

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 929 484 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

03.03.2004 Bulletin 2004/10

(21) Application number: **97919812.4**

(22) Date of filing: **25.03.1997**

(51) Int Cl.7: **B65G 47/08**, B65G 47/31

(86) International application number:
PCT/SE1997/000514

(87) International publication number:
WO 1997/038929 (23.10.1997 Gazette 1997/45)

(54) **A SET-UP FOR FEEDING TIMBER TO A SINGLE-LOG FEEDER**

ANLAGE ZUM ZUFÜHREN VON BAUMSTÄMMEN ZU EINER VEREINZELEINRICHTUNG

ASSEMBLAGE POUR APPORTER DU BOIS A UN DISPOSITIF D'ALIMENTATION D'UNE SEULE
PLANCHE DE BOIS A LA FOIS

(84) Designated Contracting States:
AT DE FI FR GB

(30) Priority: **12.04.1996 SE 9601389**
02.08.1996 SE 9602914

(43) Date of publication of application:
21.07.1999 Bulletin 1999/29

(73) Proprietor: **Renholmens Mekaniska Verkstad AB**
930 47 Byske (SE)

(72) Inventor: **MARKLUND, Erland**
S-931 34 Skellefte (SE)

(74) Representative: **Onn, Thorsten et al**
Zacco Sweden AB
P.O. Box 23101
104 35 Stockholm (SE)

(56) References cited:
DE-C- 3 316 284 **FR-A- 2 128 182**
GB-A- 2 291 393

EP 0 929 484 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to plant for feeding timber boards to and through a single-board feeder in accordance with the preamble of Claim 1. The invention relates in particular to high-speed production plants, i.e. plants in which the boards are fed to different stations at high speeds.

[0002] The timber boards are normally transported in sawmills with their longitudinal axes transversal to the direction of conveyor belt movement. The boards are not distributed uniformly on the belts and the spacings between the boards can vary widely. However, it is desirable to be able to convey the boards in a uniform and regular array, for instance in conjunction with sorting and cross-laying the boards. The boards are advanced with the aid of so-called single-board feeders which grip boards stored temporarily in a buffer region and advance the boards one by one for further handling.

[0003] Because the general aim is to increase the rate of production and therewith the speed at which boards are transported through the plant, it is endeavoured to keep the buffer region upstream of the individual board feeder under control, so that the buffer region will neither be too large nor too small. An excessively large buffer region will result in various kinds of disturbances in operation. For instance, the boards will not remain in contact with the conveyor, but will be pressed up and lifted in the buffer region. If the buffer region is too small or when no boards are present in said region, the feeder will stop. Both instances will immediately result in an interruption in production. Because a high production rate is contingent on the continuous outfeed of boards downstream of the board feeder, the buffer region must be kept constantly full of boards above a given lowest level, wherein the feeder output rate V_{ut} , i.e. the number of boards that are fed out per unit of time multiplied by the width of the board, must be lower than the board feeding speed V_{in} upstream of the individual board feeder. The buffer region upstream of the board feeder can be said to form a magazine or storage facility and is thus necessary for single-board feeding.

[0004] By utilizing the irregular advancement pattern of the boards on the conveyor to the single-board feeder, with which single-board dispensing of up to three boards per second is possible in single-board feeding operations, the problem presented by the buffer region at high production rates has been solved by the invention, which prevents the buffer region from expanding or decreasing to a lowest level in an uncontrolled manner. This is achieved by virtue of the invention having the characteristic features set forth in the following Claims.

[0005] The invention will now be described in more detail with reference to exemplifying embodiments thereof and also with reference to the accompanying drawing, in which the Figure is a schematic side view of a conveyor path on which timber boards are placed cross-wise in the vicinity of a single-board feeder.

[0006] The conveyor belt of the embodiment illustrated in Fig. 1 has the form of a belt conveyor 1 whose board-feeding rate is referenced V_{in} . The reference numeral 2 identifies a single-board feeder whose board-feeding rate is referenced V_{ut} . Thus, the conveyor 1 moves the boards 4 at the speed V_{in} , said boards lying cross-wise to the conveying direction. The boards 4 will not normally be distributed regularly on the conveyor 1, but may be spaced unevenly therealong. This is indicated on the left of the Figure. Since the single-board feeder 2 is intended to feed the boards one by one on a forwarding conveyor provided with dogging means, as indicated on the right of the Figure, it is necessary to obtain a given temporary storage or buffer 3 upstream of the single-board feeder. This buffer is obtained by ensuring that V_{in} is greater than V_{ut} , as earlier indicated. The aforescribed forms part of the known technology and a more detailed description is thereof unnecessary.

[0007] The invention enables the buffer region 3 upstream of the single-board feeder 2 to be maintained within a controlled size. There is provided upstream of the single-board feeder 2 a regulator which includes endless belts 5 disposed across the width of the conveyor 1, each of said belts being guided over respective guide wheels or rollers 6, of which one is driven. The upper run of the endless belt 5 is located above the upper transporting plane of the conveyor 1 and will thus engage the timber boards 4. As indicated in the drawings, the upper run of the belt 5 shall move in the transporting direction of the conveyor 1. The speed of the belt 5 is V_{reg} , which is lower than the speed V_{in} of the conveyor 1. The unevenly distributed boards 4 transported on the conveyor 1 will either be gripped or retarded by the belt 5 as a result of the difference between the speeds V_{in} and V_{reg} . Thus, a pre-buffer 3' will be built-up with boards on the upper run of the belt 5 at the same time as the regulator device will deliver the boards that collect thereon in a delayed rate to the conveyor 1 upstream of the single-board feeder 2 when so required by the feeder buffer 3. The pre-buffer 3' can be allowed to grow or expand to a given extent upstream of the regulator. Thus, despite the boards being forwarded to the single-board feeder 2 on the conveyor 1 at the speed V_{in} , enlargement of the buffer region 3 upstream of the single-board feeder 2 will be equalized in accordance with the timing of the conveyor 1, i.e. an enlargement which keeps within targets and smallest permitted limits. Retardation of the boards and feeding of the boards to the single-board feeder 2 is made possible by utilizing the gaps between the boards on the conveyor 1 upstream of the regulator device. The invention thus enables building-up of the pre-buffer 3' and of the buffer 3 upstream of the single-board feeder 2 to be continued for given shorter periods, even if the feeder 2 is stopped due to a halt in production of the feeder, for instance. The regulator can be constructed to adapt to different speeds of the conveyor 1, and also to different board dimensions and feeder capacities. The regulator speed

V_{reg} will normally lie between V_{in} and V_{ut} . The invention thus provides a highly flexible arrangement which can be installed in existing plants to solve an existing serious problem, particularly in the case of high-production plants. In principle, the conveyor belts may be of any appropriate kind and made from any suitable material, including high friction chains, provided that they will lower the rate of feed of the boards the speed V_{reg} .

Claims

1. Plant for feeding boards of timber (4) to and through a single-board feeder (2) for elongated boards of timber (4) which lie sequentially on a conveyor (1) transversely to the longitudinal axis of said conveyor, wherein the conveyor advances the boards to the single-board feeder (2) at a speed V_{in} , said feeder (2) operating at a board-feeding speed V_{ut} that is lower than V_{in} , **characterized by** a regulator means (5, 6) mounted upstream of the board feeder (2) and the buffer region (3) in the proximity thereof as seen in the conveying direction, wherein said regulator means retards the boards (4) advanced on the conveyor (1) to a speed V_{reg} which is slower than V_{in} prior to the boards (4) being conveyed further to the board feeder (2) on the conveyor (1).
2. Plant according to Claim 1, **characterized in that** the regulator means comprises high friction endless belts (5) or chains disposed across the width of the conveyor (1) and each passing over at least two guide wheels (6), wherein the upper runs of the belts in the regulator means are located above the conveying plane of the conveyor (1) and move at a speed V_{reg} which is slower than V_{in} .
3. Plant according to Claim 1 or 2, **characterized in that** the speed V_{reg} of the regulator means is greater than the speed V_{ut} of the single-board feeder (2) but slower than the feeding speed V_{in} of the conveyor.
4. A method of controlling the feed of timber boards to and through a single-board feeder (2), wherein the boards are transported to said the single-board feeder (2) in mutually sequential relationship transversely to the feed direction on a conveyor (1) having a board-feeding speed V_{in} , wherein the feeder (2) operates at a board-feeding speed V_{ut} that is slower than V_{in} , **characterized by** causing the boards (4) upstream of the single-board feeder (2) and the buffer region (3) adjacent thereto, as seen in the conveying direction, to move at a speed V_{reg} which is slower than the speed V_{in} , prior to forwarding the boards to the single-board feeder (2) on the conveyor (1).

Patentansprüche

1. Anlage zum Zuführen von Holzbrettern (4) zu und durch eine Einzelbrettzuführung (2) für längliche Holzbretter (4), welche nacheinander quer zu dessen Längsachse auf einem Förderer (1) liegen, wobei der Förderer die Bretter mit einer Geschwindigkeit V_{in} zur Einzelbrettzuführung (2) vorschiebt, welche mit einer Brett-Zuführungsgeschwindigkeit V_{ut} arbeitet, die niedriger ist als V_{in} , **gekennzeichnet durch** ein in Förderrichtung gesehen vor der Brettzuführung (2) und der Pufferzone (3) in der Nähe derselben angeordnetes Regelmittel (5, 6), wobei das Regelmittel die auf dem Förderer (1) vorwärts bewegtere Bretter (4) auf eine Geschwindigkeit V_{reg} verlangsamt, welche langsamer ist als V_{in} , bevor die Bretter (4) auf dem Förderer (1) zur Brettzuführung (2) weiterbefördert werden.
2. Anlage nach Anspruch 1, **dadurch gekennzeichnet, dass** das Regelmittel endlose Bänder (5) oder Ketten mit hoher Reibung enthält, welche quer über die Breite des Förderers (1) verlaufen und jeweils über mindestens zwei Führungsrollen (6) laufen, wobei die Obergurte im Regelmittel über der Förderebene des Förderers (1) liegen und sich mit einer Geschwindigkeit V_{reg} bewegen, welche niedriger ist als V_{in} .
3. Anlage nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Geschwindigkeit V_{reg} der Regelmittel grösser ist als die Geschwindigkeit V_{ut} der Einzelbrettzuführung (2), jedoch niedriger als die Zuführungsgeschwindigkeit V_{in} des Förderers.
4. Verfahren zur Steuerung der Zuführung von Holzbrettern zu und durch eine Einzelbrettzuführung (2), wobei die Bretter nacheinander quer zur Zuführungsrichtung auf einem Förderer (1) mit einer Brett-Zuführungsgeschwindigkeit V_{in} zur Einzelbrettzuführung (2) transportiert werden, wobei die Zuführung (2) mit einer Brett-Zuführungsgeschwindigkeit V_{ut} arbeitet, die niedriger ist als V_{in} , **dadurch gekennzeichnet, dass** die Bretter (4) in Förderrichtung gesehen vor der Einzelbrett-Zuführung (2) und der Pufferzone (3) neben derselben mit einer Geschwindigkeit V_{reg} bewegt werden, welche langsamer ist als V_{in} , bevor die Bretter auf dem Förderer (1) zur Einzelbrett-Zuführung (2) weiterbefördert werden.

Revendications

1. Installation pour l'alimentation de planches de bois (4) dans et à travers un dispositif d'alimentation (2) de planches individuelles pour planches de bois allongées (4), placées de manière séquentielle sur un

convoyeur (1) transversalement à l'axe longitudinal dudit convoyeur, le convoyeur avançant les planches au dispositif d'alimentation (2) de planches individuelles à une vitesse V_{in} , et ledit dispositif d'alimentation (2) fonctionnant à une vitesse d'alimentation V_{ut} qui est inférieure à V_{in} , **caractérisée par** un moyen de régulation (5, 6) agencé, vu dans la direction de transport, en amont du dispositif d'alimentation (2) des planches et de la zone-tampon (3) et à proximité de celui-ci, ledit moyen de régulation ralentissant les planches (4) avancées sur le convoyeur (1) à une vitesse V_{reg} qui est inférieure à V_{in} avant que les planches (4) ne soient avancées vers le dispositif d'alimentation (2) des planches sur le convoyeur (1).

2. Installation selon la revendication 1, **caractérisée en ce que** le moyen de régulation comprend des courroies (5) ou chaînes continues s'étendant à travers la largeur du convoyeur (1) et passant chacune sur deux rouleaux de guidage (6) au moins, les brins supérieurs des courroies dans le moyen de régulation étant situés au-dessus du plan de transport du convoyeur (1) et se déplaçant à une vitesse V_{reg} qui est inférieure à V_{in} .

3. Installation selon la revendication 1 ou 2, **caractérisée en ce que** la vitesse V_{reg} du moyen de régulation est supérieure à la vitesse V_{ut} du dispositif d'alimentation (2) de planches individuelles mais inférieure à la vitesse d'alimentation V_{in} du convoyeur.

4. Procédé de réglage de l'alimentation de planches de bois dans et à travers un dispositif d'alimentation (2) de planches individuelles, les planches étant transportées audit dispositif d'alimentation (2) de planches individuelles de manière séquentielle et transversalement à la direction d'alimentation sur un convoyeur (1) ayant une vitesse d'alimentation des planches V_{in} , le dispositif d'alimentation (2) fonctionnant à une vitesse d'alimentation V_{ut} qui est inférieure à V_{in} , **caractérisé en ce que** les planches (4), vu dans la direction de transport et en amont du dispositif d'alimentation (2) de planches individuelles et de la zone-tampon (3) y adjacente, sont déplacées à une vitesse V_{reg} qui est inférieure à la vitesse V_{in} avant que les planches ne soient avancées vers le dispositif d'alimentation (2) de planches individuelles sur le convoyeur (1).

55

