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METHOD AND A DEVICE FOR THE FORMATION OF FLEECES OF PREDETERMINED LENGTH COMPOSED OF WOOD PARTICLES

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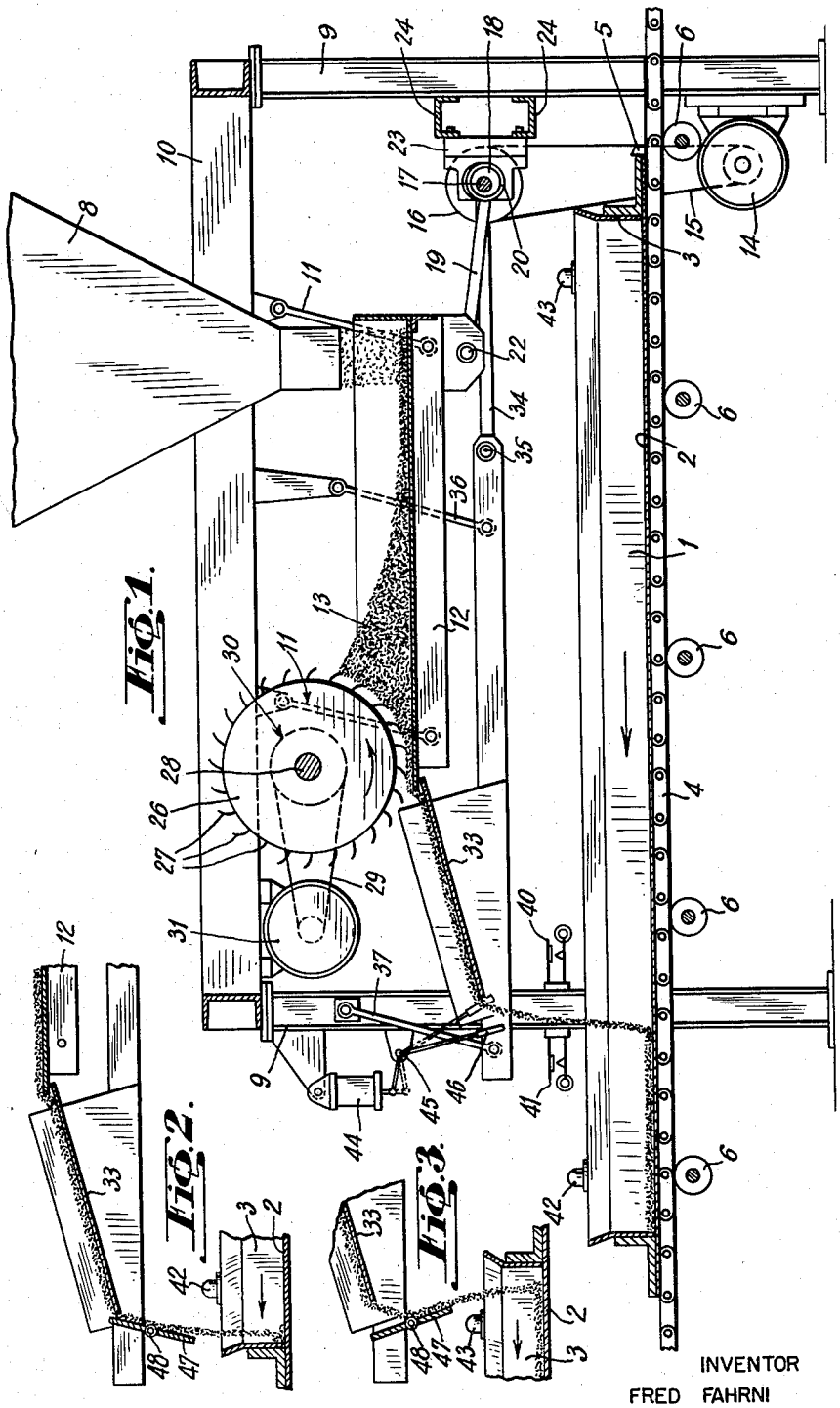


Fig. 1.

Fig. 2.

Fig. 3.

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METHOD AND A DEVICE FOR THE FORMATION OF FLEECES OF PREDETERMINED LENGTH COMPOSED OF WOOD PARTICLES

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The object of the present invention is a method for the formation of fleeces of predetermined length composed of wood particles, such as shavings, parings or similar particles, by strewing or distributing the wood particles from a strewing or distributing device provided with at least one strewing point into mould-frames moving along beneath the device.

The purpose of the invention is to strew wood particles into mould-frames which do not follow one another without interruption, without at the same time strewing wood particles beside the frames. At the same time it is indifferent whether the intervals between the mould-frames moving along beneath the strewing point are uniform or not.

In the method according to the invention this problem is solved in that the wood particles are strewed into the mould-frames by means of a vibration strewing chute and that the mould-frames themselves actuate control means which cause the vibration of the chute to begin when the beginning of a mould-frame is situated under the strewing point, whereas they cause the vibration of the chute to stop when the end of a mould-frame passes from under the strewing point.

The use of a vibration strewing chute, the principle of which is known in itself, makes it possible to employ an intermittently operating strewing action, without strewing any appreciable amount of wood particles in the region outside the mould-frame. A vibration strewing chute is particularly advantageous, because the stream of particles starts to flow suddenly when the chute is started again and is interrupted as suddenly when the chute is stopped. In addition the cross-section of the stream of particles at the point of impact is practically a line. The method according to the invention thus proposes, on the one hand, to control the strewing means by the mould-frames themselves, so that it is not necessary to have the latter following one another in regular succession, and on the other hand, proposes the use in such a device of a vibration strewing chute. It is thus possible for the first time to obtain a satisfactory strewing effect, which is uniform from one end of each mould-frame to the other, without having to consider the regularity of the succession of the mould-frames and without it being necessary to prepare in advance, for each mould-frame which moves past, a precisely determined quantity of wood particles by means of a balance or similar device. In the case of the new method it is particularly important to consider that practically no wood particles are strewn beside the frames. In fact it has been proved that the best boards are obtained when they only contain particles which have been coated with glue practically simultaneously. The addition of particles which have missed the mould frame during a former strewing operation would be contrary to this requirement.

In addition the invention also extends to a device for carrying out the method. This device makes use of a transport device which is known in itself to transport the mould frames, and of a strewing device with at least one strewing point, and is characterized in that it comprises a vibration strewing chute, means to generate the vibrating motion of the chute and, in addition, control means which cooperate with the mould-frames moving along beneath the strewing device in order to start and stop the said vibration generating means in dependence of the position of the mould-frames.

The drawing shows in FIG. 1, in partial cross-section, an embodiment of the device according to the invention given by way of an example. The device is shown viewed in a direction perpendicular to the direction of motion of the mould-frames. The FIGS. 2 and 3 are schematic cross-sections of a detail of a variant of the device.

The illustrated device is only fitted with a single strewing or distributing point. This serves to strew into mould-frames or mould 1, moving uniformly in a straight line in the direction of the arrow, a layer of shavings or wood particles such as used for the manufacture of wood shaving or wood particle boards which are hot pressed with a bonding substance.

It may be seen from the drawing, that the mould-frames, one of which is in the act of moving past beneath the strewing point described later on, comprise a bottom plate 2 and a frame proper 3 the edge of which splays out conically. The frame is removed before the cake of shaving material is run into the multi-layer press. The mould-frames 1 are carried by several parallel endless chains 4 and held in position on these by a driver 5. Rollers 6, which could also be replaced by continuous wooden battens, prevent the chains 4 from sagging.

The mass of shavings or other wood particles is first accumulated in a bin 8 and delivered according to the amount of shavings to be strewn. For this purpose a spiked drum can be provided inside the bin 8, in the neighborhood of its outlet, which rotates when shavings are required, but whose driving motor is stopped as soon as the momentary accumulation of shavings in the strewing device is sufficient to ensure the formation of an uninterrupted fleece. It would for instance be possible to provide feelers for controlling electric contacts on the transport and measuring vibrating chute member 12. This transport member (often called a jolting chute) positioned beneath the bin 8 obviously provides a path for the future movement of the shavings. The above feelers cause the driving motor of the spiked feed drum in the bin to rotate as soon as the height of the mass of shavings 13 accumulated on this transport member falls below a determined value.

All the driving motors, control devices, driving members, etc. are carried on a frame consisting of vertical pillars 9 on which rest beams 10 of U-shaped cross-section.

A measuring vibration chute 12 is suspended to the beam 10 by means of links 11 and receives the shavings dispensed by the bin 8. The plane of the chute is practically horizontal. An electric motor 14 is provided to generate the vibrating motion which is required to move the mass of shavings 13 along, which motor drives a shaft 17 by means of a belt 15 and a pulley 16. An eccentric sheave 18 is keyed to this shaft so that a driving rod 19 which engages the eccentric sheave 18 by means of a ball bearing pressed into a ring 20 is reciprocated when this shaft rotates. The driving rod 19 is articulated to the vibrating chute 12 in 22. In addition, it should be mentioned that the shaft runs in bearings, which have not been drawn, secured to supports 23 which in their turn are secured to the two transversal beams 24. In order that the quantity of shavings delivered over the edge of the vibration chute 12 per unit of time may remain as constant as possible, and in order that the shavings moved along by this chute 12 may be loosely piled and evenly distributed over the width, a spiked drum 26 is fitted in

the neighborhood of the delivery edge and rotates in the direction of the arrow. The bent back spikes **27** thus move against the direction of motion of the mass of shavings **13**. In this way, a part of the shavings is piled up by the spiked drum **26**. The shaft **28** of the spiked drum **26** is driven by an electric motor **31**, a driving belt **29** and a driving pulley **30**.

Instead of the slowly rotating drum **26**, other means could naturally be used for the piling up of the mass of shavings, such as rakes with a translatory motion or similar devices ensuring that the layer thickness of the mass of shavings flowing beneath them remains constant. According to the requirements, the axis of rotation of the spiked drum will be situated exactly above the delivery edge of the vibration chute **12** or somewhat to the side.

The described vibration chute is followed by a further strewing vibration chute **33**, which has a greater inclination and is given a vibrating motion in the same way as the chute **12** by means of a driving rod **34** articulated in **35**, the amplitude of vibration being preferably greater than that of the measuring chute **12**. This rod also ends in a ring which engages an eccentric sheave secured to the shaft by means of a ball bearing pressed into it. This second vibrating chute is suspended to the links **36** and **37**. The purpose of the supplementary vibration chute is in the first place to impart an accelerated motion to the shavings which are delivered through the space between the vibrating chute **12** and the spiked drum **26**. The result of the acceleration of the shavings is that small bundles of shavings which may eventually pass through the said space are torn apart. Finally the motion of the vibrating chute **33** has the effect of destroying the regular arrangement of the shavings which tends to be produced by the spiked drum **26**, and this ensures that the shavings have no predominent direction in the neighborhood of the delivery edge of the following vibrating chute.

In order to ensure that the strewing point only acts when a mould-frame is moving beneath it, pairs of contacts **40** and **41** are provided which are destined to cooperate with the stops **42** and **43** on the mould-frames. In order that the pair of contacts **40** may only be closed by the stop **42** and that the pair of contacts **41** may only be closed by the stops **43**, the two pairs of contacts as well as the two stops are arranged in a staggered fashion in the transversal direction.

In addition, an electro-magnet **44** is secured to the frame of the device to control a flap **46** pivoted in **45** which ensures that wood particles eventually remaining on the delivery edge after the strewing vibration chute **33** has been stopped are held back. The electro-magnet **44** could also for instance be replaced by a small compressed air cylinder with electro-magnetic control.

The control means for switching the motors **14** and **31** on and off and for actuating the flap **46** have not been shown in the drawing. It is advantageous for this purpose, to make use of electro-magnetic relays, the switching positions of which are changed by the impulses emitted when the pairs of contacts **40** and **41** are closed for a short period. The arrangement is such that both the motors **14** and **31** are stopped as soon as the end of a mould-frame is in the act of leaving the strewing point. These motors should have a relatively large starting torque, and on the other hand must be able to stop suddenly. One of the two motors can advantageously be fitted with a brake acting automatically as soon as the current is interrupted. Motors suitable for the purpose are the so-called stop motors. In such motors, when the current is cutoff the rotor is moved axially in the stator by a spring until a brake disk mounted on the rotor shaft is pressed against a fixed braking surface thus stopping the motor practically instantly. When the current is switched on again the rotor is moved axially against the action of the spring by the magnetic pull, so that the brake is released and the rotor can rotate freely.

The operation of the device the construction of which has been described is as follows:

The shavings contained in the bin **8** are distributed by delivery means which have not been drawn, and flow onto the plane surface of the measuring chute **12**, the vibratory motion of which causes them to be moved along towards the spiked drum **26**. The spikes **27** move back the shavings which lie above a certain height so that the stream of shavings flowing over the delivery edge onto the upper extremity of the strewing vibrating chute **33** has a constant volume for equal time intervals. The bent back shape of the spikes **27** prevents the shavings from being drawn up over the drum. A further loosening and disarrangement of the shavings takes place on the vibration chute **33**. On the drawing it has been supposed that there is just a mould-frame under the strewing point, i.e. under the delivery edge of the vibration chute **33**. The mould-frame **1** moves along with constant speed under the strewing point and the free falling carefully calibrated stream of shavings forms an even fleece on the plate **2**. As soon as the stop **43** closes the pair of contacts **41**, the motors **14** and **31** are instantly stopped and the magnet **44** is brought to the switching position corresponding to the closing of the flap **46**. This position of the flap is indicated by dotted lines. Shavings which are in the act of flowing are thus caught up and only released when the flap opens again, i.e. when the contacts of the pair **40** are closed by the stop **42** of the following mould-frame. The control impulse arising when this pair of contacts is actuated naturally also causes the motors **14** and **31** to start again. Owing to the control of the means for delivering the shavings by the mould-frame itself, the distance between successive mould-frames is indifferent, and the strewing quality is not influenced by the distance between the mould-frames.

In the variant illustrated in two different positions in FIGS. 2 and 3 a guide plate **47** pivoted about an axis **48** is provided in the neighborhood of the trajectory of the stream of wood shavings flowing over the delivery edge of the strewing vibration chute **33**. The axis **48** is perpendicular to the direction of motion of the mould-frames. In FIG. 2 it has been supposed that the front end of a mould-frame is just situated at the striking point of the wood particles. The guide plate, which in the example shown is of flat design, prevents the wood particles from falling too far forward, i.e. from falling over the edge of the mould-frame **3** moving in the direction of the arrow.

During the further advance of the mould-frame the guide plate **47** is swung over in a gradual fashion to the position shown in FIG. 3. For this purpose a cam control may be used to advantage. It may be seen in this figure that the stream of wood shavings is now directed towards the rear. Without the provision of such a swinging guide plate **47** the thickness of the layer would be reduced at the rear end of the mould-frame. The precision of the strewing effect is considerably increased by the appropriate control of the guide plate. The guide plate **47** can be brought back suddenly to its initial position when the motor **14** is stopped, in order that individual shavings still in the act of falling may drop on the inner side of the mould-frame **3**.

It is obvious that the principle described may be used in the case of strewing stations having a single strewing point as well as in the case of strewing stations with several strewing points, in which latter case the individual strewing points may be used to dispense different kinds of shavings or wood particles. According to the settling capacity of the shavings material and the thickness of the board to be obtained, a single layer will be sufficient, or else it will be necessary to superpose several layers, so that finally a cake of shavings material in which eventual strewing irregularities will be practically entirely compensated would be obtained. In this case it would be possible, as has been mentioned above, to move a mould-

frame along under several successive strewing points, or else to use a single strewing point and to move one or more mould-frames back and forth under this strewing point. In this case it would be necessary to take care that the last mould-frame moves on beyond the strewing point sufficiently so that on the return stroke the mould-frames have attained the full speed when the strewing operation begins again in the first mould-frame. Otherwise it could happen that fleeces of irregular thickness would be obtained.

In certain cases it may be advantageous to use photoelectric means instead of mechanically controlled contacts, the light ray of these means being influenced by the mould-frames themselves in order to control the motors **14** and **31** and the electro-magnet **44**. In addition it would be possible to use stops or similar means fitted to the mould-frames to actuate coupling means connecting the driving motors to the vibration chute and to the spiked drum. In this case the motors would run continuously. The said control could be effected directly or by means of electric switching devices controlling electromagnetic couplings.

What I claim is:

1. A method for the formation of fleeces of predetermined length composed of wood particles, by strewing the wood particles from a strewing device provided with only one strewing point into mould-frames moving along beneath the device, said mould-frames being spaced apart and having low side and end members characterized in that the wood particles are strewed into the mould-frames by means of an inclined vibration strewing chute oscillating substantially in a horizontal plane and that the mould-frames themselves actuate contact control means which cause the vibration of the chute to begin when the beginning of a mould-frame is situated under the strewing point, whereas they cause the vibration of the chute to stop when the end of a mould-frame passes from under the strewing point.

2. A device for carrying out the method according to claim 1, comprising a transport device to transport the mould-frames and a strewing device with at least one strewing point, characterized in that it comprises a vibration strewing chute, means to generate the vibrating motion of the chute and, in addition, control means which cooperate with the mould-frames moving along beneath the strewing device in order to start and stop the said vibration generating means according to the position of the mould-frames.

3. A device according to claim 2, characterized in that a measuring chute is provided before the vibration strewing chute, and that level limiting retaining means are provided above the former chute, which only allow a stream of wood particles having a limited thickness to pass beneath them.

4. A device according to claim 3, characterized in that a spiked drum with bent back spikes is provided to regulate the thickness of the stream of wood particles formed on the measuring chute, this drum rotating in such a fashion that the wood particles moving forward on the measuring chute which lie above a certain height are held back.

5. A device according to claim 2, characterized in that a guide member pivoted about a horizontal axis which is perpendicular to the direction of motion of the mould-frames, is provided in the neighborhood of the trajectory of the stream of wood particles flowing into the mould-frames, this guide member being destined to direct the beginning of the stream of wood particles towards the front end of a mould-frame and to direct the stream of wood particles on the point of being interrupted towards the rear end of a mould-frame.

6. A device according to claim 4, characterized in that a flap cooperates with the delivery edge of the vibration strewing chute and by the fact that this flap is actuated by electro-magnetic control means which are influenced by the said control means.

7. A device according to claim 6, characterized in that the vibration strewing chute is set in vibration by means of an electric motor fitted with a brake which acts automatically when the current is interrupted.

8. A device according to claim 7, characterized in that the edges of the mould-frames splay out conically in the upward direction.

9. A device according to claim 8, characterized in that the mould-frames carry stops which cooperate with fixed contacts of the said control means.

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