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(54) System to compact textile surfaces on cutting tables.

(57) System to compact textile surfaces on cutting tables (10), the textile surfaces being arranged in layers superimposed on each other to form a stack (20) on work surfaces (11) of the cutting tables (10), the compacting of the stack of layers (20) being carried out by aspiration of the air held within a spaced defined by an airtight sheet (24) superimposed on the stack (20) and surrounding the upper surface and three free sides of the stack(20), the fourth side of the stack (20) cooperating with an aspiration duct (15), to which are solidly fixed grippers (17) to grip and retain the fourth side of the stack (20), the aspiration duct (15) and the grippers (17) being solidly fixed to a gripper assembly (12) able to move on the work surface (11) of the cutting tables (10) for the cutting of the stack (20) by a cutting head (27), an interposed sheet (21-121) being introduced between the lower surface of the stack (20) and the work surface (11) and comprising, over its whole surface in contact with the stack (20) and in the direction of aspiration of air, elements (22-25) suitable to provide passages (26-126) for the flow of aspirated air, the interposed sheet (21-121) having flat dimensions at least equal to those of the stack of textile surfaces (20).

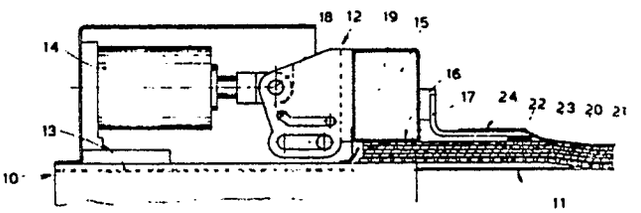

fig.1

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SYSTEM TO COMPACT TEXTILE SURFACES ON CUTTING TABLES

This invention concerns a system to compact textile surfaces on cutting tables. To be more exact, this invention concerns a system able to compress a stack of textile surfaces so as to expel the air, the stack being positioned on a cutting table and having to be displaced on that table to cooperate with a cutting head.

The state of the art includes disclosures suitable to compress a stack of air-permeable surfaces, for instance textile surfaces, in the direction of the thickness of the stack, the surfaces being arranged in layers superimposed on each other on a cutting table.

The compression is made necessary by the need to provide a compact enough body for the cutting tool and is achieved by expelling air owing to the permeability to air of the surfaces being processed.

The expulsion of air is generally accomplished by putting one side of the stack of textile surfaces in communication with an aspiration duct and by surrounding the stack almost wholly with a sheet of airtight material.

The aspiration duct acts also as a support and gripping element for the textile surfaces, which are able to move together with the aspiration duct on the surface of the cutting table so as to cooperate with the cutting unit.

In many cases the airtight sheet surrounds only the upper surface and the free side surfaces of the stack, whereas the lower surface of the stack is merely rested on a thin, flat sheet of paper or cardboard or an analogous material.

The problems associated with the state of the art arise from an inadequate degree of compression of the stack of textile surfaces owing to the great sizes of the material to be cut.

For instance, if the air is aspirated in the direction of the width of the stack, the size of the width is generally of the order of more than one metre, and therefore a good degree of compression is achieved along a given value of the width of the stack, but beyond that point this compression hinders the achievement of the required degree of compression in the remainder of the stack too.

This leads to difficulty in moving the stack and an unfavourable outcome for the cutting operation.

Moreover, the support and gripping action of the aspiration duct along one edge of the stack causes buckling of that edge, thus making even more evident the above problems of the state of the art.

The present applicant has studied, tested and achieved a system to compact textile surfaces which is able to overcome the problems of the state of the art.

The invention is set forth in the main claim, whereas the dependent claims describe various features of the invention.

The system arranges to compact a stack of textile surfaces by putting one of its sides in communication with an aspiration element and by covering its upper surface and other sides with an airtight sheet as in the state of the art.

The system according to the invention arranges to place between the lower surface of the stack and the work surface of the cutting table a sheet of a suitable material conformed in such a way as to enable a flow of air to be aspirated from the textile surfaces and to run towards the duct that aspirates the air, this flow being substantially the same at any area of the lower surface of the stack.

This conformation of the interposed sheet may be variously typified and have various dimensions but will substantially be such as to form between the lower surface of the stack and the upper surface of the interposed sheet some channels for passage of air to be expelled through the aspiration duct.

The material of the interposed sheet should also be suitable for the stack to be slid on the work surface of the cutting table by the aspiration duct, which is solidly fixed to gripper means that hold the stack.

To give a non-restrictive example, the present applicant has found especially advantageous a sheet of a plastic material of a polythene type with air cells distributed on one surface or else of the polythene commercially available for employment for packing purposes.

Equally favourable results have been achieved by using sheets of corrugated cardboard, the corrugations being substantially channels built up on a flat base. Such corrugated cardboard too is of the type normally employed for packing purposes.

The air cells of the polythene sheet and the corrugations of the cardboard sheet are arranged on a horizontal plane in such a way as to support the stack and to keep passages open for the flow of air expelled from the textile surfaces.

According to the invention the gripper means carry out retention of one side of the stack by interposition of resilient blocks suitable to avoid excessive buckling of that side during aspiration of air from the textile surfaces.

The attached figures, which are given as a non-restrictive example, show the following:-

Fig.1 shows a diagram of a side of the system to compact textile surfaces, as used according to the invention;

Figs.2 and 3 show two possible types of interposition sheets employed in the system of Fig.1;

Fig.4 gives a diagram from above of the compaction system applied to a cutting table;

Fig.5 shows a lengthwise section, deformed to provide an example, along the line A-A of Fig.4.

In Fig.1 a cutting table 10 has a work surface 11 on which the cutting oprations are carried on. A gripper assembly 12 is located on the cutting table 10 and extends substantially along the whole length of one side of that table 10 and is able to move on the work surface 11.

In this example the gripper assembly 12 consists of a slide block 13 operated by a suitable actuation means (not shown in the figure) and bearing drive means 14, jacks for instance, to set to work an aspiration and gripper assembly, which comprises an aspiration duct 15 with aspiration holes 16 and grippers 17.

The aspiration duct 15 and the grippers 17 connected thereto can oscillate on a pivot 18 owing to the action of the drive means 14.

A flexible lengthwise packing 19 is also connected to the aspiration duct 15 and forms a barrier between that duct 15 and the work surface 11.

Fig.1 shows the method of lateral retention of a stack 20 of textile surfaces by the grippers 17; an interposed sheet 21, a polythene sheet with air cells 22 for instance is introduced between the slide block 13 and the lower surface of the stack 20 and possesses dimensions substantially the same as or slightly greater than those of the stack of textile surfaces 20 and is in contact with the work surface 11 and the lower surface of the stack 20.

The grippers 17 comprise on their inner surface small resilient blocks 23, which are in contact with the outer surface of the stack 20 during the gripping action and the aspiration of air through the aspiration holes 16.

A sheet 24 of an airtight material is spread on the upper surface of the stack 20 and on the sides of the stack not subject to the gripping action.

Compaction of the stack 20 is carried out by expulsion of the air held within the space defined by the airtight sheet 24.

Figs.2 and 3 show two of the possible types of interposition sheets consisting of polythene 21 with air cells 22 and corrugated cardboard 121 with built-up corrugations 25 respectively.

Both the air cells 22 and the corrugations 25 are arranged on sheets 21-121 respectively in the direction of flow of the air aspirated from the stack 20 throughout the whole extent of the stack 20 so as to form a plurality of channels or passages for the flow of aspirated air according to the arrows 26 and 126 respectively in Figs.2 and 3.

Fig.4 shows the cutting table 10, on the work surface 11 of which is spread the stack of textile surfaces 20; the compaction of the stack according to the invention takes place by aspiration of air in the direction of its width.

A cutting head 27 is shown and in this case can move on the cutting table 10 in a direction at a right angle to the forward movement of the gripper assembly 12 on the table 10.

Fig.5 shows a section, deformed for reasons of clarity along the line A-A of Fig.4, of the elements described above of the system to compact the stack 20 according to the invention.

Claims

1 - System to compact textile surfaces on cutting tables (10), the textile surfaces being arranged in layers superimposed on each other to form a stack (20) on work surfaces (11) of the cutting tables (10), the compacting of the stack of layers (20) being carried out by aspiration of the air held within a space defined by an airtight sheet (24) superimposed on the stack (20) and surrounding the upper surface and three free sides of the stack(20), the fourth side of the stack (20) cooperating with an aspiration duct (15), to which are solidly fixed grippers (17) to grip and retain the fourth side of the stack (20), the aspiration duct (15) and the grippers (17) being solidly fixed to a gripper assembly (12) able to move on the work surface (11) of the cutting tables (10) for the cutting of the stack (20) by a cutting head (27), the system being characterized in that an interposed sheet (21-121) is introduced between the lower surface of the stack (20) and the work surface (11) and comprises, over its whole surface in contact with the stack (20) and in the direction of aspiration of air, elements (22-25) suitable to provide passages (26-126) for the flow of aspirated air, the interposed sheet (21-121) having flat dimensions at least equal to those of the stack of textile surfaces (20).

2 - System as claimed in Claim 1, in which the interposed sheet (21-121) consists of a plastic material.

3 - System as claimed in Claim 1, in which the interposed sheet (21-121) consists of a material based on paper or cardboard.

4 - System as claimed in any claim hereinbefore, in which the stack (20) and the interposed sheet (21-121) are retained at one of their sides by the aspiration and gripper assembly (15-17).

5 - System as claimed in any claim hereinbefore, in which the airtight sheet (24) merely rests on the grippers (17).

6 - System as claimed in any claim hereinbefore, in which the grippers (17) comprise small resilient blocks (23) for gripping contact with the upper surface of the stack (20).

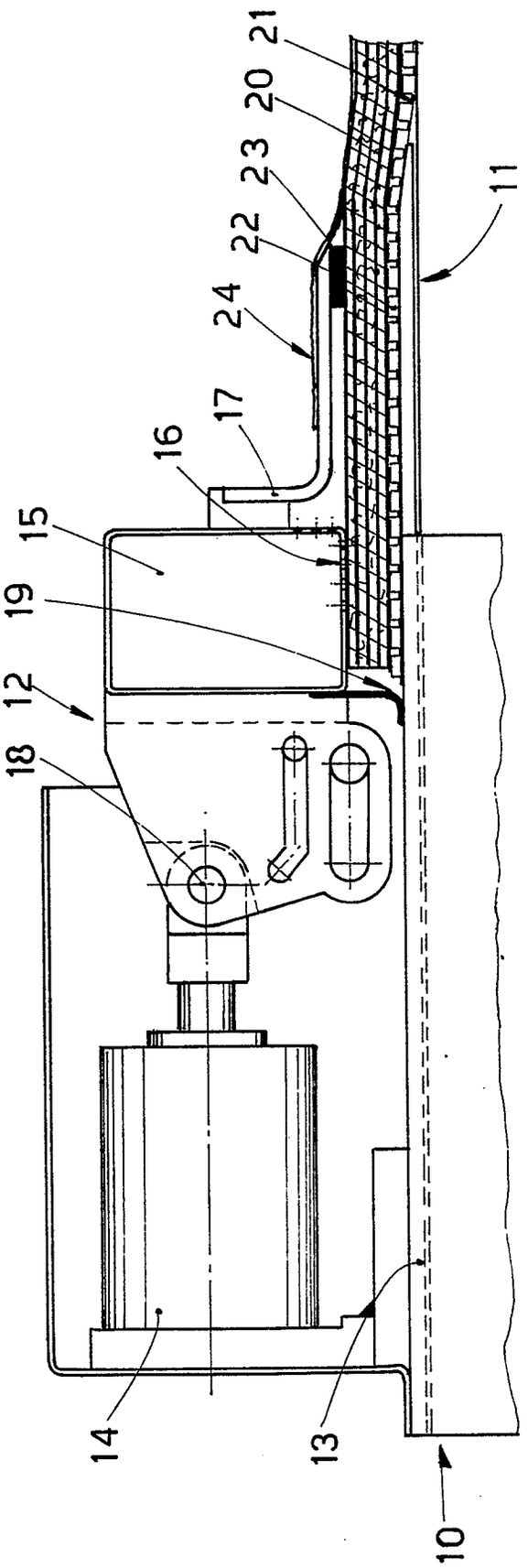

fig.1

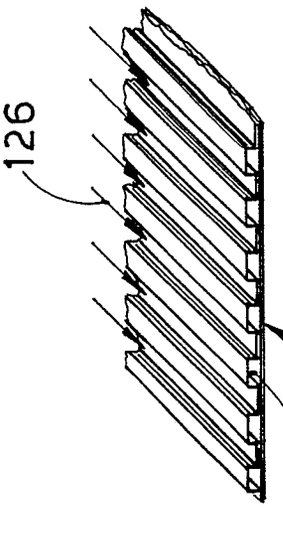

fig.3

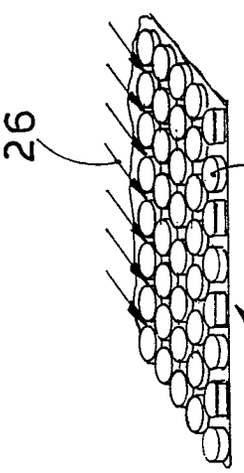

fig.2

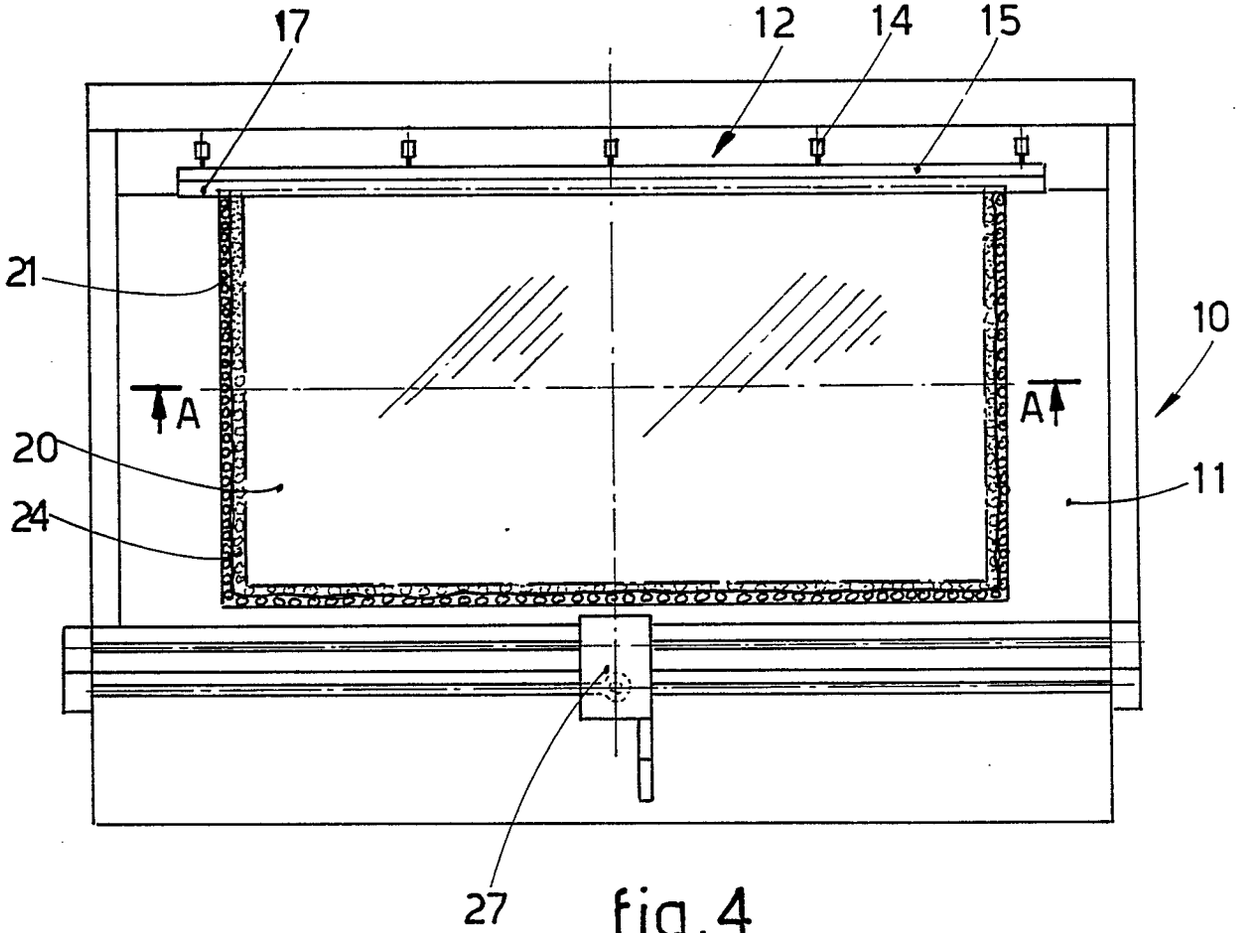

fig.4

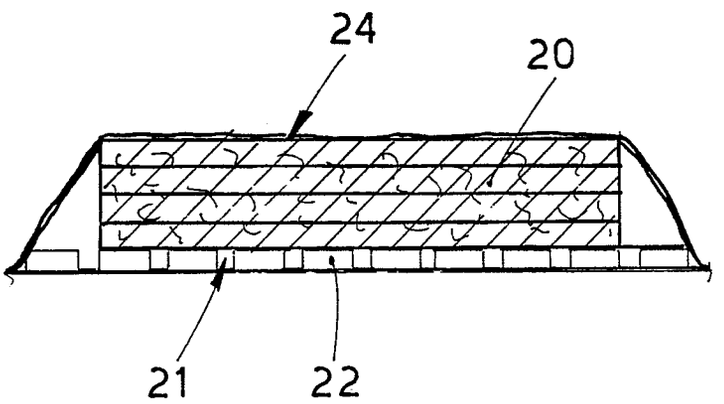

fig.5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 10 8736

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-4715805 (N. NASU) * column 3, line 37 - column 5, line 13; figures 1-5 *	1-5	A41H43/00 A41H15/00 B26D7/08
A	DE-A-3326816 (KRAUSS U. REICHERT GMBH) * page 9, paragraph 7 - page 12, paragraph 2; figures 1-5 *	1, 2, 4	
A	FR-A-2194823 (SCHUBERT & SALZER MASCHINENFABRIK) * page 2, line 16 - page 3, line 15; claim 1; figures 1-3 *	1	
A	GB-A-1249964 (GERBER GARMENT TECHNOLOGY) * page 2, lines 36 - 87; figures 1, 2 *	1, 2	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A41H
B26F
B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06 SEPTEMBER 1989	GARNIER F.M.A.C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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