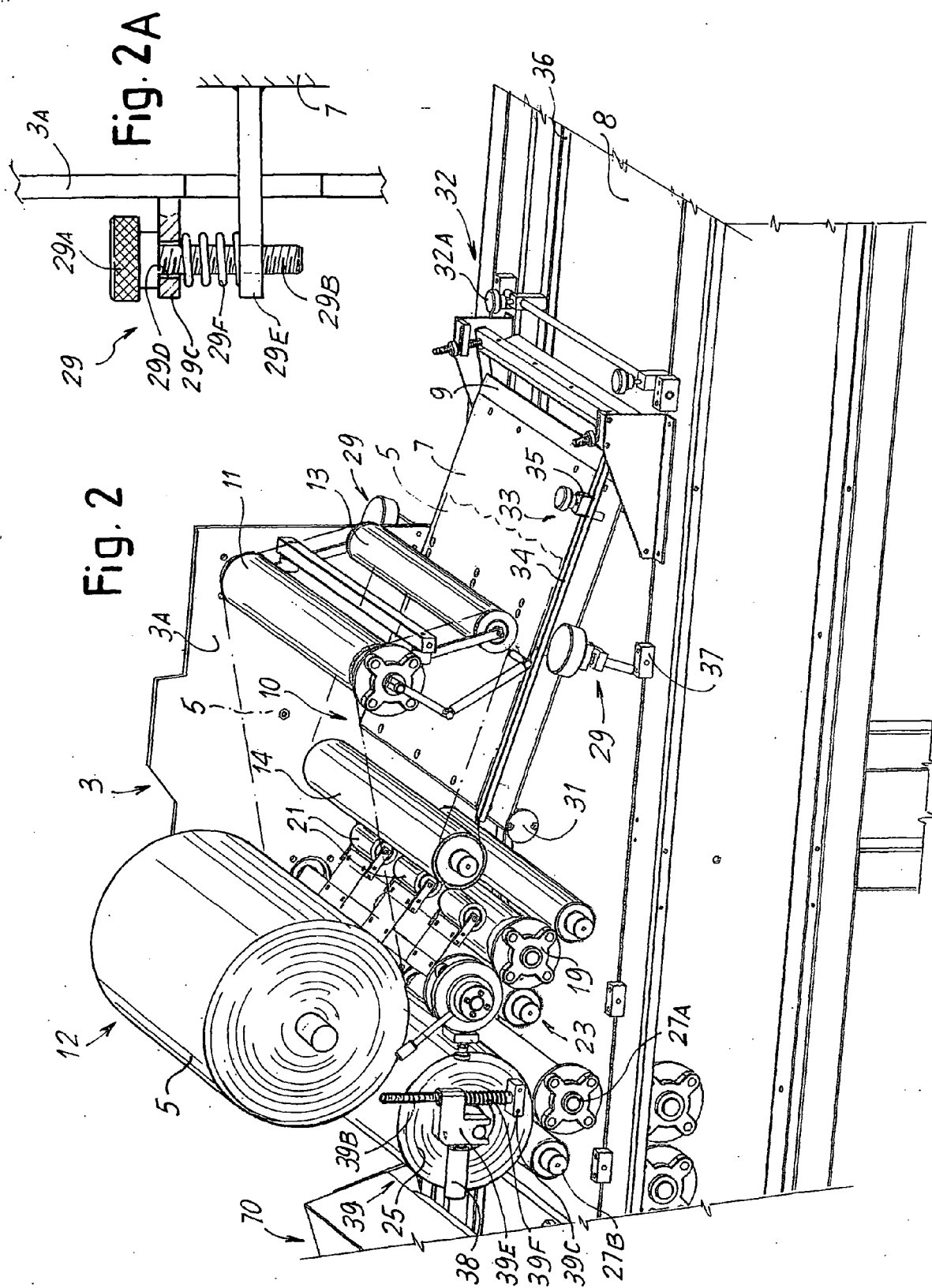
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50

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Fig.1





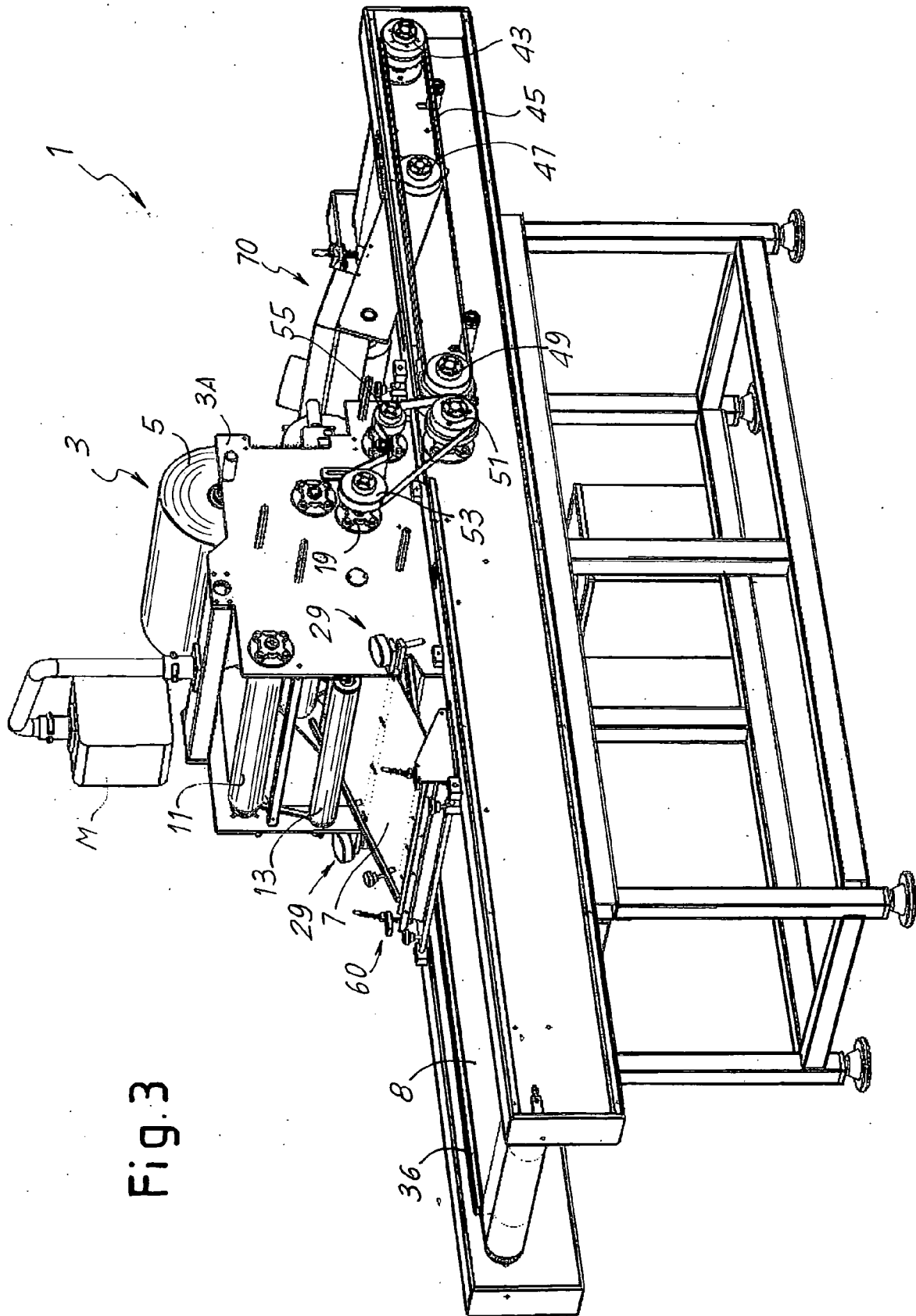
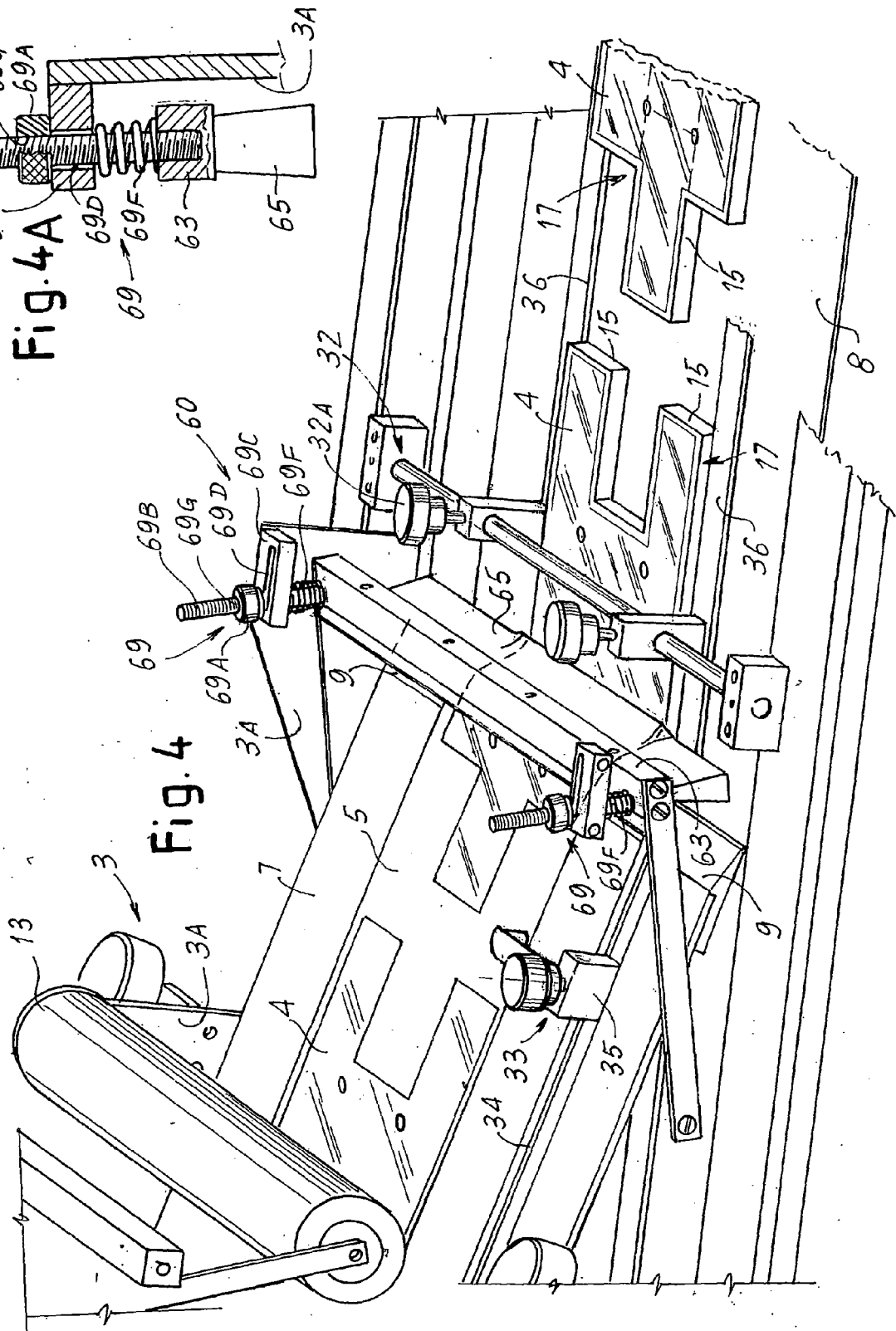
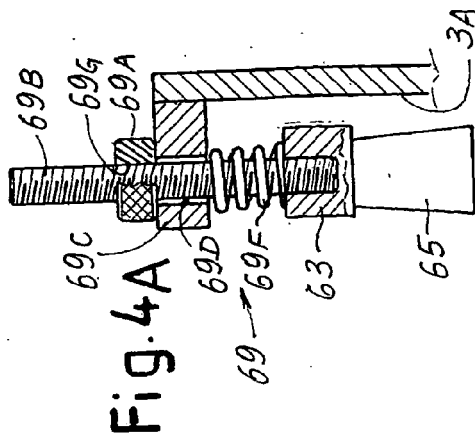


Fig. 3



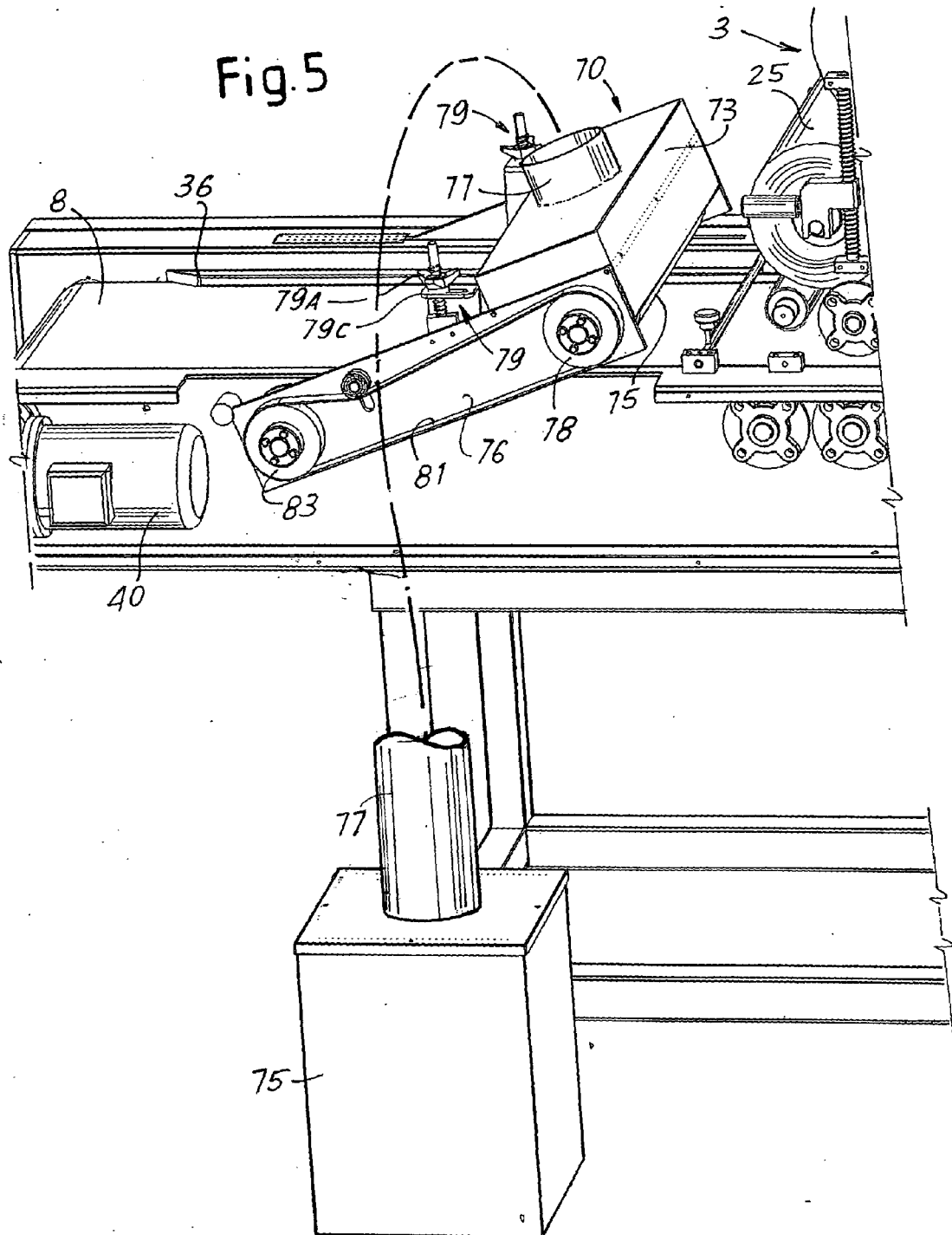
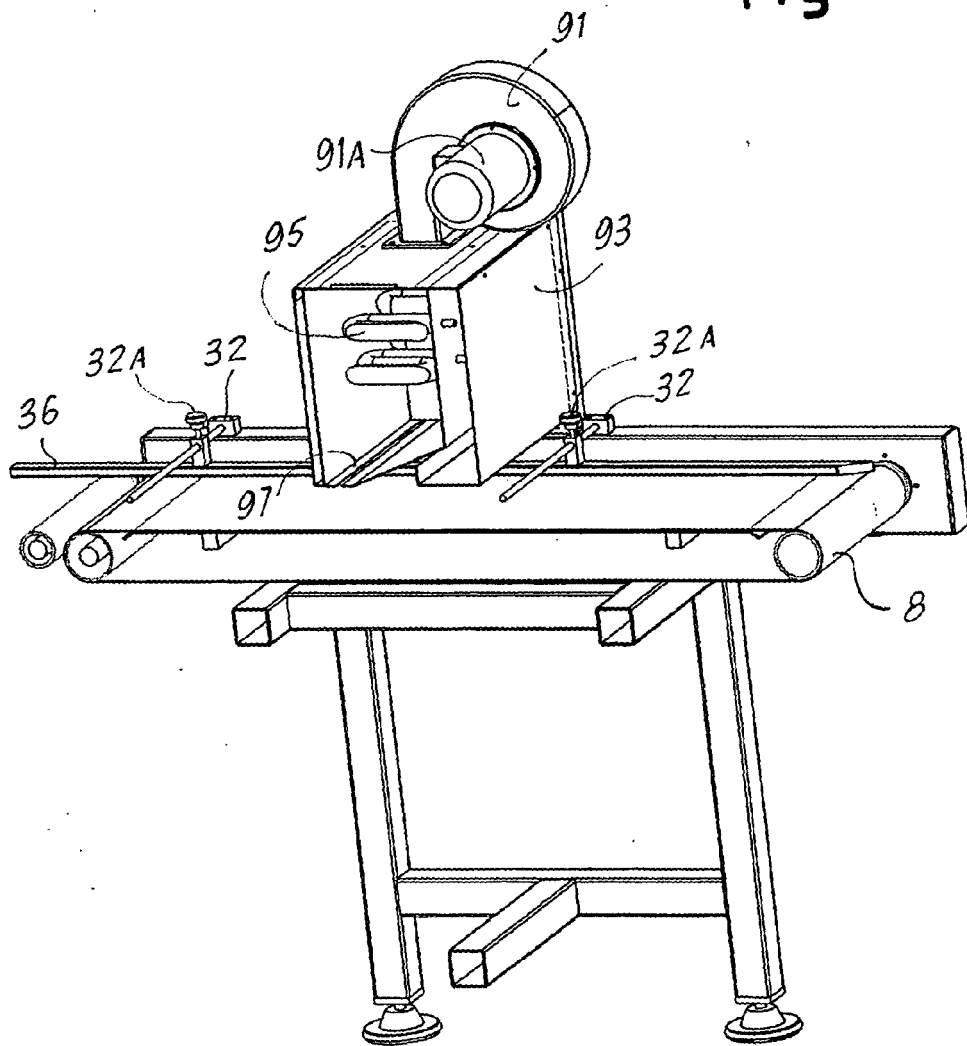


Fig. 6



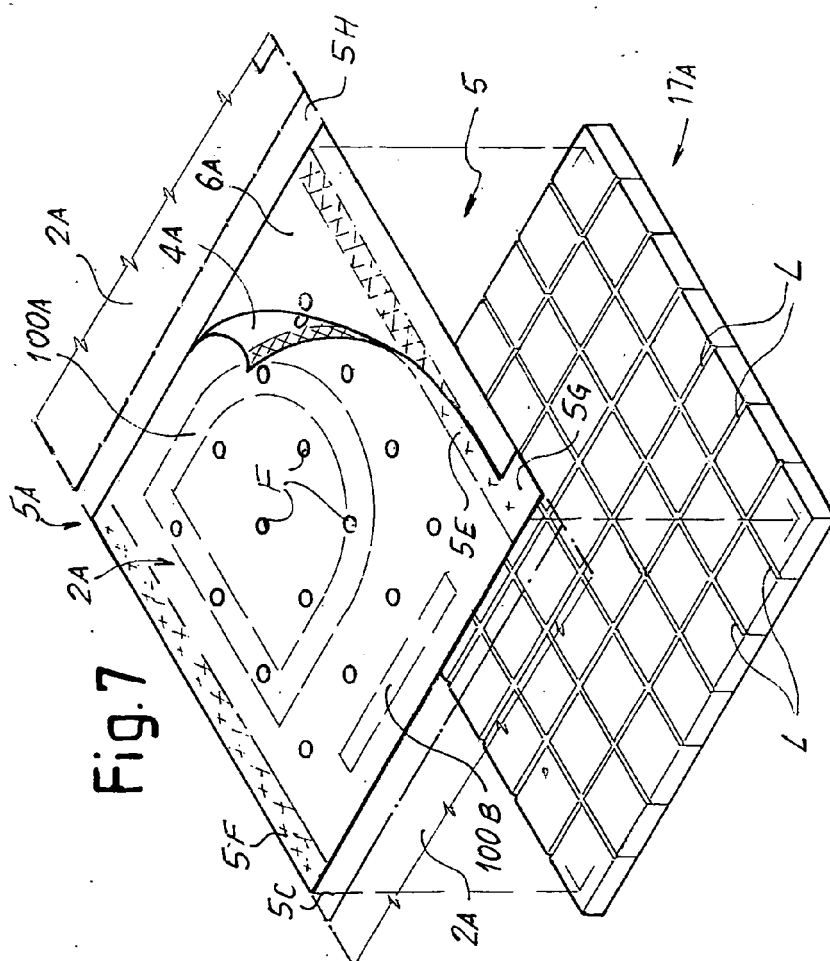


Fig. 7

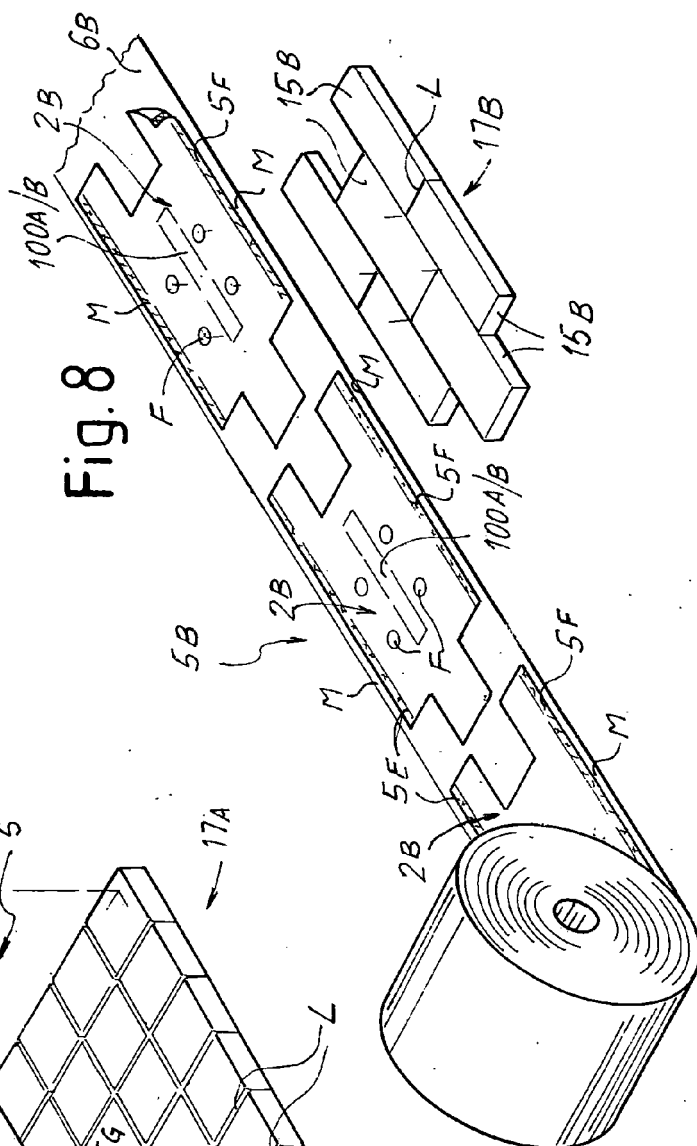


Fig. 8

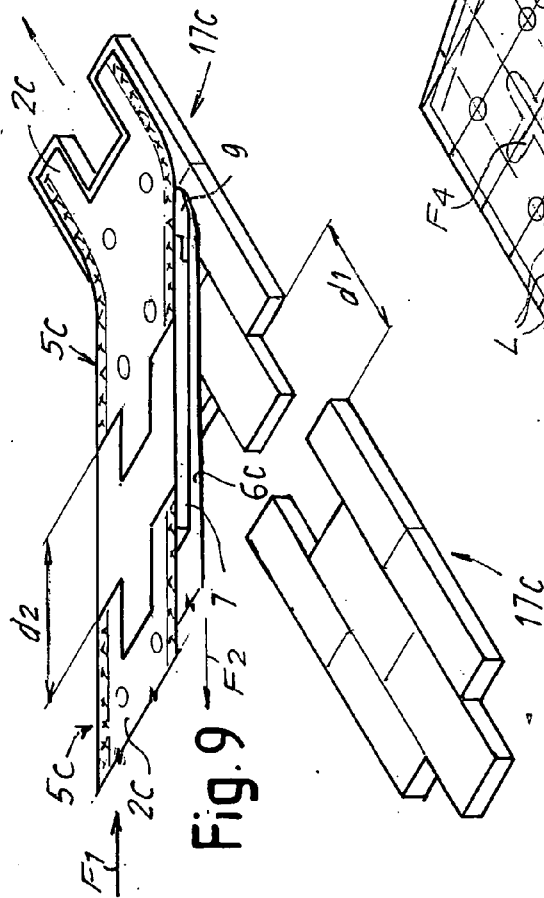


Fig. 9

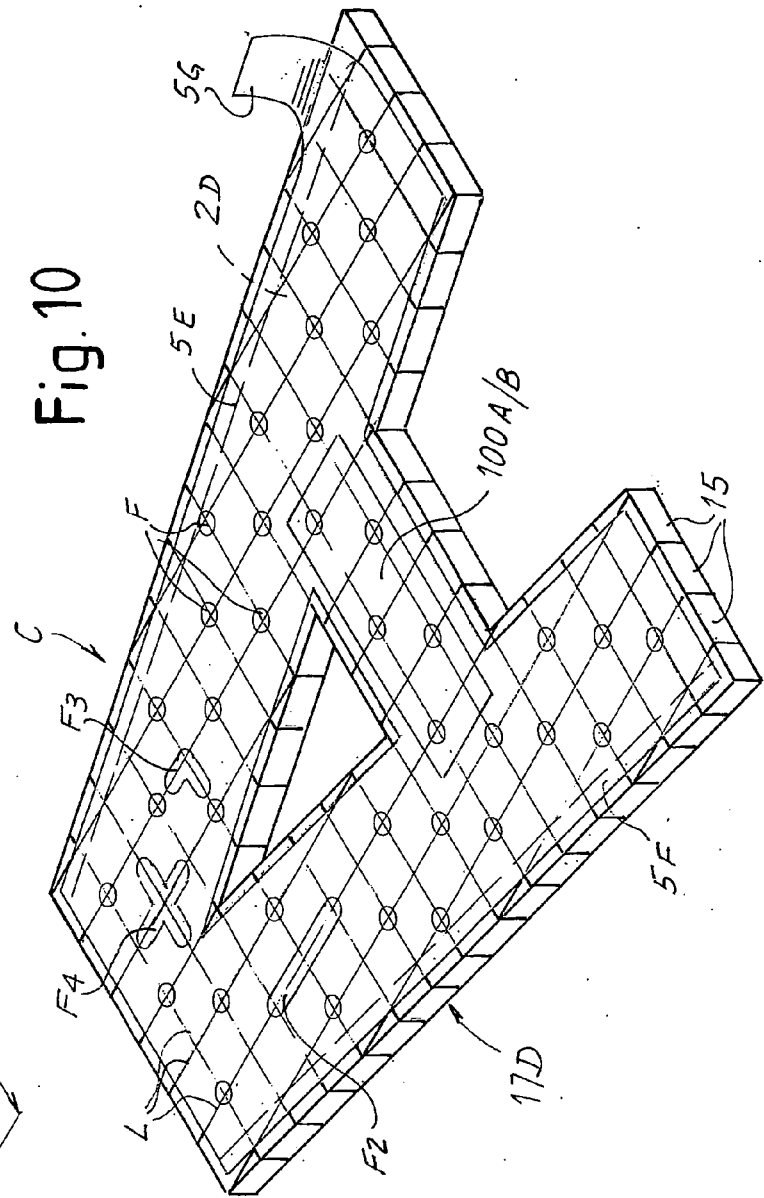


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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