



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.01.2018 Bulletin 2018/03

(51) Int Cl.:
D03D 15/00 (2006.01) **D03D 1/00** (2006.01)
D03D 13/00 (2006.01)

(21) Application number: **17179281.5**

(22) Date of filing: **03.07.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(30) Priority: **15.07.2016 JP 2016140529**

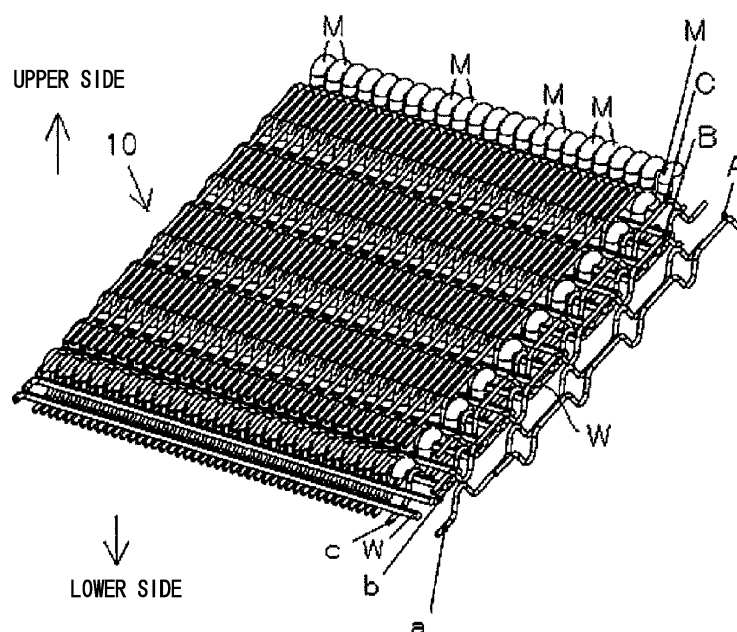
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(54) **WEBBING FOR SEAT BELT**

(57) A webbing (10) includes a base (11) made by interlacing main warps (M) and wefts (W); and thin warps (A-C, a-c) that are woven into the base (11). On the surface of the webbing, the thin warps (A-C, a-c) cover the main warps (M). The main warps (M) meander so as to

pass over odd-numbered wefts (W) and to pass under even-numbered wefts (W). On the upper side of the webbing, the thin warps (A-C) cover the main warps (M) of the base (11). On the lower side of the webbing, the thin warps (a-c) cover the main warps (M) of the base (11).

Fig. 1



Description**[Technical Field]**

[0001] The present invention relates to a webbing used in a seat belt apparatus for an automobile or the like.

[Background Art]

[0002] A seat belt apparatus for an automobile is configured to restrain an occupant with a webbing withdrawn from a retractor.

[0003] It is known that treating agents such as poly-ether polyester compounds and silicone compounds are used to improve smoothness and wear resistance of a webbing (see, for example, Japanese Patent Publication 2009-7695A).

[0004] Japanese Patent Publication H9-309405A describes a webbing for a seat belt woven by intersecting warps and wefts in which the webbing is provided with thick parts and thin parts using thick warps and thin warps, and retractability into a retractor is thereby improved, without using a treating agent.

[Summary of Invention]

[0005] It is an object of the present invention to make the texture of a webbing including thick warps and thin warps smooth. This object is achieved by a webbing as defined in claim 1 or claim 4. The dependent claims define preferred and/or advantageous embodiments of the invention.

[0006] A webbing of a first invention includes a base made by interlacing main warps and wefts, and thin warps that are woven into the base and are thinner than the main warps. On the surface of the webbing, the thin warps cover the main warps.

[0007] In an aspect of the first invention, the main warps have a fineness of 1000 to 3000 denier, the thin warps have a fineness of 250 to 1500 denier, and a total of two or more thin warps are woven for each main warp.

[0008] A webbing of a second invention includes a base made by interlacing main warps and wefts, and thin warps that are woven into the base and are thinner than the main warps. The thin warps are interposed between the main warps, and the heights of the tops of the thin warps from the wefts are substantially the same as the heights of the tops of the main warps from the wefts.

[0009] In an aspect of the second invention, the thin warps comprise first thin warps and second thin warps, the first thin warps are interposed between the second thin warps and the base, and heights of tops of the second thin warps from the wefts are substantially the same as heights of tops of the main warps from the wefts.

[0010] In an aspect of the second invention, the main warps have a fineness of 1000 to 3000 denier, the first thin warps and the second thin warps have a fineness of 250 to 1500 denier, and one or more second thin warps

are interposed between the main warps.

[Advantageous Effects of Invention]

[0011] In the webbing of the first invention, since the thick main warps are covered with the thin warps, the texture is smooth. In addition, since the thick main warps are used, the strength of the webbing is high. In the webbing of the first invention, since the thick main warps are covered with the thin warps, the thick main warps are protected from damage caused by external factors (such as light and dust).

[0012] In the webbing of the second invention, since the thin warps are disposed between the thick main warps, and, on the outer surface of the webbing, the thick warps and the thin warps are substantially flush with each other, the texture is smooth. In addition, since the thick main warps are used, the strength of the webbing is high.

[Brief Description of Drawings]**[0013]**

Fig. 1 is a perspective view of a webbing according to an embodiment of a first invention.

Fig. 2a is a sectional view of a base of the webbing of Fig. 1 in the warp direction. Figs. 2b, 2c, 2d, and 2e are each a sectional view showing the engagement relationship between wefts and thin warps.

Fig. 3 is a plan view of the base of the webbing of Fig. 1.

Fig. 4a is an enlarged end view of a section taken along line IVa-IVa of Figs. 2b to 2e. Fig. 4b is an enlarged end view of a section taken along line IVb-IVb of Figs. 2b to 2e. Fig. 4c is an enlarged end view of a section taken along line IVc-IVc of Figs. 2b to 2e. Fig. 4d is an enlarged end view of a section taken along line IVd-IVd of Figs. 2b to 2e.

Fig. 5 is a perspective view of a webbing according to an embodiment of a second invention.

Fig. 6 is an enlarged plan view of the vicinity of the lower right of Fig. 5.

Fig. 7a is a view as seen from arrow VIIa of Fig. 6, and Fig. 7b is a view as seen from arrow VIIb of Fig. 6.

Fig. 8 is a plan view of a base of the webbing of Fig. 5.

Fig. 9 is a sectional view taken along line IX-IX of Fig. 8.

[Description of Embodiments]

[0014] Embodiments will be described below with reference to the drawings.

[Embodiment of the first invention]

[0015] Fig. 1 to Fig. 4d show a webbing 10 according to an embodiment of the first invention. Fig. 1 is an enlarged perspective view of part of the webbing 10. On

the right side of Fig. 1, warps are shown as being spaced apart in the weft direction. On the lowermost side of Fig. 1, the depiction of main warps is omitted. Fig. 2a is a sectional view taken along the warp direction showing the engagement relationship between main warps M and wefts W, and is a sectional view taken along line IIa-IIa of Fig. 3. Figs. 2b to 2e are sectional views taken along the warp direction showing the engagement relationship between thin warps A to C and wefts a to c. Fig. 3 is a plan view of a base 11 consisting of main warps M and wefts W. Figs. 4a to 4d are enlarged end views of sections taken along lines IVa-IVa, IVb-IVb, IVc-IVc, and IVd-IVd, of Figs. 2b to 2e.

[0016] The webbing 10 has a base 11 and many thin warps A to C and a to c woven into the base 11. The webbing 10 has a belt-like shape elongate in the extending direction of the main warps M and the thin warps A to C and a to c.

[0017] The base 11 is made by interlacing many thick main warps M parallel to each other and many thin wefts W parallel to each other. The warps and the wefts extend in the orthogonal direction. Although the wefts W are designated by reference signs 1 to 4, this is for showing the order of arrangement, and the wefts W are the same yarn. Many wefts W are arranged in the order of 1, 2, 3, 4, 1, 2, 3, 4 ... in the longitudinal direction of the webbing 10.

[0018] The intervals between adjacent wefts W are equal, and the intervals between adjacent main warps M are also equal.

[0019] The main warps M have a fineness of 1000 to 3000 denier, preferably 1000 to 1500 denier. The thin wefts W have a fineness of 250 to 1500 denier, preferably 500 to 750 denier. The thin warps A to C and a to c have a fineness of 250 to 1500 denier, preferably 250 to 500 denier.

[0020] In the base 11 of this embodiment, as shown in Fig. 2a and Fig. 3, the thin wefts W are disposed parallel to each other on the same plane. The main warps M meander so as to pass over odd-numbered wefts 1 and 3 and to pass under even-numbered wefts 2 and 4. The main warps M may meander so as to pass over wefts 1 and 2 and to pass under wefts 3 and 4, or may meander so as to pass over wefts 1 and 2, to pass under weft 3, and to again pass over weft 4 and the next weft 1.

[0021] On the upper side of the webbing, the thin warps A, B, and C cover the main warps M of the base 11. On the lower side of the webbing, the thin warps a, b, and c cover the main warps M of the base 11.

[0022] The thin warps A, B, and C are arranged in this order repeatedly, that is, in the order of A, B, C, A, B, C, A, B, C ... from right to left in Fig. 1, Fig. 4a to Fig. 4d (that is, from one side edge to the other side edge of the webbing). The region where the thin warps A, B, and C are repeated in this order may be partial.

[0023] The thin warps a, b, and c are also arranged in this order repeatedly, that is, in the order of a, b, c, a, b, c, a, b, c ... from right to left in Fig. 1, Fig. 4a to Fig. 4d.

[0024] Of the thin warps A, B, and C covering the main warps M on the upper side of the webbing, the warps A and C pass under the second wefts 2 so as to be in contact with the wefts 2, and pass over the other, first, third, and fourth wefts 1, 3, and 4 as shown in Fig. 2b. Although depiction is omitted in Fig. 2b to make the figure clear, the main warps M are interposed between the wefts 3, 4, and 1 and the thin warps A and C as shown in Fig. 4a, Fig. 4c, and Fig. 4d.

[0025] Of the thin warps A, B, and C covering the main warps M on the upper side of the webbing, the warps B pass under the fourth wefts 4 so as to be in contact with the wefts 4, and pass over the other, first, second, and third wefts 1, 2, and 3 as shown in Fig. 2c. Although depiction is omitted in Fig. 2c, the main warps M are interposed between the wefts 1 to 3 and the thin warps B as shown in Fig. 4a to Fig. 4c. The above ordinal numbers are for convenience of description. The present invention is not limited to this, and weaving may be performed at unequal intervals without repeating.

[0026] Of the thin warps a, b, and c covering the main warps M on the lower side of the webbing, the warps a and c pass over the third wefts 3 so as to be in contact with the wefts 3, and pass under the other, first, second, and fourth wefts 1, 2, and 4 as shown in Fig. 2d. Although depiction is omitted in Fig. 2d, the main warps M are interposed between the wefts 4, 1, and 2 and the thin warps a and c as shown in Fig. 4a, Fig. 4b, and Fig. 4d.

[0027] Of the thin warps a, b, and c covering the main warps M on the lower side of the webbing, the warps b pass over the first wefts 1 so as to be in contact with the wefts 1, and pass under the other, second, third, and fourth wefts 2, 3, and 4 as shown in Fig. 2e. Although depiction is omitted in Fig. 2e, the main warps M are interposed between the wefts 2 to 4 and the thin warps b as shown in Fig. 4b to Fig. 4d.

[0028] Fig. 4a to Fig. 4d respectively show sections taken along wefts 1, 2, 3, and 4 of the webbing 10. As described above, by weaving thin warps A to C and a to c into a base 11 made by interlacing wefts W (1 to 4) and main warps M, the wefts W and the main warps M of the base 11 are integrated. Since, on the upper side of the webbing 10, the thin warps A to C cover a large part of the upper surface of the webbing, the texture of the upper surface of the webbing 10 is smooth. For example, on the upper side of the webbing 10, the thin warps A to C cover a large part of the upper surface of the webbing except for the tops t (parts most distant from the wefts W) of the main warps M.

[0029] Since, on the lower side of the webbing 10, the thin warps a to c cover a large part of the lower surface of the webbing, the texture of the lower surface of the webbing 10 is smooth. For example, on the lower side of the webbing 10, the thin warps a to c cover a large part of the lower surface of the webbing except for the tops t of the main warps M. Since the webbing 10 has thick main warps M, it has high strength. The thin warps A to C and a to c may be impregnated or coated with light

resisting agent.

[0030] In the above embodiment, three thin warps A to C and three thin warps a to c are disposed between each adjacent pair of main warps M. However, the present invention is not limited to this.

[Embodiment of the second invention]

[0031] Figs. 5 to 9 show a webbing 20 according to an embodiment of the second invention. Fig. 5 is an enlarged perspective view of part of the webbing 20. On the right side of Fig. 5, warps are shown as being spaced apart in the weft direction. On the upper side and the lower side of Fig. 5, the depiction of wefts is omitted. Fig. 6 is an enlarged plan view of the lower right part of Fig. 5. Fig. 7a and Fig. 7b are views as seen from arrows VIIa and VIIb of Fig. 6. Fig. 8 is a plan view of a base 21, and Fig. 9 is a sectional view taken along line IX-IX of Fig. 8.

[0032] The webbing 20 has a base 21 consisting of main warps M_1 to M_4 and wefts W (1 to 4), and first thin warps e to h and second thin warps E to H woven into the base 21. Although the main warps M are designated with subscripts 1 to 4 in Figs. 5 to 9, this is for showing the order of arrangement of the main warps M, and the main warps M_1 to M_4 are of the same type.

[0033] As shown in Figs. 8 and 9, the base 21 used in this embodiment is made by rib-weaving main warps M (M_1 to M_4) and wefts W. That is, as shown in Figs. 8 and 9, the main warps M_1 pass over the wefts 1 and 2 so as to be in contact with the wefts 1 and 2, and pass under the wefts 3 and 4 so as to be in contact with the wefts 3 and 4. The main warps M_4 pass over the wefts 2 and 3 so as to be in contact with the wefts 2 and 3, and pass under the wefts 4 and 1 so as to be in contact with the wefts 4 and 1. The main warps M_3 pass over the wefts 3 and 4 so as to be in contact with the wefts 3 and 4, and pass under the wefts 1 and 2 so as to be in contact with the wefts 1 and 2. The main warps M_2 pass over the wefts 4 and 1 so as to be in contact with the wefts 4 and 1, and pass under the wefts 2 and 3 so as to be in contact with the wefts 2 and 3.

[0034] In the above rib weaving, the main warps M alternately pass over and under two wefts W. However, the present invention is not limited to this. For example, the main warps M may alternately pass over and under three wefts W.

[0035] In this embodiment, the first thin warps e to h and the second thin warps E to H are used. The first and second thin warps e to h and E to H are arranged in this order from one side edge (the right side of Figs. 5 and 6 and Fig. 7b) to the other side edge (the left side of Fig. 5, Fig. 6 and Fig. 7b) of the webbing 20, between main warps M_1 and M_2 , between main warps M_2 and M_3 , between main warps M_3 and M_4 , and between main warps M_4 and M_1 .

[0036] The first thin warps e and g pass over the odd-numbered wefts 1 and 3 and pass under the even-numbered wefts 2 and 4. The first thin warps f and h pass

under the odd-numbered wefts 1 and 3 and pass over the even-numbered wefts 2 and 4. The first thin warps e to h are in contact with the wefts 1 to 4 at their parts intersecting with the wefts 1 to 4.

[0037] The second thin warps E to H are woven into the base 21 so as to overlap the first thin warps e to h. The second thin warps E pass over the wefts 4 and 1 and pass under the wefts 2 and 3. The second thin warps F pass over the wefts 1 and 2 and pass under the wefts 3 and 4. The second thin warps G pass over the wefts 2 and 3 and pass under the wefts 4 and 1. The second thin warps H pass over the wefts 3 and 4 and pass under the wefts 1 and 2.

[0038] The second thin warps E to H overlap the first thin warps e to h, and pass on the farther side of the thin warps e to h from the base 21. The thin warps E to H are woven such that the positions (the heights from the wefts W) of their tops are substantially the same as those of the tops of the main warps M_1 to M_4 , and the main warps M_1 to M_4 and the second thin warps E to H are flush with each other.

[0039] Specifically, if the distance (height) from the center in the thickness direction of the webbing 20 (the centers of the wefts W) to the tops of the main warps M_1 to M_4 is denoted as X_1 , and the distance (height) from the center in the thickness direction of the webbing 20 (the center of the wefts W) to the tops of the thin warps E to H is denoted as X_2 , the distance X_2 is 80 to 120%, preferably 95 to 105% of the distance X_1 .

[0040] Since, on both the upper and lower sides of the webbing 20, the surface of the webbing 20 is formed by the thick main warps M_1 to M_4 and the second thin warps E to H disposed therebetween, and the main warps M_1 to M_4 and the second thin warps E to H are flush with each other, the texture of the surface of the webbing 20 is smooth. In addition, since the main warps M_1 to M_4 are used, the strength of the webbing 20 is high. The thin warps E to H may be impregnated or coated with light resisting agent.

[0041] In this embodiment, the main warps M_1 to M_4 have a fineness of about 1000 to 3000 denier, preferably about 1000 to 1500 denier. The thin warps E to H and e to h are of the same denier, and have a fineness of about 250 to 1500 denier, preferably about 250 to 500 denier. The wefts W have a fineness of about 250 to 750 denier, preferably about 500 to 750 denier.

[0042] In this embodiment, four thin warps e to h and four thin warps E to H are disposed in each space between the main warps M_1 , M_2 , M_3 , and M_4 . However, the present invention is not limited to this. One or more thin warps and one or more thin warps, preferably three to four thin warps and three to four thin warps may be disposed in each space between the main warps M_1 , M_2 , M_3 , and M_4 .

[0043] The webbing of the present invention is suitable as a webbing of a seat belt apparatus for an automobile. A seat belt apparatus for an automobile includes a webbing, a retractor for retracting the webbing, a tongue to

which the webbing is inserted or connected, and a buckle to and from which the tongue is attached and detached.
[0044] The webbing of the present invention can be used in various seat belt apparatuses such as those for aircraft, ships, and game machines.

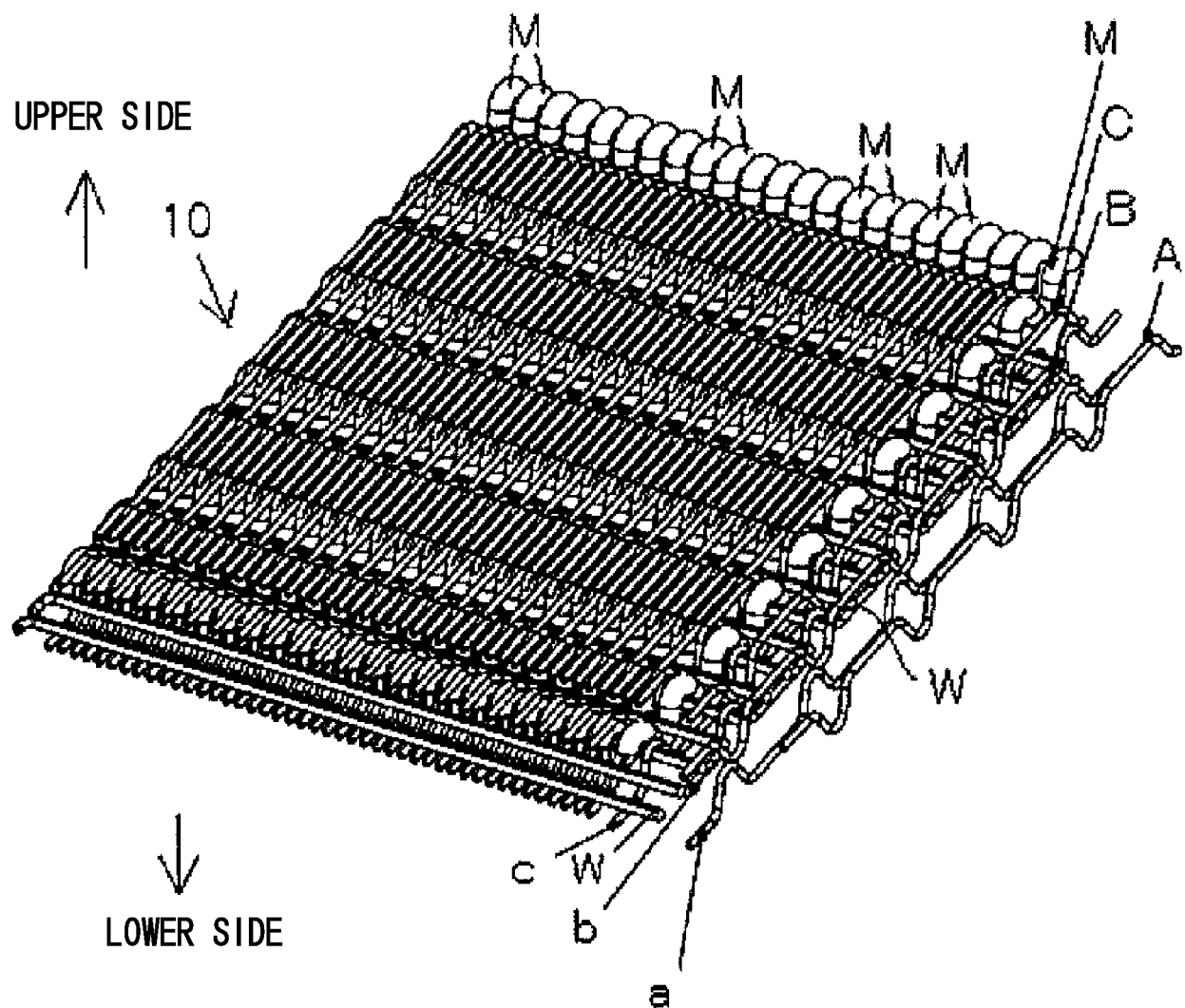
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wherein one or more second thin warps (E-H) are interposed between the main warps (M).

Claims

1. A webbing (10) comprising: 10
 - a base (11) made by interlacing main warps (M) and wefts (W); and
 - thin warps (A-C, a-c) that are woven into the base (11) and are thinner than the main warps (M), 15
 - wherein, on the surface of the webbing (10), the thin warps (A-C, a-c) cover the main warps (M).
2. The webbing (10) according to Claim 1, wherein a total of two or more thin warps (A-C, a-c) are woven for each main warp (M). 20
3. The webbing (10) according to Claim 1 or Claim 2, wherein the main warps (M) have a fineness of 1000 to 3000 denier, and the thin warps (A-C, a-c) have a fineness of 250 to 1500 denier. 25
4. A webbing (20) comprising: 30
 - a base (21) made by interlacing main warps (M) and wefts (W); and
 - thin warps (E-H, e-h) that are woven into the base (21) and are thinner than the main warps (M), 35
 - wherein the thin warps (E-H, e-h) are interposed between the main warps (M), and the heights of the tops of the thin warps (E-H, e-h) from the wefts (W) are substantially the same as the heights of the tops of the main warps (M) from the wefts (W). 40
5. The webbing (20) according to Claim 4, wherein the thin warps comprise first thin warps (e-h) and second thin warps (E-H), 45
 - wherein the first thin warps (e-h) are interposed between the second thin warps (E-H) and the base (21), and
 - wherein heights of tops of the second thin warps (E-H) from the wefts (W) are substantially the same as heights of tops of the main warps (M) from the wefts (W). 50
6. The webbing (20) according to Claim 4 or Claim 5, wherein the main warps (M) have a fineness of 1000 to 3000 denier, and the first thin warps (e-h) and the second thin warps (E-H) have a fineness of 250 to 1500 denier, and 55

Fig. 1



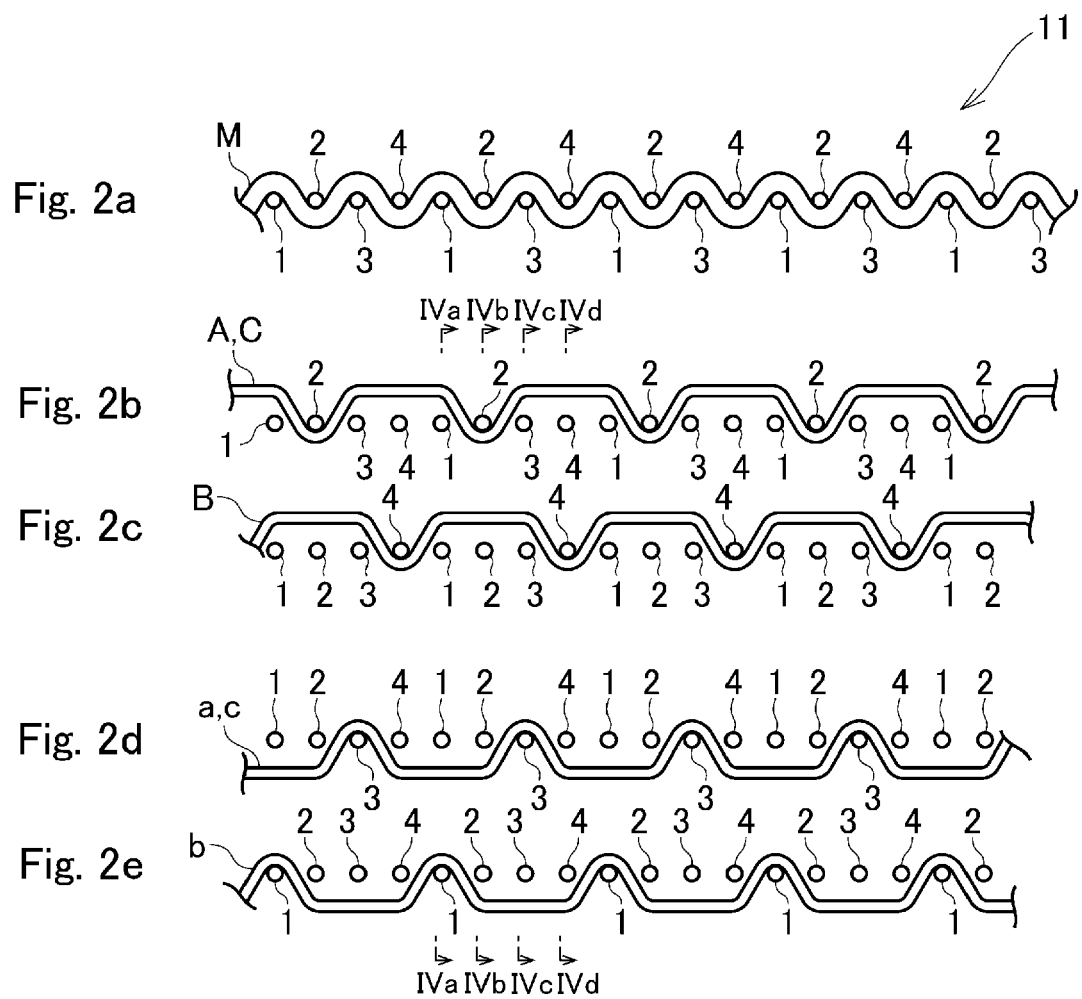


Fig. 3

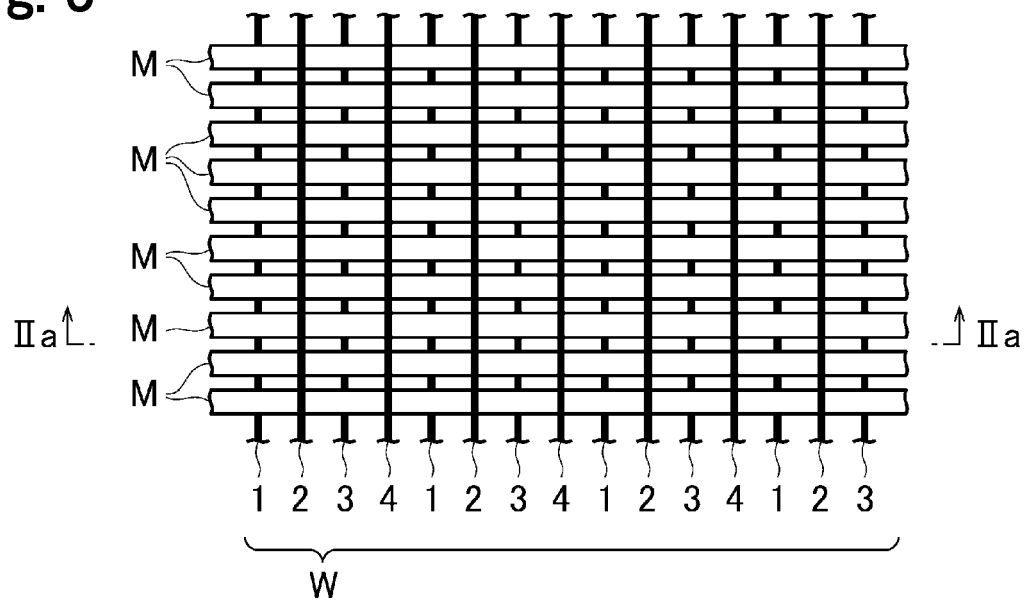


Fig. 4a

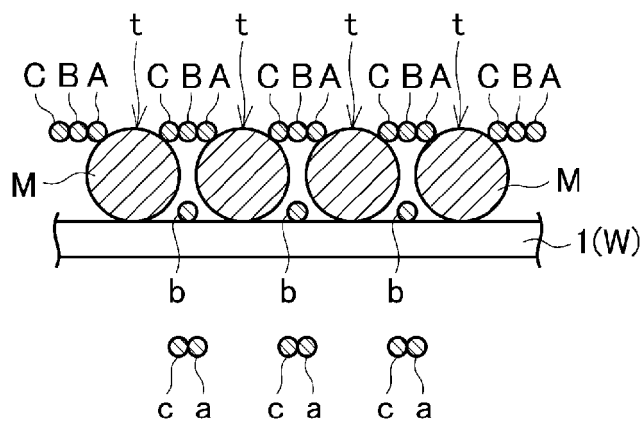


Fig. 4b

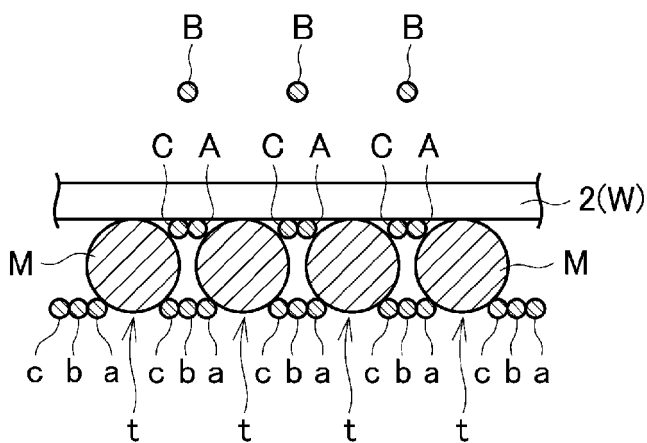


Fig. 4c

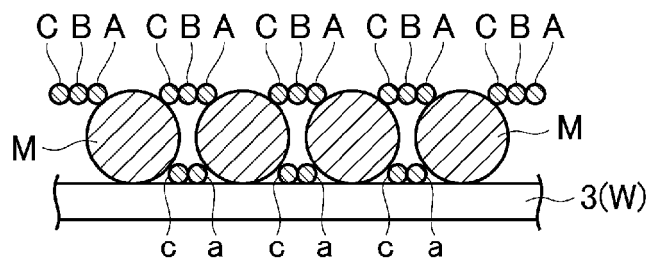
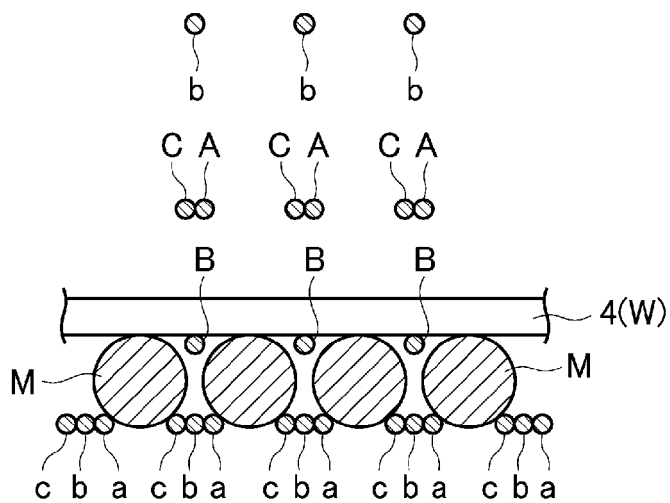


Fig. 4d



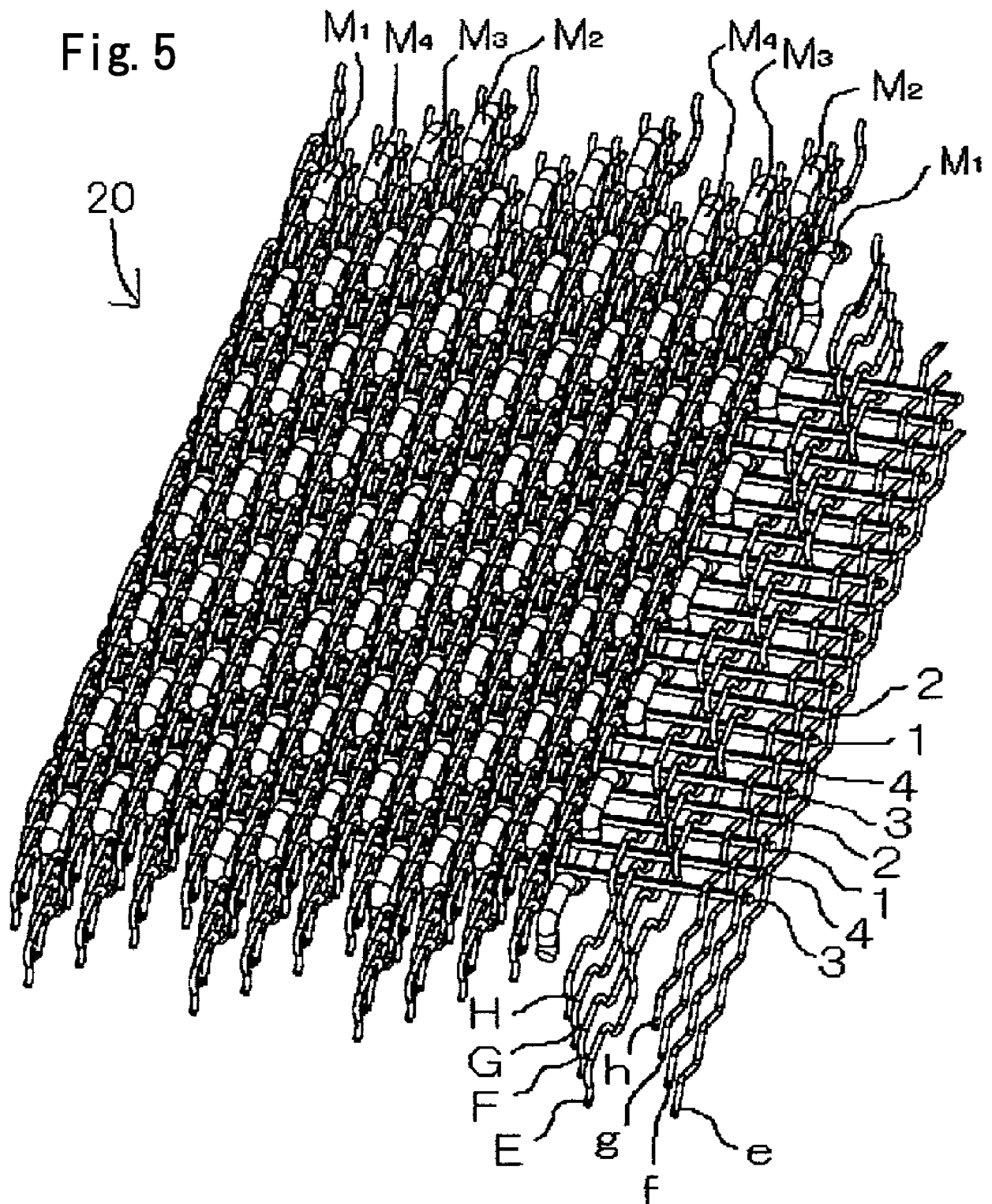
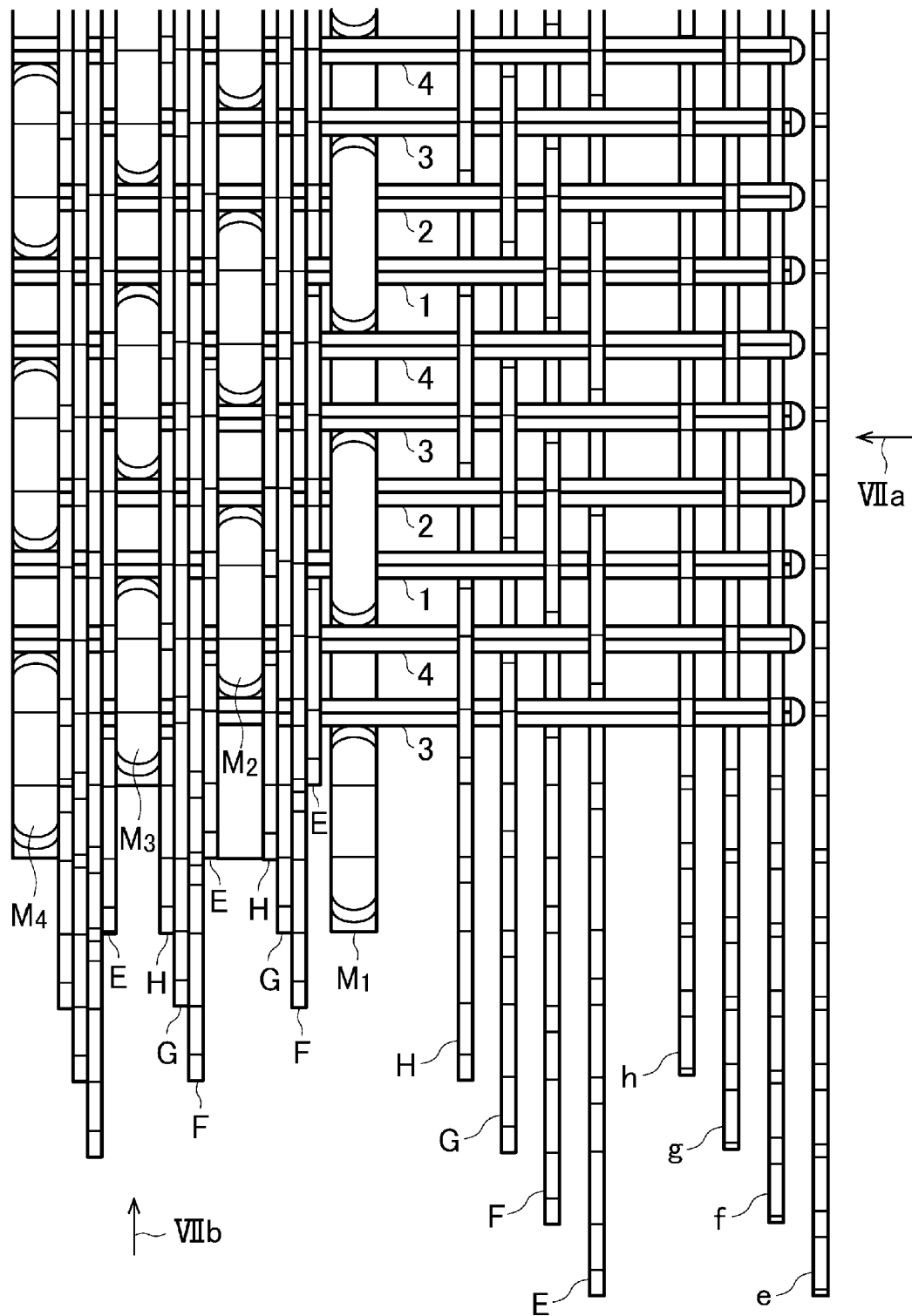


Fig. 6



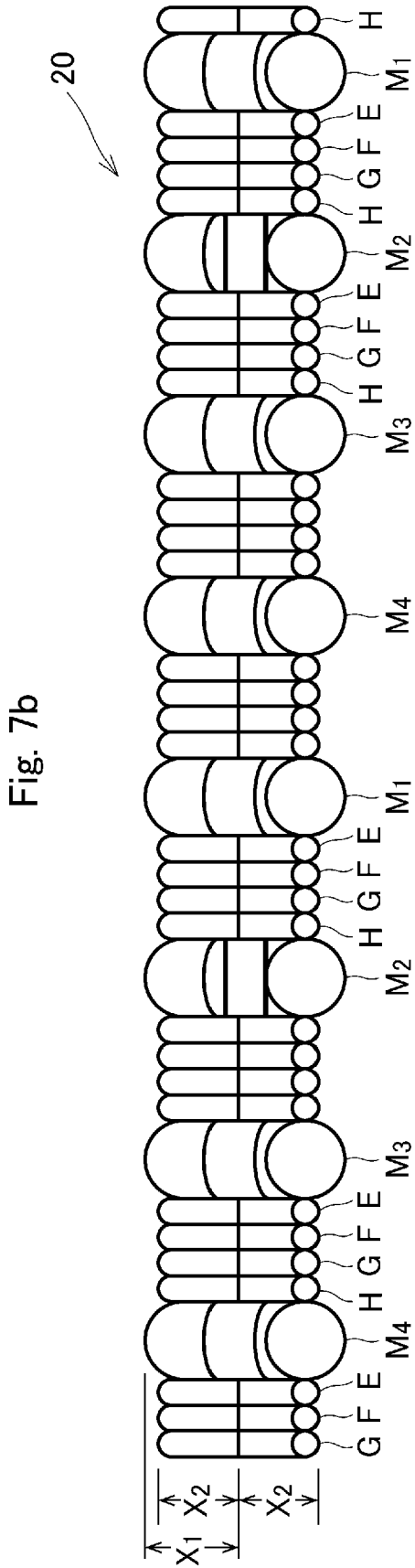
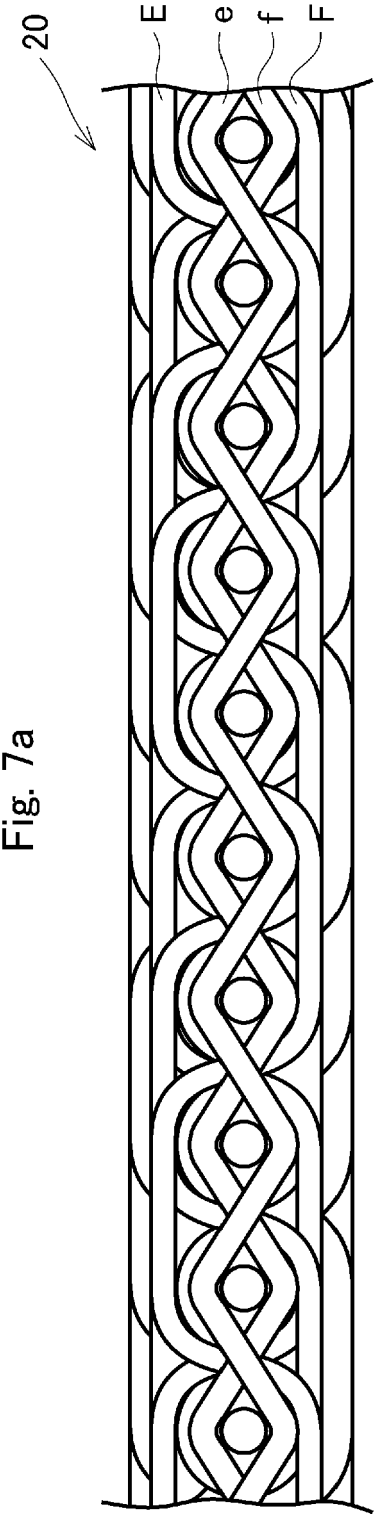


Fig. 8

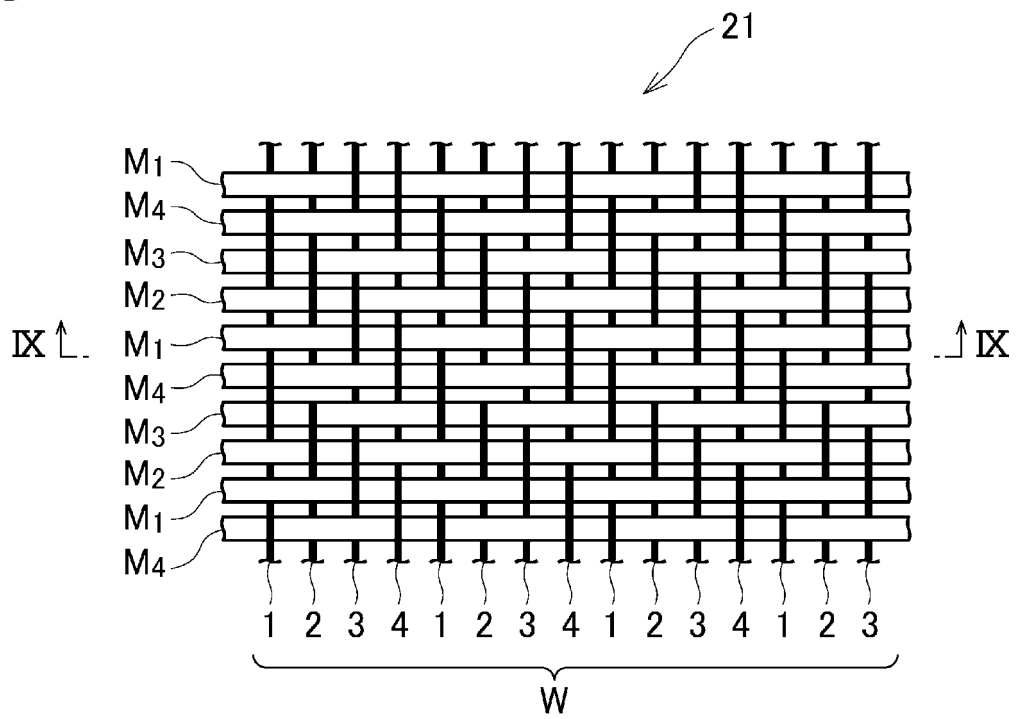
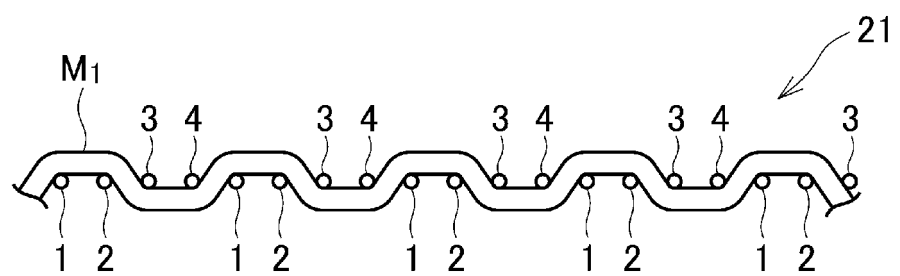


Fig. 9





EUROPEAN SEARCH REPORT

Application Number
EP 17 17 9281

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			D03D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 November 2017	Examiner Louter, Petrus
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REFERENCES CITED IN THE DESCRIPTION

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