The invention relates to a dual-layer material ramp for a machine for producing a dual-layered fibrous web, in particular a dual-layered paper or cardboard web, from two fibrous suspensions, comprising a material ramp nozzle with two nozzle spaces extending along the width and separated from one another on the inside by a separating wedge, said nozzle spaces guiding a respective fibrous suspension during operation of the dual-layer material ramp as fibrous suspension streams and coming together, each of said nozzle spaces comprising an upstream feed device, a downstream outlet gap with a gap width, said gap extending along the width and an outer wall on the outside, wherein the separating wedge comprises two separating wedge surfaces that are contacted by the respective fibrous suspension stream during operation of the dual-layer material ramp. The dual-layer material ramp according to the invention is characterized in that the separating wedge comprises two separating wedge areas, each having a separating wedge angle, an upstream separating wedge starting area and a downstream separating wedge end area, that the two separating wedge angles of the two separating wedge areas assume different angular values, wherein the separating wedge starting angle of the upstream separating wedge starting area assumes a greater angular value than the separating wedge end angle of the downstream separating wedge end area, and that a non-planar transition area is provided between at least one separating wedge surface of the separating wedge and the two separating wedge areas of the separating wedge.
DOUBLE-LAYER HEADBOX FOR A MACHINE FOR PRODUCING A DOUBLE-LAYER FIBROUS WEB

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This is a continuation of PCT application No. PCT/EP2009/063549, entitled “DUAL-LAYER MATERIAL RAMP FOR A MACHINE FOR PRODUCING A DUAL-LAYERED FIBROUS WEB”, filed Oct. 16, 2009, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to a double-layer headbox for a machine for producing a double-layer fibrous web, in particular a double-layer paper or cardboard web produced from two fibrous suspensions, with one headbox nozzle comprising two converging nozzle chambers extending across the width and separated from each other on the inside by a separating wedge, each respectively guiding one fibrous suspension in the form of a fibrous suspension stream during operation of the double-layer headbox, each of said nozzle chambers comprising one upstream feed device, one downstream outlet gap with a gap width, said gap extending across the width and an outer wall on the outside, whereby the separating wedge comprises two separating wedge surfaces which are contacted by the respective fibrous suspension stream during operation of the double-layer headbox.

[0004] 2. Description of the Related Art

[0005] As a rule, the two fibrous suspensions will be suspensions of different fiber stocks; they may however also be suspensions comprised of the same fiber stocks, whereby however different physical properties are present. A physical property could for example be different pressures controlling of different flow speeds in the respective fibrous suspension.

[0006] A double-layer headbox of this type is known for example from the German patent document DE 43 23 050 C1. For the purpose of separating two adjacent fibrous suspension streams the disclosed double-layer headbox is equipped in the headbox nozzle with a continuously tapered separating wedge which is arranged movable in the headbox nozzle by means of an upstream linked element.

[0007] The majority of double-layer headboxes are currently employed in the packaging machinery field for the production of test liner. Increasing production speeds, as well as increasing raw material and energy costs increasingly demand the production of double-layer products with lower base weights. To this end the double-layer headboxes are operated with ever smaller gap widths, or fibrous suspension stream thicknesses respectively. However, this increases the demands upon stream stability, as well as on turbulence quality of the respective fibrous suspension stream emerging from the headbox nozzle of the double-layer headbox for the purpose of decreasing the mixing zone within the fibrous suspension stream in its height direction (z-direction).

[0008] It is therefore the objective of the invention, and what is needed in the art is, to improve a double-layer headbox of the type referred to at the beginning so that a high grade layer integrity in height direction as well as so that good optical coverage quality of the two fibrous suspension layers is achieved in a fibrous web produced by said double-layer headbox. In this context, producing a double-layer fibrous web, in particular one having a base weight in the range of 20 to 60 g/m² per fibrous suspension layer at a production speed in excess of 900 m/min. should be possible.

SUMMARY OF THE INVENTION

[0009] According to the invention this objective is met with, and the present invention provides, a double-layer headbox of the type referred to at the beginning in that the separating wedge comprises two separating wedge areas, each having a separating wedge angle, an upstream separating wedge starting area and a downstream separating wedge end area, that the two separating wedge angles of the two separating wedge areas assume different angular values, wherein the separating wedge starting angle of the upstream separating wedge starting area assumes a greater angular value than the separating wedge end angle of the downstream separating wedge end area, and that a non-planar transition area is provided between at least one separating wedge surface of the separating wedge between the two separating wedge areas of the separating wedge.

[0010] The inventive objective is completely solved in this manner.

[0011] The separating wedge of the inventive double-layer headbox provides the advantage that layer integrity in height direction is clearly improved compared to known multi-layer headboxes. The reason for this is primarily that the angle of impact of the two fibrous suspension streams at their confluence at the separating wedge end is clearly reduced. Combined with this is a reduction of the turbulences which develop in the fibrous suspension streams, resulting in an improvement of the layer integrity in height direction.

[0012] The turbulences developing in the two fibrous suspension streams also substantially influence the coverage qualities of the two fibrous suspension layers. However, if the turbulences are reduced, then the mixing zones within the fibrous suspension stream also reduce in its height direction (z-direction). These reduced mixing zones in turn substantially contribute to the improvement of the coverage qualities of the two fibrous stock layers.

[0013] Herewith a high value layer integrity in height direction, as well as a good optical coverage of both fibrous suspension layers is achieved in a double-layer fibrous web which was produced by means of the inventive double-layer headbox.

[0014] The separating wedge may consist of a special steel or similar material and in areas have a minimum strength in longitudinal as well as in cross direction of a value of ≥40 N/mm. In addition the separating wedge is mounted readily, preferably by means of an upstream separating wedge retainer, in other words it is not joint and therefore not mounted freely movable in the headbox nozzle. By definition a straight line extends in longitudinal direction, preferably centered through the upstream separating wedge retainer.

[0015] There is also the possibility to provide at least one nozzle chamber of the head box nozzle of the inventive double-layer headbox with at least one lamella extending in the direction of flow of the fibrous suspension stream. The lamella may consist of a synthetic material, preferably a high performance polymer, especially PPSU, PP, PEI, PTFE, PA, POM or similar. Depending on the specific application the lamella which reaches into the area of the nozzle end can have a blunt lamella end at its non-structured end area with a height of less than 0.4 mm, preferably less than 0.3 mm, viewed in flow direction of the fibrous suspension stream, or, in its
structured end area, viewed in flow direction of the fibrous suspension stream, a blunt lamella end with a height greater than 0.5 mm. In additional embodiments, the structured end area may take the structure of grooves with rectangular and/or wedge shaped and/or parabolic and/or round form with a constant and/or different depth.

[0016] The inventive double-layer headbox can additionally be equipped with a sectionalized stock consistency control (Dilution Water - Technology, "ModuleJet") as known for example from publication DE 40 19 595 C2.

[0017] In a first preferred embodiment a non-planar transition area is provided respectively on both separating wedge surfaces of the separating wedge between the two separating wedge areas of the separating wedge. Thereby a clearly reduced angle of impact of the two fibrous suspension streams can be achieved at their confluence at the separating wedge end, whereby this clearly reduced angle of impact is then upheld by both separating wedge surfaces of the separating wedge.

[0018] Here, at least the upstream separating wedge starting area of the separating wedge can be aligned symmetrically with one straight line extending through the upstream separating wedge retainer. If in this case the downstream separating wedge end area of the separating wedge is aligned asymmetrically with a straight line extending through the upstream separating wedge retainer, then the separating wedge tip of the separating wedge is not positioned on the straight line extending through the upstream separating wedge retainer.

[0019] However, the upstream separating wedge starting area of the separating wedge, as well as the downstream separating wedge end area of the separating wedge can be aligned symmetrically with a straight line extending through the upstream separating wedge retainer, so that the separating wedge tip of the separating wedge is positioned on the straight line extending through the upstream separating wedge retainer. In this case the separating wedge is symmetric with the straight line extending through the upstream separating wedge retainer.

[0020] In a second preferred embodiment a non-planar transition area is provided on one separating wedge surface of the separating wedge between the two separating wedge areas of the separating wedge, and a planar transition area is provided on the other separating wedge surface of the separating wedge between the two separating wedge areas of the separating wedge. The separating wedge therefore forms a planar area on one side so that the distinctly reduced angle of impact of the two fibrous suspension streams when coming together at the separating wedge end must be supported by the other side of the separating wedge.

[0021] Here, at least the upstream separating wedge starting area of the separating wedge can be aligned symmetrically with one straight line extending through the upstream separating wedge retainer. If in this case the downstream separating wedge end area of the separating wedge is aligned asymmetrically with a straight line extending through the upstream separating wedge retainer, then the separating wedge tip of the separating wedge is not positioned on the straight line extending through the upstream separating wedge retainer.

[0022] However, the upstream separating wedge starting area of the separating wedge, as well as the downstream separating wedge end area of the separating wedge can be aligned asymmetrically to a straight line extending through the upstream separating wedge retainer. In this case the separating wedge tip of the separation edge could be positioned on the straight line extending through the upstream separating wedge retainer.

[0023] In order for the two fibrous suspensions flowing in the fibrous suspension streams to experience a process technologically optimum confluence, the separating wedge end angle of the downstream separating wedge end area has an angular value in the range of 1.5 to 8°, preferably 2.5 to 4.5°. Additionally, these angle areas avoid disadvantageous mixing of the two adjacent fibrous suspensions. The separating wedge starting angle of the upstream separating wedge starting area preferably has an angular value in the range of 8° to 20°, preferably 10 to 15°, so that sufficient rigidity of the separating wedge is provided in longitudinal direction, as well as in cross direction.

[0024] In regard to a sufficient guide length for the two fibrous suspension streams it is additionally advantageous if the downstream separating wedge end area of the separating wedge has a downstream separating wedge end length in the range of 10 to 100 mm, preferably 15 to 75 mm, especially 25 to 50 mm and/or the downstream separating wedge end area of the separating wedge protrudes beyond the outlet gap of the headbox nozzle, preferably in a range of 10 to 25 mm.

[0025] The respective non-planar transition area at the separating wedge surface between the two separating wedge areas of the separating wedge can moreover also be angular or round with a radius in the range of 20 to 1000 mm, preferably 100 to 500 mm, especially 150 to 250 mm.

[0026] The two fibrous suspension streams emerging from the headbox nozzle as one combined fibrous suspension stream can moreover have different stream speeds. For example, the at least one difference in the two stream speeds can assume a value in the range of 10 to 60 m/min, preferably 15 to 25 m/min. This substantially reduces spreading of the mixing cone in the fibrous suspension stream to the relevant fibrous suspension layer. These requirements can, as already known, also depend on the former concept.

[0027] In regard to controlling the fiber orientation cross profile as well as the base weight cross profile of the double-layer fibrous web it can also be advantageous if the double-layer headbox in an additional embodiment is equipped with dilution water controls which are already known from many publications. One controlled supply stream, especially a dilution water stream is to be added to at least one fibrous suspension when producing a mixed stream with a mixed concentration.

[0028] The inventive double-layer headbox can also be used in an excellent manner in a machine for the production of a double-layer fibrous web, especially a double-layer paper or cardboard web consisting of two fibrous suspensions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

[0030] FIG. 1 is a schematic longitudinal section of one design form of a headbox nozzle in an inventive double-layer headbox; and
FIGS. 2 and 3 are schematic side views of two additional design forms of separating wedges for inventive double-layer headboxes.

Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate embodiments of the invention, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

FIG. 1 illustrates a schematic longitudinal sectional view of one design form of a headbox nozzle 2 of double-layer headbox 1. The illustrated double-layer headbox 1 is part of a machine which is not depicted in closer detail, for the production of a double-layer fibrous web 3, in particular a double-layer paper or cardboard web consisting of two fibrous suspensions 4.1, 4.2.

Fibrous suspensions 4.1, 4.2 will generally be suspensions with different fiber stocks; they could however be also suspensions of the same fiber sock, whereby however different physical properties exist.

Headbox nozzle 2 comprises two converging nozzle chambers 7.1, 7.2 extending across the width B (arrow) and separated from each other on the inside by a separating wedge 5, guiding one respective fibrous suspension 4.1, 4.2 in the form of a fibrous suspension stream 6.1, 6.2 (arrow) during operation of double-layer headbox 1. The two nozzle chambers 7.1, 7.2 have the same cross sectional progression. In addition each of said nozzle chambers 7.1, 7.2 comprises an upstream feed device 8.1, 8.2 which is not illustrated in further detail, a downstream outlet gap 9.1, 9.2 with a gap width 9.1.s, 9.2.s, said gap extending across the width B (arrow) and an outer wall 10.1, 10.2 respectively on the outside.

Gap widths 9.1, 9.2 of outlet gap 9.1, 9.2 are of the same size in the illustrated example; they can however also be of a different size. In the illustrated example the respective feed device 8.1, 8.2 which is not illustrated in detail is a turbulence generator located immediately prior to headbox nozzle 2; it may however also be indirectly before the headbox nozzle and/or it may include a preferably machine wide intermediate chamber or a tubular grating.

Separating wedge 5 consists of a special steel or similar material and has a minimum strength in longitudinal as well as in cross direction of a value of at least ±40 N/mm². In addition separating wedge 5 in the present example is mounted rigidly by means of an upstream separating wedge retainer 11; in other words it is not joint and therefore not mounted movable in headbox nozzle 2. By definition a straight line G extends in longitudinal direction, preferably centered through the upstream separating wedge retainer 11.

Moreover, separating wedge 5 consists of two separating wedge areas having a respective separation angle α, β, an upstream separating wedge starting area 5.1 and a downstream separating wedge area 5.2. The two separating wedge angles α, β of the two separating wedge areas 5.1, 5.2 assume different angular values, whereby separating wedge starting angle α of the upstream separating wedge starting area 5.1 assumes a greater angular value than the separating wedge end angle β of the downstream separating wedge end area 5.2. In addition a non-planar transition area 12.0 is provided between the two separating wedge areas 5.1, 5.2 of separating wedge 5, between at least one separating wedge surface 5.0 of separating wedge 5.

The design form illustrated in FIG. 1 provides a non-planar transition area 12.0, 12.1 respectively on the two separating wedge surfaces 5.0, 5.1 of separating wedge 5, between the two separating wedge areas 5.1, 5.2 of separating wedge 5. Upstream separating wedge starting area 5.1 of separating wedge 5 as well as downstream separating wedge end area 5.2 of separating wedge 5 is aligned symmetrically with a straight line extending through the upstream separating wedge retainer 11, so that separating wedge tip 13 of separating wedge 5 is positioned on straight line extending through the upstream separating wedge retainer 11.

An additional embodiment which is not illustrated provides that only the upstream separating wedge starting area of the separating wedge is aligned symmetrically with a straight line extending through the upstream separating wedge retainer. If moreover the downstream separating wedge end area of the separating wedge is aligned asymmetrically with the straight line extending through the upstream separating wedge retainer, then the separating wedge tip of the separating wedge is not positioned on the straight line extending through the upstream separating wedge retainer.

In addition, the separating wedge starting angle α of upstream separating wedge starting area 5.1 has an angular value in the range of 8 to 20°, preferably 10 to 15°. In contrast, separating wedge end angle β of downstream separating wedge end area 5.2 has an angular value in the range of 1.5 to 8°, preferably 2.5 to 4.5°, so that it is smaller than separating wedge starting angle α of upstream separating wedge starting area 5.1.

Downstream separating wedge end area 5.2 of separating wedge 5 has a downstream separating wedge end length 15.2 in the range of 10 to 100 mm, preferably 15 to 75 mm, especially 25 to 50 mm and protrudes beyond outlet gap 9 of headbox nozzle 2, preferably in a range of 10 to 25 mm. The respective non-planar transition area 12.0, 12.1 on the appropriate separating wedge surface 5.0, 5.1 between the two separating wedge areas 5.1, 5.2 of separating wedge 5 is round with a radius 8.5, 8.5.U in the range of 20 to 1000 mm, preferably 100 to 500 mm, especially 150 to 250 mm. The single non-planar transition area at the separating wedge surface between the two separating wedge areas of the separating wedge could also be angular.

As indicated by the broken lines in FIG. 1 at least one nozzle chamber 7.1, 7.2 of headbox nozzle 2 of double-layer headbox 1 can be equipped with a lamella 15 extending in flow direction S (arrow) of fibrous suspension stream 6.1, 6.2 (arrow), preferably 2.5 to 4.5°, so that it is smaller than separating wedge starting angle α of upstream separating wedge starting area 5.1.

Moreover, separating wedge 5 consists of two separating wedge areas having a respective separation angle α, β, an upstream separating wedge starting area 5.1 and a downstream separating wedge area 5.2. The two separating wedge angles α, β of the two separating wedge areas 5.1, 5.2 assume different angular values, whereby separating wedge starting angle α of the upstream separating wedge starting area 5.1 assumes a greater angular value than the separating wedge end angle β of the downstream separating wedge end area 5.2. In addition a non-planar transition area 12.0 is provided between the two separating wedge areas 5.1, 5.2 of separating wedge 5, between at least one separating wedge surface 5.0 of separating wedge 5.

As indicated by the broken lines, two lamellas 15 are arranged in each nozzle
chamber 7.1, 7.2 which, purely as an example, but not limited to, have the same lamella lengths (nozzle chamber 7.1) and different lamella lengths (nozzle chamber 7.2).

[0046] In a non-illustrated embodiment which is however known to the expert, the inventive double-layer headbox 1 can be equipped with a sectionalized stock consistency control (Dilution Water-Technology, "ModuleJet"). A stock density control of this type for a headbox is known for example from publication DE 40 19 593 C2.

[0047] FIGS. 2 and 3 illustrate a schematic side view of two additional design forms of separating wedges 5 for inventive double-layer headboxes.

[0048] On both separating wedges a non-planar transition area 12.0 between the two separating wedge areas 5.1, 5.2 of separating wedge 5 is provided on only one separating wedge surface 5.O of separating wedge 5. On the other separating wedge surface 5.U of separating wedge 5 a planar transition area 12.U is provided—therefore no geometric change between the two separating wedge areas 5.1, 5.2 of separating wedge 5 is provided.

[0049] In the example illustrated in FIG. 2 the upstream separating wedge starting area 5.1 of separating wedge 5 is aligned symmetrically with a straight line G extending through the upstream separating wedge retainer 11, whereby straight line G is defined as previously described. Since however the downstream separating wedge end area 5.2 of separating wedge 5 is aligned asymmetrically with straight line G extending through upstream separating wedge retainer 11, separating wedge tip 13 of separating wedge 5 is not positioned on straight line G extending through upstream separating wedge retainer 11.

[0050] In the design example illustrated in FIG. 3, upstream separating wedge starting area 5.1 of separating wedge 5 as well as downstream separating wedge end area 5.2 of separating wedge 5 is aligned asymmetrically with straight line G extending through the upstream separating wedge retainer, whereby straight line G is defined as previously described. However, this design form provides that separation wedge tip 13 of separating wedge 5 is positioned on straight line G extending through upstream separating wedge retainer 11. It could however also be positioned next to it.

[0051] In both design examples shown in FIGS. 2 and 3 the respective separating wedge starting angle α of upstream separating wedge starting area 5.1 has again an angular value in the range of 8 to 20°, preferably 10 to 15°. Respective separating wedge angle β of downstream separation end area 5.2 again has an angular value in the range of 1.5 to 8°, preferably 2.5 to 4.5°, so that it is smaller than the separating wedge starting angle α of upstream separating wedge starting area 5.1. Downstream separating wedge end area 5.2 of the respective separating wedge 5 has a downstream separating wedge end length 15.2 in the range of 10 to 100 mm, preferably 15 to 75 mm, especially 25 to 50 mm.

[0052] In contrast to the design example of separating wedge 5 illustrated in FIG. 1, non-planar transition area 12.0 at separating wedge surface 5.O between the two separating wedge areas 5.1, 5.2 of the individual separating wedge 5 illustrated in FIGS. 2 and 3 is geometrically angular. The transition progresses in transverse direction of separating wedge 5, in other words along a line L. The respective non-planar transition area could also be round with a corresponding radius.

[0053] In all three illustrated design examples of double-layer headbox 1 and as depicted in the design example shown in FIG. 1, fibrous suspension streams 6.1, 6.2 emerging from headbox nozzle 2 as a common fibrous suspension stream 14 can have different stream flow speeds v6.1 (arrow), v6.2 (arrow). The difference in stream flow speeds v6.1 (arrow), v6.2 (arrow) in particular, assume a value in the range of 10 to 60 m/min, preferably 15 to 25 m/min.

[0054] Lastly, a controlled stream, in particular a dilution water stream can be added to at least one fibrous suspension when producing a mixed stream with a mixing concentration. This allows control for the fiber orientation cross profile, as well as the base weight profile of the double-layer fibrous web.

[0055] Double-layer headbox 1 illustrated or respectively indicated in FIGS. 1 through 3 are particularly suitable for utilization in a machine for the production of a double-layer fibrous web 3, in particular a double-layer paper or cardboard web from two fibrous suspensions 4.1, 4.2.

[0056] In summary it is emphasized that the invention creates a double-layer headbox of the type described at the beginning providing high grade layer integrity in height direction as well as good optical coverage quality of the two fibrous suspension layers in a fibrous web produced by said double-layer headbox. In particular this is also made possible in the production of a double-layer fibrous web with a base weight in the range of 20 to 60 g/m² per fibrous suspension layer at a production speed in excess of 900 m/min.

[0057] While this invention has been described with respect to at least one embodiment, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

COMPONENT IDENTIFICATION

[0058] 1 Double-layer headbox
[0059] 2 Headbox nozzle
[0060] 3 Double-layer fibrous web
[0061] 4.1 Fibrous suspension
[0062] 4.2 Fibrous suspension
[0063] 5 Separating wedge
[0064] 5.1 Separating wedge starting area (upstream)
[0065] 5.2 Separating wedge end area (downstream)
[0066] 5.O Separating wedge surface
[0067] 5.U Separating wedge surface
[0068] 6.1 Fibrous suspension stream (arrow)
[0069] 6.2 Fibrous suspension stream (arrow)
[0070] 7.1 Nozzle chamber
[0071] 7.2 Nozzle chamber
[0072] 8.1 Feeding device
[0073] 8.2 Feeding device
[0074] 9 Outlet gap
[0075] 9.1 Outlet gap
[0076] 9.2 Outlet gap
[0077] 10.1 Outside wall
[0078] 10.2 Outside wall
[0079] 11 Separating wedge retainer
[0080] 12.0 Transition area
[0081] 12.1 Transition area
[0082] 13 Separating wedge tip
[0083] 14 Fibrous suspension stream
[0084] 15 Width (arrow)
[0085] G Straight line
What is claimed is:

1. A double-layer headbox for a machine for producing a double-layer fibrous web produced from two fibrous suspensions, the double-layer fibrous web being one of a double-layer paper web and a double-layer cardboard web, said double-layer headbox comprising:

one headbox nozzle including two converging nozzle chambers and one separating wedge, said two converging nozzle chambers extending across a width and being separated from each other on an inside by said separating wedge, each of said two converging nozzle chambers respectively guiding one of the fibrous suspensions formed respectively as a fibrous suspension stream during operation of the double-layer headbox, each of said two converging nozzle chambers respectively including one upstream feed device, one downstream outlet gap with a gap width and extending across said width, and an outer wall on an outside, said separating wedge including two separating wedge surfaces each of which is contacted by a respective said fibrous suspension stream during operation of the double-layer headbox, said separating wedge including two separating wedge areas each having a separating wedge angle, one of said two separating wedge areas being an upstream separating wedge starting area, another of said two separating wedge areas being a downstream separating wedge end area, said separating wedge angle of said upstream separating wedge starting area being a separating wedge starting angle, said separating wedge angle of said downstream separating wedge end area being a separating wedge end angle, said separating wedge starting angle of said upstream separating wedge starting area having a greater angular value than said separating wedge end angle of said downstream separating wedge end area, said separating wedge including at least one non-planar transition area between said two separating wedge areas of said separating wedge, said at least one non-planar transition area being on at least one of said two separating wedge surfaces of said separating wedge.

2. The double-layer headbox according to claim 1, wherein a respective said non-planar transition area is provided at both said two separating wedge surfaces of said separating wedge between said two separating wedge areas of said separating wedge.

3. The double-layer headbox according to claim 1, further including an upstream separating wedge retainer, at least said upstream separating wedge starting area of said separating wedge being aligned symmetrically with one straight line extending through said upstream separating wedge retainer.

4. The double-layer headbox according to claim 3, wherein said separating wedge includes a separating wedge tip, said upstream separating wedge starting area of said separating wedge and said downstream separating wedge end area of said separating wedge being aligned symmetrically with said straight line extending through said upstream separating wedge retainer so that said separating wedge tip of said separating wedge is positioned on said straight line extending through said upstream separating wedge retainer.

5. The double-layer headbox according to claim 1, wherein said non-planar transition area is on one of said two separating wedge surfaces of said separating wedge between said two separating wedge areas of said separating wedge, said separating wedge including a planar transition area, said planar transition area being on another of said two separating wedge surfaces of said separating wedge between said two separating wedge areas of said separating wedge.

6. The double-layer headbox according to claim 5, further including an upstream separating wedge retainer, at least said upstream separating wedge starting area of said separating wedge and said downstream separating wedge end area of said separating wedge being aligned symmetrically with one straight line extending through said upstream separating wedge retainer.

7. The double-layer headbox according to claim 5, further including an upstream separating wedge retainer, said upstream separating wedge starting area of said separating wedge and said downstream separating wedge end area of said separating wedge being aligned asymmetrically to a straight line extending through said upstream separating wedge retainer.

8. The double-layer headbox according to claim 7, wherein said separating wedge includes a separating wedge tip which is positioned on said straight line extending through said upstream separating wedge retainer.

9. The double-layer headbox according to claim 1, wherein said separating wedge starting angle of said upstream separating wedge starting area has an angular value in a range of 8° to 20°, and that said separating wedge end angle of said downstream separating wedge end area has an angular value in a range of 1.5° to 8°.

10. The double-layer headbox according to claim 1, wherein said separating wedge starting angle of said upstream separating wedge starting area has an angular value in a range of 10° to 15°, and that said separating wedge end angle of said downstream separating wedge end area has an angular value in a range of 2.5° to 4.5°.

11. The double-layer headbox according to claim 1, wherein said downstream separating wedge end area of said separating wedge has a downstream separating wedge end length in a range of 10 mm to 100 mm.

12. The double-layer headbox according to claim 1, wherein said downstream separating wedge end area of said separating wedge has a downstream separating wedge end length in a range of 15 mm to 75 mm.

13. The double-layer headbox according to claim 1, wherein said downstream separating wedge end area of said separating wedge has a downstream separating wedge end length in a range of 25 mm to 50 mm.

14. The double-layer headbox according to claim 1, wherein said headbox nozzle includes an outlet gap, said downstream separating wedge end area of said separating wedge protruding beyond said outlet gap of said headbox nozzle in a range of 10 to 25 mm.

15. The double-layer headbox according to claim 1, wherein said non-planar transition area at said separating
wedge surface between said two separating wedge areas of said separating wedge is angular.

16. The double-layer headbox according to claim 1, wherein non-planar transition area at said separating wedge surface between said two separating wedge areas of said separating wedge is round with a radius in a range of 20 mm to 1000 mm.

17. The double-layer headbox according to claim 1, wherein non-planar transition area at said separating wedge surface between said two separating wedge areas of said separating wedge is round with a radius in a range of 100 mm to 500 mm.

18. The double-layer headbox according to claim 1, wherein non-planar transition area at said separating wedge surface between said two separating wedge areas of said separating wedge is round with a radius in a range of 150 mm to 250 mm.

19. The double-layer headbox according to claim 1, wherein two of said fibrous suspension stream emerging from said headbox nozzle as one combined fibrous suspension stream have different stream speeds.

20. The double-layer headbox according to claim 19, wherein said stream speeds differ relative to each other by a value in a range of 10 to 60 m/min.

21. The double-layer headbox according to claim 19, wherein said stream speeds differ relative to each other by a value in a range of 15 to 25 m/min.

22. The double-layer headbox according to claim 1, wherein one controlled supply stream is added to at least one of the fibrous suspensions when producing a mixed stream with a mixed concentration, said controlled supply stream being a dilution water stream.

23. A machine to produce a double-layer fibrous web from two fibrous suspensions, the double-layer fibrous web being one of a double-layer paper web and a double-layer cardboard web, from two fibrous suspensions, said machine comprising: at least one double-layer headbox including one headbox nozzle including two converging nozzle chambers and one separating wedge, said two converging nozzle chambers extending across a width and being separated from each other on an inside by said separating wedge, each of said two converging nozzle chambers respectively guiding one of the fibrous suspensions formed respectively as a fibrous suspension stream during operation of said at least one double-layer headbox, each of said two converging nozzle chambers respectively including one upstream feed device, one downstream outlet gap with a gap width and extending across said width, and an outer wall on an outside, said separating wedge including two separating wedge surfaces each of which is contacted by a respective said fibrous suspension stream during operation of said at least one double-layer headbox, said separating wedge including two separating wedge areas each having a separating wedge angle, one of said two separating wedge areas being an upstream separating wedge starting area, another of said two separating wedge areas being a downstream separating wedge end area, said separating wedge angle of said upstream separating wedge starting area being a separating wedge starting angle, said separating wedge angle of said downstream separating wedge end area being a separating wedge end angle, said separating wedge starting angle having a different angular value than said separating wedge end angle, said separating wedge starting angle of said upstream separating wedge starting area having a greater angular value than said separating wedge end angle of said downstream separating wedge end area, said separating wedge including at least one non-planar transition area between said two separating wedge areas of said separating wedge, said at least one non-planar transition area being on at least one of said two separating wedge surfaces of said separating wedge.