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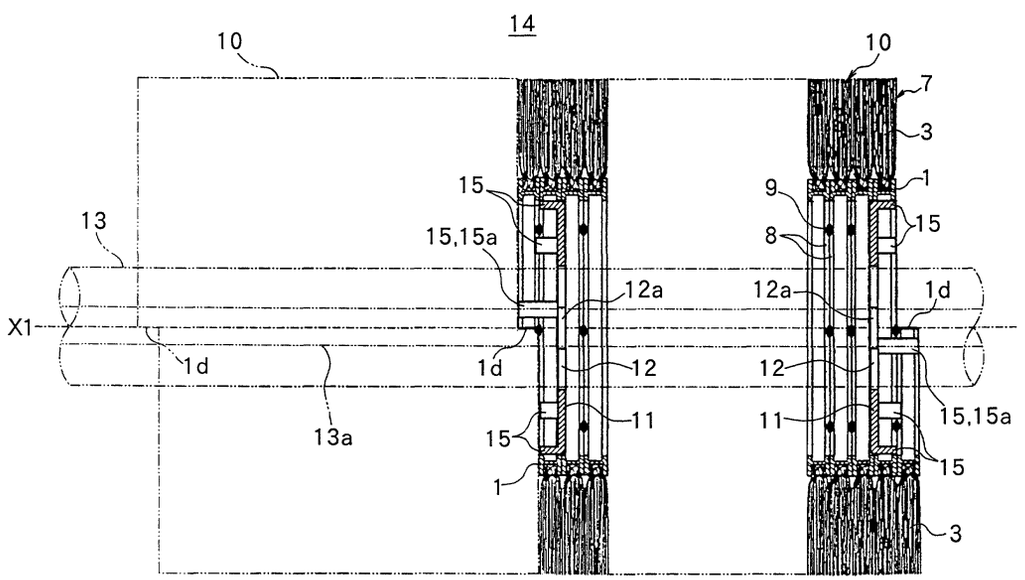
(54) Coil brush for forming rotary roll brush

(57) To prevent the peel-off of the winding end of a channel at the time a coil brush is shaped by tightly spirally winding a channel brush, thereby obtaining an appropriate abutment the winding end of the channel at the time a rotary roll brush is shaped by externally fitting a plurality of coil brushes to the roll. A coil brush for forming a rotary roll brush in which a coil brush 10 is formed by tightly spirally winding a channel brush 7 which is formed by retaining a basal portion of a brush material on a channel 1, a flange 11 is internally fitted to opposite ends of a cavity of the coil brush10, and a roll insertion hole defined by an inner peripheral edge of the flange 11 is formed in a central area of each flange11, wherein a plurality of projecting pieces 15 are spacedly erected from an outer peripheral edge of each flange 11 towards outside, each projecting piece 15 is welded to a bottom portion of the channel 1, and one piece 15a of the projecting pieces is welded to a bottom portion in the vicinity of an end face 1d of a winding end of each channel 1, or one side edge of the one piece 15a of the projecting pieces is aligned with end faces 1d at the winding ends of the channel 1 and welded.

FIG.2



EP 1 245 169 A2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates to a coil brush for forming a rotary coil brush by externally fitting to a roll.

2. Related Art

[0002] A rotary roll brush is known, which is formed by the steps of forming a channel brush by retaining a basal portion of a brush material on a channel, forming a coil brush by tightly spirally winding the channel brush, externally fitting a plurality of such coil brushes to a roll, tightening the same with a tightening plate abutted with each side thereof and compressing the same.

[0003] In the above coil brush, a flange is internally fitted to opposite ends of a cavity formed by the channel, a roll insertion hole defined by an inner peripheral edge of the flange is formed in a central area of each flange, a key groove engageable with a key of the roll is formed in an inner peripheral edge of the flange, and inserting the roll into the roll insertion hole while receiving the key provided on the roll in the key groove, thereby transmitting rotation.

[0004] The above-mentioned rotary roll brush is subjected to grinding treatment under a high-speed continuous driving operation and normally receives strong impact. Accordingly, there is such a fear that peel-off is likely to occur at the winding end of the channel of each coil brush.

OBJECTS OF THE PRESENT INVENTION

[0005] It is, therefore, an object of the present invention to provide a coil brush for forming a rotary roll brush which is capable of properly solving the problem of occurrence of peel-off with the help of a flange.

[0006] Since a coil brush is formed by spirally winding a coil brush, its opposite sides are inevitably slanted with respect to the axis. Therefore, the flange is internally fitted so far as to the inner depth away from the winding end of the channel and as a consequence, the winding end of the channel is separated from the flange. This makes it difficult to prevent the above-mentioned peel-off by reinforcing the winding end of the channel with the flange.

[0007] It is, therefore, another object of the present invention to provide a coil brush for forming a rotary roll brush which is capable of properly reinforcing the winding end of a channel with a flange.

[0008] It can also be contemplated a method in which an expanded portion of the winding end of a channel, i. e., expanded portion of the winding end of a coil brush, which can be a cause for the above-mentioned slanting, is worked by crushing over a predetermined length to make a correction so that opposite side surfaces of the coil brush will become as more strictly orthogonal to the axis as possible, a flange is internally fitted to a tail end of a cavity, and the winding end of the channel is welded for reinforcement. However, since this method requires the crushing treatment, it is necessary that the density of implanting a brush at the winding end of the channel is extensively reduced over the predetermined length or an empty channel portion is formed. As a result, a rough brush density area is formed at an adjacent area of each coil brush in the roll brush. This often results in uneven grinding. Moreover, such a troublesome operation as crushing is required.

[0009] It is a further object of the present invention to provide a coil brush for forming a rotary roll brush which is capable of eliminating the crushing treatment applicable to the winding end of a channel and effectively preventing the reduction of brush implanting density caused by the crushing treatment.

[0010] Moreover, according to the conventional devices, a key is engaged in the key groove and in that state, the coil brush is externally fitted to the roll. Accordingly, it often occurs that the winding ends of the channel are separated at an adjacent area of the coil brush, or the winding ends of the channel are superimposed one upon another, thereby generating a gap on a surface of the rotary roll brush. It gives rise to a problem of uneven grinding.

[0011] It is a still further object of the present invention to provide a coil brush for forming a rotary roll brush which is capable of properly solving the problems of the generation of a gap and of the uneven grinding by equalizing the planting density of the brush at the adjacent area of the coil brush by means of abutting, in parallel, the winding end faces of the channel between the adjacent coil brushes.

[0012] According to the present invention, a flange is internally fitted to opposite ends of a cavity formed by a channel of a coil brush, a plurality of projecting pieces are spacedly erected from an outer peripheral edge of each flange towards outside, each projecting piece is welded to a bottom portion of the channel, and one piece of the projecting pieces is welded to a bottom portion in the vicinity of an end face of a winding end of each channel so that the winding end is reinforced. Preferably, one side edge of the one piece of the projecting pieces is aligned with end faces at left and right winding ends of the channel.

[0013] The present invention properly solves the problem of peel-off occurrable at the winding end of the channel by means of the internally fitting flange. Owing to the features of the construction in which the projecting pieces are independently spaced apart, one projecting piece of all the projecting pieces can be made longer than the remaining projecting pieces. In other words, by making one projecting piece long enough so as to reach the winding end of the channel, thereby facilitating an easy welding of the projecting piece to the bottom por-

tion of the winding end.

[0014] At that time, one side edge of one projecting piece of all the projecting pieces is aligned with the end face of the winding end of the channel. By doing so, a sufficient abutment strength of the flange is obtained by abutting the end faces of the winding end of the channel of each coil brush externally fitted to the roll and in that state, by abutting one side edges of one projecting piece.

[0015] According to the present invention, each projecting piece is welded to a bottom portion of the channel with one side edge of the one piece of the projecting pieces aligned with end faces of the winding ends of the channel, and an end face of each winding end of the channel is disposed on a same general line of the coil brush. And one side edge of one piece of the projecting pieces is located on a center line of the key groove on a diameter line of the coil brush.

[0016] By virtue of the construction in which the end face of the channel is disposed on a same general line and the construction of the flange, one kind of flange having the same projecting position of the projecting pieces and the same forming position of the key groove can be used commonly for the opposite ends of each coil brush. Moreover, merely by engaging the key in the key groove, a proper abutment between the end faces of the winding ends of the channel can be obtained.

[0017] Owing to the above arrangement, merely externally fitting the coil brush to the roll in accordance with guidance of the key groove and the key, there can be formed a wholesome rotary roll brush having no gap on the surface of the brush and no unevenness in density by tightly abutting the winding ends of the respective coil brushes in the rotary coil brush.

[0018] A reinforcing piece to be superimposed on an end face of a winding end of the channel is folded from one side edge of one piece of the projecting pieces.

[0019] Owing to the above arrangement, there can be obtained a sufficient strength in the vicinity of the winding end of the channel and at the end face at the time the coil brushes are abutted with each other in the rotary roll brush. In this way, peel-off occurrable at the winding end of the channel brush can be prevented effectively.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1(A) is a perspective view showing, in section, one example of a channel brush for forming a coil brush and FIG. 1(B) is a plan view showing the coil brush with a brush material omitted therefrom;

FIG. 2 is a sectional view showing a state in which a flange is internally fitted to the above coil brush;

FIG. 3 is likewise a sectional view showing another example;

FIG. 4 is a side view of the above flange;

FIG. 5 is an enlarged side view showing a state in which a reinforcing piece is provided on a projecting piece of the above flange;

FIG. 6 is a side view showing a state in which a flange is internally fitted to the coil brush in a rotary roll brush; and

FIG. 7(A) is a perspective view showing, on an enlarged scale, a state in which a flange having a projecting piece with a reinforcing piece formed thereon is internally fitted to the coil brush in the rotary roll brush, and FIG. 7(B) is a perspective view showing, on an enlarged scale, a state in which a flange having a projecting piece but with no reinforcing piece formed thereon is internally fitted to the coil brush.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] Embodiments of the present invention will now be described with reference to FIGS. 1 through 7.

[0022] As shown in FIGS. 1(A) and 1(B), a bent basal portion of a twice-folded brush material 3 is implanted in a groove 2 formed by a bottom plate 1a and left and right side plates 1b, 1c of a channel 1 together with a V-shaped core material 4 inserted into the bent basal portion. Left and right claw pieces 5, 6 projecting from an upper end edge of one of the side plates 1b, 1c and from an upper end edge of the other side plate are bent into the V-shaped core material 4 while being bent into the groove 2, so that the core material 4 is prevented from escaping. Then, the left and right side surfaces of the bent basal portion of the brush material 3 are pressed and clamped by the left and right side plates 1b, 1c. By doing so, a channeled brush 7 is formed.

[0023] Also, a twice-folded brush material is implanted in the channel 1 together with a core material, thereby forming a channel brush 7. Any of those channel brushes 7 is known per se.

[0024] Also, a connection area between the bottom plate 1a and the left and right side plates 1b, 1c in the channel 1 is folded downward thereby forming a stand 8 in which folded pieces are superimposed and extended in parallel in the longitudinal direction of the channel 1.

[0025] Then, the channel brush 7 is cut in such a manner as to be orthogonal to the axis of the channel brush 7 between the left claw piece 5 and the right claw piece 6, thereby forming an end face 1d which is orthogonal and planar.

[0026] As shown in FIGS. 1(B), 2 and 3, a coil brush 10 is formed by tightly spirally winding the channel brush 7. In the coil brush 10, adjacent stands 8 of the tightly wound channel brush 7 are fixedly welded, thereby the tightly spirally winding of the channel brush 7 is retained. Reference numeral 9 denotes this welding area.

[0027] A flange 11 is internally fitted to opposite ends of a cavity which is formed by the channel 1 of the coil brush 10 thus constructed. Each flange 11 has a roll insertion hole 12 which is defined by an inner peripheral

edge of the flange 11 and which is formed in the central area thereof.

[0028] A plurality of such coil brushes 10 are externally fitted to the roll 13, the end faces 1d of the winding ends of the adjacent channels 1 are abutted with each other and opposite sides are tightened and compressed by a tightening plate which is integral with the roll 13. By doing so, a rotary roll brush 14 is formed.

[0029] As shown in FIGS. 2 and 4, a plurality of projecting pieces 15 are spacedly independently erected from an outer peripheral edge of each flange 11 towards outside, each projecting piece 15 is welded to a bottom portion of the channel 1, and one piece 15a of the projecting pieces is welded to a bottom portion in the vicinity of an end face 1d of a winding end of each channel 1. Each projecting piece 15 is suspended between the stands 8 disposed between the winding of the adjacent channels 1 and welded. Each projecting piece 15 is formed by punching from a flat metal plate in a same plane as indicated by an imaginary line of FIG. 4, and then, bending the same at right angles as indicated by an arrow and a solid line of FIG. 4.

[0030] As a preferred example, as shown in FIGS. 3 and 6, one side edge of one piece 15a of the projecting pieces is aligned with the end face 1d of each winding end of the channel 1. By doing so, a sufficient abutment strength of the flange 11 is obtained by abutting the end faces 1d of the winding end of the channel 1 of each coil brush 10 externally fitted to the roll 13 and in that state, by abutting one side edges of the above-mentioned one projecting piece 15a.

[0031] As shown in FIGS. 2 and 4, as well as elsewhere, the projecting piece 15a of all the projecting pieces can be made longer than the remaining projecting pieces 15. In other words, by making one projecting piece 15a long enough so as to reach the winding end of the channel 1, or by aligning one side edge of one projecting piece 15a of the projecting pieces with the end face 1d of each winding end of the channel 1, the projecting piece is welded to the bottom portion of the winding end of the channel 1.

[0032] Owing to the above arrangement, the connection by means of welding with respect to the adjacent channels 1 of the winding end of the channel 1 of the coil brush 10 is enhanced, a sufficient abutment strength between the end faces 1d of the channel 1 is ensured, and peel-off occurrable at the winding end of the channel 1 is effectively prevented.

[0033] As another preferred example, as shown in FIGS. 4 through 6, a key groove 12a for receiving a key 13a formed on a roll 13 is formed in an inner peripheral edge which defines a roll insertion hole 12 of the flange 11, the key 13a is engaged in the key groove 12a, and in that state, the coil brush 10 is externally fitted to the roll 13, thereby forming the rotary roll brush 14.

[0034] As shown in FIG. 4, as well as elsewhere, a pair of or only one of such key 13a is formed on a diameter line of the roll 13, and a pair of or only one of such key groove 12a is formed on a diameter line of the inner peripheral edge of the flange 11. The key 13a is brought into engagement with the key groove 12a, so that the coil brush 11 and the roll 13 can be turned in unison.

[0035] As a further preferred example, as shown in FIGS. 3, 4, 6 and 7(B), one side edge of one piece 15a of all the projecting pieces is aligned with the right angled end face 1d of each winding edge of the channel 1 and in that state, the same is welded between the adjacent stands 8 of the bottom portion of the winding end of the channel 1. On the other hand, the end face 1d of each winding end of the channel 1 is disposed on the same general line X1 of the coil brush 10 and one side edge of one projecting piece 15a of all the projecting pieces is located on the center line X2 of the key groove 12a and the key 13a.

[0036] That is, the key groove 12a and the key 13a are formed on a diameter line of the rotary roll brush 14 (the coil brush 10 and the roll 13), and one side edge of one piece 15a of all the projecting pieces is located on the center line X2 of the key groove 12a and the key 13a which are located on the diameter line.

[0037] Owing to the construction in which the end face 1d of the channel 1 is disposed on the same general line X1 and the construction of the flange 11, only one kind of flange 11 in which the projecting position of the projecting piece 15 and the forming position of the key groove 12a are same can be used commonly for the opposite ends of each coil brush 10. And merely by engaging the key 13a in the key groove 12a, a proper abutment between the end faces 1d of the winding end of the channel 1 can be obtained.

[0038] That is, merely by externally fitting the coil brushes 10 to the roll 13 in accordance with the guidance of the key groove 12a and the key 13a, a wholesome rotary roll brush 14 can be formed in which the end faces 1d of the winding ends of the channel 1 are tightly abutted with each other between the coil brushes 10 and no gap and no density unevenness occurs at the adjacent areas of the coil brushes 10,

[0039] As a still further preferred example, as shown in FIGS. 5, 6 and 7(A), a reinforcing piece 16 is formed by folding from one side edge of one piece 15a of all the projecting pieces, one side edge of one piece 15a of all the projecting pieces is aligned with the end face 1d of the winding end of the channel 1, and in that state, the reinforcing piece 16 is superimposed on the end face 1d or welded to the channel 1 while being superimposed thereon.

[0040] Owing to the above arrangement, a sufficient abutment strength of the end face 1d of the channel 1 is ensured at the time of abutting the coil brushes 10 in the rotary roll brush 14 and adjustability at the time of abutment is enhanced. Each projecting piece 15a is formed by punching from a flat metal plate in a same plane as indicated by an imaginary line of FIG. 5, and then, bending the same at right angles with respect to the flange 11 as indicated by an arrow and a solid line

of FIG. 5. Then, the reinforcing piece 16 is bent at right angles with respect to the projecting piece 15a.

[0041] As mentioned previously, the end face 1d of the winding edge of the channel 1 is plane finished and cutting the same so as to be orthogonal to the axis of the coil brush 10, i.e., orthogonal to the axis of the channel 7. By doing so, the end faces 1d can be tightly abutted with each other.

[0042] According to the present invention, a rotary roll brush is formed by employing the engagement between the key 13a and the key groove 12a in combination with the abutment between the end faces 1d of the winding ends of the respective channels 1, or by abutting the end faces 1d of the winding ends of the channels 1 in each coil brush 10 with each other without using the key engagement, rotation being transmitted only by a known tightening plate.

Claims

1. A coil brush for forming a rotary roll brush in which a coil brush is formed by tightly spirally winding a channel brush which is formed by retaining a basal portion of a brush material on a channel, a flange is internally fitted to opposite ends of a cavity formed by said channel of said coil brush, and a roll insertion hole defined by an inner peripheral edge of said flange is formed in a central area of each flange,

   said coil brush being **characterized in that** a plurality of projecting pieces are spacedly erected from an outer peripheral edge of each flange towards outside, each projecting piece is welded to a bottom portion of said channel, and one piece of said projecting pieces is welded to a bottom portion in the vicinity of an end face of a winding end of each channel.

2. A coil brush for forming a rotary roll brush according to claim 1, wherein one side edge of said one piece of said projecting pieces is aligned with end faces at left and right winding ends of said channel.

3. A coil brush for forming a rotary roll brush in which a coil brush is formed by tightly spirally winding a channel brush which is formed by retaining a basal portion of a brush material on a channel, a flange is internally fitted to opposite ends of a cavity formed by said channel of said coil brush, a roll insertion hole defined by an inner peripheral edge of said flange is formed in a central area of each flange, and said flange is provided at an inner peripheral edge thereof with a key groove engageable with a key of said roll,

   said coil brush being **characterized in that** a plurality of projecting pieces are spacedly erected from an outer peripheral edge of each flange towards outside, each projecting piece is welded to a bottom portion of said channel, one piece of said projecting pieces is welded to a bottom portion in the vicinity of an end face of a winding end of each channel, one side edge of said one piece of said projecting pieces is aligned with end faces at left and right winding ends of said channel, an end face of each winding end of said channel is disposed on a same general line of said coil brush, and one side edge of one piece of said projecting pieces is located on a center line of said key groove.

4. A coil brush for forming a rotary roll brush according to claim 2 or 3, wherein a reinforcing piece superimposed on an end face of a winding end of said channel is folded from one side edge of one piece of said projecting pieces.

FIG.1A

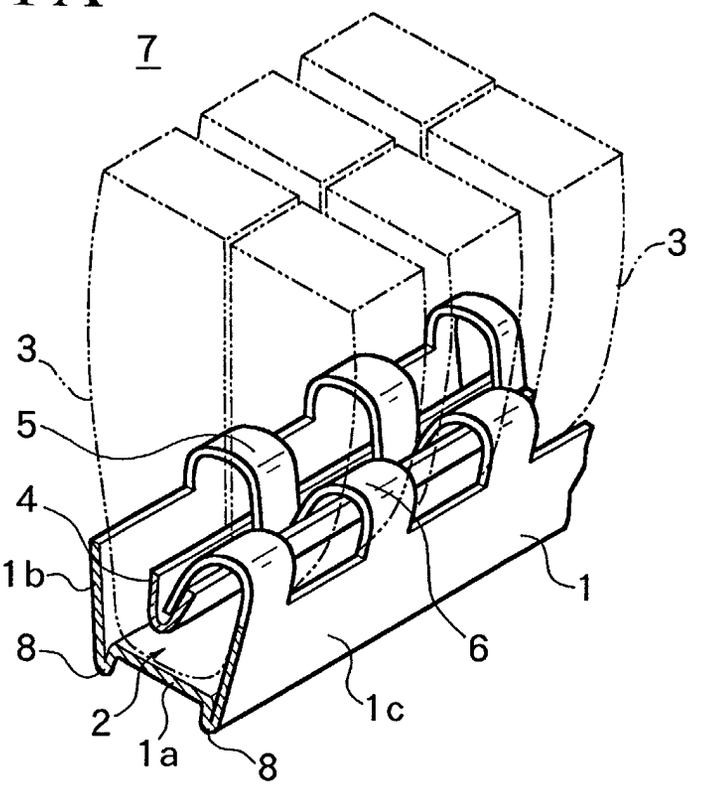


FIG.1B

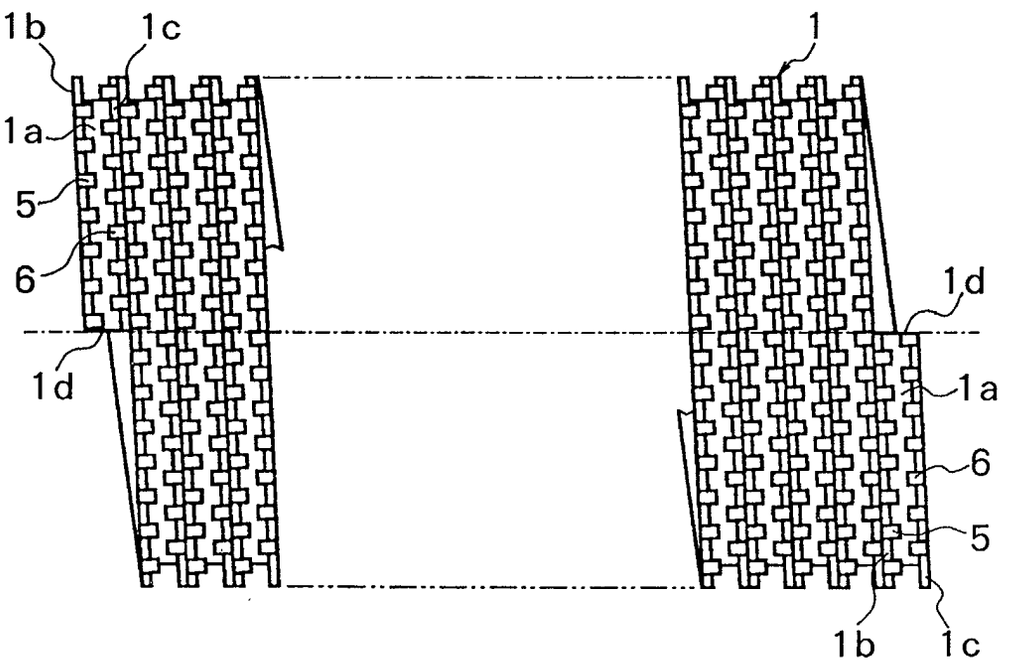
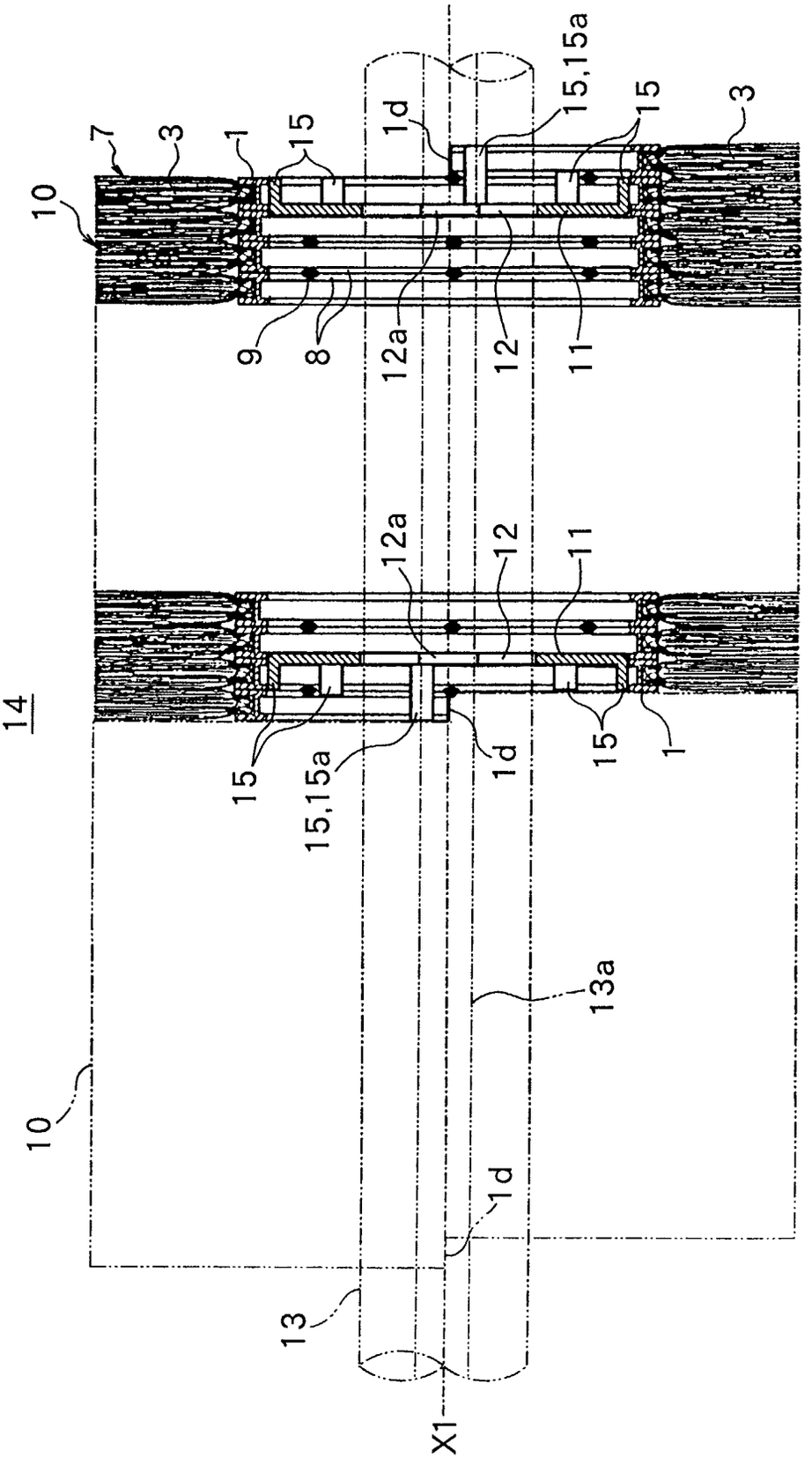


FIG.2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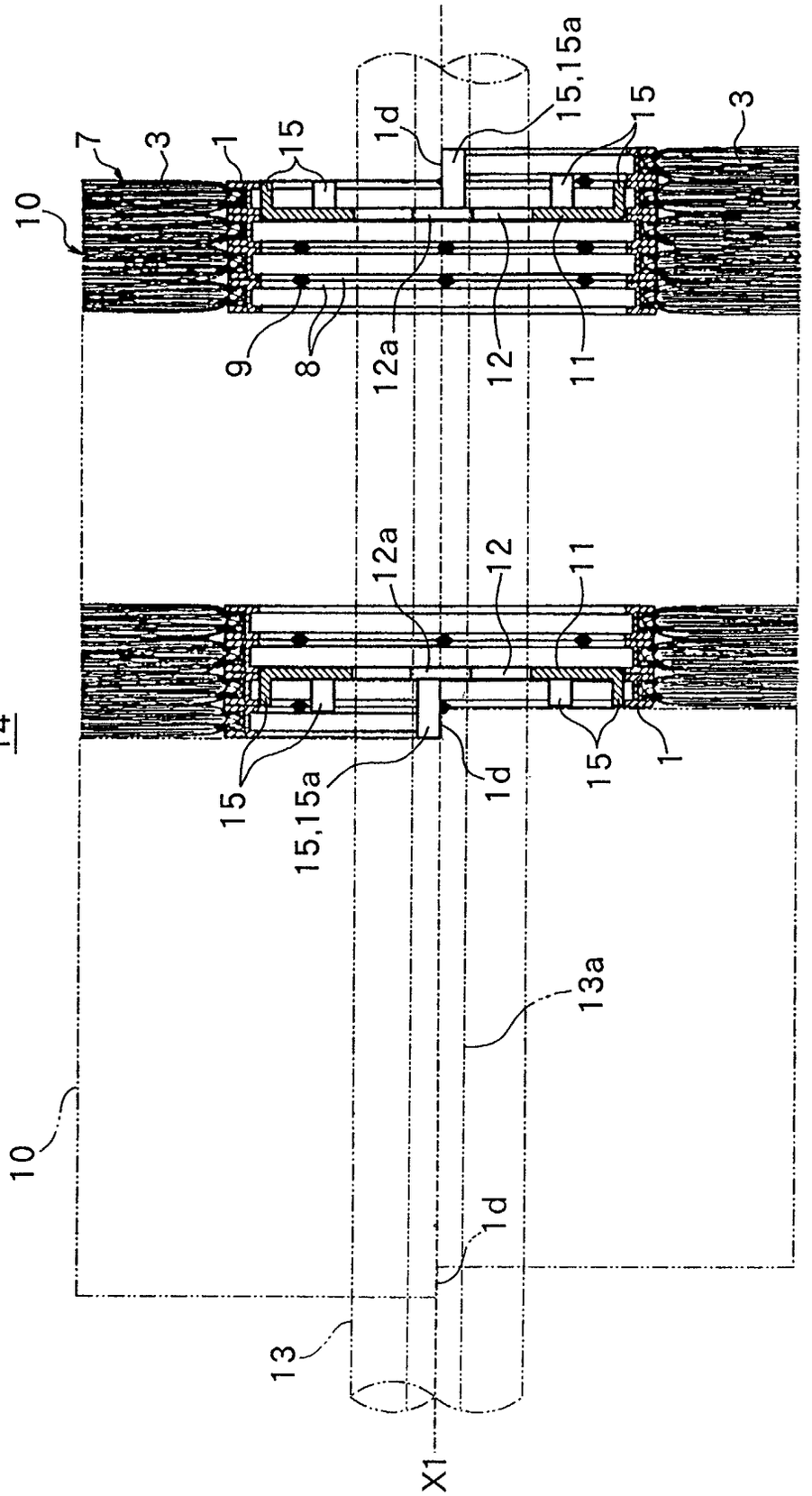
13
X1

FIG.3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10
1d
13
X1

FIG.4

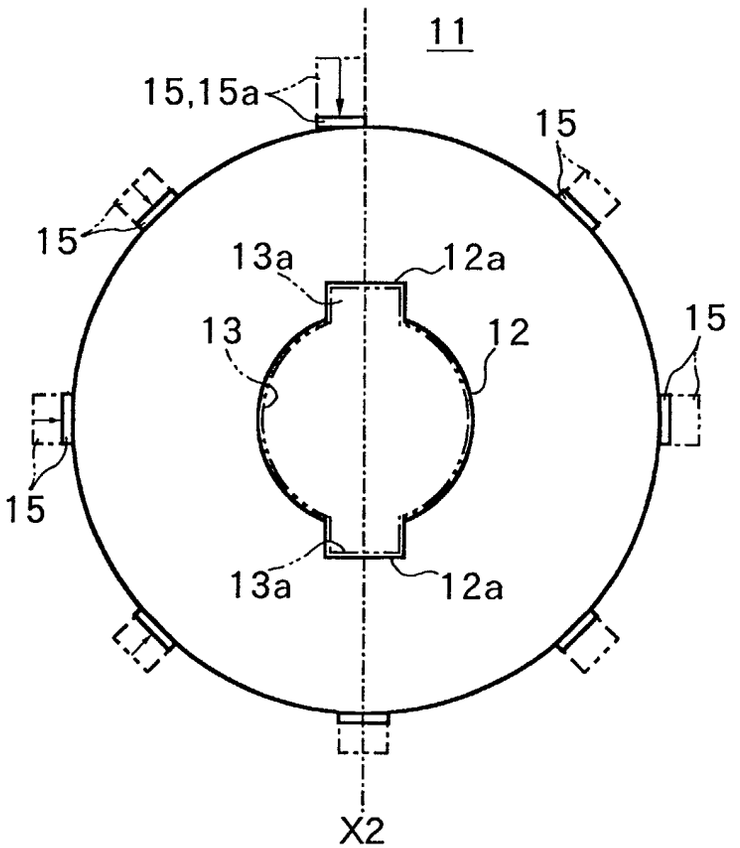

FIG.5

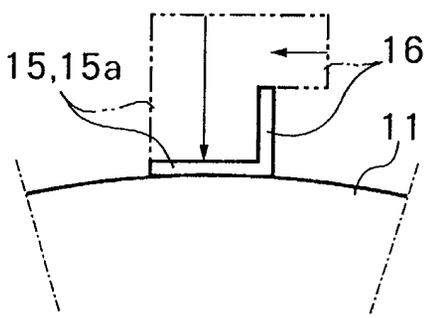

FIG.6

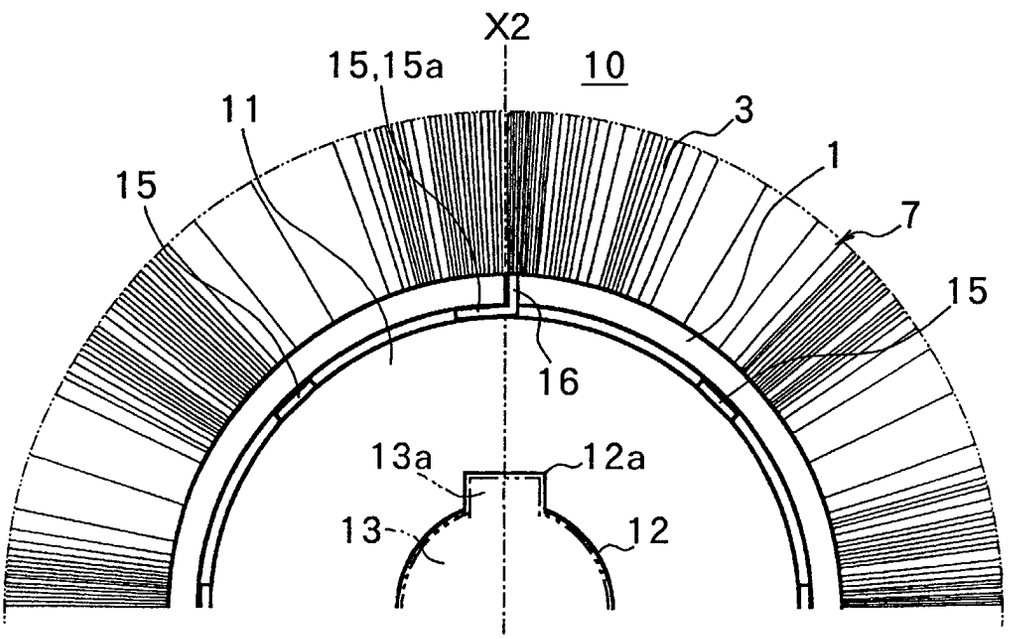

FIG.7A

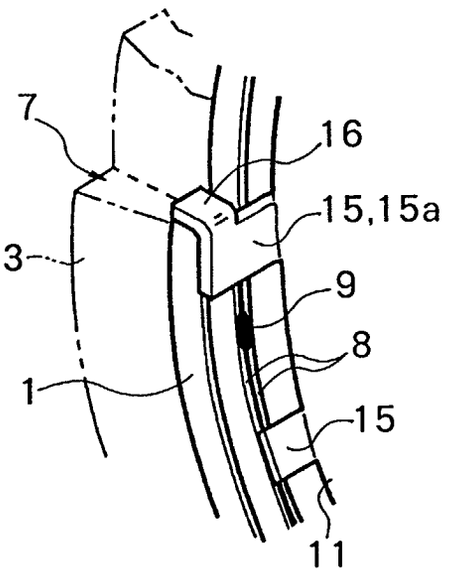

FIG.7B