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(54) **A METHOD OF MANUFACTURING A FLOOR**

BODENHERSTELLUNGSVERFAHREN

PROCÉDÉ DE FABRICATION D'UN PLANCHER

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Description

Technical Field

[0001] The present invention relates to a method of processing a floor board, and more particularly to a method of processing an interlocking floor board.

Background Art

[0002] The Floor board enjoys great popularity as an indoor ground decorative material. The current flooring is usually formed by jointing together relatively small strip-shaped floor boards, in which the interlocking floor board is commonly used. The interlocking floor board has become one of the main products in the flooring in recent years due to its characteristics of easy assembly, no gluing and repeatable disassembly and assembly. The interlocking structure of the interlocking floor board comprises grooves and tongues made on mutually opposite sides of the floor boards. When paving the floor boards, a tongue of one floor board is interlocked into a groove of another adjacent board, i.e., interlocking mating is formed. Repeated as such, a plurality of floor boards can be jointed into one piece so as to form a flooring with a nearly integral effect. When the flooring needs to be disassembled, the tongue of a floor board is disengaged from the groove of another adjacent floor board.

[0003] When making floor boards, a large floor board blank needs to be cut into a plurality of small floor board blanks 101 according to a desired floor board size. As shown in Figs. 1 and 2, the large floor board blank is directly cut by a saw 102 according to the prior art. The saw cuts through the blank each time of cutting. This processing method leads to apparent kerf loss. The thickness of a kerf 103 generated upon each cut is larger than that of the saw, so a floor board material having the thickness of at least one saw will be lost. After the floor board blank is cut, corresponding grooves or tongues are milled by a milling cutter at peripheral edges of the floor board blank; since planar cutting surfaces are formed during cutting procedure, there is no special advantageous effect to the subsequent manufacturing of the grooves or tongues.

[0004] WO 03/083 234 A1 discloses the separation of floor elements by means of upper and lower saw blades, which create kerfs with rectangular geometry.

[0005] EP 1 754 582 A1 and EP 1 754 581 A1 discloses profiled saw blades for cutting upper and lower kerfs, wherein the kerfs are in a distance, such that a material bridge remains in between them.

[0006] EP 1 941 980 A1 has been published after the filing date of the present application and discloses a saw with a profile, such that it may also provide the function of a miller cutter when cutting floor board blanks. However, it is not disclosed that kerfs which are cut with the profiled saw are directly adjacent to each other, and further it is not disclosed which kind of profile the profiled saw blade has.

Summary of the Invention

[0007] In regard to said defects of the prior art, the present invention intends to solve the problem of great kerf loss caused by direct cut-through of a conventional method of processing a floor and to provide a method of processing a floor board with reduced kerf loss.

[0008] The solution to said technical problem of the present invention is to provide a method of processing a floor board, comprising the following steps of: (1) cutting a floor board blank: at an interface between two adjacent floor board parts of a large floor board blank, the blank is cut firstly on a front face of the blank with a saw and then cut secondly on a back face of the blank with a saw, and kerfs of the first and second cuts are linked with each other at the interface between the two adjacent floor board parts so that the two adjacent floor board parts are separated. The head of the saw has a sharp-angled or inclined configuration such that the thickness of the blank cut off at a position where the kerfs are linked is less than the thickness of the saw; (2) processing grooves or tongues: milling the grooves or tongues at edges of said floor board parts cut off with a miller cutter.

[0009] In the present invention, when the opposing edges of the two adjacent floor board parts are both processed as grooves or tongues, the head of the saw has preferably a centrosymmetrically sharp-angled configuration; the kerfs of the first and second cuts have the same central line; and an inner sharp angle formed by the kerf of the first cut and an inner sharp angle formed by the kerf of the second cut are linked at the interface between the two adjacent floor board parts.

[0010] In the present invention, when one of the opposing edges of the two adjacent floor board parts is processed as a groove while the other is processed as a tongue, the head of the saw has preferably an inclined configuration; the central line of the kerf of the first cut and the central line of the kerf of the second cut are parallel to each other and the distance therebetween is equal to or slightly less than the thickness of the saw; and an inner inclined angle formed by the kerf of the first cut and an inner inclined angle formed by the kerf of the second cut are linked at the interface between the two adjacent floor board parts.

[0011] In the present invention, the inclined configuration of the head of the saw may be a stepwise inclined configuration or an integral inclined configuration.

[0012] In the present invention, the kerf depths of the first and second cuts are preferably equal to or slightly greater than a half of the thickness of the floor board blank.

[0013] It can be seen from said technical solution that due to the two cuts on the front and back faces plus the saw head with a sharp-angled or inclined configuration, the thickness of the blank cut off at a position where kerfs

are linked will be less than the thickness of the saw, thereby reducing the kerf loss; furthermore, a saw can be selected according to a groove or tongue to be manufactured at the edges of the floor board blank, so that on the one hand, the kerf loss is reduced; and that on the other hand, grooves or tongues are made while cutting the floor board blank so as to reduce the work of processing grooves or tongues.

Brief Description of the Drawings

[0014]

Fig. 1 is a schematic view of cutting a large floor board blank according to the prior art;

Fig. 2 is a schematic view after separate floor board parts are cut off from the floor board blank;

Fig. 3a to 3f are schematic views of cutting by a saw with a stepwise inclined configuration according to one embodiment of the present invention;

Fig. 4 is a schematic view of kerf loss when cutting by a saw with a stepwise inclined configuration;

Fig. 5 is a schematic view of kerf loss when cutting by a saw with an integral inclined configuration;

Fig. 6 is a schematic view of kerf loss using a conventional processing method when the edges of two adjacent floor board parts are both processed as tenons.

Fig. 7 is a schematic view of kerf loss using a sharp-angled saw when the edges of two adjacent floor board parts are both processed as tenons.

Fig. 8 is a schematic view of kerf loss using another sharp-angled saw when the edges of two adjacent floor board parts are both processed as tenons.

Preferred Embodiments of the Description

[0015] One preferable embodiment according to the present invention is shown in Figs.3a to 3f, illustrating a process of cutting with a saw having a stepwise inclined configuration.

[0016] Fig. 3a shows a large floor board blank prior to cutting.

[0017] In Fig. 3b, a saw 104 with a stepwise inclined configuration is used to cut. A first cut is made on a front face of the blank and the structure as shown in Fig. 3c is formed after removing the saw. The drawings of embodiments of the present invention are all simplified cross-sectional views. In the embodiment, the saw is a disk-structured electric saw and the edge thereof is provided with a stepwise inclined configuration as shown in the drawing. For the purpose of easy depiction, the edge of the saw is depicted as a head of the saw according to the cross-sectional effect in the present invention.

[0018] In Fig. 3d, a second cut is made on a back face of the blank and the structure as shown in Fig. 3e is formed after removing the saw.

[0019] Fig. 3f shows subsequently processed tenon and groove structures, wherein the tenon is on the left and the groove is on the right.

[0020] It can be seen from Figs. 3a-3f that the kerf depths of the first and second cuts are equal to each other and both slightly greater than a half of the thickness of the floor board blank; the kerfs of the first and second cuts are linked at the interface between two adjacent floor board parts 101 so that the two adjacent floor board parts are separated. Since the head of the saw is an inclined configuration, the thickness of the blank cut off at a position where the kerfs are linked is less than the thickness of the saw 104, and therefore kerf loss is notably reduced.

[0021] Figs. 4 to 8 show kerf losses generated by various cutting methods, wherein the structures of the processed floor board edges, i.e., complete tenon and groove structures, are shown for easy illustration; in the actual manufactured procedure as shown in Figs. 3a-3f, the cutting is conducted first and then the tenon and groove structures are manufactured.

[0022] In Fig. 4, the saw 104 is a stepwise inclined configuration with the thickness of 32 (3.2mm in fact, Fig.4 shows the 10-times enlarged effect, and so are the data shown in Figs. 5, 6, 7 and 8). It can be seen from Fig. 4 that the left side of the first cut and the right side of the second cut are on the same line, which shows that the central line of the kerf of the first cut and the central line of the kerf of the second cut are parallel to each other and the distance therebetween are equal to the thickness of the saw; the lower edge of the first cut and the upper edge of the second cut are on the same line, which shows that the kerf depths of the first and second cuts are equal to each other and approximately equal to a half of the thickness of the blank. It can be seen from Fig. 4 that the distance between the edges of the tenon and groove structures to be achieved is 20, which is 12 shorter than the thickness of the saw. Compared with the conventional manufactured method, the kerf loss of a thickness of 12 can be saved in each cut. Furthermore, the cutting positions of the first and second cuts correspond to the tenon and groove structures to be processed such that the work of processing grooves and tongues can be saved.

[0023] In Fig. 5, a saw 105 is an integral inclined structure with a thickness of 32. It can be seen from Fig. 5 that the central line of the kerf of the first cut and the central line of the kerf of the second cut are parallel to each other and the distance therebetween are slightly less than the thickness of the saw; the kerf depths of the first and second cuts are equal to each other and slightly greater than a half of the thickness of the blank. The distance between the edges of the tenon and groove structures to be formed is 20.65, which is 11.35 shorter than the thickness of the

saw. That is to say, the kerf loss of a thickness of 11.35 can be saved in each cut.

[0024] Fig. 6 shows kerf loss using a conventional processing method when the edges of the two adjacent floor board parts are both processed as tenons. The thickness of the saw 102 is 32, and the whole large blank is cut through. It can be seen from Fig. 6 that the thickness of the blank cut off between upper edges of two tenons after processing is 68.2.

[0025] Fig. 7 shows kerf loss using a method according to the present invention when the edges of two adjacent floor board parts are both processed as tenons. A sharp-angled saw 106 as shown is used to cut the blank on the front and back faces thereof. The thickness of the saw is still 32. The thickness of the blank cut off between upper edges of two tenons after processing is 52, which is 16.2 less than the kerf loss of Fig. 6.

[0026] Compared with Fig. 7, a saw 107 in Fig. 8 is much shaper and the thickness of the saw is still 32. The thickness of the blank cut off between upper edges of two tenons after processing is 39.02, which is 29.18 less than the kerf loss of Fig. 6.

[0027] It can be known from said embodiments that due to the two cuts on the front and back faces of the blank plus the saw head having a sharp-angled or inclined configuration, the thickness of the blank cut off at a position where kerfs are linked will be less than the thickness of the saw, thereby reducing the kerf loss; furthermore, a saw can be selected according to a groove or tongue to be processed at the edge of the blank, so that on the one hand, the kerf loss is reduced; and that on the other hand, grooves or tongues are made while cutting the blank so as to reduce the work of processing grooves or tongues.

Claims

1. A method of processing a floor board, comprising the steps of:

   (1) cutting a floor board blank (101),
   wherein at an interface between two adjacent floor board parts of the large floor board blank (101), the blank (101) is cut firstly on a front face of the blank (101) with a saw (104,105,106,107) and then cut secondly on a back face of the blank (101) with the saw (104,105,106,107), and wherein kerfs of the first and second cuts (108,109) are linked at the interface between the two adjacent floor board parts so that the two adjacent floor board parts are separated, and wherein the head of the saw (104,105,106,107) has a sharp-angled or inclined configuration so that the thickness of the blank cut off at a position where the kerfs are linked is less than the thickness of the saw (104,105,106,107);

   (2) processing grooves or tongues, which includes milling the grooves or tongues at the edges of said floor board parts cut off with a miller cutter.

2. The method of processing a floor board according to claim 1, **characterized in that** when the opposing edges of the two adjacent floor board parts are both processed as grooves or tongues, the head of the saw (106,107) has preferably a centrosymmetrically sharp-angled configuration; and that the kerfs of the first and second cuts have the same central line; and that an inner sharp angle formed by the kerf of the first cut and an inner sharp angle formed by the kerf of the second cut are linked at the interface between the two adjacent floor board parts.

3. The method of processing a floor board according to claim 1, **characterized in that** when one of the opposing edges of the two adjacent floor board parts is processed as a groove while the other is processed as a tongue, the head of the saw (104,105) has preferably an inclined configuration; and that the central line of the kerf of the first cut and the central line of the kerf of the second cut are parallel to each other and that the distance therebetween is equal to or slightly less than the thickness of the saw (104,105); and that an inner inclined angle formed by the kerf of the first cut (108) and an inner inclined angle formed by the kerf of the second cut (109) are linked at the interface between the two adjacent floor board parts.

4. The method of processing a floor board according to claim 3, **characterized in that** the inclined configuration of the head of the saw (104,105) is a stepwise inclined configuration or an integral inclined configuration.

5. The method of processing a floor board according to any of claims 1 through 4, **characterized in that** the kerf depths of the first and second cuts (108,109) are preferably equal to or slightly greater than a half of the thickness of the floor board blank (101).

Patentansprüche

1. Verfahren zum Bearbeiten eines Bodenbretts, umfassend folgende Schritte:

   (1) Zuschneiden eines Bodenbrettrohlings (101),
   wobei an einer Schnittstelle zwischen zwei benachbarten Bodenbrettteilen des großen Bodenbrettrohlings (101) der Rohling (101) zuerst auf einer Frontfläche des Rohlings (101) mit einer Säge eingeschnitten wird und anschließend

auf einer Rückseite des Rohlings (101) mit der Säge eingeschnitten wird, und wobei die Sägenuten des ersten und zweiten Schnitts (108, 109) an der Schnittstelle zwischen den zwei benachbarten Bodenbrettteilen zusammenhängen, so dass die zwei benachbarten Bodenbrettteile getrennt werden, und wobei der Sägekopf (104, 105, 106, 107) eine scharfwinklige oder schräge Form aufweist, so dass die Dicke des Rohlings an einer Schnittposition, an der die Sägenuten zusammenhängen, geringer als die Dicke der Säge (104, 105, 106, 107) ist;
(2) Bearbeiten der Nuten oder Federn, was das Fräsen der Nuten oder Federn an den Rändern der geschnittenen Bodenbrettteile mit einem Fräswerkzeug beinhaltet.

2. Verfahren zum Bearbeiten eines Bodenbretts nach Anspruch 1, **dadurch gekennzeichnet, dass** die gegenüberliegenden Kanten der zwei benachbarten Bodenbrettteile beide als Nuten oder Federn bearbeitet werden, wobei der Kopf der Säge (106, 107) vorzugsweise eine punktsymmetrische, scharfwinklige Form aufweist; und dass die Sägenuten des ersten und zweiten Schnitts dieselbe Schnittkante aufweisen; und dass der scharfe Innenwinkel, der von der Sägenut des ersten Schnitts gebildet wird, und ein scharfer Innenwinkel, der von der Sägenut des zweiten Schnitts gebildet wird, an der Schnittstelle zwischen den zwei benachbarten Bodenbrettteilen zusammenhängen.

3. Verfahren zum Bearbeiten eines Bodenbretts nach Anspruch 1, **dadurch gekennzeichnet, dass**, wenn eine der gegenüberliegenden Kanten der zwei benachbarten Bodenbrettteile als Nut bearbeitet wird, während die andere als Feder bearbeitet wird, der Kopf der Säge (104, 105) vorzugweise eine schräge Form aufweist; und dass die Schnittkante der Sägenut des ersten Schnitts und die Schnittkante der Sägenut des zweiten Schnitts parallel zueinander verlaufen und dass der Abstand dazwischen gleich oder etwas kleiner als die Dicke der Säge (105, 104) ist; und dass ein schräger Innenwinkel, der durch die Sägenut des ersten Schnitts (108) gebildet wird und ein schräger Innenwinkel, der durch die Sägenut des zweiten Schnitts (109) gebildet wird, an der Schnittstelle zwischen den zwei benachbarten Bodenbrettteilen zusammenhängen.

4. Verfahren zum Bearbeiten eines Bodenbretts nach Anspruch 3, **dadurch gekennzeichnet, dass** die schräge Form des Sägekopfes (104, 105) eine stufenweise abgeschrägte Form oder eine integral abgeschrägte Form ist.

5. Verfahren zum Bearbeiten eines Bodenbretts nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Sägenuttiefen des ersten und zweiten Schnitts (108, 109) vorzugsweise gleich oder etwas größer als eine Hälfte der Dicke des Bodenbrettrohlings (101) sind.

Revendications

1. Procédé de traitement d'un panneau de plancher, comprenant les étapes consistant à :

1) découper une ébauche de panneau de plancher (101),

- pour lequel, à une interface entre deux parties de panneaux de plancher adjacentes de la grande ébauche de panneau de plancher (101), l'ébauche (101) est découpée premièrement sur une face frontale de l'ébauche (101) avec une scie (104, 105, 106, 107), puis découpée deuxièmement sur une face dorsale de l'ébauche (101) avec la scie (104, 105, 106, 107), pour lequel des traits des première et deuxième découpes (108, 109) sont liés à l'interface entre les deux parties de panneaux de plancher adjacentes, de sorte que les deux parties de panneaux de plancher adjacentes soient séparées et pour lequel la tête de la scie (104, 105, 106, 107) a une configuration en angle aigu ou inclinée de sorte que l'épaisseur de l'ébauche découpée à une position où les traits sont liés soit inférieure à l'épaisseur de la scie (104, 105, 106, 107) ;

2) traiter des rainures ou des languettes, ce qui inclut de fraiser les rainures ou les languettes aux bords desdites parties de panneaux de plancher découpées avec un dispositif de découpe fraiseur.

2. Procédé de traitement d'un panneau de plancher selon la revendication 1, **caractérisé en ce que**, lorsque les bords opposés des deux parties de panneaux de plancher adjacentes sont tous deux traités en rainures ou languettes, la tête de la scie (106, 107) a, de préférence, une configuration en angle aigu à symétrie centrale ; **en ce que** les traits des première et deuxième découpes ont la même ligne centrale ; et **en ce qu'**un angle aigu intérieur formé par le trait de la première découpe et un angle aigu intérieur formé par le trait de la deuxième découpe sont liés à l'interface entre les deux parties de panneaux de plancher adjacentes.

3. Procédé de traitement d'un panneau de plancher selon la revendication 1, **caractérisé en ce que**, lors-

qu'un des bords opposés des deux parties de panneaux de plancher adjacentes est traité en une rainure, tandis que l'autre est traité en une languette, la tête de la scie (106, 107) a, de préférence, une configuration inclinée ; **en ce que** la ligne centrale du trait de la première découpe et la ligne centrale du trait de la deuxième découpe sont parallèles l'une à l'autre ; **en ce que** la distance entre celles-ci est légèrement inférieure ou égale à l'épaisseur de la scie (104, 105) ; et **en ce qu'**un angle incliné intérieur formé par le trait de la première découpe (108) et un angle incliné intérieur formé par le trait de la deuxième découpe (109) sont liés à l'interface entre les deux parties de panneaux de plancher adjacentes.

4. Procédé de traitement d'un panneau de plancher selon la revendication 3, **caractérisé en ce que** la configuration inclinée de la tête de la scie (104, 105) est une configuration inclinée en gradins ou une configuration inclinée intégrale.

5. Procédé de traitement d'un panneau de plancher selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** les profondeurs de traits des première et deuxième découpes (108, 109) sont, de préférence, légèrement supérieures ou égales à une moitié de l'épaisseur de l'ébauche de panneau de plancher (101).

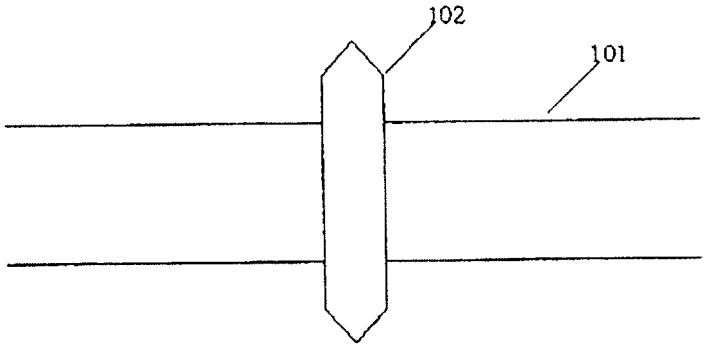

Fig.1

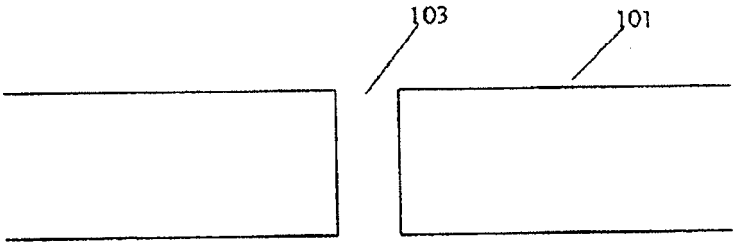

Fig.2

Fig.3a

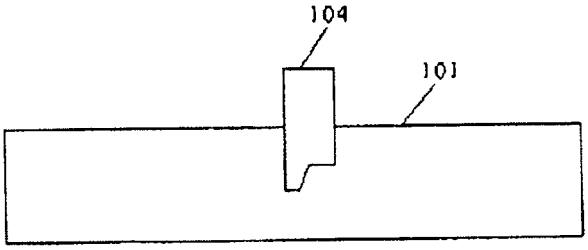

Fig.3b

Fig.3c

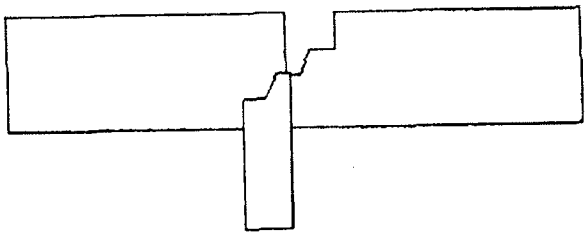

Fig.3d

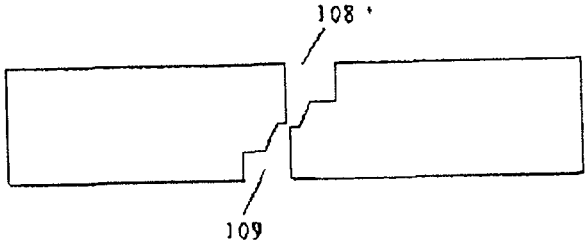

Fig.3e

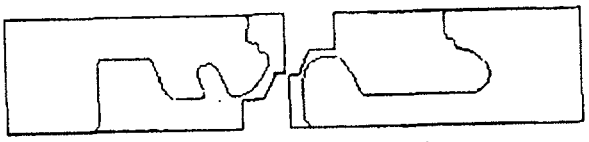

Fig.3f

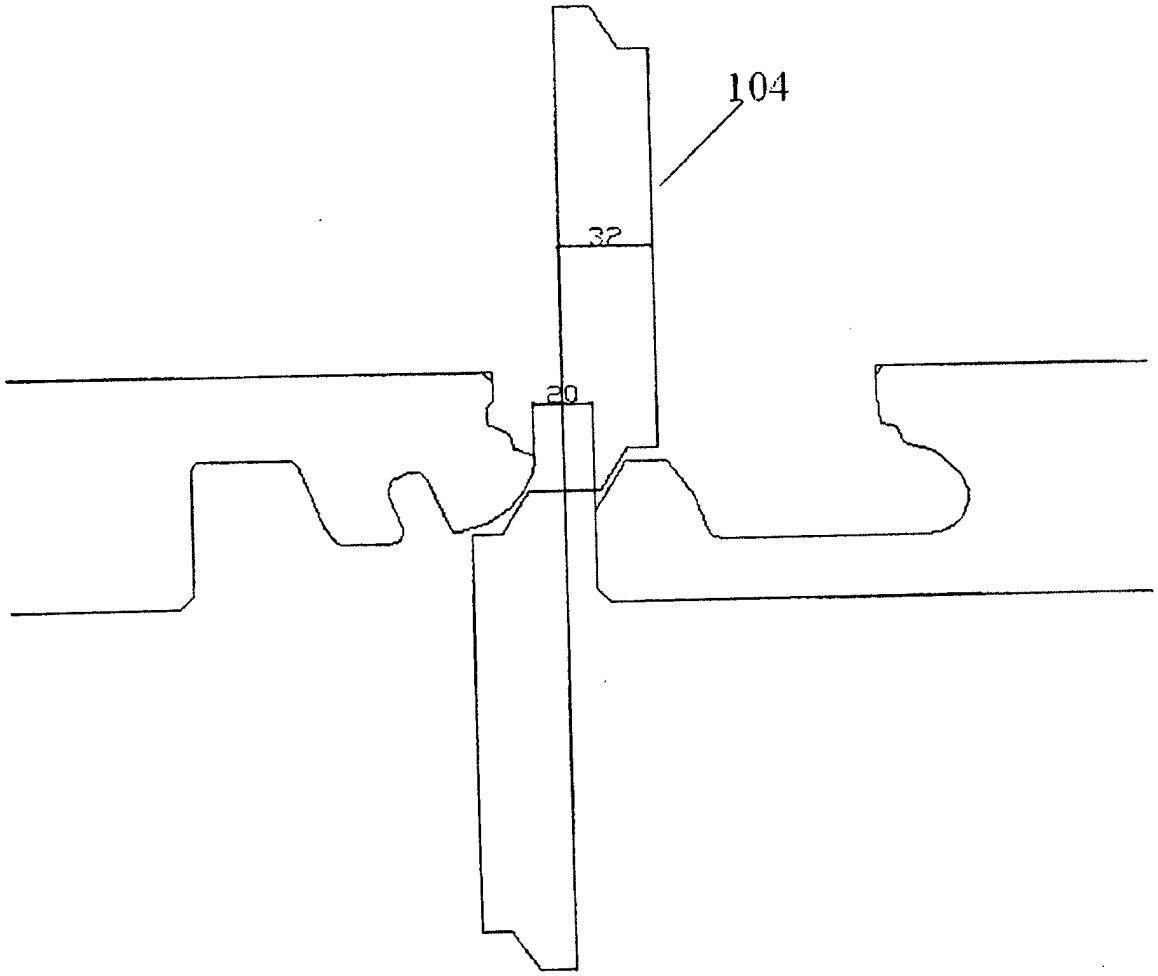

Fig.4

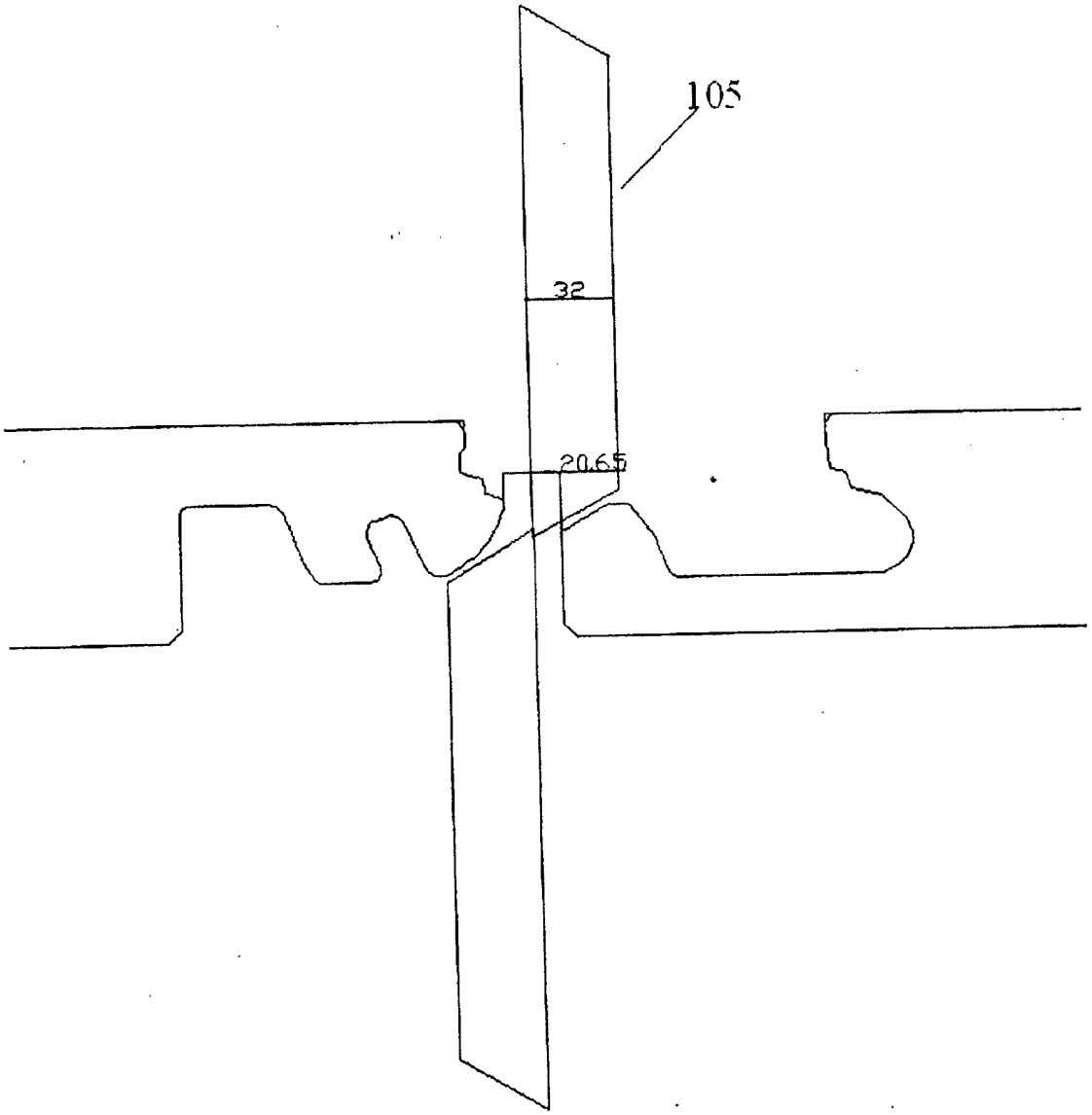

Fig.5

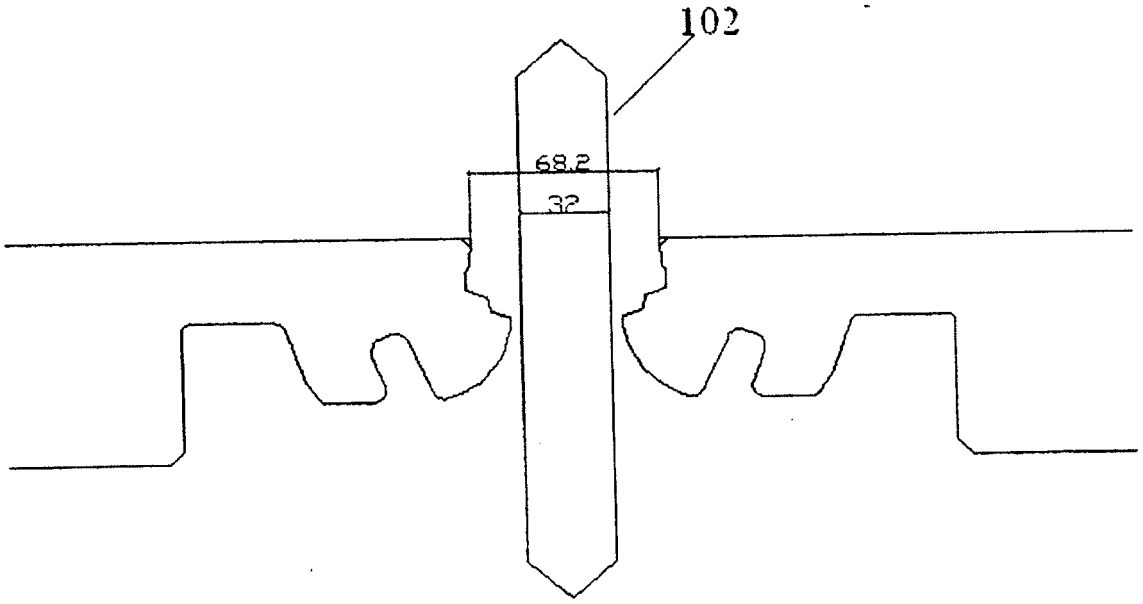

Fig.6

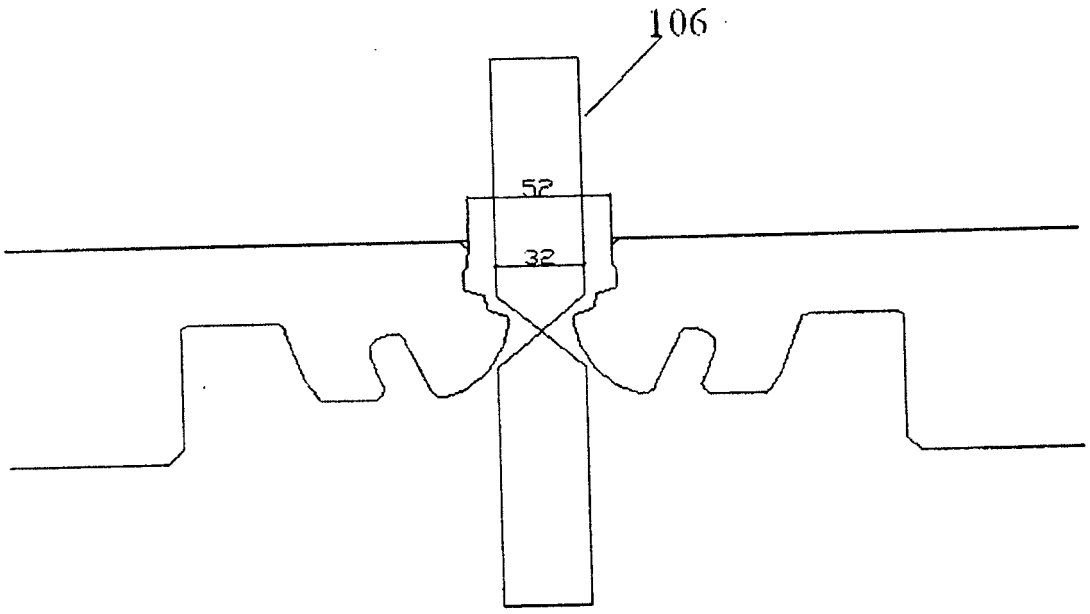

Fig.7

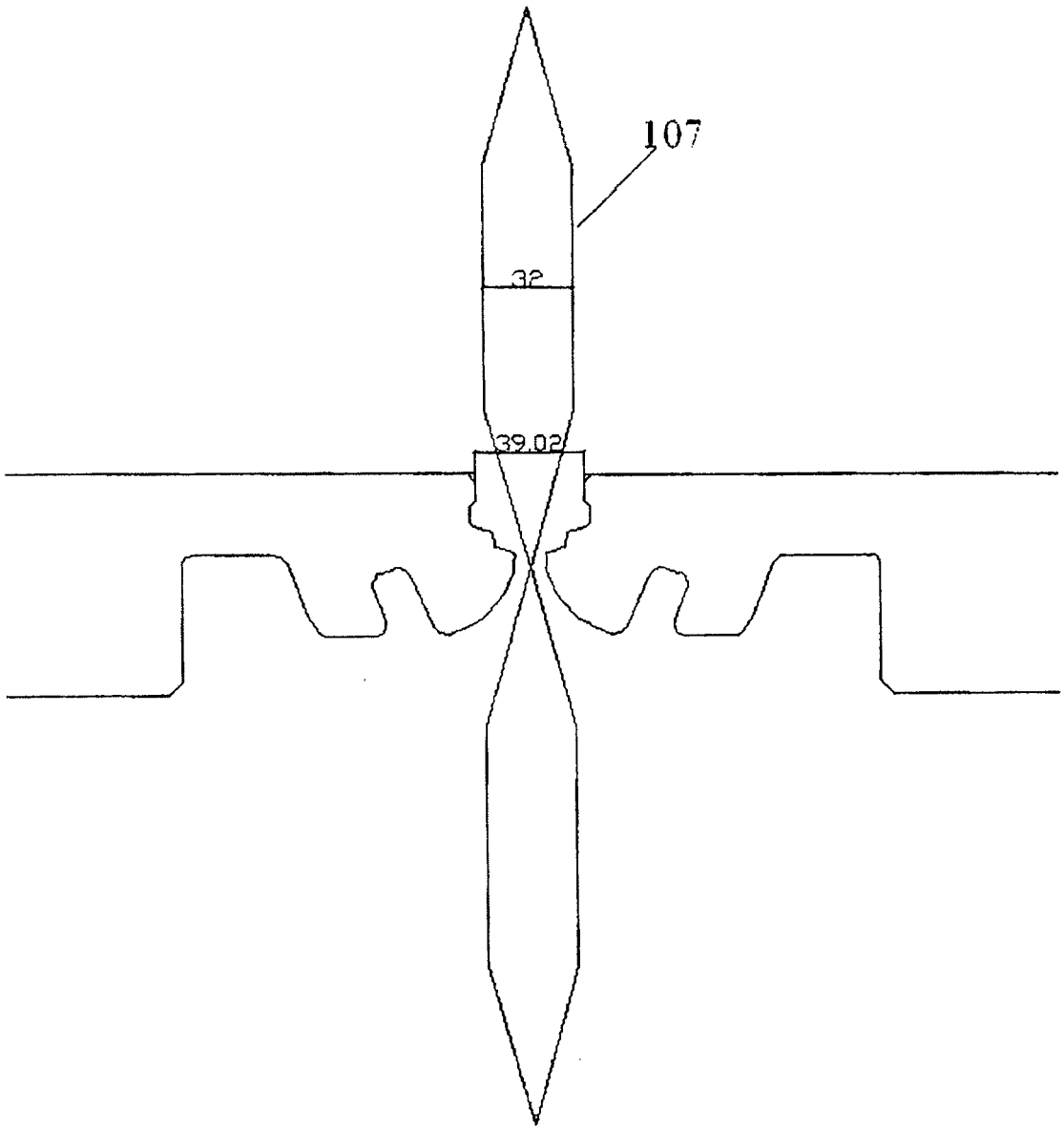

Fig.8

REFERENCES CITED IN THE DESCRIPTION

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