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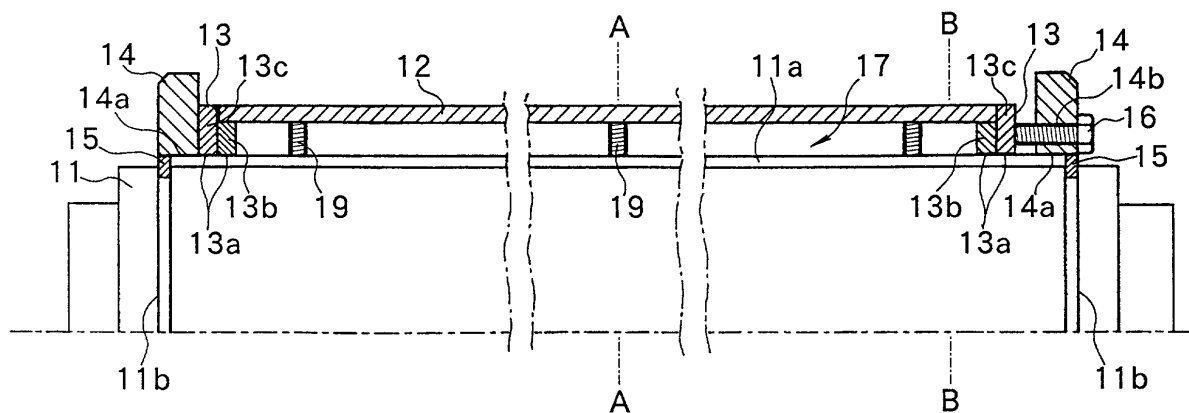
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(54) **Rotary roll brush**

(57) The present invention provides a rotary roll brush in which an expensive key-attached shaft for forming a disc type rotary roll brush can properly be utilized as a shaft for a channel type rotary roll brush, which is inexpensive and which can easily cope with difference in diameter between a shaft for the disc type rotary roll brush and a shaft for the channel type rotary roll brush.

The rotary roll brush includes a drum 12 having a larger diameter than the key-attached shaft 11 which drum 12 is externally inserted in the key-attached shaft 11 such that the drum 12 can be inserted in and removed from the key-attached shaft 11, and a channel type brush 7 wound around the outer peripheral surface of the drum 12.

FIG.3



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention relates to a rotary roll brush designed for performing removal of slug and surface polishing with respect to a rolled steel plate or the like. Particularly, it relates to a proposal which is suited to utilize a key attached-shaft employed in a conventional roll brush which is formed by externally inserting a disc-type brush provided with a plurality of key grooves in the key-attached shaft, in a rotary roll brush in which a channel type brush is employed.

Related Art

[0002] Heretofore, a rotary roll brush has been formed by using a disc type brush in which a brush material is implanted in an outer peripheral edge of the disc. In this disc type rotary roll brush, a shaft insertion hole is formed in a central area of the disc, a key groove is formed in a disc inner peripheral edge which defines the shaft insertion hole, and a plurality of disc type brushes are externally inserted in a shaft while serving the key groove and the key formed on the shaft as a guide, thereby forming a rotary roll brush.

[0003] A worn out used disk type rotary roll brush is supplied to a brush maker from a roll maker, etc. The brush maker externally inserts a new disc brush in this key-attached shaft and delivers the same to the roll maker, etc. This situation is likewise applicable to a channel type rotary roll brush to be described hereinafter.

[0004] However, the key-attached shaft constituting the disc type rotary roll brush has the following inconveniences. Since the key projects over the entire length, it is impossible to wind a channel type brush around the key-attached shaft. Moreover, since the shaft with the channel type brush wound therearound is large in diameter and the key-attached shaft of the disc type rotary roll brush is small in diameter, even if an attempt is made to wind the channel type brush around the key-attached shaft after the key has been removed, it is difficult to obtain a channel type rotary roll brush having a required diameter.

[0005] That is, the key-attached shaft cannot be utilized as a rotary roll brush using a channel type brush which can constitute a rotary roll brush as an inexpensive manner. Therefore, a channel type rotary roll brush-specific shaft or drum is used. This puts an economic burden on the roll maker, etc.

SUMMARY OF THE INVENTION

[0006] According to the present invention, a channel type rotary roll brush in which a key-attached shaft is employed, is formed by externally inserting a drum hav-

ing a larger diameter than the key-attached shaft in the shaft.

[0007] This rotary roll brush properly achieves an object for utilizing a shaft used for a disc type rotary roll brush as a shaft for a channel type rotary roll brush in an extremely simple manner. Moreover, an extremely inexpensive channel type rotary roll brush can be provided.

[0008] In addition, the present invention can easily cope with difference in diameter between the shaft for the disc type rotary roll brush and the shaft for the channel type rotary roll brush.

[0009] Furthermore, it is designed such that the drum can be inserted in and removed from the shaft. The drum is removed from the shaft. Then, the disc type brush is externally inserted in the shaft to constitute the disc type rotary roll brush. Owing to this feature, a single number of key-attached shaft can be commonly used for both the channel type rotary roll brush and the disc type rotary roll brush and therefore, economic efficiency can be obtained.

[0010] Moreover, drum support flanges are externally fitted to the outer peripheral surface of opposite ends of the key-attached shaft and opposite ends of the drum are externally fitted to the drum support flanges. By doing so, the drum is coaxially supported on the key-attached shaft. Owing to this feature, the drum and the key-attached shaft can easily be centered and externally inserted.

[0011] In addition, a support pin is threadingly inserted in the outer peripheral surface of the drum and a forward end of the support pin is abutted with the outer peripheral surface of the key-attached shaft thereby supporting the drum on the key-attached shaft. Owing to this feature, bending of the drum can effectively be prevented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a perspective view showing, in section, one example of a channel type brush in a roll brush;

FIG. 2 is a sectional view showing a coil brush formed by the channel type brush;

FIG. 3 is a sectional view showing a state that a drum with the channel type brush wound therearound is externally inserted in a shaft attached with a key;

FIG. 4 is a sectional view likewise showing a state of a drum with the channel type brush wound therearound, but the position where the drum is sectioned is changed;

FIG. 5 is a sectional view taken on line A-A of FIG. 3;

FIG. 6 is a sectional view taken on line B-B of FIG. 3;

FIG. 7 is a side view of a stop ring;

FIG. 8 is a side view of a drum tightening brush;

FIG. 9 is a side view of a drum support flange; and

FIG. 10(A) is a side view of a reduced diameter flange (drum fitting portion) forming the drum support flange, and FIG. 10(B) is a side view of an enlarged diameter flange (drum abutment portion).

DETAILED DESCRIPTION OF THE EMBODIMENT

[0013] One embodiment of the present invention will now be described with reference to FIGS. 1 through 10 of the accompanying drawings.

[0014] FIG. 1 shows one example of a typical channel type brush. The illustrated channel type brush 7 is formed as follows. A bent basal portion of a two-folded brush material 3 is implanted in a groove 2 which is defined by a bottom plate 1a and left and right side plates 1b 1c, together with a V-shaped core material 4. Then, left and right claws 5, 6 projecting from upper end edges of the left and right side plates 1b, 1c respectively are bent into the groove 2. While doing so, the left and right claws 5, 6 are bent into the V-shaped core material 4 so as to prevent the core material 4 from escaping. Then, left and right side surfaces of the bent basal portion of the brush material 3 are sandwichingly press-held by and between the left and right side plates 1b, 1c. By this, formation of the channel type brush 7 is finished.

[0015] It is also a known channel type brush 7 which is formed by placing the two-folded brush material 3 astride a core and implanting the brush material 3 in the channel 1 together with the core.

[0016] Connection portions between the bottom plate 1a and the left and right side plates 1b, 1c in the channel 1 are undulatingly curved downward such that undulatingly curved pieces are mutually overlapped thereby forming a stand 8 extending in a longitudinal direction of the channel 1.

[0017] As shown in FIG. 2, the channel type brush 7 is tightly wound to form a coil brush 9. Every adjacent stands 8 of the tightly wound channel type brush 7 are spot welded to each other so that the tightly wound condition of the channel type brush 7 can be retained. Reference numeral 10 denotes such a spot-welded portion as just mentioned.

[0018] On the other hand, as shown in FIG. 3, a cylindrical drum 12 is externally inserted in a shaft 11 attached with a key 11a extending along a general line of an outer peripheral surface, and a pair of drum support flanges 13 for externally fitting the drum 12 and a pair of tightening flanges 14 for tightening the drum 12 to the key-attached shaft 11 together with the drum support flanges 13 are externally fitted to opposite ends of the key-attached shaft 11. The drum support flange 13 and the tightening flange 14 each have a shaft insertion hole of a mutually equal diameter and key grooves 13a, 14a formed in inner peripheral edge portions of the shaft insertion holes and engaged with the key 11a of the key-attached shaft 11. The key grooves 13a, 14a are engaged with the key 11a and in that condition, the drum 12 is externally inserted in the key-attached shaft 11,

thereby unrotatably assembling the drum support flange 13 and the tightening flange 14 to the key-attached shaft 11.

[0019] The drum 12 is externally inserted in the key-attached shaft 11 through an annular space such that the drum 12 is spaced apart from the outer peripheral surface of the key-attached shaft 11 and from the key 11a. Opposite ends of the drum 12 are externally fitted to the drum support flanges 13. By doing so, the key-attached shaft 11 and the drum 12 are assembled on a same axis.

[0020] In the alternative, the drum 12 is externally inserted in the key-attached shaft 11 such that the inner peripheral surface of the drum 12 contacts a top surface of the key 11a. The opposite ends of the drum 12 are externally fitted to the drum support flanges 13. By doing so, the key-attached shaft 11 and the drum 12 are assembled on a same axis.

[0021] The drum support flange 13 has a fitting portion 12b for allowing external fitting of the opposite ends of the drum 12 and a drum abutment portion 13c for abutting with opposite end faces of the drum 12 which is fitted to the drum fitting portion 13b. The opposite ends of the drum 12 are externally fitted to the drum fitting portion 13b. In that condition, the opposite end faces of the drum 12 are abutted with the drum abutment portion 13c.

[0022] Each tightening flange 14 is arranged at the outside of the drum support flange 13 and abutted with a stop ring 15 arranged at the outside of the tightening flange 14 so as to prevent escape from the key-attached shaft 11.

[0023] Specifically, the stop rings 15 are fitted into the annular grooves 11b formed in the opposite ends of the key-attached shaft 11 and the stop rings 15 are abutted with the peripheral edge portions of the shaft insertion holes formed in the outer surfaces of the tightening flanges 14, so that the flanges 14 are prevented from escaping and so that the drum 12 is prevented from escaping from the drum support flanges 13.

[0024] In the case where the stop ring 15 is formed into a two-split structure, a cut-out annular groove 14c is formed in a shaft insertion hole formed in an outer surface of each tightening flange 14, and the stop ring 15 is fitted into the cut-out annular groove 14c. By restricting the outer peripheral surface of the stop ring 15 with an inner peripheral surface of the annular groove 14c, prevention of opening and prevention of escaping can be attained.

[0025] As shown in FIG. 7, the stop ring 15 has a radially two-split structure. The split ring elements are fitted into the annular groove 11b of the key-attached shaft 11 in a radially direction of the groove 11b and assembled into a circular configuration, so that the radial movement is prevented by the groove 11b.

[0026] As shown in FIGS. 9 and 10(A), 10(B), as well as elsewhere, the drum support flange 13 comprises a small diameter ring with a key groove 13a, and a large diameter ring with a key groove 13a which is in coinci-

dence with the key groove 13a of the small diameter groove. The small and large rings are separately formed and coaxially welded as a single part. The drum fitting portion is formed by the small diameter ring and the drum abutment portion 13c is formed by the large diameter ring.

[0027] In the alternative, the drum support flange is formed into a single part by cutting the drum fitting portion 13b and the drum abutment portion 13c.

[0028] As means for welding the small diameter ring to an inner surface of the large ring, notches 13d are formed in an outer peripheral surface of the small diameter ring at an equal interval and the small diameter ring is welded to the large diameter ring within the notches 13d, so that the padding of the welded portions 10' does not interfere with the opposite ends of the drum 12.

[0029] One of the tightening flanges 14 is provided with a plurality of internally threaded through holes 14 extending from an outer surface to an inner surface thereof and spacedly circumferentially arranged. A tightening bolt 16 is inserted into each through hole 14 from the outer surface side thereof and threadingly engaged therewith. While threadingly advancing the tightening bolts 16, front end faces of the bolts 16 spacedly press an outer surface of the drum support flange 13, i.e., outer surface of the drum abutment portion 13c in the circumferential direction. Hence, while pressing one of the drum support flanges 13 against one end face of the drum 12, the other end face of the drum 12 is pressed against the other drum support flange 13 which is prevented from moving outward and the drum tightening flange 14. In co-action with the stop ring 15, the drum 12 is thereby integrally assembled with the key-attached shaft 11.

[0030] Through holes 12a each consisting of the internally threaded hole extending from an outer peripheral surface to an inner peripheral surface of an outer peripheral wall of the drum 12 are circumferentially and axially spacedly arranged. A support pin 19 consisting of an externally threaded pin is inserted into each through hole 12a from the outer peripheral surface side and threadingly engaged therewith. While threadingly advancing, the front end face of the support pin 19 is abutted with the outer peripheral surface of the key-attached shaft 11 so that the drum 12 is retained between the drum support flanges 13, thereby preventing the bending of the drum 12.

[0031] The support pin 19 is threadingly engaged with the drum 12 such that the basal end of the pin 19 is not projected from the outer peripheral surface of the drum 12.

[0032] The channel type brush 7 is tightly spirally wound around the drum 12 thus constructed, thereby forming a rotary roll brush 18. In the alternative, the coil brush 9 is externally inserted in the outer peripheral surface of the drum 12, thereby forming the rotary brush 18. Any of them has the channel type brush 7 wound around the outer peripheral surface of the drum 12.

[0033] Moreover, it is also accepted that the tightening bolt 16 of the tightening flange 14 is released from the ring 15 to remove the stop ring 15 from the annular groove 11b and to remove the tightening flange 14 and the support flange 13, and then, while guiding the key 11a through the shaft insertion hole, the key grooved disc type brush is inserted in the key-attached shaft 11, thereby forming the rotary roll brush 18.

[0034] According to the present invention, an expensive key-attached shaft for forming a disc type rotary roll brush can be utilized as a shaft of a channel type roll brush and an inexpensive rotary roll brush can be provided.

[0035] Moreover, the present invention can easily cope with difference in diameter between the shaft for the disc type rotary roll brush and the shaft for the channel type rotary roll brush.

[0036] Furthermore, by designing such that the drum can be inserted in and removed from the shaft, the same key-attached shaft can be utilized both for the channel type rotary roll brush and the disc type rotary roll brush and thus, economic efficiency can be obtained.

[0037] Moreover, by coaxially supporting the drum on the key-attached shaft through the drum support flange, the drum and the key-attached shaft can easily be centered and externally inserted.

[0038] In addition, by supporting the drum on the key-attached shaft through a support pin, bending of the drum can effectively be prevented and centering over the entire length of the drum can effectively be maintained.

Claims

1. A rotary roll brush comprising a shaft attached with a key, a drum having an enlarged diameter and externally inserted in said key-attached shaft, and a channel type brush wound around an outer peripheral surface of said drum.
2. A rotary roll brush according to claim 1, wherein said drum is removably inserted in said key-attached shaft.
3. A rotary roll brush according to claim 1, wherein a drum support flange is externally fitted to an outer peripheral surface of each opposite end of said key-attached shaft, thereby coaxially supporting said drum on said key-attached shaft.
4. A rotary roll brush according to claim 1, wherein a support pin is threadingly inserted from the outer peripheral surface of said drum and a forward end of said support pin is abutted with an outer peripheral surface of said key-attached shaft, thereby supporting said drum on said key-attached shaft.

FIG.1

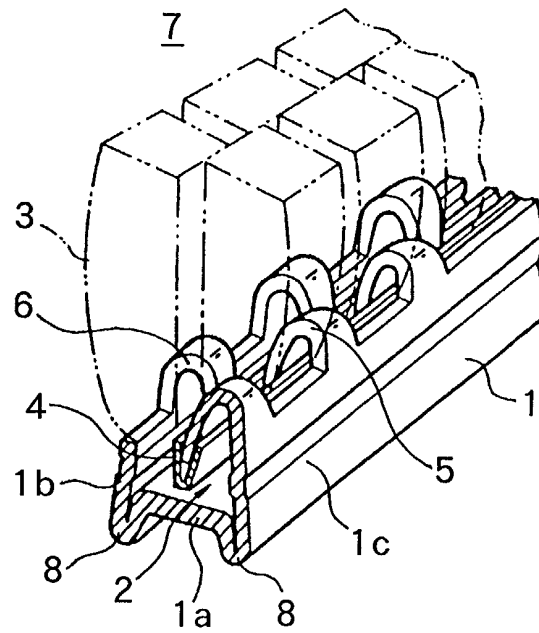


FIG.2

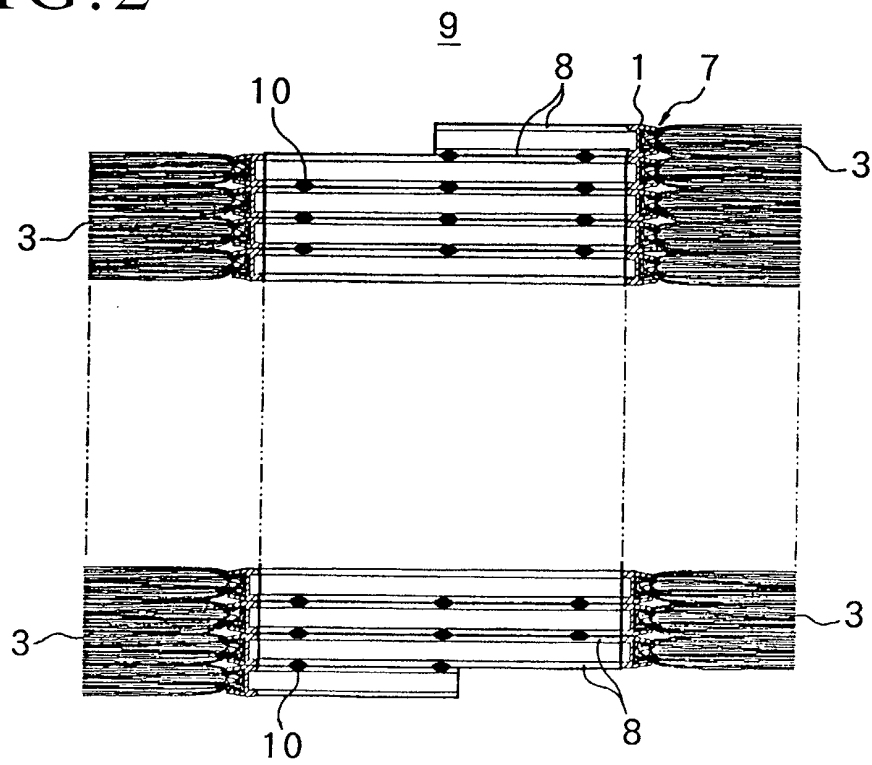


FIG.3

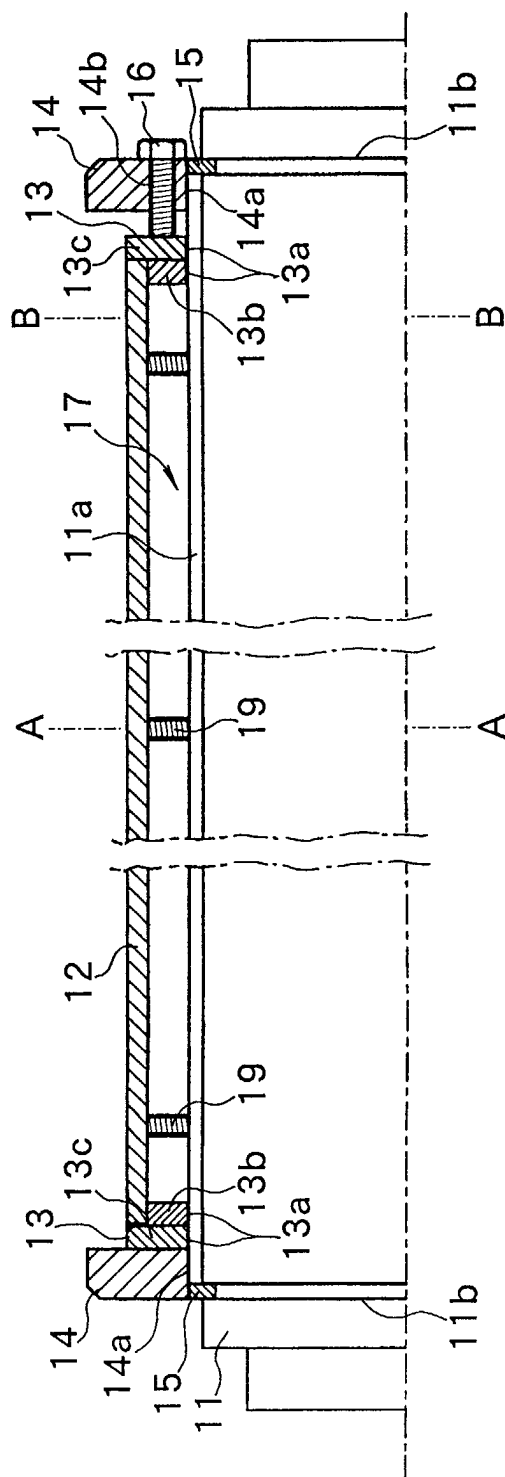


FIG.4

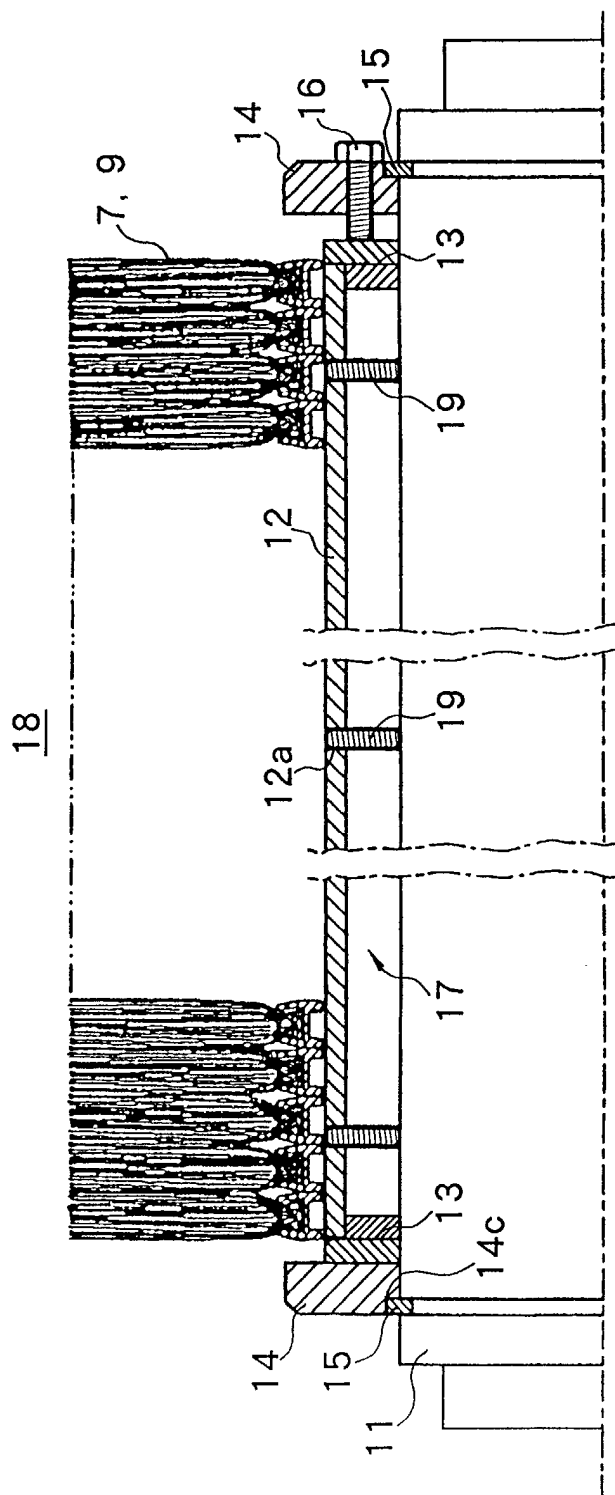


FIG.5

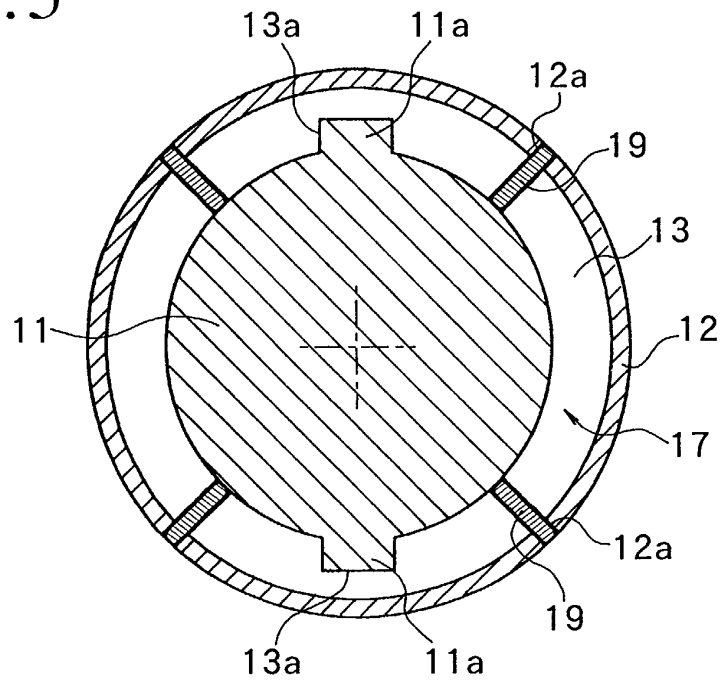


FIG.6

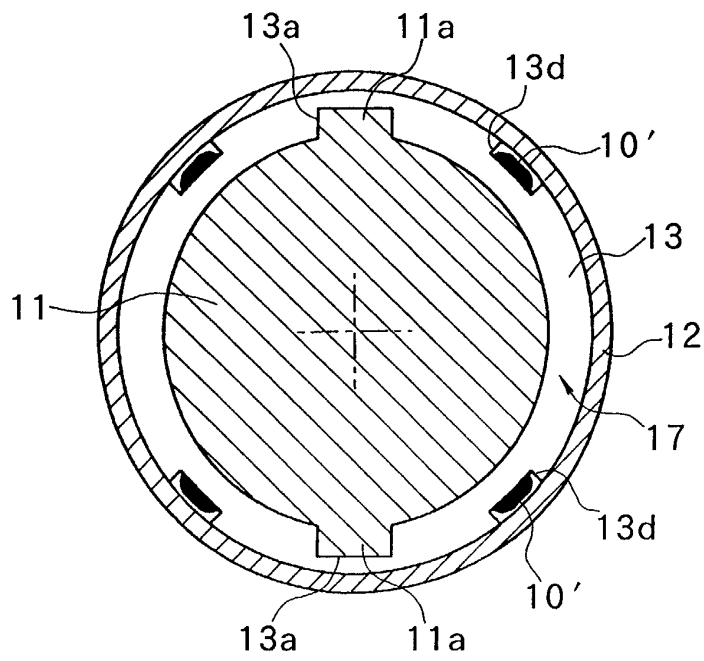


FIG.7

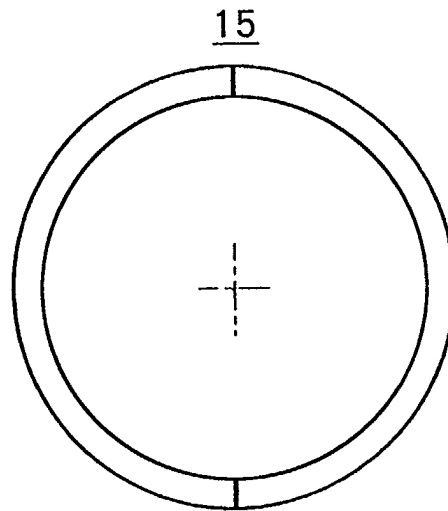


FIG.8

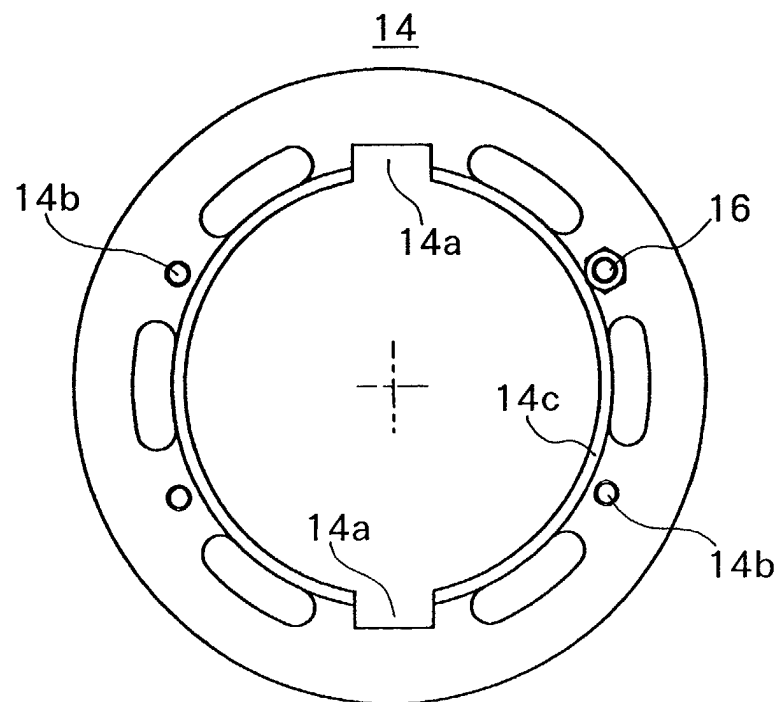


FIG.9

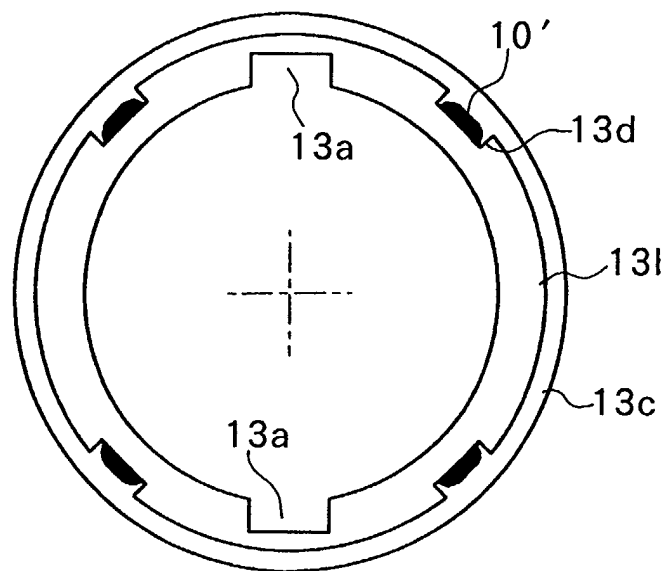


FIG. 10A

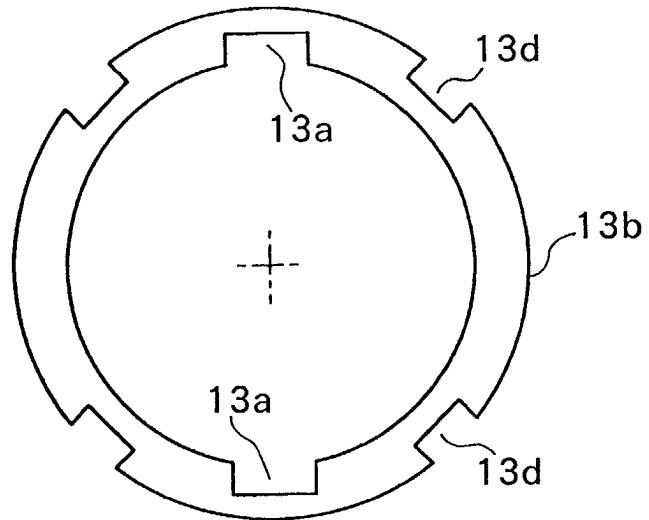


FIG. 10B

