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(54) An apparatus for spraying glue into panel holes

(57) The invention relates to an apparatus for spraying glue into panel holes, comprising panel feeding means (11) for feeding the panels to a sprayer set assembly (9). The main feature of the invention is that the sprayer set assembly is operatively coupled to sensor means (13) for sensing the specific geometric con-

figuration of the holes pertaining to the panel (5) being supplied to the sensor means, as well as to programmable means for timing a single sprayer element at the holes of the panel to be sprayed with glue.

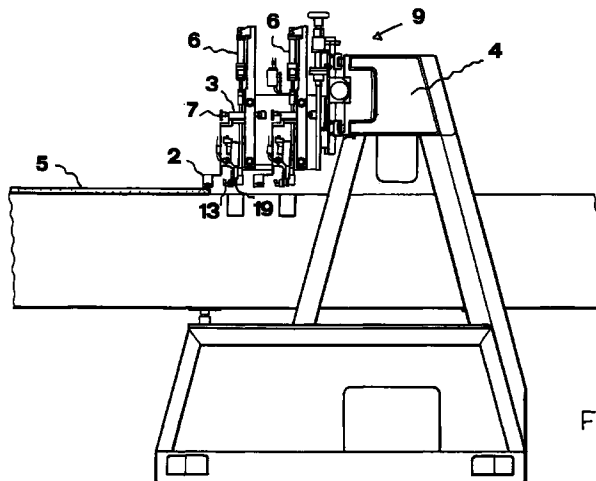


FIG. 3

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an apparatus for spraying a glue into panel holes.

[0002] The panels, in particular, are provided for assembling to form furniture pieces.

[0003] As is known, for assembling furniture panels by using clamping and pin assembling means, the panels are at first subjected to boring operations.

[0004] The panel bores or holes, in particular, are suitably arranged through the desired surfaces of the panel, where pin elements for assembling said panels will be applied.

[0005] In turn, the pin element must be glued at suitable and suitably preset positions, so as to provide an easy and firm assembling thereof.

[0006] Accordingly, each panel is at the start subjected to multiple boring operations, and, to the formed holes, a glue material for properly glueing the pin elements must be introduced.

[0007] A proper application of the glue material to said holes is affected by the problem that the holes are provided in different patterns which can greatly vary from panel to panel.

[0008] Thus, it is not possible to properly process in a continuous manner a plurality of panels, since said panels are usually different from one another and are provided with different hole patterns.

SUMMARY OF THE INVENTION

[0009] Accordingly, the aim of the present invention is to provide an apparatus for spraying glue into panel holes, which is specifically designed for automatically precisely spraying a glue material into a plurality of panel holes, while detecting the specific arrangements of the holes provided in the individual panels.

[0010] Within the scope of the above mentioned aim, a main object of the present invention is to provide such an automatic glue application apparatus which is specifically designed for automatically spraying a glue material into a plurality of holes formed in corresponding panels, without requiring the panel conveying belt to be stopped.

[0011] Another object of the present invention is to provide a glue spraying apparatus which can be fitted to different types of panel processing operations, in particular which can be fitted to a lot of different panels having a lot of different hole patterns provided therein.

[0012] Another object of the present invention is to provide such an automatic glue application apparatus which is adapted to also detect the provision of projections and the like, as formed on particular type of panels, so as to automatically fit to these panels.

[0013] According to one aspect of the present invention, the above mentioned aim and objects, as well as

yet other objects, which will become more apparent hereinafter, are achieved by an apparatus for spraying glue into panel holes, comprising panel feeding means for supplying the panels to a spraying set assembly supported by a framework, said apparatus being characterized in that said spraying set assembly is operatively coupled to sensing means for sensing a specific geometric pattern of the panel holes formed in a panel fed to said apparatus, as well as to programmable means for timing a single spraying element of said spraying element set at panel holes thereinto the glue is to be sprayed.

[0014] According to a preferred embodiment of the present invention, the sensing means comprise a plurality of photocells which are vertically arranged of the panel.

[0015] According to a further preferred embodiment of the present invention, each of said spraying element set comprises a photocell for detecting the provision of a hole as well as a glue spraying element, which glueing spraying element is arranged downstream of said photocell along the panel feeding direction, at a distance which substantially corresponds to the diameter of the hole into which the glue must be sprayed.

[0016] According to yet another preferred embodiment of the present invention, the programmable means for driving a single or individual spraying element comprises a PLC.

[0017] Advantageously, each spraying element set is mounted on supporting guides therealong it can be displaced independently from the other spraying element sets, transversely of the panel feeding direction.

[0018] According to yet another preferred embodiment of the present invention, the apparatus according to the invention further comprises at least a horizontal photocell supporting element, arranged upstream of said spraying element set assembly.

[0019] Alternately to the use of a PLC, the glue spraying machine according to the present invention can also comprise a numerical control device for suitably timing the individual spraying elements at each hole of said panel to which said glue must be applied.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Further advantages and characteristics of the present invention will become more apparent hereinafter from the following disclosure, given by way of an illustrative but not limitative example, with reference to the accompanying drawings, where:

Figure 1 is a top schematic view of the glue spraying apparatus according to the present invention;

Figure 2 is a further schematic top view of the spraying set of the apparatus shown in Figure 1;

Figure 3 is a schematic side view of a spraying set

of the subject apparatus;

Figure 4 is a detailed side view of the spraying set;

Figure 5 is a side view of a spraying set in a first operating position thereof; and

Figure 6 is a further side view of the spraying set in a second operating position thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] In the following disclosure reference will be made to some preferred embodiments of the invention, which have been shown by way of a not limitative example of several possible variations of the invention.

[0022] Figure 1 illustrates a glue spraying machine for spraying a glue into holes formed on panels, according to the present invention, and generally indicated by the reference number 1.

[0023] The apparatus comprises panel feeding means for feeding panels to be processed to an assembly 9 including a plurality of spraying element sets 20, each including a plurality of conveyor rollers 11, slightly slanted in a cross direction of the panel 5 feeding direction, and cooperating with a plurality of side vertical abutment rollers 10, in order to allow a panel 5 being processed to be perfectly aligned and guided.

[0024] The assembly 9 of spraying element sets 20 comprises sensor means, in particular including a plurality of photocells 13, which are vertically arranged of the panel 5 and cooperate with a PLC for sensing the specific geometric configuration or pattern of the panel holes as said panel is supplied to the apparatus 1.

[0025] More specifically, each spraying element set 20 comprises a photocell 13 for detecting the presence of a respective hole 12, as well as a glue spraying element 19; each spraying element 19 is arranged downstream of its respective photocell 13 with respect to the panel feeding direction, at a distance substantially corresponding to the diameter of the hole 12.

[0026] The glue spraying apparatus 1 comprises furthermore programmable means, preferably comprising a PLC, in order to suitably drive, with a set timing, a single spraying element 13 at each hole 12 of said panel 5 to which said glue must be applied.

[0027] A further feature of the glue spraying apparatus 1 according to the invention is that each said spraying element set 20 is mounted on a framework 4 provided with a plurality of supporting guides 21, on which an individual spraying element set 20 can be driven in a cross direction with respect to the panel feeding direction.

[0028] To each spraying element set 20, actually, an adjusting element 3 is coupled, for adjusting the position of the glue spraying element 19, said adjusting element

3 including a locking knob 7, an adjusting screw and a reference or set screw 18 for engaging with a suitable position of a rack 8, said rack having preferably a rack pitch corresponding to the diameter of the smallest holes to be processed.

[0029] The driving of the individual spraying element sets 20 can be carried out independently from the other spraying element sets 20, thereby the spraying apparatus can be fitted to a lot of different types of panels and patterns and size of the holes 12 formed in said panels 5.

[0030] The subject apparatus 1 comprises moreover at least a support element 2 for a horizontal photocell, which support element is arranged upstream of said spraying element set 20 assembly 9, in the panel 5 feeding direction.

[0031] Furthermore, each said spraying element set 20 can be slidably driven on sliding pads 15 along a linear guide 14, by a pneumatic driving cylinder 6.

[0032] Thus, the apparatus 1 can also detect the provision of projections or the like, characteristic of particular types of panels, thereby automatically fitting to these panels, as clearly shown in Figures 5 and 6, in which the spraying element set 20 is shown in two different working positions.

[0033] The apparatus for spraying glue in panel holes according to the present invention operates as follows.

[0034] As stated, said photocells 13 are arranged at set positions and are specifically designed for detecting the panels according to the geometrical patterns of the holes 12 therein.

[0035] More specifically, the photocells 13 are arranged along such a direction that the panel, being fed by the conveyor rollers 11, will be arranged so that the holes 12 thereof will pass through the region where the related photocell 13 is arranged which photocell, upon detecting the respective hole 12, will drive, with a slight delay, the spraying element 19 associated with said photocell.

[0036] Then, upon having detected a panel 5, the apparatus will cause the feeding speed of the panel 5 to decrease to properly arrange the panel 5 at the hole detecting photocells.

[0037] Then, with the mentioned small delay, the glue will be sprayed in said holes; the delay, in particular, will also depend on the smaller sliding speed of the panel 5 at the spraying set.

[0038] Advantageously, the spraying operation will be started as the panel 5 passes through the photocell 13, i.e. at the end of the hole 12 detected by said photocell.

[0039] Actually, the distance of the photocell 13 and spraying element 19 substantially corresponds to the diameter of the hole 12 thereby, as the hole 12 has passed through the photocell 13, it will be arranged with its leading edge at the vertical line of the spraying element 19, thereby allowing the apparatus to detect the most suitable glue spraying time.

[0040] As stated, the subject apparatus is preferably

controlled by a PLC which will greatly simplify the construction and operation of the apparatus, by providing very simple control elements for controlling the operation of said apparatus.

[0041] Moreover, it will allow the apparatus to operate with a very high operating speed.

[0042] From the above it should be apparent that a glue spraying apparatus 1 having a very flexible operation has been provided.

[0043] As stated, an alternating solution to the use of a PLC, even if with a smaller processing rate, would provide to use a numerical control system in order to timely drive the single spraying elements at each hole of said panel.

[0044] From the above disclosure it should be also apparent that the invention fully achieves the intended objects.

Claims

1. An apparatus for spraying glue into panel holes, comprising panel feeding means for feeding panels to a spraying element set assembly supported by a supporting framework, characterized in that said spraying element set assembly is operatively coupled to sensing means for sensing a geometric pattern of said holes in a said panel supplied to said apparatus, as well as to programmable means for timing the operation of individual spraying elements of a said spraying element set at said panel holes to which a glue must be applied.
2. An apparatus for spraying glue into panel holes, according to Claim 1, characterized in that said sensing means comprise a plurality of photocells arranged vertically of a said panel being processed.
3. An apparatus for spraying glue into panel holes, according to Claim 1 or 2, characterized in that each said spraying element set comprises a photocell for detecting a hole and a glue spraying element, said glue spraying element being arranged downstream of said photocell in the panel feeding direction at a distance substantially corresponding to a diameter of said hole.
4. An apparatus for spraying glue into panel holes, according to one or more of the preceding claims, characterized in that said programmable means for driving a single spraying element comprises a PLC.
5. An apparatus for spraying glue into panel holes, according to one or more of the preceding claims, characterized in that each said spraying element set is supported on supporting guides thereon said spraying element set can be driven independently from the other spraying element sets, in a cross direction of said panel feeding direction.
6. An apparatus for spraying glue into panel holes, according to one or more of the preceding claims, characterized in that said apparatus comprises moreover at least a supporting element for a horizontal photocell, said supporting element being arranged upstream of said spraying element set assembly, in the panel feeding direction.
7. An apparatus for spraying glue into panel holes, according to one or more of the preceding claims, characterized in that each said spraying element set is vertically slidable along a linear guide as controlled by a pneumatic driving cylinder.
8. An apparatus for spraying glue into panel holes, according to one or more of the preceding claims, characterized in that said panel feeding means for feeding said panels to said spraying element set assembly comprise a plurality of panel conveyor rollers, slightly slanted in a cross direction of said panel feeding direction and cooperating with a plurality of vertical abutting side rollers.
9. An apparatus for spraying glue into panel holes, comprising feeding means for supplying said panels to a spraying element set assembly, characterized in that said spraying element set assembly is operatively coupled to sensing means for sensing a specific geometric pattern of said holes in a said panel being supplied to said spraying element set assembly and to a numeric control system for timing an individual spraying element at a corresponding hole of a said panel to which glue must be applied.

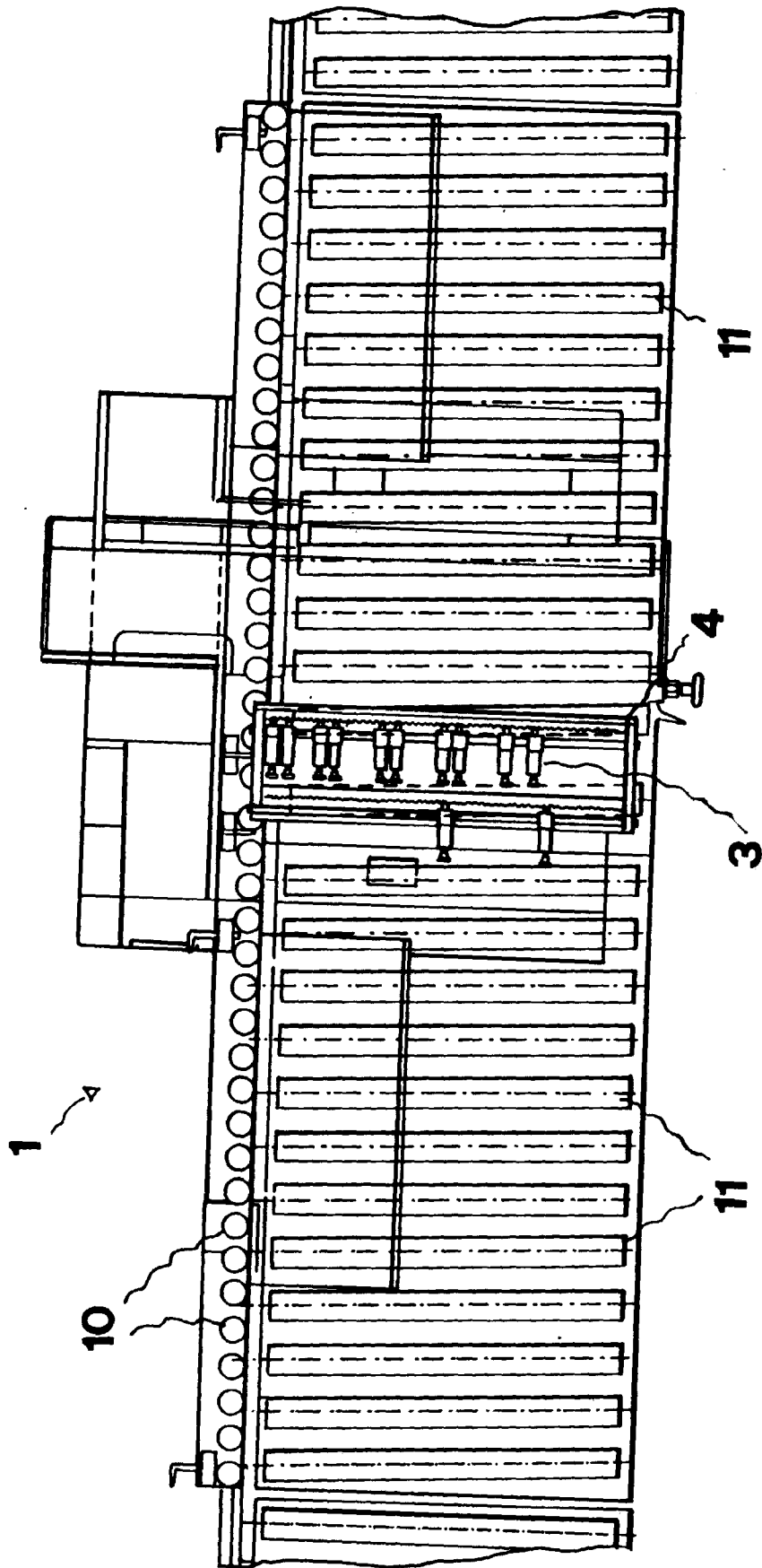


FIG. 1

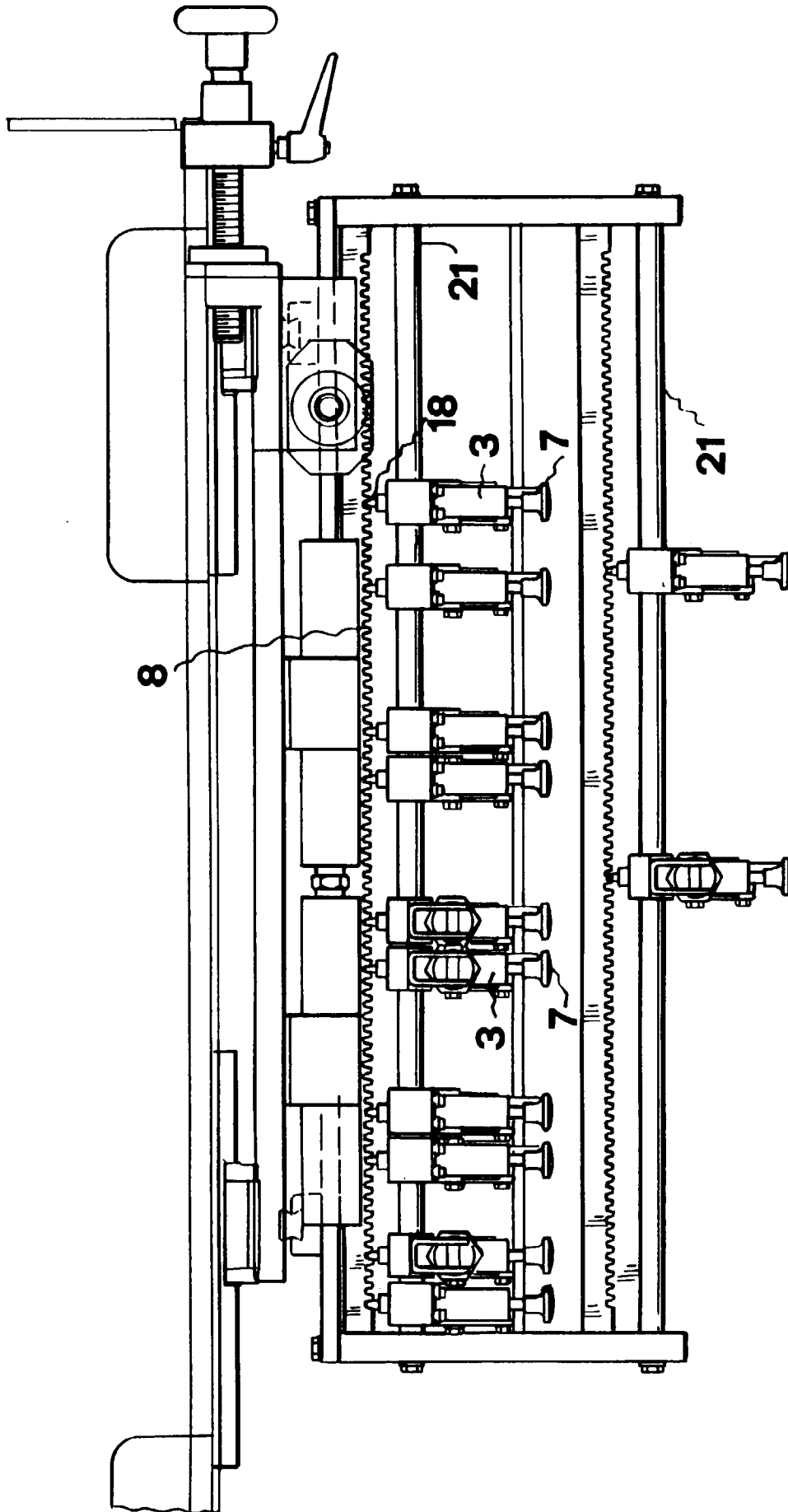


FIG. 2

