

"SHAFT BEARING STRUCTURE"

This invention relates to a shaft bearing structure.

5 A shaft bearing structure is known for the rotatable mounting of a shaft. The shaft is rotatably mounted in a bush, and the bush is fitted in a hole formed in a supporting member. The bush and hole have circumferential surfaces which are in tight contact with each other. In such a structure, however, a high degree of machining accuracy is required in machining both the hole and the bush. If some play is present when these components are fitted together, the shaft cannot be accurately supported and held at a given position. Therefore, if the structure is used in a printer in which the rotatable shaft of a platen and a guide shaft of a print head are to be rotatably supported, the two shafts will not have the desired parallelism or will become unstable, so that high quality printing cannot be attained.

10 It is therefore an object of the present invention to provide a shaft bearing structure in which the hole and the bush can be tightly fitted together without need for high machining accuracy.

20 According to the present invention, there is therefore provided a shaft bearing structure comprising a supporting member formed with a hole in which is fitted a bush in which a shaft is rotatably mounted, the bush and the hole having correspondingly tapered surfaces, a retainer which is fixed to the shaft, and biasing means for resiliently urging the said surfaces into contact with each other, said biasing means acting between the bush and a gear which is mounted on the shaft so that the gear is urged by the biasing means away from the bush and against the return, the biasing

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means acting frictionally on said gear so as to prevent backlash of the gear.

Preferably, there are rotation preventing means for preventing rotation of the bush in the hole.

5 Thus the rotation preventing means may comprise a projection on the bush which engages the sides of a slot in the supporting member, the slot communicating with the said hole.

10 The biasing means preferably comprises a compression spring which acts between the bush and the gear.

The invention also comprises a printer provided with the said shaft bearing structure, the said shaft carrying a platen of the printer.

15 The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 is a front view, partly in cross-section, of one embodiment of a shaft bearing structure according to the present invention, and

20 Figure 2 is a sectional view taken along line A-A of Figure 1.

As shown in Figure 1, a shaft 2 of a platen 1 is rotatably mounted in a bush 3 carried by a supporting member 4. The shaft 2 is rotatably mounted in a bearing hole 3a of the bush 3. The outer axially extending surface 3b of the bush 3 is tapered so as to have a conical shape, and in the illustrated embodiment its smaller diameter is on the side of the platen 1. The supporting member 4 has a hole 5 therein in which the bush 3 is fitted, the axially extending surface 5a of the hole 5 being correspondingly tapered so as to contact the tapered outer surface 3b of the bush 3. Thus in the illustrated embodiment, the diameter of the hole 5 on the side of the supporting member 4 remote from the

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platen 1 is larger than that on the opposite side thereof. A portion of the shaft 2 projects through the supporting member 4 and has a gear 6, acting as a fixed member, mounted thereon relatively non-rotatably, the position in the axial direction of the gear 6 being defined by an E-shaped retainer 7. A coil spring 8, acting as a biasing member, is interposed in a compressed state between a boss portion 6a of the gear 6 and the bush 3. The coil spring 8 acts on the bush 3 so as to urge the tapered outer surface 3b of the bush 3 into contact with the tapered surface 5a of the hole 5.

As shown in Figure 2, the supporting member 4 has an inclined slot 4b leading from its upper end surface 4a to the hole 5 so that the shaft 2 can reach the hole 5 by passing through the slot 4b. The bush 3 has a projection 3c engageable with the sides of the slot 4b. When the bush 3 is held in a tightly fitted state in the gap between the shaft 2 and the hole 5 by the resilient force of the biasing member 8, the projection 3c engages with the sides of the slot 4b to prevent the rotation of the bush 3. Thus the projection 3c and the slot 4b constitute a restricting means 9 for restricting the rotation of the bush 3.

In assembling the structure described above in which the shaft 2 is rotatably mounted in the supporting member 4, the bush 3 is shifted rightwards as seen in Figure 1 in opposition to the resilient force of the biasing member 8, and the shaft 2 is passed through the slot 4b and positioned inside the hole 5. Then, the bush 3 is released. As a result, the bush 3 is fitted in the hole 5 by the resilient force of the biasing member 8, so that the tapered surface 3b and the tapered surface 5a are in tight contact with each other, whereby the bearing of the rotatable shaft 2 is completed. At the same time the

projection 3c and the sides of the slot 4b are engaged with each other, whereby the rotation of the bush 3 is restricted. Since the gear 6 is subjected to a load in an anti-rotational direction by the biasing member 8, the gear 6 is prevented from causing backlash.

In the shaft bearing structure described above since the tapered outer surface 3b of the bush 3 is in tight contact with the tapered surface 5a of the hole 5, the surfaces 3b, 5a can be in a very tightly contacted state without the need for high machining accuracy, no backlash occurs, and the shaft 2 can be stably supported.



CLAIMS

1. A shaft bearing structure comprising a supporting member formed with a hole in which is fitted a bush in which a shaft is rotatably mounted, the bush and the hole having correspondingly tapered surfaces, a retainer which is fixed to the shaft, and biasing means for resiliently urging the said surfaces into contact with each other, said biasing means acting between the bush and a gear which is mounted on the shaft so that the gear is urged by the biasing means away from the bush and against the retainer, the biasing means acting frictionally on said gear so as to prevent backlash of the gear.
2. A shaft bearing structure as claimed in claim 1 in which there are rotation preventing means for preventing rotation of the bush in the hole.
3. A shaft bearing structure as claimed in claim 2 in which the rotation preventing means comprises a projection on the bush which engages the sides of a slot in the supporting member, the slot communicating with the said hole.
4. A shaft bearing structure as claimed in any preceding claim in which the biasing means comprises a compression spring which acts between the bush and the gear.
5. A shaft bearing structure substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
6. A printer provided with a shaft bearing structure, as claimed in any preceding claim, the said shaft carrying a platen of the printer.