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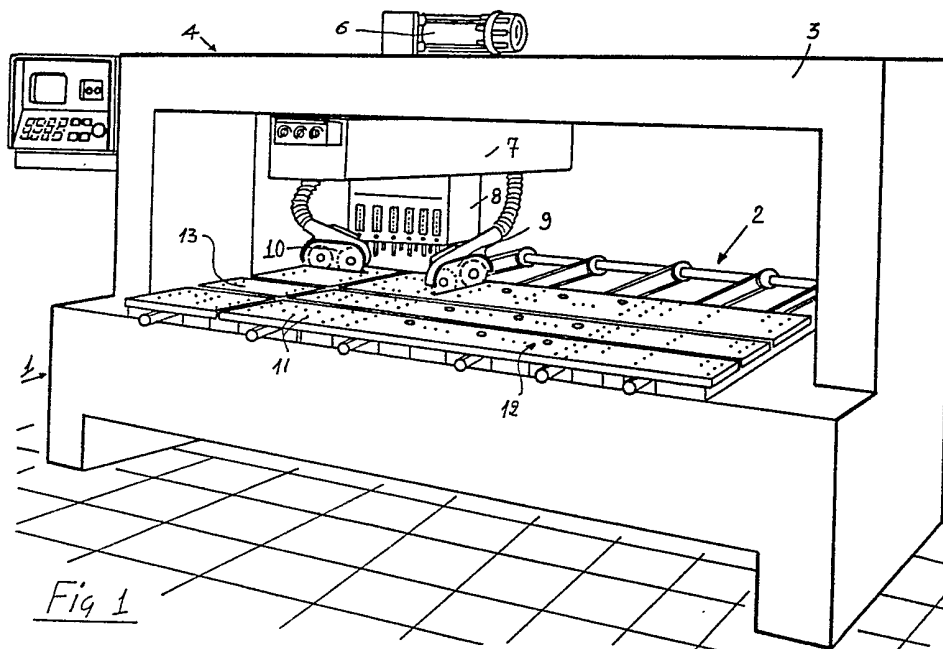
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(54) A method for forming panels for the production of furniture and the like and an automatic machine for forming the method

(57) The subject of the present invention is a method and a machine for forming panels for the production of furniture and the like, which provides for a plurality of holes (11) to be formed in predetermined positions on a sheet-like element (12) of large dimensions, which may be stabilised and/or veneered; subsequently parting and simultaneously squaring the sheet-like element to form a plurality of smaller panels (13) which the previously formed holes (11) are perfectly positioned for the subsequent assembly of furniture or the like. The machine comprises a base (1) with a cross beam (3) and a movable head (4) displaceable in two perpendicular directions and carrying a hole-piercing unit (8) and two parting and squaring units (9, 10) for operating on the sheet.



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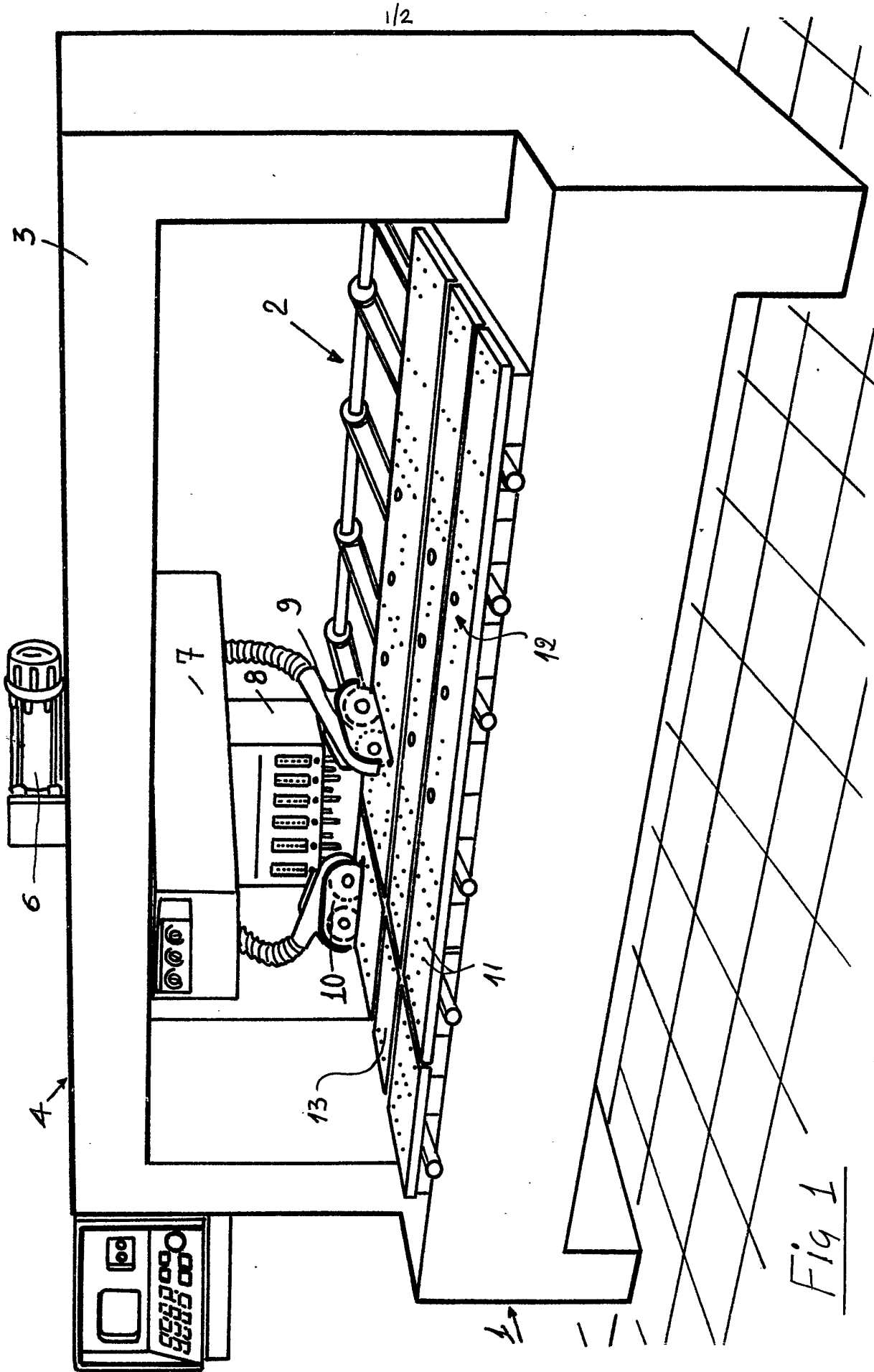


Fig 1

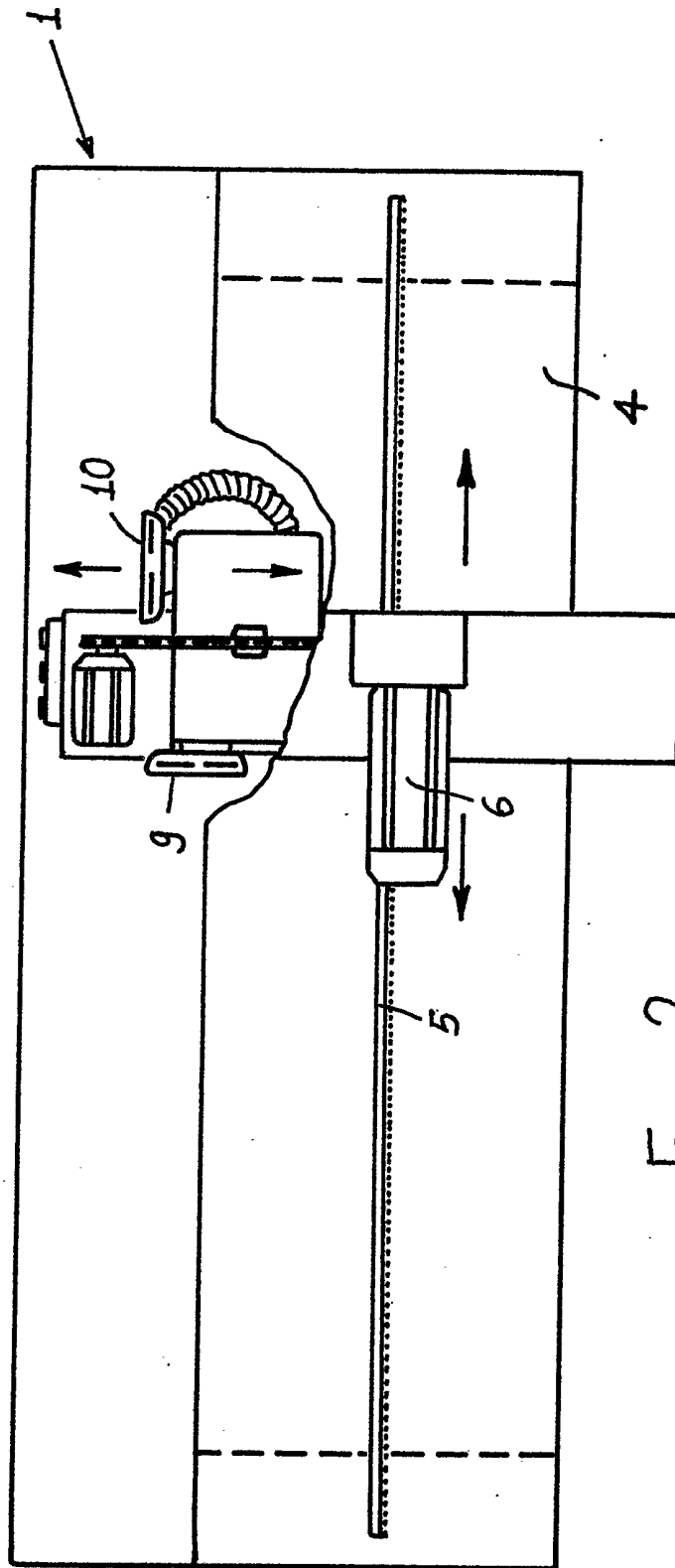


FIG. 2

SPECIFICATION

A method for forming panels for the production of furniture and the like, and an automatic machine for performing the method

The present invention relates to a method for forming panels for the production of furniture and the like, and an automatic machine which can be used for performing the method.

As is known, in the production of furniture and furnishing elements in general, panels of stabilised or coated chipboard are currently utilised, which are cut up into smaller panels, squared, edged and subsequently pierced with holes or recesses. The purpose of the piercing operation is to allow the assembly of the panels to produce units of furniture, by means of the suitable application of pins or other mechanical connection elements, which permit the various panels which constitute the furniture or the like to be assembled together rapidly and easily.

In the known art, the hole-forming operations are performed in effect as the final phase of the working of the panels used for producing the furniture. The accuracy with which the hole-forming operation is performed is often open to criticism in that there are inevitably dimensional differences in the various panels which would require continuous adjustment and modification of the guide stops of the hole-forming machines, in such a way as to be able to maintain any differences in the positions of the holes within acceptable tolerance limits.

These positioning differences, even if maintained within the tolerance limits, always make the final assembly of the furniture problematical. In fact, although such assembly is usually possible, it is rather difficult and requires a large amount of labour during assembly, and results in furniture which is not as rigid as it could be.

With the currently utilised processes it was practically impossible to have holes with precisely accurate positions in that the positioning of the holes themselves was affected by the dimensions of the panel, that is to say, by the precision with which the dimensions of the panel themselves were formed. Unfortunately this was not always obtained, because the tolerances on the preceding parting and squaring stages by which the large sheets are cut down to the finished panel sizes inevitably led to dimensional variations which, even though they were small, detracted from the accuracy of the subsequent hole-forming operation.

Another disadvantage attributable to the known prior art techniques is constituted by the fact that all the operating stages previously described were performed on different machines located in succession to one another and thereby requiring movement of the various panels to transport them from one working station to another, that is to say, from one machine to another. These machines performed, in succession, the various operations with a significant waste of space in that the machines themselves had to be located in the workshop and involved rather large dead times for transferring the workpieces between the various successive working

stages.

Another disadvantage, moreover, is constituted by the fact that the movement of the panels to transfer them between the various operating stations, significantly adds to the production costs.

The present invention seeks therefore to eliminate the previously discussed disadvantages by providing a new method of working the panels which will give the possibility of obtaining panels with a very high precision in the hole-forming operation such as to allow the elimination of any inconvenience upon assembly. The process of the present invention runs contrary to conventional practice and results in new and improved characteristics being obtained, both from a structural point of view and in the working stages.

The present invention also comprehends an automatic machine on which all the stages of the process can be performed, thus eliminating the necessity of moving the panels themselves to transfer them to the various operating stages. This machine, because of its particular structural characteristics, and being of the numerically controlled type, is able to provide the widest guarantees of reliability and safety in use.

According to one aspect of the present invention there is provided a method for forming panels for furniture and the like, in which a veneered and/or stabilised sheet-like element is first formed with a plurality of holes in predetermined positions, subsequently the pierced sheet-like element is subjected to parting operations to cut it up into a plurality of panels in which the previously formed holes are perfectly positioned for the subsequent assembly of furniture and the like.

According to another aspect of the present invention there is provided an automatic machine for forming panels for furniture and the like comprising a supporting frame which defines an upper working platform for the support of a sheet-like element, and a cross beam above the said platform supporting at least one operating head movable in two substantially perpendicular directions; the said operating head having at least one piercing unit and at least two parting and squaring units acting in perpendicular directions.

One embodiment of the present invention will now be more particularly described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a machine made in accordance with the principles of the invention; and

Figure 2 is a plan view from above of the machine shown in *Figure 1*, partially cut away, to illustrate certain details.

With particular reference now to the said drawings, the automatic machine for the production of panels for making furniture and the like, according to the invention, includes a supporting frame generally indicated with the reference numeral 1, which defines an upper working platform 2 on which a stabilised, coated (e.g. melamine coated) or veneered sheet-like element of large dimensions can be positioned. Over the platform 2 extends an upper cross beam 3 which serves as a support and guide

element for at least one operating head generally indicated with the reference numeral 4, which is connected in such a way that it can be displaced in two perpendicular directions, that is to say, a
5 direction along the cross beam 3 and in a direction perpendicular to it.

In more detail, on the cross beam 3 there is provided a guide rack 5 with which a first motor 6 engages, which allows longitudinal displacements
10 of the head to be performed. Beneath the cross beam 3 there is located an intermediate frame 7 which allows displacement of the working zone of the operating head 4 in a transverse direction in such a way that, in combination with the movement
15 conferred to the frame itself by the upper rack 5, the operating head will have the possibility of moving to any point in the plane defined by the platform 2.

At its lower part the operating head 4 has at least one hole-forming head, indicated 8, which is pro-
20 vided with a plurality of drill bits, variously positionable, and controlled by a programming unit, which allows a precise and rapid selection of the drill bits to be effected.

Advantageously, the machine is of numerically
25 controlled type which allows the maximum working precision.

Alongside the operating head 8 there are advantageously provided two parting and squaring units, respectively indicated 9 and 10, which are provided
30 with a pair of cutters or working tools which work along substantially parallel axes. Advantageously, the two units work in directions perpendicular to one another.

In practice, for the performance of the method in
35 question it is sufficient to position on the platform 2 a sheet-like element 12 of large dimensions corresponding to the useful operating plane defined by the platform 2.

The first operation which is performed, and this is
40 an important detail of the invention, consists in performing the hole-forming operation by making, on the still complete sheet-like element, a plurality of holes 11 in the exact positions which they are to assume in the panels 13 which will be subsequently
45 formed.

This principle reverses in practice, that currently utilised in which the hole-forming operation was performed last.

In this case, on the other hand, the hole-forming
50 operation is performed as the first operation on the still complete sheet-like element 12.

Once the hole-forming operation has been performed by means of the hole-forming head 8, the parting and squaring units 9 and 10 are activated,
55 which act to perform, according to an automatic cycle, on the sheet-like element 12 which is still positioned on the same platform 2, the parting and squaring operations required to obtain the various panels 13 desired from the sheet.

There is thus the certainty that the holes 11 will be
60 perfectly positioned in that their positions are not determined with reference to the edges of the panels 13 to be cut from the sheet 12, which could have dimensional variations and consequently could in-
65 volve errors in positioning, but rather are absolutely

positioned by the machine before the sheet 12 is cut into panels 13.

In the case in question, the panels 13 are in practice parted by taking as reference points the
70 positions of the holes 11 after they have been formed which, consequently, are always perfectly positioned with significant advantage in the subsequent operating stages.

Once the parting and squaring operations which
75 are performed simultaneously are completed, the panels 13, which have been in practice formed on a single machine without being subject to any displacement to transfer them from one machine to another, will be ready for a wide range of uses. In the
80 case in which edging of a panel 13 is necessary, this latter can be subjected to edging in a conventional machine and, possibly, whenever this is required, the panel can be provided with edge holes.

From what has been explained above it will be
85 seen how the method described above, as well as the utilised for its performance, leads to a significant simplification in the furniture manufacturing operations in that they do not require, for the hole-forming, parting and squaring operations on the
90 panel, any translation of the product, with the total elimination of transport chains between one working stage and another.

This provides a significant reduction in the area occupied by the installations, a small consumption
95 of electrical energy and a smaller number of operators.

Further, the significant precision with which the hole-forming can be obtained must also be taken
100 into consideration, which is very considerably better than that which can be obtained using the constructional processes adopted on currently commercially available machines and even better than that which can be obtained by an artisan of tested ability and experience.

The invention, thus conceived, is susceptible of
105 numerous modifications and variations, all within the scope of the inventive concept as defined in the following Claims.

Moreover, all the details can be replaced by other
110 constructional and technically equivalent detail.

In practice, the materials used, as well as the dimensions and the contingent forms, can be of any type according to requirements.

115 CLAIMS

1. A method for forming panels for furniture and the like, in which a veneered and/or stabilised sheet-like element is first formed with a plurality of
120 holes in predetermined positions, subsequently the pierced sheet-like element is subjected to parting operations to cut it up into a plurality of panels in which the previously formed holes are perfectly positioned for the subsequent assembly of furniture and the like.

2. A method as Claimed in claim 1, in which at least one of the pierced panels cut from the sheet is subjected to an edge squaring operation and/or to an edging operation and/or to an edge piercing opera-
130 tion.

3. A method as claimed in Claim 1 or Claim 2, in which all the operations are performed on a single automatic machine.

4. An automatic machine for forming panels for furniture and the like, comprising a supporting frame which defines an upper working platform for the support of a sheet-like element, and a cross beam above the said platform, supporting at least one operating head movable in two substantially perpendicular directions; the said operating head having at least one piercing unit and at least two parting and squaring units acting in perpendicular directions.

5. A machine as claimed in Claim 4, in which the said operating head is movable along a rack extending longitudinally along the said cross beam and supports an intermediate frame movable in a direction substantially perpendicular to the direction defined by the rack.

6. A machine as claimed in Claim 4 or Claim 5, in which there are a plurality of operating heads capable of acting simultaneously on a sheet-like element.

7. A machine as claimed in any of Claims 4, 5 or 6, in which the said parting and squaring units have two tools rotating about substantially parallel axes.

8. A machine as claimed in any of Claims 4 to 7, in which the hole-forming, parting and squaring operations can be performed on a panel without movement of the product.

9. A machine for forming panels for furniture and the like, substantially as hereinbefore described with reference to the accompanying drawings.

10. A method for forming panels for furniture and the like substantially as hereinbefore described with reference to and as shown in, the accompanying drawings.