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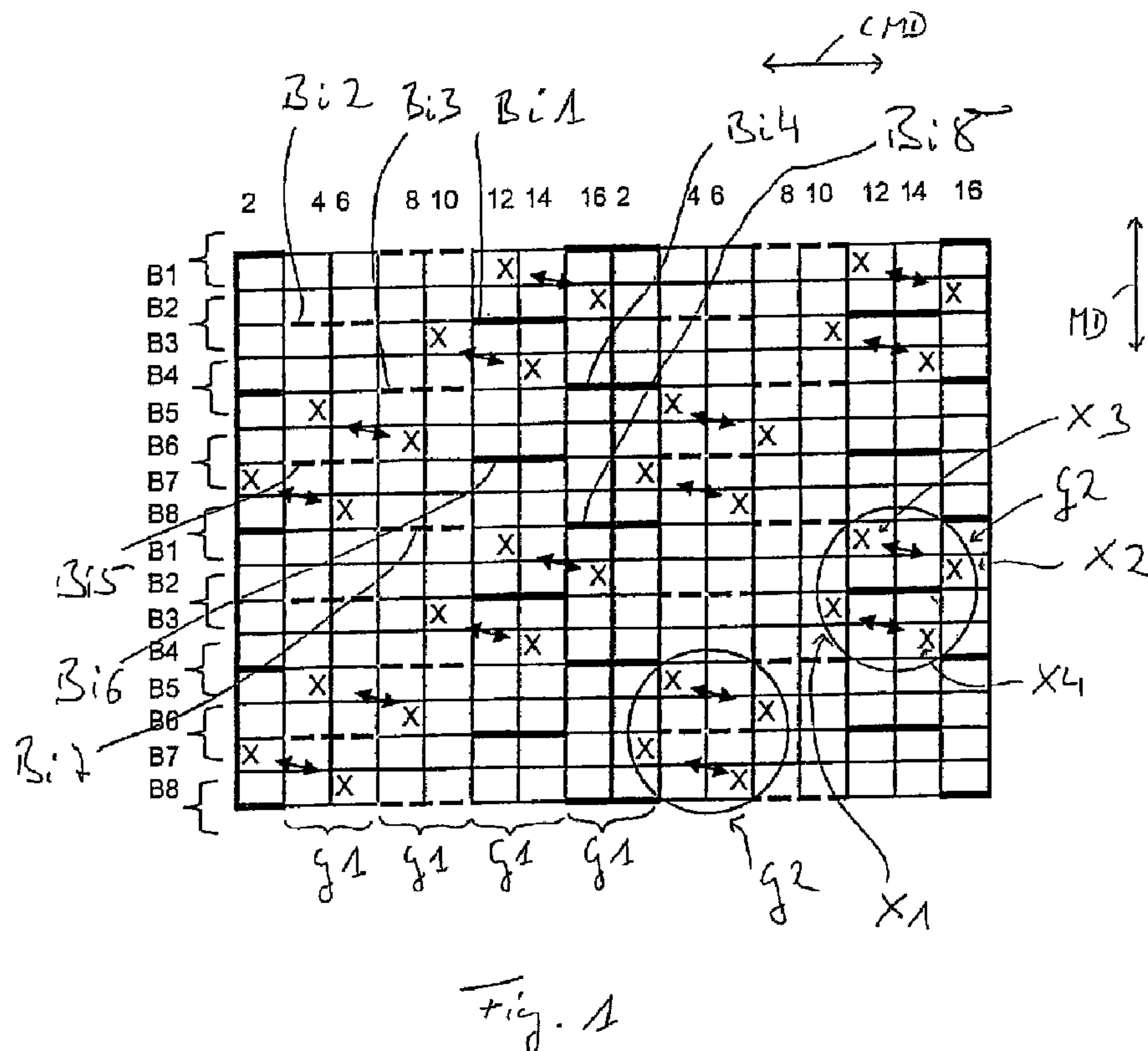
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(54) Titre : BANDE DE TISSU POUR UNE MACHINE DESTINEE A FABRIQUER UN MATERIAU EN BANDE, EN PARTICULIER DU PAPIER OU DU CARTON

(54) Title: WOVEN FABRIC BELT FOR A MACHINE FOR THE PRODUCTION OF WEB MATERIAL, ESPECIALLY PAPER OR CARDBOARD



(57) Abrégé/Abstract:

Woven fabric belt for a machine for the production of web material, especially paper or cardboard, including a web material side first fabric layer (102) and a machine side second fabric layer (100), with threads (1-16) extending in machine direction (MD) and



(57) **Abrégé(suite)/Abstract(continued):**

respectively with threads (B1-B8, T1-T8) extending in cross machine direction (CMD), whereby the first woven fabric layer (102) and the second woven fabric layer (100) are connected with each other by paired binder threads (Bi1-Bi8), whereby the binder thread pairs tie off with threads (2-16) of the second fabric layer (100) extending in one direction (MD) of machine direction (MD) and cross machine direction (CMD) in such a way that in the second fabric layer (100) - in the other direction (CMD) of longitudinal direction (MD) of the belt and cross direction (CMD) of the belt - consecutive groups (G1) of threads (2-16) which are gathered by the binder threads (Bi1-Bi8) and extend in the one direction (MD) are formed and/or whereby inside one field of repeat extending in the second fabric layer (100) in machine direction (MD) and cross machine direction (CMD) the threads (Bi1-Bi8) of the second fabric layer (100) which extend in the other direction (CMD) of machine direction and cross machine (CMD) direction tie off at the threads (2-16) of the second fabric layer (100) extending in the one direction (MD) in order to form respective tie-off points (X) on a side facing away from the machine contact side (108) in such a way that at least one group (G2) of tie-off points (X) is formed within the field of repeat which press the threads (2-16) of one group (G1) of threads of the second fabric (100) layer extending in the one direction (MD) against each other in the other direction (CMD).

Summary

Woven fabric belt for a machine for the production of web material, especially paper or cardboard

Woven fabric belt for a machine for the production of web material, especially paper or cardboard, including a web material side first fabric layer (102) and a machine side second fabric layer (100), with threads (1-16) extending in machine direction (MD) and respectively with threads (B1-B8, T1-T8) extending in cross machine direction (CMD), whereby the first woven fabric layer (102) and the second woven fabric layer (100) are connected with each other by paired binder threads (Bi1-Bi8), whereby the binder thread pairs tie off with threads (2-16) of the second fabric layer (100) extending in one direction (MD) of machine direction (MD) and cross machine direction (CMD) in such a way that in the second fabric layer (100) - in the other direction (CMD) of longitudinal direction (MD) of the belt and cross direction (CMD) of the belt - consecutive groups (G1) of threads (2-16) which are gathered by the binder threads (Bi1-Bi8) and extend in the one direction (MD) are formed and/or whereby inside one field of repeat extending in the second fabric layer (100) in machine direction (MD) and cross machine direction (CMD) the threads (Bi1-Bi8) of the second fabric layer (100) which extend in the other direction (CMD) of machine direction and cross machine (CMD) direction tie off at the threads (2-16) of the second fabric layer (100) extending in the one direction (MD) in order to form respective tie-off points (X) on a side facing away from the machine contact side (108) in such a way that at least one group (G2) of tie-off points (X) is formed within the field of repeat which press the threads (2-16) of one group (G1) of threads of the second fabric (100) layer extending in the one direction (MD) against each other in the other direction (CMD).

(Fig. 1)

Woven fabric belt for a machine for the production of web material, especially paper or cardboard

The current invention relates to a woven fabric belt for a machine for the production of web material, especially paper or cardboard, including a web side first woven fabric layer and a machine side second woven fabric layer, in each instance with threads extending in longitudinal direction of the belt and threads extending in cross direction of the belt, whereby the first woven fabric layer and the second woven fabric layer are connected with each other by paired binder threads.

A woven fabric belt of this type which can, for example, be utilized as a forming fabric in a machine for the production of paper or cardboard is known from DE 10 2006 008 812 A1. Due to the structure of the fabric belt comprising two fabric layers the possibility is created to provide a very finely structured woven structure at a web contact surface - for example in the form of linen weave - consisting of the threads which extend in machine direction and cross machine direction of this fabric layer and which has only a low tendency of marking. Due to the uneven satin weave at the machine side on the other hand and at the same time because of an uneven distribution of the binding locations of the paired binder threads which provide the connection between the two woven fabric layers a high load capacity, especially in regard to contact with various idler rollers and drive rollers is provided on the machine side.

It is the objective of the current invention to provide a fabric belt for a machine for the production of web material whereby an increased stability can be achieved through the utilization of thicker threads in the composition of a machine contact surface, without increasing the thickness of the entire structure.

According to the invention this objective is met by a fabric belt for a machine for the production of web material, especially paper or cardboard, including a web material side first fabric layer and a machine side second fabric layer, each with threads extending in machine direction and respectively threads extending in cross machine direction, whereby the first fabric layer and the second fabric layer are connected with each other by paired binder threads,

- whereby the binder thread pairs tie off with threads of the second fabric layer extending in one direction of machine direction and cross machine direction in such a way that in the second fabric layer – in the other direction of longitudinal direction of the belt and cross direction of the belt consecutive groups of threads which are gathered by the binder threads and extend in the one direction are formed,

and/or

- whereby inside one field of repeat extending in the second fabric layer in machine direction and cross machine direction the threads of the second fabric layer which extend in the other direction of machine direction and cross machine direction tie off at the threads of the second fabric layer extending in the one direction in order to form respective tie-off points on a side facing away from the machine contact side in such a way that at least one group of tie-off points is formed within the field of repeat which press the threads of one group of threads of the second fabric layer extending in the one direction against each other in the other direction, and/or press threads of a group of threads of the second fabric layer which extend in the other direction against each other in the one direction.

In the inventive fabric belt therefore, groups of threads extending in one direction are generated, whereby in these groups due to gathering of the threads or the compression of the threads against

each other the distance between the threads is smaller than the distance between the individual groups. Consequently, comparatively thin threads can be used for the threads of the second fabric layer which extend in the one direction and which – due to gathering into groups appear to be “thicker threads” and which then produce a very stable machine contact surface together with the threads of the second fabric layer extending in the other direction which can indeed have a larger cross sectional dimension, without the disadvantages that are normally associated with the utilization of very rough fabric structures with thicker threads.

In order to be able to produce an even structure in the other direction it is suggested that groups of threads of the second fabric layer extending in the one direction which are arranged adjacent to each other in the other direction include the same number of threads.

The inventive aspect of gathering individual threads of the second fabric layer extending in the one direction into groups which are then interwoven with threads of the second fabric layer which extend transversely or in other words in the other direction can be utilized especially advantageously if each group of threads of the second fabric layer extending in the one direction includes two threads.

For example, the interaction of the binder thread pairs with the threads of the second fabric layer which extend in the one direction can be such that in a binder thread pair one binder thread progresses alternately on the machine contact side of one group of threads extending in the one direction, and the other binder thread progresses on the machine contact side of the group of threads of the second fabric layer following the one after the next one extending in the one direction.

In addition it is possible that with binder threads which are located immediately after each other in one direction one thread of one pair of threads progresses on the machine contact side of a group of threads of the second fabric layer which extend in the one direction and alternatively one thread of a following pair progresses on the machine contact side of a group of threads of the second fabric layer immediately following in the other direction and extending in the one direction. In this way it can be avoided that – with the same pair of binder threads – in the transition from the first to the second fabric layer and vice versa crossover points are created between two immediately adjacent group of threads of the second fabric layer which extend in the one direction. On the contrary, such a crossover point can be located on a web side of an additional group of threads of the second fabric layer.

In addition, in order to produce a very finely structured web side contact surface two threads of the first fabric layer which extend in the other direction and two threads of the second fabric layer which extend in the other direction may be provided between two binder thread pairs which are located following each other in the one direction. It should be pointed out here that obviously the number of the specifically available threads in the one direction of the first fabric layer, or the second fabric layer respectively can be selected to be different. This will depend upon how strong the mutual binding together of the two fabric layers needs to be.

For gathering of individual threads into a respective group through the provision of defined tie-off points it is suggested that in each group of tie-off points a first tie-off point and a second tie-off point are formed in the other direction on both sides of the threads of one group of threads of the second fabric layer which extend in the one direction and which are pressed against each other by this group of tie-off points. Here it can be provided that the first tie-off point and the second tie-off point are formed by immediately adjacent threads in the second fabric layer which extend in the other direction.

Moreover, such a group of tie-off points may include a third tie-off point and a fourth tie-off point which are formed in the one direction on both sides of the first tie-off point and the second tie-off point and in the other direction between the first tie-off point and the second tie-off point. Here, it may be provided that the third tie-off point and the fourth tie-off point are formed at immediately adjacent threads extending in one direction of a group of threads of the second fabric layer which extend in the one direction.

The groups of tie-off points provided according to one inventive aspect may – in addition to the previously discussed aspect of formation of threads extending in the one direction, also include the effect of a group formation of threads extending in the other direction. Due to the crimping occurring at the tie-off points – not only of the threads extending in the other direction, but also of the threads extending in the one direction – particularly those threads extending in the other direction which are positioned between two tie-off points and which are located in the one direction at a distance to each other are pressed against each other. In other words, particularly those located between the third and the fourth tie-off points.

In order to be able to further positively utilize this group formation effect of threads extending in the other direction it is suggested that a binder thread pair is located between the threads of the second fabric layer which extend in the other direction and which form the first and the second tie-off point. In this manner the binder threads of a respective binder thread pair are tightly gathered and thereby also supported by those threads which are gathered by two or more tie-off points into groups extending in the other direction and which are then located adjacent to each other in the one direction.

The second woven fabric layer, in other words the fabric layer which also provides the contact with the various idler or drive rollers can for example be arranged so that within one field of repeat each thread of the second woven fabric layer extending in the other direction is tied off at a single thread of the second fabric layer extending in the one direction, thereby forming a tie-off point, and/or that within one field of repeat a single thread of the second woven fabric layer extending in the other direction ties off at each thread of the second woven fabric layer extending in the one direction.

It is further suggested that between two successive tie-off points in the other direction of a thread of the second woven fabric layer extending in the other direction this thread progresses on the machine side of the threads of the second woven layer extending in the one direction. In this way it can be assured that those threads of the second woven fabric layer which – in the inventive arrangement can be selected with larger dimensions, in other words greater thickness do in fact also provide the machine contact surface in essential areas.

The gathering of the threads extending in the one direction into individual groups which preferably extend completely in the one direction over the entire belt is accomplished especially efficiently in that threads of one group of the second fabric layer extending in the one direction which are pressed against each other by a group of tie-off points in the other direction are also gathered into one group by binder threads extending in the other direction

The one direction can for example be consistent with the longitudinal direction of the belt, whereby then the other direction is consistent with the cross direction of the belt. Production technological reasons preferably further provide that the one direction is consistent with a warp direction and the other direction is consistent with a weft direction.

The current invention is explained in further detail with reference to the enclosed drawings:

Fig. 1 Top view of four immediately adjacent fields of repeat of a machine side woven fabric layer, viewed from the machine side:

Fig. 2 an illustration representing the progression in two adjacent fields of repeat of the paired binder threads which are allocated to each other;

Fig. 3 for one field of repeat of the tie-off arrangement shown in Fig. 1 – the progression of the threads in a web side fabric layer, a machine side fabric layer and the progression of the paired binder threads which are allocated to each other and which hold together the two fabric layers.

Figures 1 through 3 illustrate the tie-off principle of the current invention by depicting the progression of the various threads of two woven fabric layers of a fabric belt which may for example be used as a forming fabric. B1, B2, B3, B4, B5, B6, B7 and B8 identify the threads of a machine side fabric layer 100 which, in Fig. 1 through 3 extend from left to right and which – in a fabric belt – preferably extend in cross direction of the belt CMD. T1, T2, T3, T4, T5, T6, T7 and T8 identify the threads extending in the same direction, in other words in cross direction CMD of the belt of a web side material layer 102.

In the machine side fabric layer 100 threads 2, 4, 6, 8, 10, 12, 14, 16 extend in the longitudinal MD direction of the belt. The longitudinal direction of the belt MD is also consistent with the

machine direction. Likewise, threads 1, 3, 5, 7, 9, 11, 13 and 15 of the web side fabric layer 102 extend in longitudinal direction MD of the belt. For example threads T1-T8 follow each other in longitudinal direction MD of the belt in the web material side fabric layer 102 in a respective field of repeat which defines the smallest repeat unit in longitudinal direction MD of the belt and in cross direction CMD of the belt.

After each two threads T1, T2 extending in cross direction CMD of the belt in the web side fabric layer 102, and likewise two threads B1 and B2 in the machine side fabric layer 100 a pair of binder threads Bi1, Bi2, Bi3, Bi4, Bi5, Bi6, Bi7, Bi8 which are allocated to each other follows. This means that within each field of repeat there are several successive binder thread pairs Bi1-2, Bi3-4, Bi5-6, Bi7-8 located in longitudinal direction MD of the belt. In each pair of binder threads the individual binder threads change over (as shown for example in the binder thread pair Bi1-2) at the cross over points K between the web side fabric layer 102 and the machine side fabric layer 104. In the area where the respective binder threads Bi1 or Bi2 are tied into the web side fabric layer 102 they form a linen weave together with threads 1, 3, 5, 7, 9, 11, 13, 15 which extend in the longitudinal direction MD of the belt, resulting in a very finely structured web contact surface on the web material side 106. Binder threads Bi1, Bi2, Bi3, Bi4, Bi5, Bi6, Bi7, Bi8 also serve in a structure creating capacity so that each binder thread pair Bi1-2, Bi3-4, Bi5-6, Bi7-8 in the web side fabric layer 104 in fact replaces a complete thread which extends in cross direction CMD of the belt.

In the machine side fabric layer 100 threads B1, B2, B3, B4, B5, B6, B7, and B8 which extend in cross direction CMD of the belt progress essentially on a side facing the machine side 108 of the respective threads 2, 4, 6, 8, 10, 12, 14, 16 of this fabric layer 100 which extend in longitudinal

direction MD of the belt. However, inside a field of repeat each of the threads B1-B8 extending in cross direction CMD of the belt ties off at a tie-off point X above one of the threads 2, 4, 6, 8, 10, 12, 14, 16 of this fabric layer 100. “Above” in this instance means that the tie-off occurs on the side facing away from the machine side 108 of a respective thread extending in longitudinal direction MD of the belt, as is indicated for example by the tie-off point X of thread B1 in Fig. 3. In the locations where these threads B1-B8 do not form tie-off points X they progress or float on the machine side 108 of threads 2, 4, 6, 8, 10, 12, 14, 16 of this fabric layer 100 which extend in longitudinal direction MD of the belt. Herewith a satin weave is realized – in the illustrated example of a field of repeat with eight adjacent threads it is an eight-time satin weave – which provides that almost the entire machine contact surface on the machine side 108 is provided by evenly progressing thread segments, so that on the one hand a very smooth even machine contact surface is produced and thereby on the other hand also the wear resistance increased.

It can be seen, especially in Fig. 1 and 3 that with the respective binder thread pairs Bi1-2, Bi3-4, Bi5-6, Bi7-8 the respective binder threads Bi1, Bi2, Bi3, Bi4, Bi5, Bi6, Bi7, Bi8 tie off with respective threads of the machine side fabric layer 100 which extend in longitudinal direction MD of the belt at locations where they are not tied into the web side fabric layer 102 in such a way that they are gathered into respective groups G1 of threads extending in longitudinal direction MD of the belt. It can be seen from binder thread pair Bi1-2 that threads 4, 6 of the machine side fabric layer 100 which extend in longitudinal direction MD of the belt are gathered by binder thread Bi2, whereas threads 12, 14 are gathered by binder thread Bi1 into a group G1. The binder thread pair Bi3-4 which follows in longitudinal direction MD of the belt likewise gathers threads 8, 10 into a group G1 with binder thread Bi3, whereas binder thread Bi4 gathers thread 2 of this field of repeat with thread 16 of an immediately adjacent field of repeat into a group G1. The next following binder thread pair Bi5-6 again gathers threads 4, 6 or 12, 14 into a respective group G1.

This results in the structure which can also be seen in Fig. 1 whereby groups G1 of threads extending in longitudinal direction MD of the belt are gathered by a respective binder thread pair Bi1-2, Bi3-4, Bi5-6, Bi7-8 so that a respective binder thread extends on the machine side 108 of these threads or of this group G1 of threads. A group of threads extending in longitudinal direction of the belt which are not tied together by this pair of binder threads is located between two such progressions at each binder thread pair, for example binder thread pair Bi1-2, so that a respective binder thread extends along the machine side of these threads. In the case of binder thread pair Bi1-2 shown in Fig. 3 these would for example be threads 8, 10 or 16, 2. Whereas threads 4, 6 and 12, 14 are moved closer to each other in cross direction CMD of the belt by this binder thread pair Bi1-2 in that they are squeezed together by binder threads Bi1, B2 extending on the machine side 108 a similar effect also occurs with threads 8, 10, or 16, 2 respectively which are pushed away from threads 6 or 12 as a result of binder threads Bi1, Bi2 crossing above these threads 8, 10 or 2, 16.

In longitudinal direction MD of the belt immediately adjacent binder thread pairs Bi1-2, Bi3-4, Bi5-6 alternate in gathering threads which extend in longitudinal direction MD of the belt into groups G1.

The result is a structure of groups G1 on threads extending in longitudinal direction MD of the belt which are represented here by threads 4, 6 or 8, 10, or 12, 14 or 16, 2 respectively (in the adjoining area of two fields of repeat). These groups G1 extend in the entire longitudinal direction MD of the belt through the field of repeat. The distance of threads which extend in longitudinal direction MD of the belt inside a respective group G1 with threads 4, 6 or 8, 10, or 12, 14 or 16, 2 is thereby smaller than the distance between the individual groups G1.

These

groups G1 thereby have the effect of a virtual “thicker thread” above which a respective thread B1, B2, B3, B4, B5, B6, B7, B8 extending in cross direction CMD of the belt ties off in order to form a respective tie-off point X. Despite utilization of comparatively thinner threads 2, 4, 6, 8, 10, 12, 14, 16 of the machine side fabric layer 100 which extend in longitudinal direction MD of the belt it is therefore possible to utilize comparatively thicker threads B1-B8 extending in cross direction CMD of the belt which then also provide an accordingly higher wear resistance.

As indicated in Fig. 2, this progression of binder threads Bi1-Bi6, or the location of their crossover points K which are identified in Fig. 2 by a star causes the formation of ribbons of crossover points K extending in longitudinal direction MD of the belt and located at threads 1, 3 or 9, 12 respectively of the web side fabric layer 102, whereas no crossover points K occur at threads 5, 7 or 13, 15 respectively.

A further contribution to the formation of individual groups G1 of threads in the machine side fabric layer 100 which, in spite of comparatively thinner thread material appear as a thicker thread is achieved by the defined positioning of the tie-off points X of threads B1-B8 which extend in cross direction CMD of the belt. Below this is explained with reference to Fig. 1 and specifically the field of repeat on the bottom right.

Here one can see two encircled groups G2 of tie-off points X which exert such forces upon threads 2, 4, 6, 8, 10, 12, 14, 16 of the machine side fabric layer 100 which extend in longitudinal direction MD of the belt that likewise threads 4, 6, or 8, 10, or 12, 14 or 16, 2 respectively are pressed against each other. In such a group G2 there are two tie-off points X1, X2 which

are located on both sides of the two threads which are to be gathered into a group G1. In group G2 which is located on the right in Fig. 1 the tie-off point of thread B3 above thread 10 can be considered as a first tie-off point X1, whereas the tie-off point of thread B2 above thread 16 can be considered as a second tie-off point X2. Thread B3 hereby exerts a force upon thread 12 which presses it in the direction toward thread 14; whereas thread B2 exerts a force upon thread 14 which presses it in the direction toward thread 12. An additional pair of tie-off points X within such a group G2 is positioned so that in longitudinal direction MD of the belt it is located on both sides of the previously addressed first or respectively second tie-off points X1, X2 however, in cross direction CMD of the belt it is located between these two tie-off points X1, X2. The tie-off point of thread B1 above thread 12 can therefore be considered for example as a third tie-off point X3 of group G2, whereas the tie-off point of thread B4 above thread 14 can be considered as a fourth tie-off point X4. The third tie-off point X3 causes a force which spreads threads 10 and 12 apart, whereas the fourth tie-off point X4 produces a force which spreads threads 14 and 16 apart.

This explanation illustrates that each of these groups G2 of tie-off points X within one field of repeat presses two threads which extend in longitudinal direction MD of the belt and which at the same time are also gathered by a binder thread pair into a group G1 of threads extending in longitudinal direction MD of the belt against each other. The two effects generated by the binder threads and the tie-off points therefore support each other.

An additional effect caused by the provision of the tie-off points X in defined positions is that not only the formation of pairs of threads B2-B16 which extend in longitudinal direction MD of the belt is supported, but also that adjacent threads B1-B8 in cross direction CMD of the belt are gathered into groups or pairs. At the left edge of Figure 1 this point is illustrated by brackets capturing threads B2, B3 or respectively B4, B5 etc.

This effect is produced when in each respective group G2 the third tie-off point X3 and the fourth tie-off point X4 are positioned so that between them threads also progress which extend in cross direction CMD of the belt and which will be or have been combined into a pair. The crimps produced at the respective tie-off points X are present not only at the threads extending in cross direction CMD of the belt. Threads 2 through 16 extending in longitudinal direction MD of the belt are also crimped at these tie-off points – in other words they are deflected from their straight progression and with this crimp produce a force in longitudinal direction MD of the belt which is exerted upon an immediately adjacent thread extending in cross direction CMD of the belt. For example, as a result of this crimping, thread 12 of fabric layer 100 which ties off with thread B1 at the tie-off point X3 presses thread B2 in Fig. 1 which is immediately following in longitudinal direction MD of the belt downward. Accordingly thread B3 which extends in cross direction CMD of the belt is pressed upward due to the crimping of thread 14 at the tie-off point X4, so that threads B2 and B3 are moved closer to each and for example threads B1 and B2 are spread apart by group G2, especially by the tie-off points X3 and X4.

The current invention utilizes this effect in order to arrange a pair of binder threads between two such threads which extend in cross direction CMD of the belt and which form a thread group which in the previously described example is the pair formed by binder threads Bi1 and Bi2.

Threads B2 and B3 which are herewith to move closer toward each other form a protection especially at the machine side 108 for the binder thread pairs gathered there so that these are subjected to a lower stress, especially in interaction with the various rolls which drive or guide a belt of this type.

It is pointed out in this context that Fig. 1 clearly shows that groups G2 are repeated in cross direction CMD of the belt and that in each such group 2 the same threads which extend in cross direction CMD of the belt are gathered into a pair by means of the respective third tie-off point X3 and the fourth tie-off point X4. It is further pointed out that in the previously discussed groups of tie-off points four such tie-off points do not always need to necessarily be available from which two primarily form the thread pairs or thread groups which extend in longitudinal direction MD of the belt and two primarily form the thread pairs or thread groups which extend in cross direction CMD of the belt or support the respective pair formation. Groups G2 of tie-off points, each consisting of only two such tie-off points could also be provided, whereby individual groups G2 more intensively support the formation of pairs in the one direction and other groups G2 more intensively support the formation of pairs in the other direction.

Also clearly recognizable in Fig. 1 is an additional special effect in the formation of pairs of threads B1 through B8 which extend in cross direction CMD of the belt, in interaction with binder threads Bi1-Bi8 which extend in the same direction, whereby the tie-off points X which contribute to the pairing formation within a respective group B2 – in other words especially tie-off points X3 and X4 – are located exactly at the threads extending in longitudinal direction MD of the belt which are captured into a pair by a respective binder thread. This means that everywhere where a binder thread Bi1-Bi8 progresses on the machine side of threads 2 through 16 of the fabric layer 100 which extend in longitudinal direction MD of the belt and where it is very exposed in regard to a critical wear and tear sensitive interaction with driving or idling rollers the threads B1-B8 which extend in cross direction CMD of the belt and which gather this binder thread are pressed toward each other by the tie-off points X3, X4, thereby producing an effective protection at precisely this critical location for a respective binder thread.

In the previously described example of a fabric belt the longitudinal direction MD of the belt, in other words the machine direction can be consistent with the warp direction during the manufacture of such a belt, whereas the cross direction CMD of the belt, in other words the cross machine direction can be consistent with the weft direction. Obviously, this can also be vice versa. It must also be pointed out that the number of threads in a respective group G1 can differ from the illustrated example. However it has been shown that based on the selection of groups G1 with two threads each, the desired effect of gathering or pressing toward each other can be achieved especially efficiently, especially in conjunction with an 8-time satin weave of the machine side fabric layer 100. It is also pointed out that essentially groups G1 are oriented such that they extend in cross direction CMD of the belt.

Claims

1. Woven fabric belt for a machine for the production of web material, especially paper or cardboard, including a web material side first fabric layer (102) and a machine side second fabric layer (100), with threads (1-16) extending in machine direction (MD) and respectively with threads (B1-B8, T1-T8) extending in cross machine direction (CMD), whereby the first woven fabric layer (102) and the second woven fabric layer (100) are connected with each other by paired binder threads (Bi1-Bi8),
 - whereby the binder thread pairs (Bi1-2, Bi3-4, Bi5-6, Bi7-8) tie off with threads (2-16) of the second fabric layer (100) extending in one direction (MD) of machine direction (MD) and cross machine direction (CMD) in such a way that in the second fabric layer (100) - in the other direction (CMD) of longitudinal direction (MD) of the belt and cross direction (CMD) of the belt - consecutive groups (G1) of threads (2-16) which are gathered by the binder threads (Bi1-Bi8) and extend in the one direction (MD) are formed

and/or

- whereby inside one field of repeat extending in the second fabric layer (100) in machine direction (MD) and cross machine direction (CMD) the threads (Bi1-Bi8) of the second fabric layer (100) which extend in the other direction (CMD) of machine direction and cross machine (CMD) direction tie off at the threads (2-16) of the second fabric layer (100) extending in the one direction (MD) in order to form respective tie-off points (X) on a side facing away from the machine contact side (108) in such a way that at least one group (G2) of tie-off points (X) is formed within the field of repeat which press the threads (2-16) of one group (G1) of threads of the

second fabric (100) layer extending in the one direction (MD) against each other in the other direction (CMD), and/or press threads (Bi1-Bi8) of a group of threads (Bi1-Bi8) of the second fabric layer (100) which extend in the other direction (CMD) against each other in the one direction (MD).

2. Fabric belt according to claim 1,

Characterized in that groups (G1) of threads (2-16) of the second fabric layer (100) extending in the one direction (MD) which are arranged adjacent to each other in the other direction (CMD) include the same number of threads.

3. Fabric belt according to claim 1 or 2,

Characterized in that each group (G1) of threads (2-16) of the second fabric layer (100) extending in the one direction (MD) comprises two threads.

4. Fabric belt according to one of the claims 1 through 3,

Characterized in that in a binder thread pair (Bi1-2, Bi3-4, Bi5-6) one binder thread progresses alternately on the machine side (108) of one group (G1) of threads (2-16) extending in the one direction (MD), and the other binder thread progresses on the machine side of the group (G1) of threads (2-16) of the second fabric layer (100) following the one after the next one extending in the one direction (MD).

5. Fabric belt according to claim 4,

Characterized in that with binder thread pairs (Bi1-2, Bi3-4, Bi5-6, Bi7-8) which are located immediately after each other in the one direction (MD) one thread of one pair of threads progresses on the machine side (108) of a group (G1) of threads (2-16) of the second fabric layer (100) which extend in the one direction (MD) and alternatively one thread of a

following pair progresses on the machine side (108) of a group (G1) of threads (2-16) of the second fabric layer (100) immediately following in the other direction (CMD) and extending in the one direction (MD).

6. Fabric belt according to one of the claims 1 to 5,
Characterized in that two threads (T1-T8) of the first fabric layer(102) which extend in the other direction (CMD) and two threads (B1-B8) of the second fabric layer (100) which extend in the other direction (CMD) are provided between two binder thread pairs (Bi1-2, Bi3-4, Bi5-6, Bi7-8) which are located following each other in the one direction (MD).
7. Fabric belt according to one of the claims 1 through 6,
Characterized in that in each group (G2) of tie-off points (X) a first tie-off point (X1) and a second tie-off point (X2) are formed in the other direction (CMD) on both sides of the threads of one group (G1) of threads (2-16) of the second fabric layer (100) which extend in the one direction (MD) and which are pressed against each other by this group (G2) of tie-off points (X).
8. Fabric belt according to claim 7,
Characterized in that the first tie-off point (X1) and the second tie-off point (X2) are formed by immediately adjacent threads (B1-B8) in the second fabric layer (100) which extend in the other direction (CMD).
9. Fabric belt according to claim 7 or 8 ,
Characterized in that in each group (G2) of tie-off points (X) a third tie-off point (X3) and a fourth tie-off point (X4) are formed in the one direction (MD) on both sides of the first tie-off point (X1) and the second tie-off point (X2) and in the other direction (CMD) between the first tie-off point (X1) and the second tie-off point (X2).

10. Fabric belt according to claim 9,

Characterized in that the third tie-off point (X3) and the fourth tie-off point (X4) are formed at immediately adjacent threads (2-16) extending in the one direction (MD) of a group (G1) of threads (2-16) of the second fabric layer (100) which extend in the one direction (MD).

11. Fabric belt according to claim 8 and claim 9 or 10,

Characterized in that a binder thread pair (Bi1-2, Bi3-4, Bi5-6, Bi7-8) is located between threads (B1-B8) of the second fabric layer (100) which extend in the other direction (CMD) and which form the first tie-off point (X1) and the second tie-off point (X2).

12. Fabric belt according to one of the claims 7 through 11,

Characterized in that within one field of repeat each thread (B1-B8) of the second fabric layer (100) extending in the other direction (CMD) is tied off at a single thread (2-16) of the second fabric layer (100) extending in the one direction (MD), thereby forming a tie-off point (X).

13. Fabric belt according to one of the claims 7 through 12,

Characterized in that within one field of repeat a single thread (B1-B8) of the second fabric layer (100) extending in the other direction (CMD) ties off at each thread (2-16) of the second fabric layer (100) extending in the one direction (MD).

14. Fabric belt according to one of the claims 7 through 13,
Characterized in that between two successive tie-off points (X) in the other direction (CMD) of a thread (B1-B8) of the second fabric layer (100) extending in the other direction (CMD) this thread progresses on the machine side (108) of threads (2-16) of the second woven layer (100) extending in the one direction (MD).
15. Fabric belt according to one of the claims 1 through 14,
Characterized in that threads of one group (G1) of the second fabric layer(100) extending in the one direction (MD) which are pressed against each other by a group (G2) of tie-off points (X) in the other direction (CMD) are also gathered into one group (G1) by binder threads Bi1-Bi6) extending in the other direction (CMD).
16. Fabric belt according to one of the claims 1 through 15,
Characterized in that the one direction (MD) is consistent with the longitudinal direction (MD) of the belt and the other direction (CMD) is consistent with the cross direction (CMD) of the belt.
17. Fabric belt according to one of the claims 1 through 16,
Characterized in that the one direction (MD) is consistent with a warp direction and the other direction (CMD) is consistent with a weft direction.

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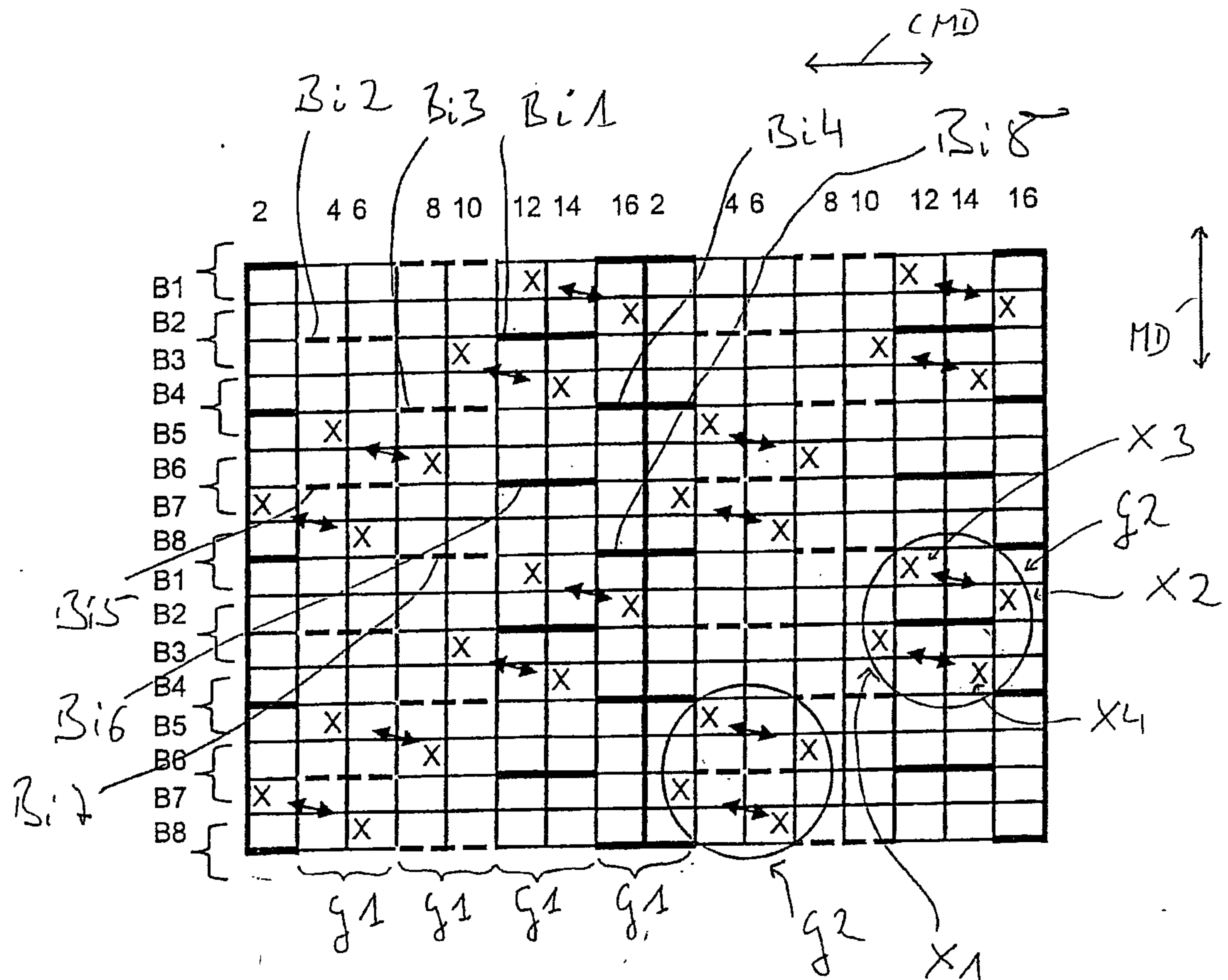


Fig. 1

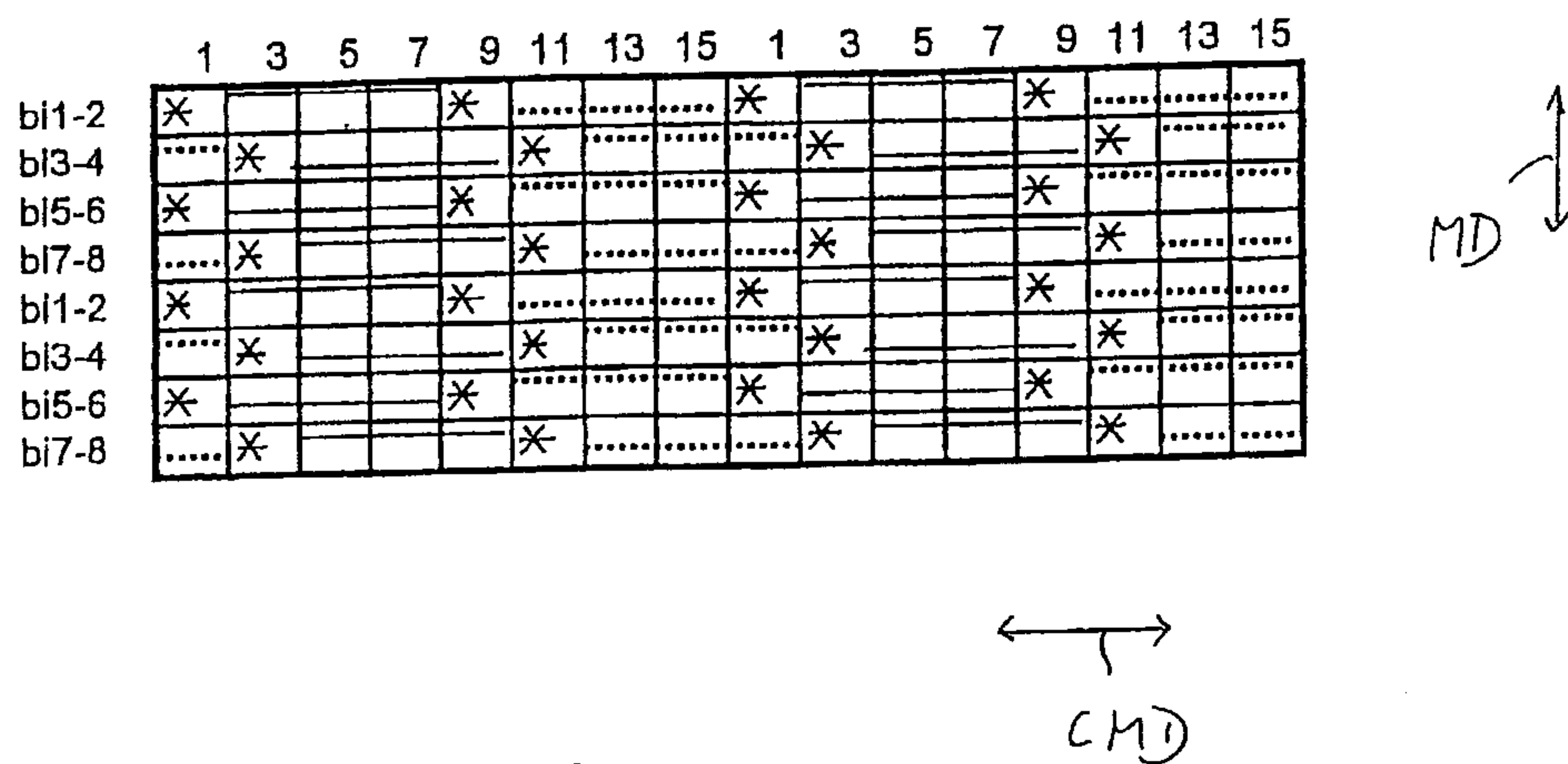
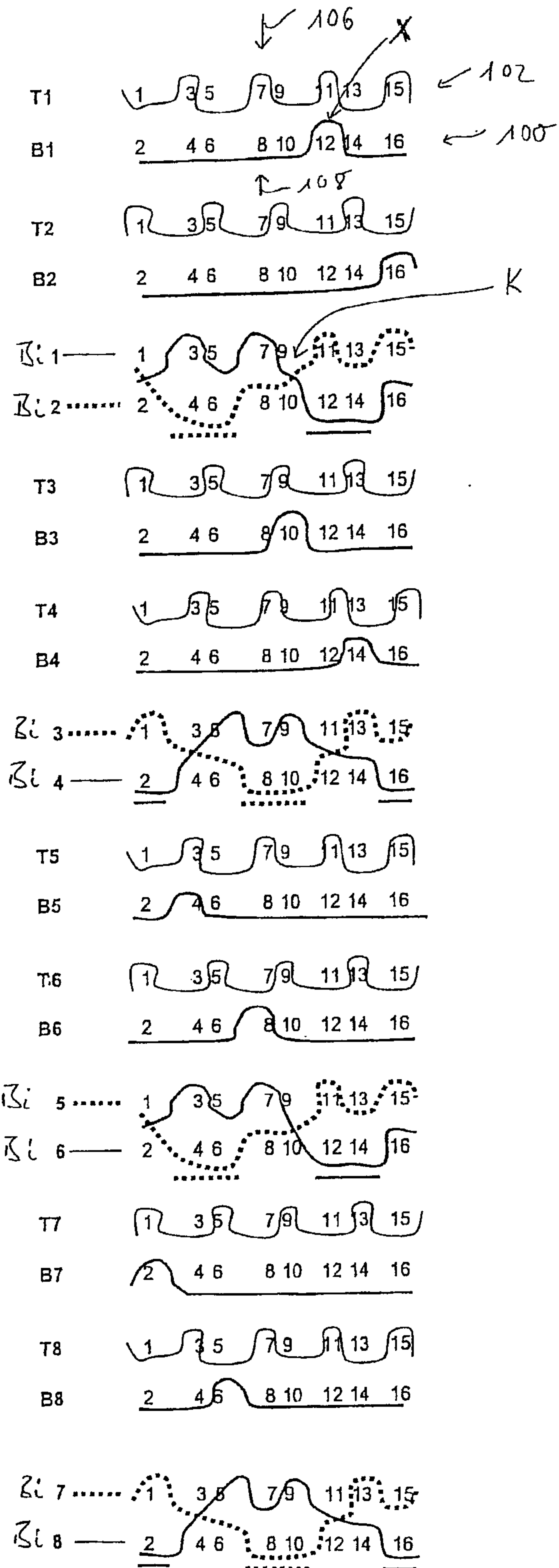


Fig. 2

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Fig. 3



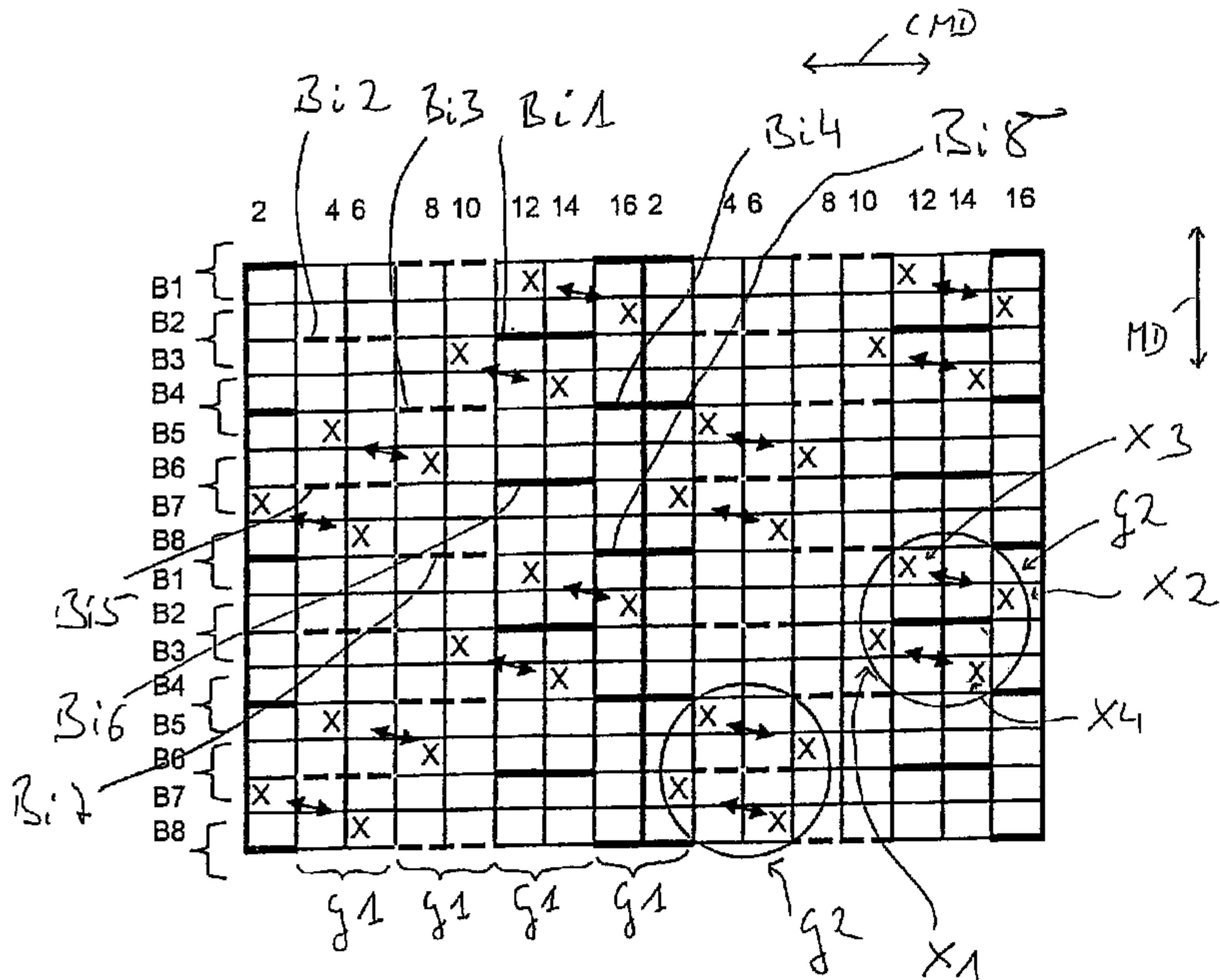


Fig. 1