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71 Applicant: Perini, Peter Frederick
29 Shellcove Road
Neutral Bay New South Wales 2089 (AU)

72 Inventor: Allen, Robert Andrew
383 West Botany Street
Rockdale, New South Wales 2216 (AU)

Till, Lynton George
383 West Botany Street
Rockdale, New South Wales 2216 (AU)

74 Representative: MacGregor, Gordon et al
ERIC POTTER & CLARKSON 14 Oxford Street
Nottingham, NG1 5BP (GB)

54 A core manufacturing machine.

57 A machine 15 to manufacture door cores 12, the machine 15 includes a cutter 19 which receives a plurality of cardboard sheets and formed in the sheets lines of weakness, a glue applicator to apply glue to the sheets along lines normal to the lines of weakness, and a laminating conveyor 27 to attach the sheets, and a press to form a laminated structure by curing the glue. Portions are then severed from the sheets, which portions are defined by the lines of weakness.

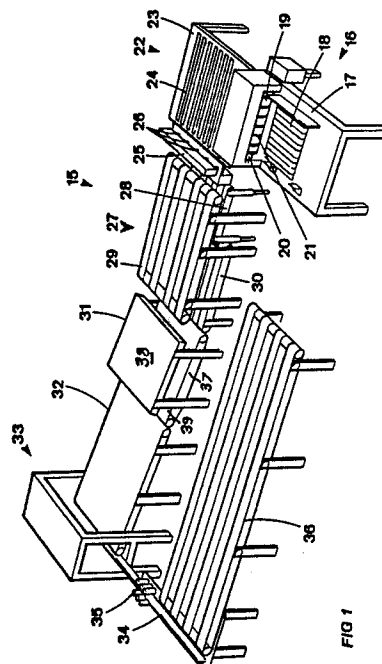


FIG 1

Description

A CORE MANUFACTURING MACHINE

The present invention relates to the manufacture of cores for laminated panels and more particularly but not exclusively to the manufacture of cores for doors, which cores are sandwiched between the two major panels of the door.

Cores used in the manufacture of panels and doors have consisted of a "honeycomb" of cardboard. The "honeycomb" being formed from strips of cardboard. This method of forming the cores from strips is time consuming and therefore costly.

It is the object of the present invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a machine to manufacture a laminated product to be used in the manufacture of cores, said laminated product consisting of a plurality of laminated sheets, said machine comprising cutter means to receive at least one of said sheets at a time and to deform same as the sheets pass through the cutter means, said cutter means being adapted to deform said sheets so as to form in said sheets a plurality of parallel lines of weakness, glue applicator means to apply glue to the sheets so that the glue is located along lines extending generally normal to the lines of weakness in the sheets, and laminating means to receive a plurality of weakened and glued sheets and to stack same with the lines of weakness lying within common planes normal to the sheets.

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a perspective plan view of a machine to manufacture the door cores;

Figure 2 is a schematic perspective view of a door frame employing a core manufactured by the machine of Figure 1; and

Figure 3 is a schematic perspective view of a core to be used in the manufacture of the door of Figure 2.

In Figure 2 of the accompanying drawings, there is schematically depicted a door 10, under manufacture and consisting of a timber frame 11 which receives a core 12. The core 12 is a "honeycomb" cardboard construction formed by expanding the compacted core 12A of Figure 3. The core 12A consists of a plurality of strips 13 of cardboard glued together along lines 14 so that upon the core 12A being expanded, the honeycomb construction as seen in Figure 2 is created. As best seen in Figure 3, the glue lines 14A of one strip 13 are not aligned with the glue line 14B of the adjacent strip 13. More particularly the glue lines of every second strip 13 are aligned so that the glue lines thereof are arranged in planes extending generally normal to the general direction of extension of the strips 13. The strips 13 are preferably strips of cardboard and more particularly but not exclusively, corrugated cardboard or a cardboard laminated structure.

In Figure 1 there is schematically depicted a machine 15 to manufacture the core 12A of Figure 4.

The machine 15 has a first workstation 16 which receives a stack of corrugated sized cardboard sheets. The workstation 16 includes a conveyor assembly 17 having a set of belts 18 which are apertured. A vacuum is applied to the underside of the belts 18 so that the bottom sheet of the stack is firmly held against the belts 18. When the conveyor assembly 17 is activated, the bottom sheet is fed to a slitter assembly 19 consisting of a rotatably driven shaft 20 upon which a plurality of circular blades 21 are fixed. As the sheet is passed through the slitter assembly 19, the sheet is cut so as to have a plurality of lines of weakness extending the length of the sheet. These lines of weakness basically consist of lengths wherein the sheet is entirely cut, which cut lengths are separated by uncut portions. Accordingly the sheet maintains its integrity but provides lines of weakness along which strips 13 may be removed from the sheet. The conveyor assembly 17 includes a stop which retains the remaining sheets in position as each lowermost sheet is moved through the slitter assembly 19.

Each sheet, provided with its lines of weakness, is delivered to a second workstation 22 consisting of a conveyor assembly 23 having belts 24 which extend at 90° to the direction of delivery of the sheets to the workstation 22. Once a sheet is located on the belts 24, the belts 24 are operated to pass the weakened sheet through a glue assembly 25 consisting of a plurality of glue heads 26 which lay glue lines along the sheet as it passes therebeneath. The glue heads 26 are reciprocally mounted on a base so as to be movable between two positions, so that the glue lines of consecutive sheets are not aligned. Such a gluing arrangement enables the honeycomb core 12 to be produced. As best seen in Figure 4, when the heads 26 are in a first position, the glue lines 14A are formed, while when the head is in the second position, the glue lines 14B are formed. This then locates the glue lines in two sets of planes, one set of planes being associated with a first set of strips 13, and the other set of planes being associated with strips 13 located between the strips 13 of the first set of planes.

After passing through the second workstation 22, the sheet now provided with weakened lines and glue lines running normal thereto, it is delivered to a conveyor assembly 27. The conveyor assembly 27 includes a first conveyor 28 which receives the glued sheets, which in turn delivers these sheets to the under surface of a second conveyor 29 wherein the belts are of the perforated kind to which a vacuum is applied. The sheets when first engaged by the conveyor 29 are raised from the conveyor 28 due to the vacuum applied to the apertures in the belts of the conveyor 29. The conveyor 29 delivers the glued sheets to a collating conveyor 30 which accumulates several of the glued sheets so as to form a laminated structure thereof. To release the sheets from the conveyor 29, the vacuum is turned off. Once the desired number of sheets has been collected, the

glued laminated structure is delivered to a press assembly 31 to cause curing of the glue. Accordingly it is preferable that the glue is a pressure sensitive glue. The press assembly includes a lower press conveyor belt 39 which passes over a support 37. An upper movable press member 38 is lowered to engage the laminated structure. Once the glue has cured, the laminated structure is delivered to a further conveyor 32, by the belt 39, which delivers the laminated structure to a further workstation 33. The workstation 33 includes a guillotine which severs cores 12A from the laminated structure. The cores 12A are then transferred via a further conveyor 34 through knurling rollers 35 which size the cores 12A while knurling the edges thereof to give a full gluing area. The cores 12A are then delivered to an accumulator conveyor 36.

The above described guillotine would include a clamp assembly which engages the laminated structure while the blade of the guillotine is lowered to sever the core 12A along the lines of weakness of the sheets of the laminated structure.

As can be seen from the above, when the glued sheets are being stacked, the lines of weakness extend transverse of the direction of travel of the sheets, and are aligned so as to lie within a plurality of planes extending normal to the sheets and normal to the direction of travel of the sheets along the conveyor assembly 27.

Claims

1. A machine 15 to manufacture a laminated product to be used in the manufacture of cores 12, said laminated product consisting of a plurality of laminated sheets, said machine 15 comprising cutter means to receive at least one of said sheets at a time and to deform same as the sheets pass through the cutter means, said cutter means 19 being adapted to deform said sheets so as to form in said sheets a plurality of parallel lines of weakness, glue applicator means 25 to apply glue to the sheets so that the glue is located along lines extending generally normal to the lines of weakness in the sheets, and laminating means 27 to receive a plurality of weakened and glued sheets and to stack same with the lines of weakness lying within common planes normal to the sheets.

2. The machine 15 of Claim 1 further including a first conveyor 17 which delivers said sheets to said cutter means 19, a second conveyor 23 to deliver said sheets to said glue applicator, and wherein said first conveyor 17 has a direction of travel normal to the direction of travel of said second conveyor 23.

3. The machine 15 of Claim 2 further including press means 31 to engage the laminated sheets so as to apply thereto to aid in curing of the glue.

4. The machine of Claim 3 wherein said pressure means 31 comprises a conveyor belt 39 which receives the laminated sheets, and a

movable press member 38 to apply pressure to the laminated sheets.

5. The machine 15 of Claim 4 further including a guillotine means 33 to sever portions from the laminated sheets, which portions are defined by said lines of weakness.

6. The machine 15 of Claim 1 wherein said cutter means 19 comprises a plurality of blades 21 which sever each sheet at portions extending along the lines of weakness.

7. The machine 15 of Claim 6 wherein said glue applicator includes a plurality of nozzles to deliver the glue.

8. The machine of Claim 1 wherein said laminating means 27 comprises a first conveyor 29 to engage the sheets, which first conveyor 29 engages an upper surface of the sheets, and a second conveyor 30 located beneath the first conveyor 29 and to which the sheets are delivered so as to be laminated on the second conveyor 30.

9. A machine to manufacture cores for doors, substantially as hereinbefore described with reference to the accompanying drawings.

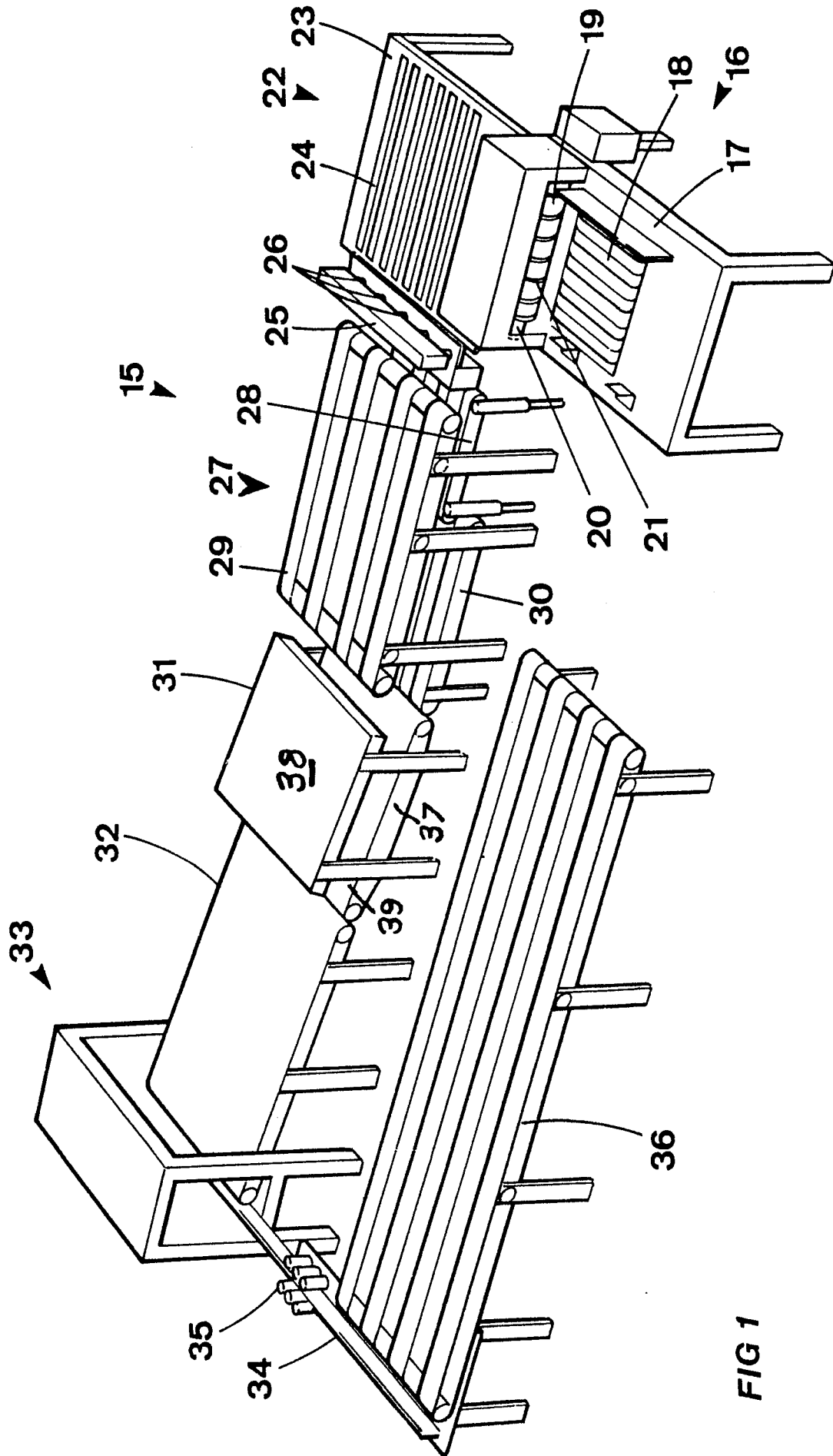


FIG 1

