Oct. 26, 1965 L. E. WAENERLUND 3,214,316

DEVICE FOR MANUFACTURING PARTICLE BOARDS

Filed Sept. 6, 1960 3 Sheets-Sheet 1

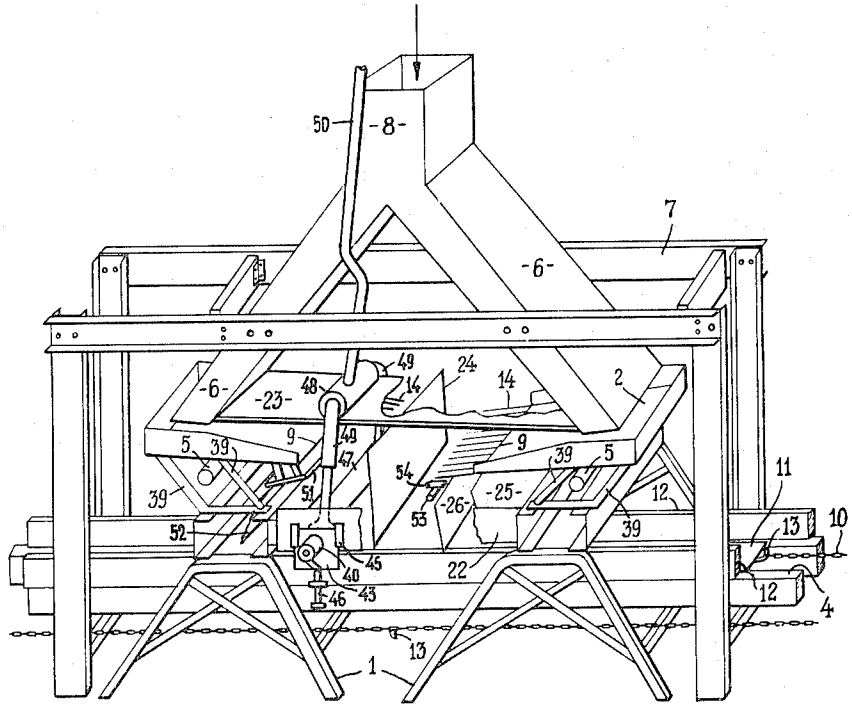


Fig. 1

Inventor
Lars Edvard Waenerlund
by Sommers & Young
Attorneys

Oct. 26, 1965 L. E. WAENERLUND 3,214,316

DEVICE FOR MANUFACTURING PARTICLE BOARDS

Filed Sept. 6, 1960 3 Sheets-Sheet 2

Fig. 5

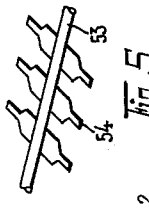


Fig. 2

Inventor
Lars Edvard Waenerlund
by Sommers & Young
Attorneys

Oct. 26, 1965 L. E. WAENERLUND 3,214,316

DEVICE FOR MANUFACTURING PARTICLE BOARDS

Filed Sept. 6, 1960 3 Sheets-Sheet 3

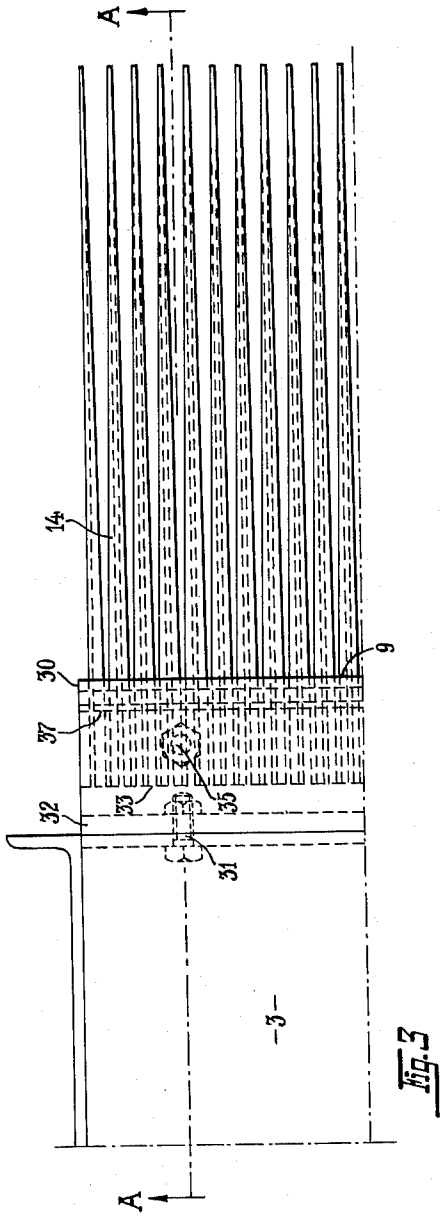


Fig. 3

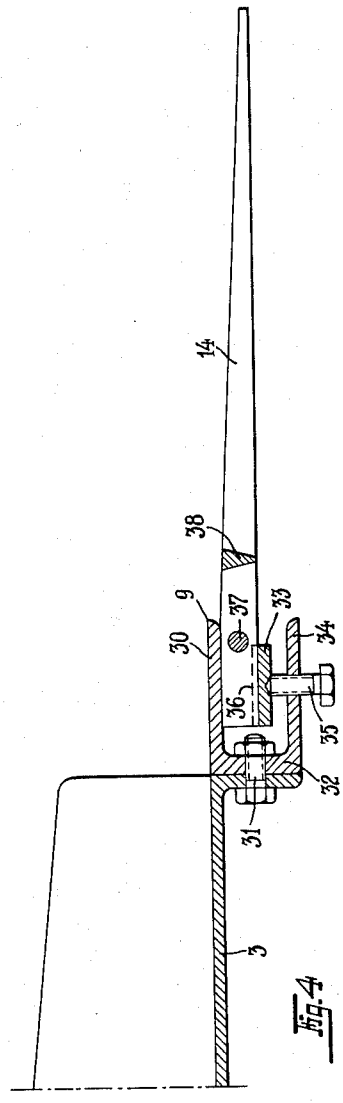


Fig. 4

Inventor
Lars Edvard Waenerlund
by Sommers & Young
Attorneys

United States Patent Office 3,214,316 Patented Oct. 26, 1965

3,214,316

DEVICE FOR MANUFACTURING PARTICLE BOARDS

Lars Edvard Waenerlund, Carcavelos, Portugal, assignor to Svenska Tandsticks Aktiebolaget, Jonkoping, Sweden, a joint-stock company of Sweden

Filed Sept. 6, 1960, Ser. No. 54,162
Claims priority, application Sweden, Sept. 11, 1959, 8,461/59
1 Claim. (Cl. 156—373)

The invention relates to the manufacture of particle boards from a mixture of fine and coarse shavings impregnated with a hot setting adhesive, and more particularly to particle boards comprising a lower and an upper layer of substantially fine shavings and a middle layer of substantially coarse shavings. When the layers are distributed one upon the other they are pressed in a hot press to a solid board.

It is an object of the invention to provide an improved device for obtaining a substantially even total thickness of three loose layers distributed on the bed plate and thereby a substantially constant density in different parts of the pressed board.

Another object of the invention is to secure a high quality of the particle board with smooth and tight surfaces formed of the finest particles.

With the foregoing and other objects in view, my invention comprises certain novel methods, constructions, combinations and arrangements of parts, as will be hereinafter fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claim.

In the drawings:

FIGURE 1 is a perspective view of an embodiment of a device according to the invention for the sieving and distribution of the shavings and smoothing of the middle layer.

FIGURE 2 is an enlarged side view partly in section of the lower middle portion in FIGURE 1.

FIGURE 3 is a plane view of a distributing sieve device,

FIGURE 4 is a section on line A—A in FIGURE 3.

FIGURE 5 is a perspective view of a portion of a spreading device seen obliquely from below.

In the device as shown in the drawings the shavings are separated and collected as superimposed layers on a row of bed or press plates **11** which are movable in a conveying track consisting of two wooden slide beams **4** and two boards **12** serving as lateral guides. Below the press plates a driven endless chain **10** is located and provided with upright hooks **13** engaging the press plates, and over adjacent ends of two press plates a cap, not shown, may be arranged. When the plates have passed the machine and collected the shavings they are inserted into a hot press for pressing the superimposed layers to particle boards with nice, smooth and hard surfaces.

The impregnated and dried shavings are caused to fall down from a feeding device, not shown, through a vertical channel **8** carried by a framework **7**, from which channel the shavings by means of a suitable device are distributed to two branch pipes **6**, from which they are delivered to two stations with distributing devices in a continuous and thin current having a width corresponding to the internal width of the pipes **6**. Each distributing device comprises a shaking or vibrating table consisting of a plate with three upright side walls. At the fourth edge **9** a plurality of teeth **14** are attached which have a trapezoid cross section **38** and extend in the longitudinal direction of the conveying track **4** so as to serve as a sieve with increasing distance between the teeth towards their ends. As will be seen from FIGURES 3 and 4 a U-shaped bracket **32** is attached by bolts **31** to a downwardly

directed flange of the vibrating table **3**, and the teeth are clamped to the upper flange **30** of the bracket by a plate **33** and clamp bolts **35** screwed into the bottom flange of the bracket. To hold the teeth in proper positions with equal spaces the upper side of the plate is shaped with ridges **36**, between which the ends of the teeth are inserted. A transverse bar **37**, extending through all teeth prevents the loosening of individual teeth.

In the embodiment as shown in FIGURES 3 and 4 the teeth are given a trapezoid section, but it is obvious that the sieve may be modified in different ways. Thus the teeth may have a conical form, and if cylindrical rods are used they may be of different length.

Each vibrating table **2**, **3** is carried by two pairs of resilient legs **39** on two frames **1** and is actuated by a vibrator **5** arranged under the table for the vibration of the shavings and for their displacement along the vibrating table and to the sieve.

By the vibration the fine shavings on the table will sink to the bottom, while the coarse shavings will be displaced to form an upper layer on the vibrating tables. When the shavings thus at least partly separated on the vibrating table is vibrated towards the sieves and passes over the edge **9**, the fine shavings will first fall down between the teeth of the sieves, while coarse shavings are displaced further outwards along the teeth and thereafter will fall down between these or over the ends of the teeth. As will be seen more clearly in FIGURE 2 a press plate passing along the conveying track **4** to the left in the direction of the arrow **15** will at first receive fine shavings from the vibrating table **2** as a current of shavings shown by a dashed line **16**, than somewhat more coarse shavings as a current **17** of shavings and finally the coarse shavings as a current **18** of shavings falling down substantially over the ends of the sieve teeth. Thereby the shavings from the first distributing device will be separated on the press plate to form a bottom layer of fine shavings and a superimposed layer of coarse shavings. In its continued movement in the direction of the arrow **15** the press plate will now receive shavings from the other vibrating table **3**, but as this operates in the opposite direction compared with the vibrating table **2** the press plate will at first receive coarse shavings in a current **19** between and over the outer ends of the teeth, and then the fine shavings in a current **42** through the sieve adjacent to the edge **9**. In this way the shavings will be arranged on the press plate as a lower and an upper layer consisting of fine shavings and a middle layer of coarse shavings.

In order to obviate disturbing air currents the device is provided with protecting plates of different kinds. Thus vertical side plates **22** are provided each at one side of the transport track **4**, a horizontal plate **23** between the branch pipes **5** and one or more depending transverse and vertical plates **24**. Other more or less inclined plates **25** and **26**, attached to the side plates **22** below the table **2**, serve simultaneously as guides for directing shavings of different degrees of fineness from the table **2** to different portions of the press plate, so that the layers of fine shavings will more continuously increase in thickness, whereby it is avoided that more coarse shavings fall down and are mixed with fine shavings. At least the currents **18** and **19** of coarse shavings may be spread along in the transport direction by means of preferably vibrating spreading devices consisting of at least one transverse horizontal rod **53** attached below each sieve **14** to the side plates **22** and a plurality of substantially horizontal plates **54** distributed along and attached to said rods. As will be seen from FIGURE 5 said plates may be given a step-by-step decreasing width, whereby the shavings will be well distributed.

To avoid that the upper surface of fine shavings due to unavoidable irregularities in the supply of shavings on the

press plate will be uneven, which will cause corresponding irregularities in the density of the finished pressed board, a smoothing down of this layer might be performed by means of a fixed scraper, but thereby this upper layer would vary in thickness and show portions of the surface composed of more or less uncovered coarse shavings.

According to the invention it is possible to obtain an upper layer of fine shavings with a more constant thickness by a special arrangement of the sieve in the second station whereby a sufficient space is obtained between the streams of coarse and fine shavings for equalizing of the middle layer of coarse shavings before applying the upper layer. For this purpose a vertically adjustable scraper or plough may be used, but a rotary member is preferred. The smoothing device consists of a cylindrical rotary brush **41**, which is driven by and directly connected with an electrical motor **40**. Said brush extends in the transverse direction over the bed plate below the vibrating table **3** and between the places, where the coarse shavings **19** and the fine shavings **42** fall down onto the bed plate. The brush is carried by bearings in blocks **43**, which cover openings **44** in the side walls **22** and are slidably mounted in vertical guides attached to the side walls at the vertical edges of said openings **44**. The brush is vertically adjustable by means of screw devices **46**. A hood **47** attached to the lids embraces the brush from above in such a way that the shavings removed by the brush are collected and exhausted by a blower **48** and pipe **50** for returning the shavings to a hopper for new shavings together with which they are passed again to the feeding devices. The blower has a downwardly directed pipe **49** telescopically connected with a pipe from the hood **47** to allow vertical adjustment of the brush and the hood.

The fine shavings passing the sieve **14** of the vibrating table **3** are conducted over the brush **41** by a transport device arranged below the vibrating table **3**, so that they will be transferred to a point where the middle layer is smoothed. In the shown embodiment said transparent device consists of an inclined plate **51** which is attached to the vibrating motion of the plate **51** and delivered to a sloping guide plate **52** from which they are distributed as an upper layer upon the middle layer of coarse shavings.

As a rule some long, thin and narrow shavings are present in the mixture. Some of these shavings may

pass through the sieve together with the fine shavings and will then form an armouring of the surface layers, while another portion escapes over the ends of the teeth **14** and is mixed with the coarse shavings in the middle layer. If this layer should consist only of coarse shavings it has proved, that the contact surfaces between the shavings will be insufficient, so that the tensile strength of the board perpendicularly to its plane will be unsatisfactory and even can cause the board to be split up into two parts due to the steam pressure when the board is taken out from the press. By a certain intermixture of the thin shavings into the middle layer the coarse shavings will better be bound together, so that the transverse tensile strength will be increased.

What I claim is:

In apparatus for making particle boards from a mixture of fine and coarse shavings, a movable bed plate, a first distributing device, a second distributing device located after said first one in the moving direction of the bed plate, a common vertical channel above said distributing devices for supplying the mixture of shavings, said channel having branched pipes each conducting a part of the mixture to its corresponding distributing device, each of said distributing devices comprising a shaking sieve having parallel teeth for distributing coarse shavings from both as a layer, a smoothing device for smoothing the layer before applying an upper layer, and a forwardly downwardly inclined conveyor plate device for conveying fine shavings from said second distributing device forwardly a distance in the moving direction of the bed plate, past said smoothing device, thus spacing the current of fine shavings from the current of coarse shavings and making room between said currents for the smoothing device, and for delivering the fine shavings onto the smoothed layer.

References Cited by the Examiner

UNITED STATES PATENTS

2,743,758	5/56	Uschmann	156—35 XR
2,840,865	7/58	Reed	19—155
2,943,365	7/60	Erickson et al.	154—101 XR

EARL M. BERGERT, *Primary Examiner.*

CARL F. KRAFFT, *Examiner.*