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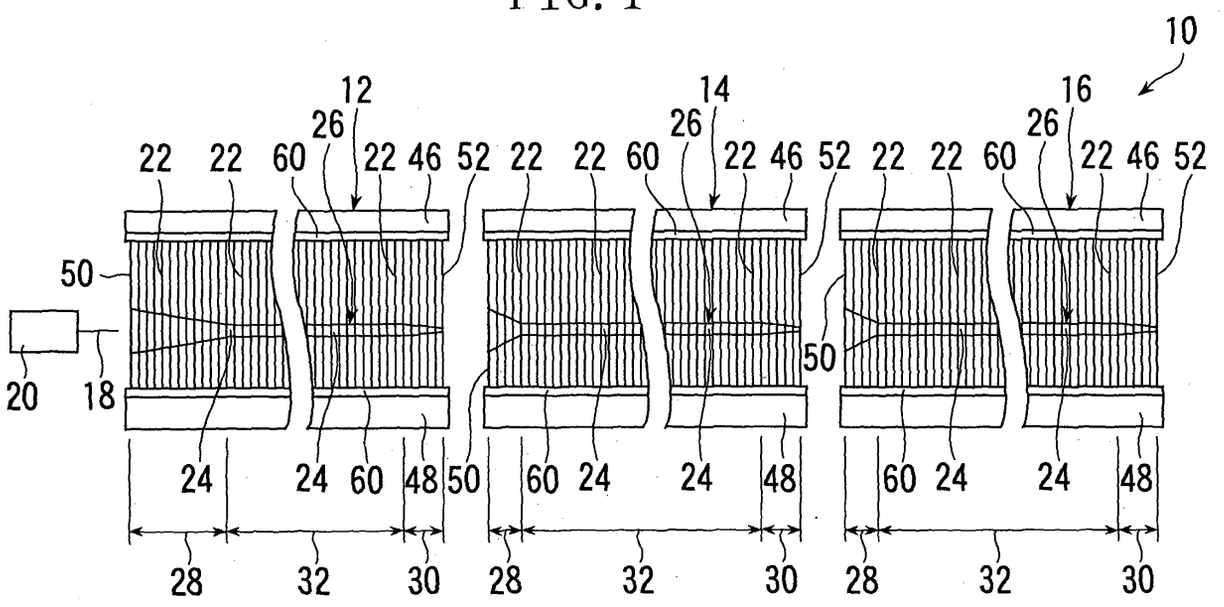
(54) Reed for weaving

(57) In a reed for weaving in which a plurality of reed dents (22) each having a dented portion for guiding the weft are arranged such that the dented portions (24) are communicated to each other to form a guide groove for the weft, the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed dents (22) located at the end portion on the downstream side in the weft inserting direction are made smaller than the dimension between the upper and lower faces of the dented portions (24) of the reed dents (22) located in an intermediate portion between the end portion of the downstream side in the weft inserting direction and the end portion on the upstream side in the weft inserting direction. The reed is formed as a single reed or at least one of a plurality of divided reeds.

FIG. 1



EP 1 431 434 A2

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a reed for weaving such as a divided reed or a single reed to be used in a loom.

Description of Prior Art

[0002] A loom produces a fabric by repeating the steps of: dividing a plurality of warps into a plurality of warp groups; forming a warp shed by vertically moving each warp group by means of a shedding device; and after having the weft run into the warp shed, beating the weft with a reed for weaving comprising a plurality of reed dents.

[0003] In an air jet loom, in general, a reed is formed by combining a plurality of reed dents with each other such that their dented portions communicate to each other to form a guide groove for the weft. Such reed can be applied to the loom in such forms as a single reed in which only one reed is used and a divided reed in which a plurality of reeds are used in combination.

[0004] The weft runs, upon receipt of a compressed fluid jetted from a plurality of subnozzles, meandering within the guide groove (between the upper face and lower face) of the divided reed. In case of the divided reed, the weft bursts out from the downstream side in the weft inserting direction of the divided reed on the upstream side in the weft inserting direction toward the divided reed on the downstream side in the weft inserting direction. At this time, the running direction of the weft bursting out of the divided reed on the upstream side is dispersed between the upper face and the lower face of the guide groove.

[0005] Further, since the divided reed on the upstream side and the divided reed on the downstream side are spaced apart for disposing a tuck-in device or the like, the weft running direction tends to be dispersed.

[0006] Consequently, it is necessary to facilitate for the weft from the divided reed on the upstream side to enter the guide groove of the divided reed on the downstream side. One of such techniques is described, for example, in Patent Document 1, in which a fixed reed with the dimension between the upper face and the lower face of the guide groove made larger toward the upstream side in the weft inserting direction is disposed between adjacent divided reeds.

[Patent Document 1]

[0007] Japanese Patent Appln. Public Disclosure No. 2-269833 (Fig. 5, and p. 3, from line 20 of the upper right column to line 5 of the lower left column)

[0008] According to the technique described in Patent Document 1, however, by a beating system with a small dwell (a short stop of a reed at both ends of a swinging range), there will be caused a discrepancy between weft guide grooves of both reeds with the movement of the divided reed when the weft runs between the moving divided reed and the fixed reed, which tends to cause a failure in weft insertion.

SUMMARY OF THE INVENTION

[0009] An object of the present invention is to make a guide groove in which the weft running state between divided reeds is stable.

[0010] The reed according to the present invention may be applied to a so-called single reed with a plurality of reed dents assembled into upper and lower caps (fixing members) common to the plurality of reed dents, or may be applied to a so-called divided reed with a plurality of reed dents assembled into the upper and lower caps.

[0011] In both foregoing reeds, a plurality of reed dents each having a dented portion for guiding a weft are arranged so that the dented portions may be communicated to each other to form a guide groove for the weft. In such reeds, the dimension between the upper and lower faces of the dented portions of the reed dents located at the end portion on the downstream side in the weft inserting direction is made smaller than the dimension between the upper and lower faces of the dented portion of the reed dents located in an intermediate portion between the end portions on the downstream side and the upstream side in the weft inserting direction.

[0012] The dimension between the upper and lower faces of the dented portions of the plurality of reed dents located at the end portion on the downstream side in the weft inserting direction is made larger gradually or stepwise toward the reed dents located in the intermediate portion to approach the dimension between the upper and lower faces of the dented portions of the reed dents located in the intermediate portion.

[0013] In both foregoing reeds, since the dimension between the upper and lower faces of the dented portions of the reed dents located at the end portion on the downstream side in the weft inserting direction is smaller than that of the reed dents located in the intermediate portion, convergence of a compression fluid flowing in the dented portions of the reed dents located at the end portion on the downstream side in the weft inserting direction is improved, and the weft running state becomes stable.

[0014] When applying the above-mentioned reed to a divided reed, the reed dents, which are located at the end portion on the downstream side in the weft inserting direction and of which the dimensions between the upper and lower faces of the dented portions are smaller than that of the reed dents located in the intermediate portion, can be disposed in the divided reed on the upstream side in the weft inserting direction, and the di-

mensions between the upper and lower faces of the dented portions of the reed dents of the reed disposed at downstream side located at the end portion on the upstream side in the weft inserting direction are gradually reduced toward the reed dents located in the intermediate portion to approach the dimension between the upper and lower faces of the dented portions of the reed dents located in the intermediate portion. Thus, the weft can be surely delivered to the guide groove of the reeds disposed downstream in the weft inserting direction, thereby preventing a failure in weft insertion.

[0015] When applying the foregoing reeds to a single reed and a divided reed, in more detail, to a single reed and a plurality of divided reeds provided in a loom, the reed dents located at the end portion on the downstream side in the weft inserting'direction may be disposed beyond the range of a weaving width. By this, there is no warp disposed outside the weaving width, the dented portions of the plurality of reed dents located at the end portion on the downstream side in the weft inserting direction can be prevented from catching on the warp.

[0016] The reed dents include a front end portion and a rear end portion, and the dimensions between the upper and lower faces of the dented portions of the reed dents located at the end portion on the downstream side in the weft inserting direction can be made such that the rear end side dented portions are larger than the front end side dented portions. This reduces the quantity of the compression fluid flowing in the guide groove to diffuse from the open portion of the guide groove, thereby enabling the weft to run efficiently.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 is a schematic diagram of an embodiment of the reed for weaving according to the present invention.

Fig. 2 is a schematic side view of a reed dent located near the intermediate portion of the reed for weaving shown in Fig.1 according to the present invention.

Figs. 3(A) and 3(B) are views showing an embodiment of a reed dent located on the upstream side in the weft inserting direction among reed dents used in the reed for weaving shown in Fig. 1. (A) is a schematic side view, and (B) a schematic front elevation.

Figs. 4(A) and 4(B) are views showing an embodiment of a reed dent located on the downstream side in the weft inserting direction among reed dents used in the reed for weaving shown in Fig. 1. (A) is a schematic side view, and (B) a schematic front elevation.

Figs. 5(A), 5(B) and 5(C) are schematic front elevations of the reed dents located on the downstream side in the weft inserting direction, showing another embodiment of the reed for weaving according to the present invention.

Fig. 6 is a schematic front elevation of a dent located on the downstream side in the weft inserting direction, showing still another embodiment of the reed for weaving according to the present invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0018] Referring to Figs. 1 through 3, a reed 10 for weaving is composed of a plurality of divided reeds. In more detail, a divided reed 12 of the first width, a divided reed 14 of the second width, and a divided reed 16 of the third (the last) width are arranged successively in an air jet loom.

[0019] As shown in Fig. 1, the weft 18 is jetted from a weft insert nozzle 20 together with a compression fluid to be inserted into a warp shed. In this embodiment, the air is applied as the compression fluid, but another compression fluid will do.

[0020] In each of the divided reeds 12, 14, 16 a plurality of reed dents (reed tooth) 22 are arranged in parallel to each other at intervals in the weft inserting direction, and a guide groove 26 for the weft 18 is formed by dented portions 24 formed in the reed dents 22.

[0021] The guide groove 26 includes, as described later, an upstream groove portion and a downstream groove portion respectively formed by the dented portions 24 of the reed dents 22 located in ranges 28 and 30 at the end portions on the upstream and downstream sides in the weft inserting direction, and an intermediate groove portion formed by the dented portions 24 of the reed dents 22 located in an intermediate range 32 between the upstream and downstream end portions in the weft inserting direction.

[0022] As shown in Fig. 2, the reed dents 22 of each divided reed 12, 14, 16 are formed like tie plates which are long in the vertical direction and have a substantially constant thickness. Each reed dent 22 has its upper and lower end portions 34 and 34 rounded. Each reed dent 22 has a front edge portion 36 as a cloth fell side and a rear edge portion 38 as a non-cloth-fell side.

[0023] Each reed dent 22 has a projected portion 40 around the center of the front edge portion 36, the projected portion 40 including a dented portion 24.

[0024] Each dented portion 24 has a one-side open rectangular shape with its corners rounded with its upper and lower faces 42 and 42 and a depth bottom portion (depth bottom face) 44. The distance between the upper face 42 and the lower face 42 is a dimension L between the upper and lower faces of the dented portion 24.

[0025] The depth bottom portion 44 is around the same position as an extended line of the front edge portion 36 in the forward and backward direction. Also, the rear edge portion 38 of each reed dent 22 is made linear (i.e., flat) over the entire vertical direction of the reed dent 22.

[0026] Figs. 3 and 4 show the divided reed 14. The divided reed 16 has a guide groove 26 of substantially the same shape as that of the divided reed 14. The divided reed 12 has the guide groove 26 of a shape like that of the reed dents 14, 16, except the shape of the guide groove 26 mentioned below.

[0027] In the following, explanation on the divided reeds 12, 14 and 16 will be given with reference to Figs. 3 and 4 showing the divided reed 14.

[0028] The divided reeds 12, 14 and 16 are formed by a plurality of reed dents 22, the upper and lower caps (attachment members) 46 and 48 which are respectively attached at the upper end portion 34 as well as the lower end portion 34 of the reed dents 22, and the right and left side caps (coupling members) 50 and 52 which respectively connect the upper and lower caps 46 and 48. Each guide groove 26 is formed by making the dented portions 24 in the corresponding plurality of reed dents 22 communicate to the respective divided reeds 12, 14 and 16.

[0029] The reed dents 22 of each divided reed 12, 14, 16 have their upper end portions 34 and the lower end portions 34 respectively inserted into the grooves 54 and 56 of the upper and lower caps 46 and 48 having a one-side open rectangular sectional shape so as to form the guide groove 26 making their thickness direction an inserting direction and with a plurality of the dented portions 24 arranged in parallel in the weft inserting direction.

[0030] In each divided reed 12, 14, 16, the plurality of reed dents 22 forming an upstream guide groove portion and a downstream guide groove portion in the ranges 28 and 30 are inserted into the grooves 54 and 56 so as to form the guide groove 26 such that those with the larger dimension L between the upper and lower faces of the dented portions 24 are arranged on the upstream side in the weft inserting direction, while those with the smaller dimension L between the upper and lower faces of the dented portions 24 are arranged on the downstream side in the weft inserting direction.

[0031] However, the plurality of the reed dents 22 forming an intermediate guide groove portion in the range 32 have the equal dimension L between the upper and lower faces of the dented portions 24.

[0032] The dimensions L between the upper and lower faces of the dented portions 24 of the reed dents 22 forming the guide grooves 26 in the ranges 28 and 30 are gradually made smaller or larger toward the range 32.

[0033] In other words, the dimension L of the dented portions 24 of the reed dents 22 forming the guide groove 26 in the ranges 28 and 30 are made smaller or larger toward the reed dents 22 positioned at the ends of corresponding divided reeds 12, 14, 16 so that the dimension L of the reed dents 22 nearest the range 32 may approach the dimension L of the dented portions 24 of the reed dents 22 positioned in the guide groove 26 of the range 32.

[0034] That is to say, the dimension between the upper and lower faces of the dented portion 24 positioned at the end portion on the weft inserting side in the range 28 is larger than that of the dented portion 24 positioned in the range 32, while the dimension between the upper and lower faces of the dented portion 24 positioned at the end portion on the non-weft-inserting side in range 30 is smaller than that of the dented portion 24 positioned in the range 32.

[0035] Therefore, the dimensions L between the upper and lower faces of the dented portions 24 of the reed dents 22 forming the guide groove 26 of each divided reed 12, 14, 16 is gradually made smaller from the weft inserting side to the non-inserting side, firstly on the weft inserting side, then made constant from halfway in the weft inserting direction, and thereafter, gradually made smaller again. Thus, both faces of the guide grooves 26 in the width direction (vertical direction) are tapered in the ranges 28 and 30.

[0036] A space 58 between adjoining reed dents 22 is used as the space 58 for passing the warp by a pair of spacers 60 disposed in each divided reed 12, 14, 16 at vertical intervals. In the illustration, the spacers 60 are coil springs of compressive or tensile type. Each ring-shaped portion of the coil spring 60 is located between adjoining reed dents 22 to form a constant space 58 between the adjoining reed dents 22.

[0037] The divided reeds 12, 14, 16 are assembled, with the plurality of reed dents 22 attached to the upper and lower caps 46, 48 as mentioned above, and with the side caps 50 and 52 acting as master dents respectively inserted into the weft inserting side and the non-inserting side of the upper and lower caps 46, 48, and by attaching the side caps 50 and 52 to the upper and lower caps 46 and 48 with rivets, lock screws, adhesives and the like.

[0038] Each side cap 50, 52 is formed to have a one-side open rectangular shape by bending both end portions of the plate material of the tie plate a little thicker than the reed dent 22 in the direction of the thickness, and is attached to the upper and lower caps 46 and 48 so as not to block the dented portion 24 of the reed dent 22 located at the end portion. For example, the side caps 50 and 52 can have substantially the same width dimension as the dimension from the rear edge portions 38 to the dented portions 24 of the reed dents 22 located at the end of the weft inserting side and the end of the non-weft-inserting side.

[0039] The divided reeds 12, 14, 16 forming the reed 10 for weaving assembled as mentioned above are assembled in series into a reed sley (not shown) which is attached to an arm (not shown) in the lower cap 48 such that the guide grooves 26 are located in an area where the warp exists and that the guide grooves 26 are communicated to each other and oppose the cloth fell of a cloth.

[0040] As mentioned above, if the dimension L between the upper and lower faces of the guide groove 26

of each divided reed 12, 14 is gradually made smaller from the weft inserting side toward the non-inserting side, running of the weft 18 becomes stable, and the running state of the weft 18 to the divided reeds 14, 16 on the downstream side or to a catcher becomes stable.

[0041] In particular, in the downstream guide groove portion in the range 30, the dimension L between the upper and lower faces of the dented portion 24 of the reed dent 22 located most downstream in the weft inserting direction being made the minimum, a vertical dispersion of the weft 18 bursting out of the divided reeds 12, 14 is small, thereby making the running state of the weft 18 to the divided reeds 14, 16 disposed downstream further stable.

[0042] While the divided reed 14 is explained with reference to Figs. 2 and 3, the divided reeds 12 and 16 also have the same shape of the guide grooves 26 as in the reed 14.

[0043] While the divided reeds 12, 14, 16 can be shaped as mentioned above, they may have other shapes, for example, those as shown in Figs. 5 and 6.

[0044] Referring to Fig. 5(A), in a divided reed 62, the dimension L between the upper and lower faces of the dented portions 24 of plurality of reed dents 22 forming a downstream guide groove portion in the range 30 are smaller than that of the dented portions 24 of the reed dents 22 forming the intermediate guide groove portion in the range 32, and, besides, have a constant value.

[0045] Referring to Fig. 5(B), in a divided reed 64, the downstream guide groove portion in the range 30 is shaped to have a range where the dimension L between the upper and lower faces of the dented portions 24 of the reed dents 22 forming the guide groove portion is gradually reduced as in the downstream guide groove portion in the range 30 shown in Fig. 4(B) and a range where they are constant as in the downstream guide groove of the range 30 as shown in Fig. 5(A).

[0046] Referring to Fig. 5(C), in a divided reed 66, the downstream guide groove portion in the range 30 has such a shape as the dimension L between the upper and lower faces of the dented portions 24 of the reed dents 22 is made smaller stepwise (gradually made smaller).

[0047] Referring to Fig. 6, each of the plurality of reed dents 22 forming the downstream guide groove portion in the range 30 is formed such that a dimension A between the upper and lower faces of the dented portion 24 on the rear edge portion 38 is shaped larger than a dimension B between the upper and lower faces of the dented portion 24 on the side of the front edge portion 36.

[0048] Thus, the compression fluid flowing within the downstream guide groove in the range 30 can be reduce in quantity to be diffused from the opening portion of the downstream guide groove portion in the range 30, thereby making the weft 18 run efficiently.

[0049] Also, the shape of the guide groove as viewed from the weft inserting direction in Fig. 6 may be circular (C-shaped) or may be formed to be integral as a guide member, instead of disposing reed dents in the range 30.

[0050] Any one of the divided reeds 12, 14 and 16 may be made a single reed.

[0051] Also, there are looms in which the weft inserting side is on the left side, right side, and both right and left sides. Any of the foregoing embodiments can be used for a loom in which the weft is inserted from the left side; in other words, a loom in which the left side becomes the upstream in the weft inserting direction.

[0052] However, the dimension L between the upper and lower faces of the dented portions 24 of the reed dents 22 forming the guide groove 26 of each divided reed to be used for a loom in which the weft is inserted from the right side, in other words, a loom in which the right side becomes the upstream in the weft inserting direction, is gradually made smaller from the weft inserting side (the right side) toward the non-inserting side (the left side), made constant from halfway in the weft inserting direction (from the right side to the left side), and then made smaller again.

[0053] The present invention is not limited to the above embodiments but can be variously modified without departing from its spirit.

Claims

1. A reed for weaving, wherein a plurality of reed dents (22) each having a dented portion (24) for guiding a weft (18) such that the dented portions are arranged to communicate to each other so as to form a guide groove (26) for the weft, and

   wherein the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed dents (22) located at the end portion on the downstream side in the weft inserting direction is made smaller than the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed dents (22) located in the intermediate portion between the end portion of the downstream side end and the end portion on the upstream side in the weft inserting direction.

2. A reed for weaving according to claim 1, wherein the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed dents (22) located at the end portion on the downstream side in the weft inserting direction is made gradually larger toward the dented portions (24) of the reed dents (22) located in the intermediate portion to approach the dimension between the upper and lower faces of the dented portions (24) of the reed dents (22) located in the intermediate portion.

3. A reed for weaving according to claim 1, wherein the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed

dents (22) located at the end portion on the downstream side in the weft inserting direction is made larger stepwise toward the dented portions (24) of the reed dents (22) located in the intermediate portion to approach the dimension between the upper and lower faces of the dented portions (24) of the reed dents (22) located in the intermediate portion.

4. A reed according to any one of claims 1 through 3, wherein the reed is formed as a single reed.

5. A reed according to any one of claims 1 through 3, wherein the reed is formed as at least one of a plurality of divided reeds.

6. A reed according to claim 5, wherein reed dents (22) which are located at the end portion on the downstream side in the weft inserting direction and which have a smaller dimension between the upper and lower faces of their dented portions (24) than the dimension between the upper and lower faces of the dented portions (24) located in the intermediate portion are located in a divided reed on the upstream side in the weft inserting direction, and

wherein the dimension between the upper and lower faces of the dented portions (24) of the plurality of reed dents (22) located at the end portion on the upstream side in the weft inserting direction of the divided reed on the downstream side in the weft inserting direction are gradually made smaller toward the reed dents (22) located in the intermediate portion to approach the dimension between the upper and lower faces of the dented portions (24) of the reed dents (22) located in the intermediate portion.

7. A reed according to any one of claims 1 through 6, wherein the reed dents (22) located at the end portion on the downstream side in the weft inserting direction are disposed beyond the range of a weaving width.

FIG. 1

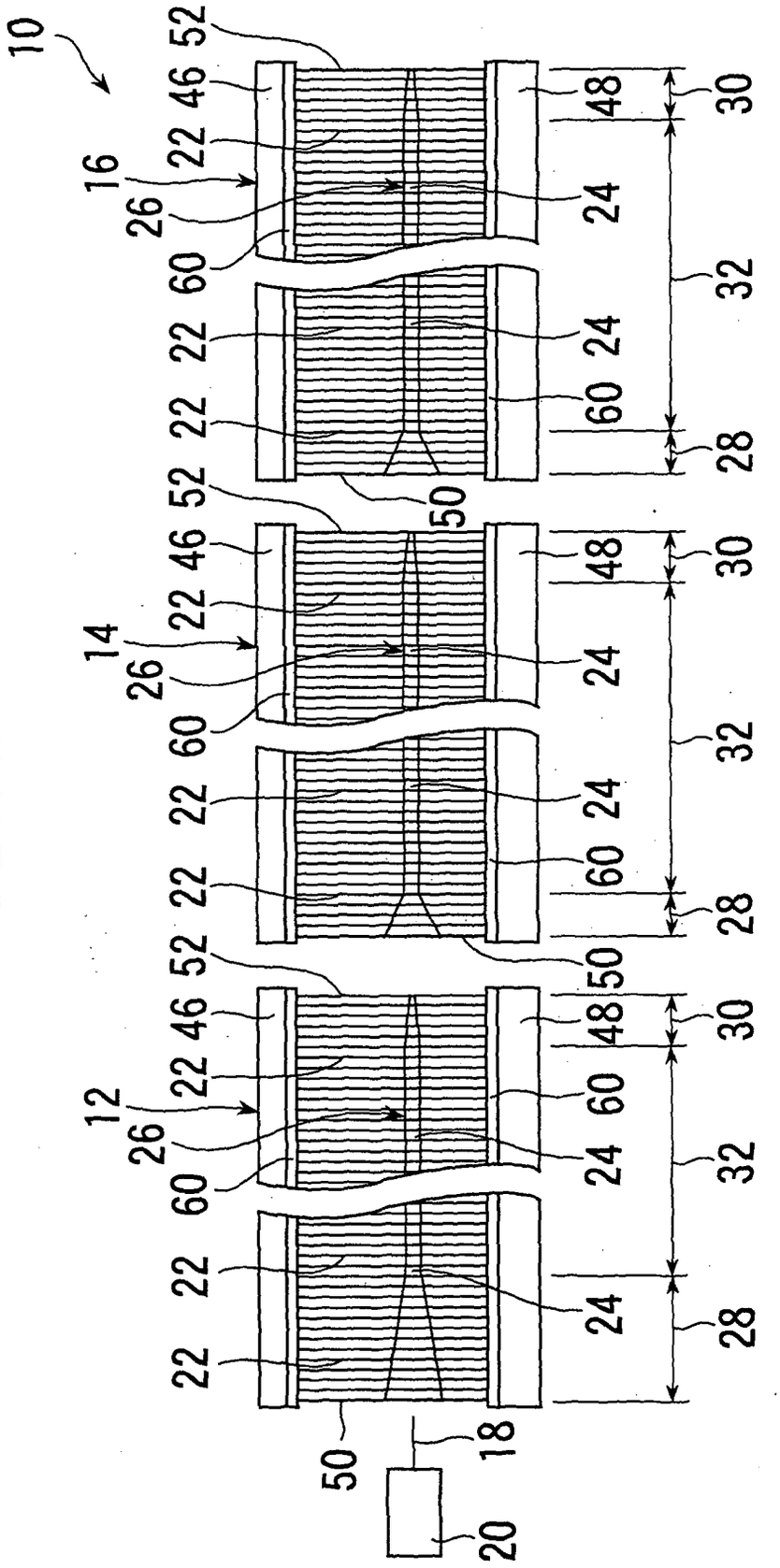


FIG. 2

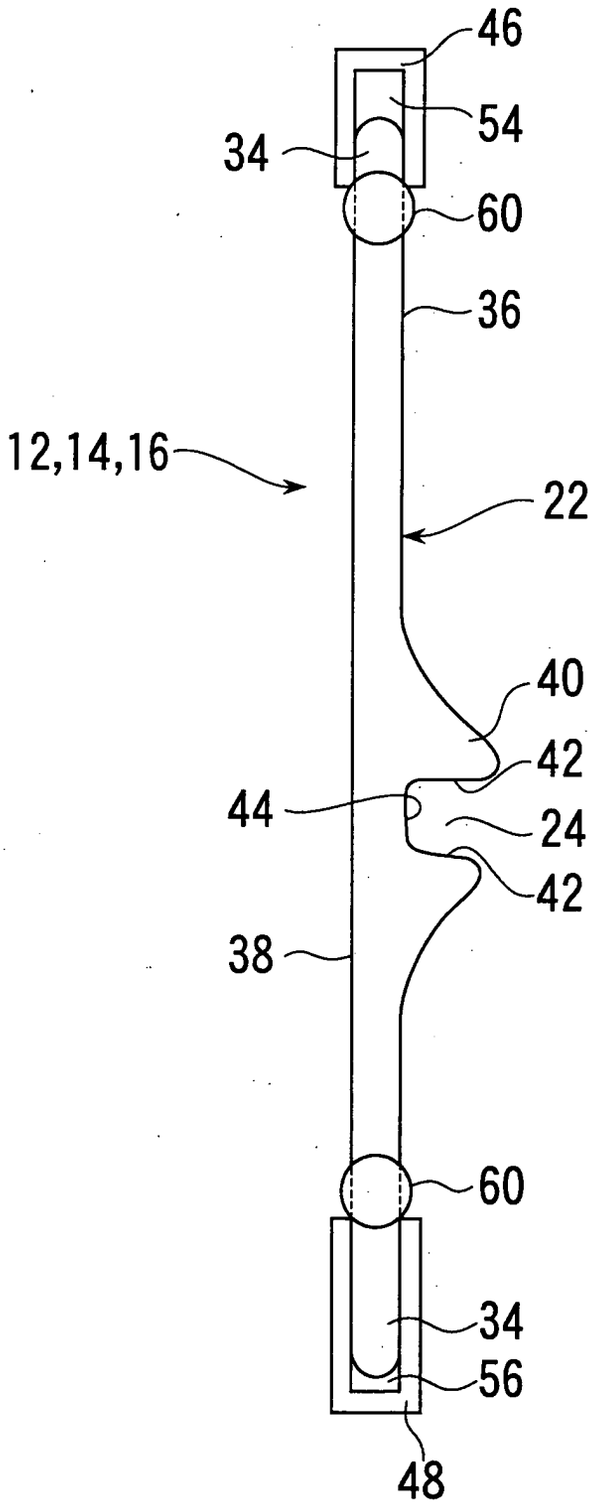


FIG. 3 (A)

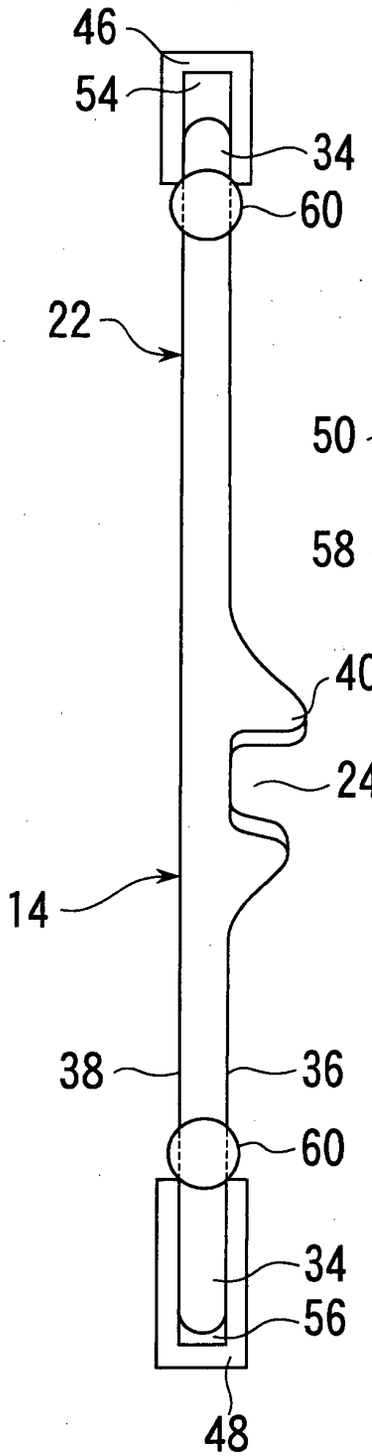

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FIG. 3 (B)

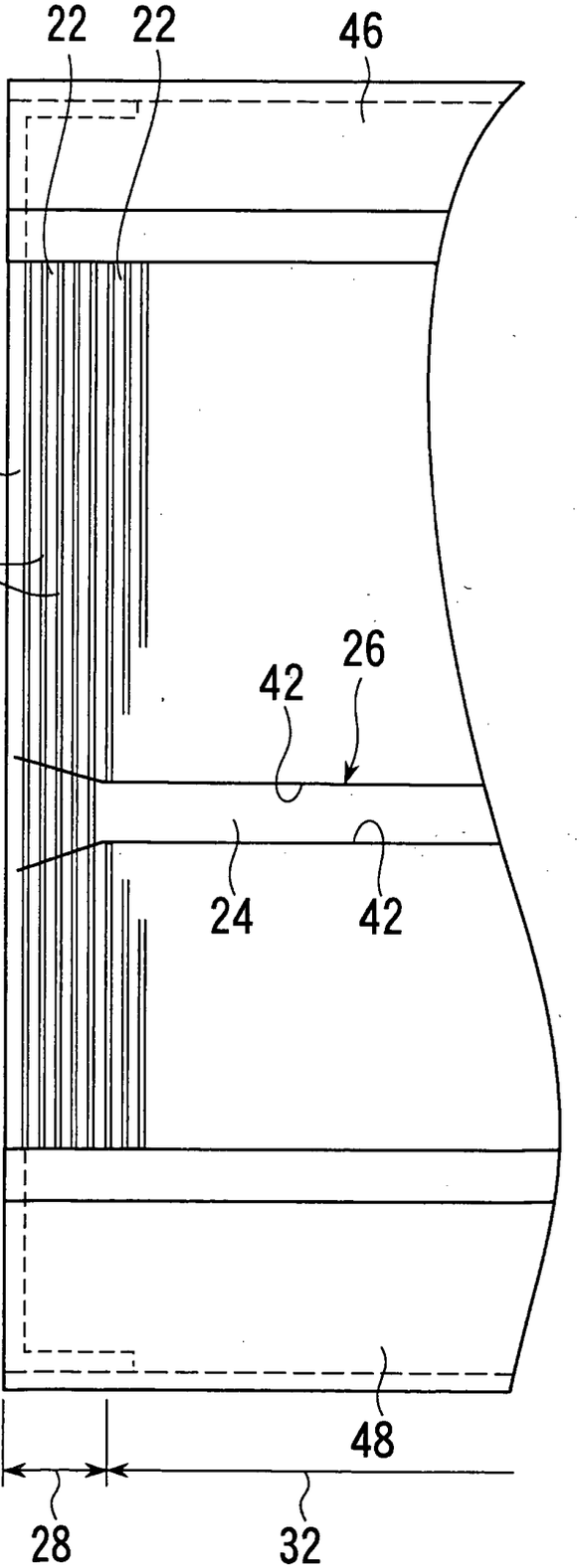
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FIG. 4(A)

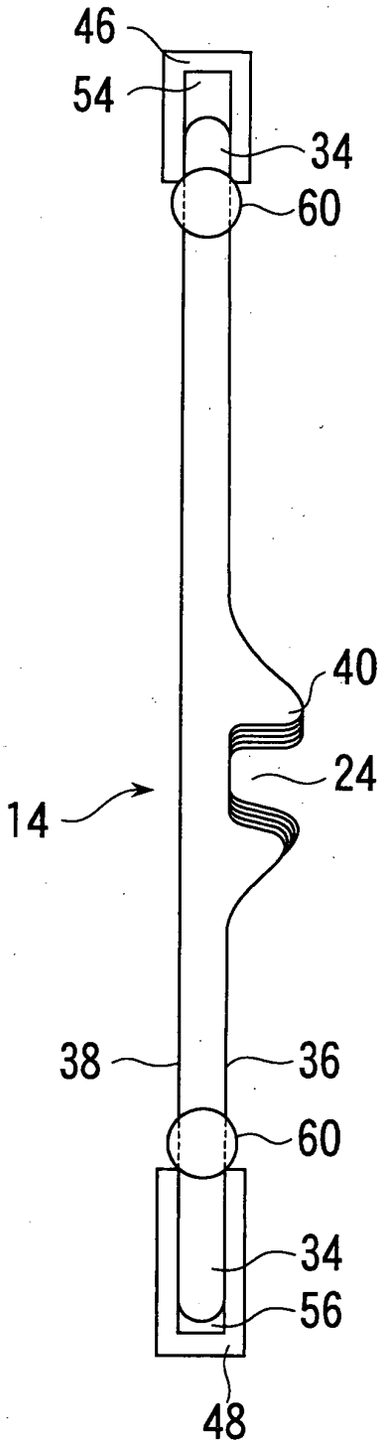
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FIG. 4(B)

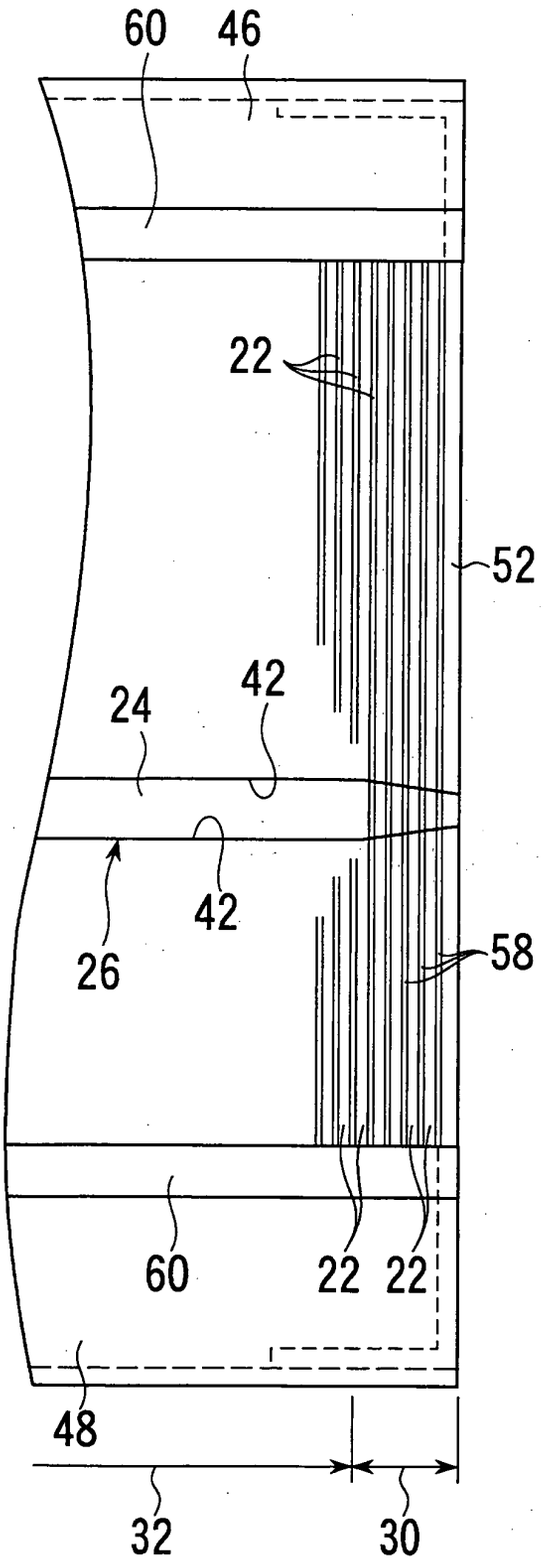
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FIG. 5 (A)

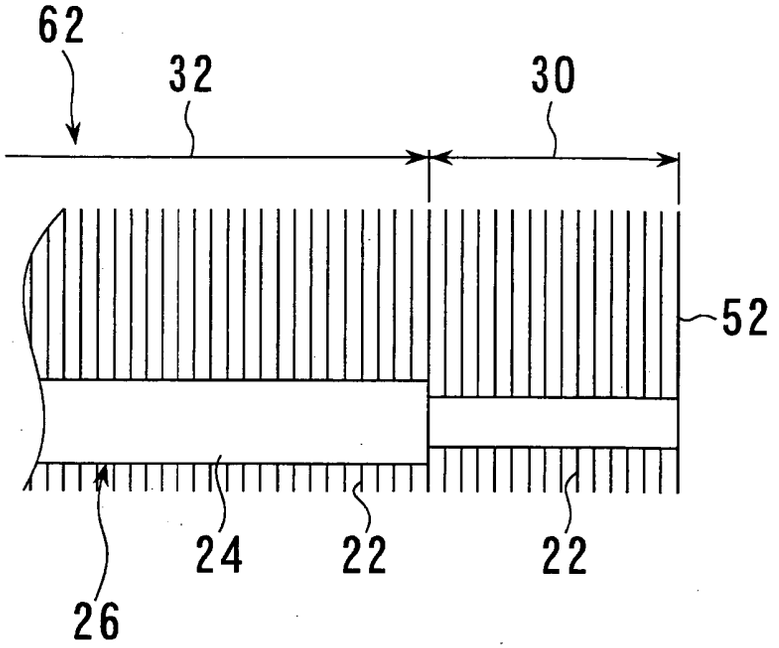

FIG. 5 (B)

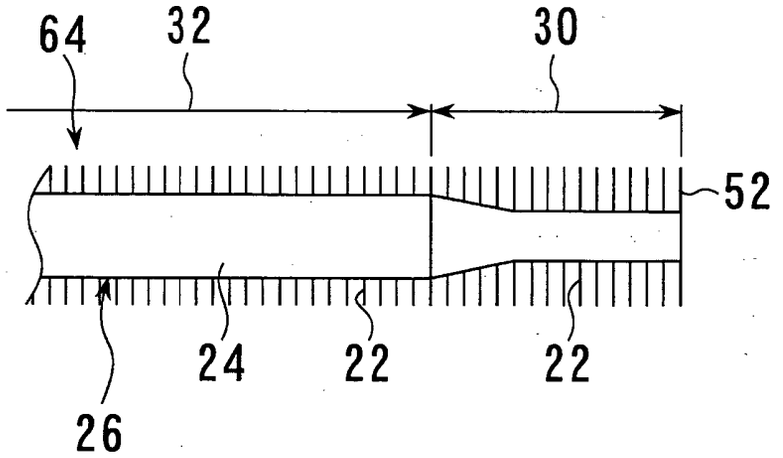

FIG. 5 (C)

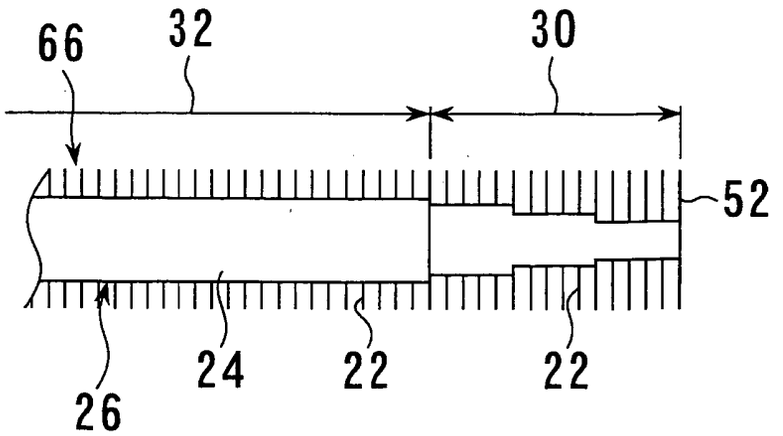

FIG. 6