

[54] MACHINE FOR CONTINUOUS
MANUFACTURING OF CHIP BOARDS

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[22] Filed: Aug. 15, 1972

[21] Appl. No.: 280,854

[30] Foreign Application Priority Data

Aug. 16, 1971 Finland..... 2278/71

[52] U.S. Cl..... 425/141, 264/109, 425/371,
425/812

[51] Int. Cl..... B29c 3/06, B29j 5/00

[58] Field of Search..... 425/364, 371, 141,
425/4, 812; 264/109, 112, 122

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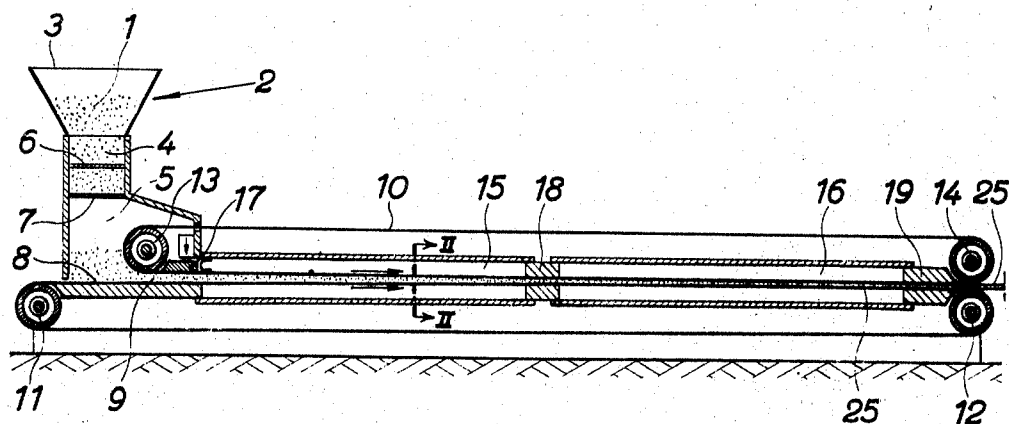
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[57] ABSTRACT

Machine for continuous manufacturing of chip boards, consisting of a strewing station for strewing chips to form a mat on a moving surface and a continuous action press for pressing the chip mat in the press gap between two moving surfaces, at least one of which consists of an endless belt, most appropriately a steel band, which is loaded by the aid of a pressure chamber to be urged in direction against the chip mat. The chip strewing station has been formed to constitute a chamber provided with a closable feed opening, which chamber directly communicates with the press gap provided with marginal seals and into which chamber pressure fluid can be introduced under a pressure which at the most equals the pressure prevailing in the pressure chamber.

6 Claims, 2 Drawing Figures



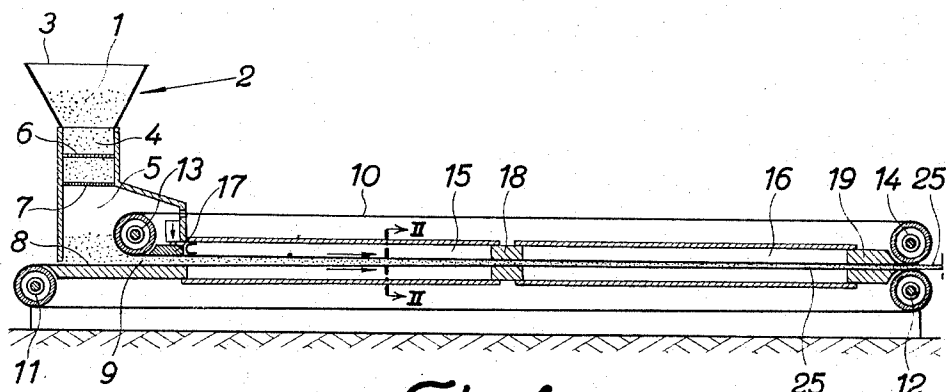


Fig. 1

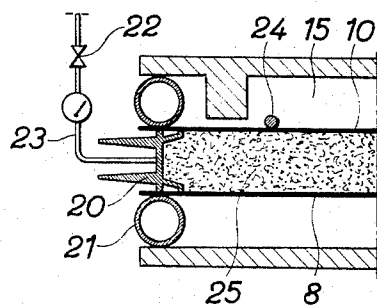


Fig. 2

MACHINE FOR CONTINUOUS MANUFACTURING OF CHIP BOARDS

The trend has been observed in chip board manufacturing to increasingly adopt a continuous manufacturing process in replacement of the cycle process. In continuous action devices of prior art a continuous action press has been employed which has two endless steel bands, into the press gap between which the chip material has been fed. However, the press force between the bands as such is insufficient, for which reason the pressure has been increased by means of a pressure chamber acting upon the band. Since the requisite pressure is rather high, the ascent of pressure at the initial end of the band then takes place by a rapid step from zero to peak pressure, which is not favourable for the band nor for the chip board to be manufactured.

The object of the present invention is to eliminate this drawback and to provide a chip board manufacturing machine wherein the compressive force acting from outward on the chip mat in the press gap increases uniformly. The invention is characterized in that the chip strewing station has been formed so as to constitute a chamber provided with a closable feeding aperture and which immediately communicates with the press gap, provided with edge seals, and into which pressure medium can be supplied under a pressure which at most equals the pressure prevailing in the pressure chamber.

In that case the pressing force acting on the chip mat will increase at a uniform rate, for the following reason. The pressure of the pressure fluid in the press gap at the initial end of the endless band nearly equals the pressure in the pressure chamber outside the band. Low differential pressure also implies a low pressing force. As a result of the porous character of the chip board, the pressure fluid pressure in the press gap decreases towards the ultimate end of the press gap, and it equals the atmospheric pressure at the point where the completed board emerges from the machine. Hereby the differential pressure between the pressure chamber and the press gap increases, that is, the force compressing the chip mat increases. In other words, as the pressure fluid in the press gap yields by bleeding off, the chip mat takes up an increasing pressing force and is compressed to become a chip board.

An appropriate way to preserve the pressure in the chip strewing station is to provide the feed opening of the strewing station with two consecutive, tightly closing hatches, which are alternately opened, whereby the pressure in the strewing chamber cannot escape when chip material is introduced into the strewing chamber through the feed opening. It is then necessary to supply additional pressure fluid only in the amount in which it passes off through the porous chip mat.

According to an advantageous embodiment, there are on both sides of the press gap in the marginal seals, over the entire length of the press gap at fixed intervals, vent pipes provided with valves, for regulating the pressure prevailing in the press gap at various points of this press gap. The conditions in the press gap are then completely controllable and the pressure ascent curve, among others, is easily adjustable to be the most favourable.

The lowering of pressure is accomplished, according to one embodiment, in that the pressure chamber has been subdivided into several consecutive chambers in which pressures of different height prevail. If the number of chambers is made large enough, the pressure act-

ing from the outside on the endless band can be made to change by sufficiently small steps. It is more advantageous, however, to provide only a few pressure chambers and to arrange for the change of pressure by placing opposite to the end walls and partitions of the chambers, drag presses. A drag press is here understood to be a press known in prior art, wherein the endless band drags against a supporting surface. In the present instance the drag presses may be made comparatively short, whereby friction will not constitute any objectionable factor.

According to still another embodiment, the conditions in the press gap may be controlled by arranging said valves of the vent pipes in the marginal seals of the press gap to be controlled by sensors touching the endless band, which sensors measure the thickness of the chip mat in the press gap. It is then achieved that the chip mat is compressed in accordance with a preconceived programme. If, for instance, for one reason or another an excessive quantity of chip material is introduced into the press gap, this material will urge the endless band outwardly. The resultant movement of the sensor opens the valve in the marginal seal of the press gap at this point, whereby the differential pressure between the press gap and the pressure chamber increases and the increased pressing force compresses the chip mat down to desired thickness.

The invention is described in closer detail in the following with the aid of an example, with reference to the attached drawing, wherein

FIG. 1 shows a chip board manufacturing machine according to one embodiment of the invention in longitudinal vertical section, and

FIG. 2 shows the section carried along the line II—II in FIG. 1.

Referring now to the drawing, the chip material 1 is fed by the aid of the strewing station 2, which comprises the feed hopper 3, the feed aperture 4 and the strewing chamber 5. The feed aperture has been provided with two consecutive, tightly closing hatches 6 and 7, which are alternately opened, whereby the pressure existing in the strewing chamber 5 cannot escape when chip material 1 is fed through the feed aperture 4 into the strewing chamber 5. In the strewing chamber 5 the chip material 1 is strewn to be deposited on an endless belt conveyor 8, whence it ends up to the press gap 9 of a continuous action press.

The press comprises the bands 8 and 10 and their end rolls 11, 12, 13 and 14. The band 10 is subject to pressure from the pressure chambers 15 and 16 and from the drag presses 17, 18 and 19. The belt conveyor 8 has corresponding pressing elements at corresponding points. The press gap 9 is confined on both sides by marginal seals 20, and the pressure chambers have sealing elements 21 at corresponding points. In the marginal seals 20 of the press gap 9 there are at fixed intervals vent pipes 23 provided with valves 22. The endless band 10 is touched by sensors 24, which control the valves 22 of the vent pipes 23 by measuring the thickness of the chip mat 25.

The chip board manufacturing machine according to the example operates so that a pressure of 25 at gauge pressure is present in the strewing chamber. At the first stage the drag press 17 performs preparatory pressing of the chip mat. This is followed by the pressure chamber 15 containing a pressure 26 at gauge. At the initial end of the pressure chamber 15 there is a differential

pressure of 1 at, which increases in the same degree in which the vent pipes 23 in the marginal seals 20 reduce the pressure of the pressure fluid in the press gap 9. At the end of the pressure chamber 25 the pressure in the press gap is 1 at and the differential pressure is at its maximum or 26 at. In the drag press 18 the pressure acting on the endless band is reduced to 4 at gauge level, which is also the pressure in the pressure chamber 16. In contact with this pressure chamber constant pressure compression of the chip mat takes place, at which stage the board finally hardens. At last, the overpressure is lowered down to zero in the drag press 19.

It is obvious to one skilled in the art that different embodiments of the invention may vary within the scope of the claims presented hereinafter. For instance, the chip-preparing machine need not be exactly of the type shown in the drawing. It is essential that a strewing station is employed which has been designed to form a chamber provided with a closable feed aperture, and a continuous action press. The press gap may equally be confined e.g., by one endless band and opposite this a cylinder of large diameter. The number of pressure chambers and drag presses may vary.

The feeding of chip material through the feed aperture 4 into the strewing chamber 5 may be arranged as follows. While the tightly closing hatch 7 is closed the hatch 6 is opened and the chip material 1 under atmospheric pressure is conducted into the antechamber between said hatches. After the equally tight hatch 6 has been closed, pressure fluid is conducted from the outside into this chamber so that the same pressure prevails in it as in the strewing chamber 5. It is then possible to open the hatch 7 without causing any harmful change in the pressure of the strewing chamber 5. After the space between the hatches has been emptied, the hatch 7 is closed and the pressure in this chamber is once more lowered to equal the atmospheric pressure, by letting the pressure directly escape from this space. The hatch 6 may now again be opened for another dose of chips.

We claim:

1. Improvement in a continuous action machine for

manufacturing a chip boards consisting of a strewing station for strewing chips to form a mat on a moving surface and of a continuous action press for pressing the chip mat between two moving surfaces in a press gap, at least one of which moving surfaces consists of an endless band, most appropriately a steel band, which is loaded with the aid of a pressure chamber to be urged against the chip mat to be pressed, the improvement comprising the chip strewing station has been formed to constitute a chamber provided with a closable feed opening, which chamber directly communicates with the press gap provided with marginal seals and into which chamber pressure fluid can be introduced under a pressure which at the most equals the pressure prevailing in the pressure chamber.

2. Machine for manufacturing chip boards according to claim 1, characterized in that the feed aperture of the strewing station has been provided with two consecutive, tightly closing hatches, which are alternately opened, whereby the pressure in the strewing chamber cannot escape when chip material is fed through the feed aperture into the strewing chamber.

3. Machine for manufacturing chip boards according to claim 1, characterized in that on both sides of the press gap in the marginal seals there are over the entire length of the press gap at fixed intervals vent pipes provided with valves for regulating the pressure in the press gap at its various points.

4. Machine for manufacturing chip boards according to claim 1, characterized in that the pressure chamber has been divided into a plurality of consecutive chambers in which pressures of different height prevail.

5. Machine for manufacturing chip boards according to claim 1, characterized in that opposite to the end walls and partitions of the chambers drag presses have been placed.

6. Machine for manufacturing chip boards according to claim 1, characterized in that the valves of the vent pipes in the marginal seals of the press gap are controlled by sensors touching the endless band and which measure the thickness of the chip mat in the press gap.

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