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JOURNAL BEARING

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Fig. 2

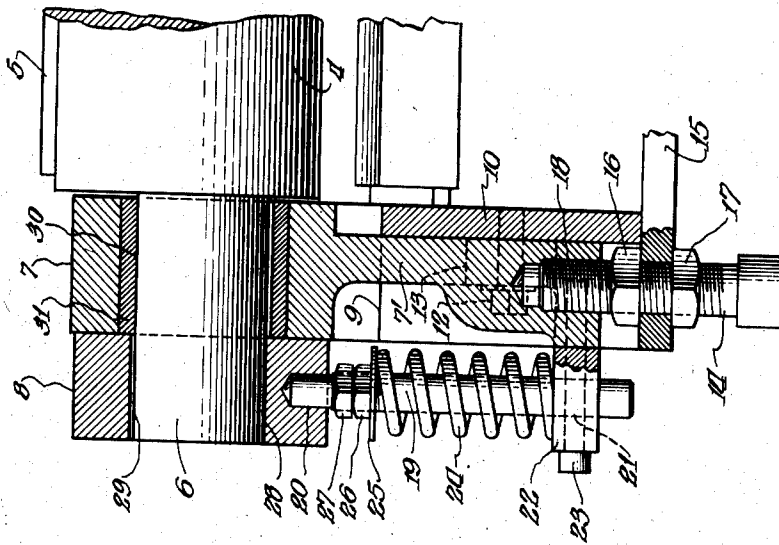
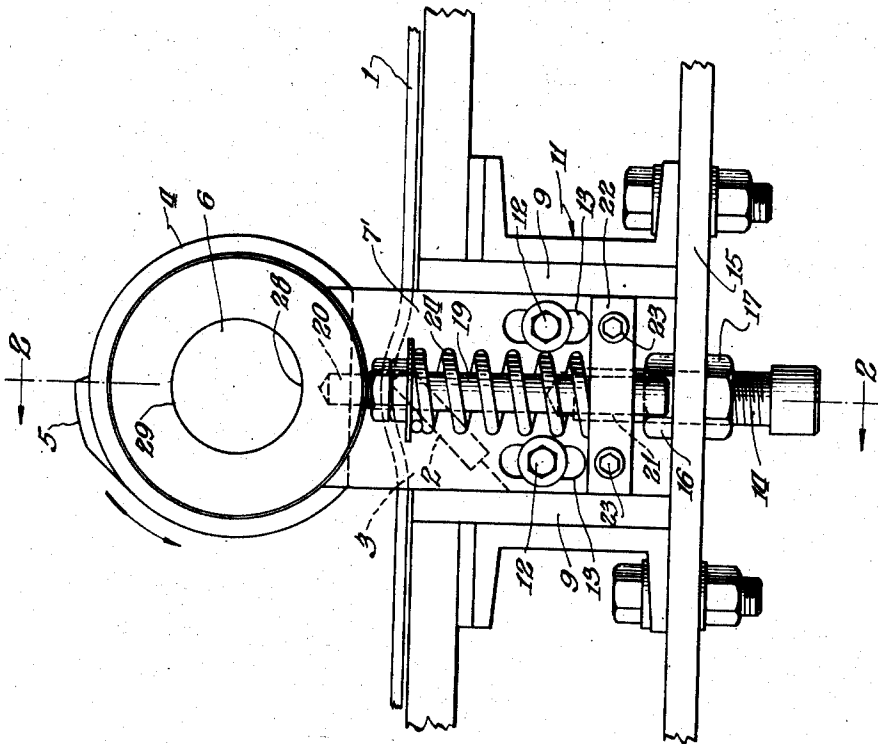


Fig. 1



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2 Claims. (Cl. 308—58)

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This invention relates to an improvement in a journal bearing construction and it has particular reference to an arrangement in a journal bearing for preventing radial play of the supported shaft in the bearing.

In the construction of certain types of machinery it is highly important to hold a shaft within extremely small tolerances to a fixed position in which it is supported by a roller or ball bearing, or a sleeve or bushing type bearing. Conventional practice is to make the bearing element, whether of the ball, roller or sleeve type as accurately as possible to a dimension which will permit the required rotation of the shaft in the bearing. High precision manufacture of journal bearings and parts thereof, is slow and costly work and in addition to excessive cost, presents serious problems of attaining sufficiently free running fits especially for high speed machinery in which the journalled element must be very accurately held to a predetermined position.

The present invention has for its main object the provision of a journal bearing structure which can be produced with ordinary standards of accuracy and which will provide entirely free running fits for the supported shafts while at the same time effectively holding the supported member within very close tolerances to the required operating position.

Other objects and advantages of the invention are to provide a bearing structure of the character indicated which can be made economically and by ordinary manufacturing equipment and which can be readily applied to machinery of various kinds without complicated special provisions for receiving the improved bearing structure. Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing in which there is illustrated a journal bearing embodying a selected form of the invention.

In the drawing:

Figure 1 is an end elevation; and

Figure 2 is a cross section on the line 2—2 of Figure 1.

The drawing illustrates the improved journal bearing as applied to mechanism for cutting a fairly heavy web 1 consisting of a multiplicity of plies of crepe tissue paper. The web cutting mechanism comprises a normally stationary bed knife 2 suitably mounted on frame structure 3, and a knife roll 4 which carries a knife member 5 for cooperating with the bed knife to cut the web 1. The details of the knife structure and of the bed knife are not herein illustrated since

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they form no part of the present invention and further for the reason that they are illustrated merely to represent one example of the application of the improved journal bearing structure which will presently be described. It may, however, be observed that the bed knife 2 may be yieldingly mounted so that the rotary knife 5 can displace the bed knife to a limited extent as required to permit the rotary knife to pass the bed knife in normal operation.

The cutting roll 4 is journalled for rotation through the agency of an endwise projecting stub shaft 6 which is journalled in a pair of bearing members 7 and 8. These bearing members are arranged side by side or end to end in approximate axial alignment to jointly receive and rotatably support the shaft 6.

The bearing member 7 is represented in this instance as being vertically adjustably supported through the agency of a depending plate portion 7' which may be integral with the bearing head 7. Said plate 8 is vertically slidably mounted between suitable guides 9—9 and against a back plate 10, the side guides 9 and back plate 10 being in effect a channel shaped guide element which is suitably secured to framework indicated generally at 11. Clamping bolts 12—12 pass through slots 13 in the slide plate 8 and are threaded into the back plate 10 for clamping locking the plate 7' and bearing 7 in selected position of adjustment on the supporting frame structure. For adjusting the bearing 7 vertically, there is provided an adjusting screw 14 which extends through a suitable opening provided in a supporting frame member 15 and is locked in vertical position of adjustment by nuts 16 and 17 on the bolt 14 and on opposite sides of said frame member 15. The upper end of the adjusting screw 14 is received in a socket 18 in the lower portion of the plate 7'. By loosening either or both of the nuts 16 and 17 the adjusting screw 14 is freed for vertical adjustment up or down to correspondingly effect vertical adjustment of the bearing member 7. This bearing member 7 may be considered a normally fixed bearing although it is capable of adjustment as described.

The bearing member 8 is supported on the upper end portion of a rod 19 which is received in a socket 20 provided in said bearing member. The lower portion of said rod 19 is vertically slidable through an opening 21 provided in an ear or lug 22 which extends laterally from the fixed bearing mounting plate 8, this lug 21 being formed by a separate piece bolted to said mounting plate by means of a pair of bolts 23. A coil

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spring 24 is disposed around the slide rod 19 between the lug 22 and a suitable washer or collar 25 which is supported in predetermined position on the rod by means of a nut and lock nut 26 and 27 respectively which are threaded on a portion of the guide rod 19. The spring 24 is of sufficient strength and under compression between the lug 22 and collar 25 to normally urge the bearing member 8 upwardly so that the lower surface portion of said bearing will engage and support the shaft 6 as indicated at 28 while the upper portion of the bearing may be slightly spaced from the adjacent portion of the shaft as indicated at 29.

In the illustrated arrangement the knife roll 4 is normally subjected to an upwardly directed load so that under load, the shaft 6 will bear tightly as indicated at 30 against the bearing 7 or against a bronze or other bearing element 31 forming a part of said bearing 7. In equipment where the supported member such as the cutting roll represented by the roll 7 is subjected to shock loads, there is a normal tendency for the shaft to shift laterally or radially in its supporting bearing. In the arrangement illustrated the bearing 8 normally holds the shaft 6 in its loaded position against a portion of the bearing 7 so that when the shaft is relieved of its operating load, said shaft will not be permitted to shift from its normal load position.

When a bearing is constructed in the manner described, the diameter of the bearing opening may be made a fairly free running fit on the shaft which is to be journaled in the bearing thereby avoiding difficulties attending the production and use of precision fit bearings.

The two bearing members may be of like character, i. e., they may both embody bronze bushings or roller bearings or the like or the main load supporting bearing (the bearing 7 in this instance) may be of one type especially adapted to the service for which it is designed and the bearing 8 of a different type which is adequate for the lesser service which it is called upon to give.

Although it is generally preferable that the bearing 7 be made as wide as a normal bearing for the same purpose, it is not wholly necessary that this be done since the bearing 8 serves to eliminate a considerable portion of the shock loading applied to the main bearing element so that a smaller bearing may often be employed with satisfactory results. Accordingly, it is often possible to provide the described double bearing structure in equipment initially designed for a conventional single bearing. In any event the described double bearing structure can be applied to most equipment with relatively little change, sometimes nothing more than elongation of the shaft which is to be journaled.

In some apparatus, the auxiliary bearing 8 may be adjustably supported in selected position relative to the main bearing 7. The described structure may be readily modified to that end by screw threading the end portion of the slide rod 19 which passes through the lug 22 and applying lock nuts (similar to the nuts 16 and 17) to such threaded portion above and below the lug 22.

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Suitable provision may be made for lubricating the bearing structure in accordance with conventional practice. For some purposes, either or both of the bearing members may be in the form of semi-circular or other partial bearing sections which do not surround the shaft, it being observed that the portions of the bearing structure which are spaced from the shaft in the illustrated arrangement are dispensable in some applications.

The details of the bearing structure may be varied considerably in accordance with the particular equipment in which it is to be used while the principle of the described structure is nevertheless retained.

I claim:

1. A journal bearing comprising a main bearing, an auxiliary bearing, said main and auxiliary bearings being arranged side by side to rotatably receive a shaft, said main bearing being adapted to be adjustably mounted for supporting a shaft in a selected position within the range of adjustment provided, and means interposed between portions of said main and auxiliary bearings for biasing said auxiliary bearing in the direction of load applied to said main bearing, whereby said auxiliary bearing member is operative to hold a shaft journaled in said bearings steadily against a predetermined portion of said main bearing, thereby to hold such shaft against lateral movement, said auxiliary bearing being supported from said main bearing so as to be movable with said main bearing as an incident to adjustment thereof, whereby the biasing force applied to said auxiliary bearing remains substantially constant notwithstanding adjustment of said main bearing.

2. A journal bearing comprising a main bearing, an auxiliary bearing, said main and auxiliary bearings being arranged side by side to rotatably receive a shaft, said main bearing being adapted to be adjustably mounted for supporting a shaft in a selected position within the range of adjustment provided, and spring means interposed between portions of said main and auxiliary bearings for resiliently biasing said auxiliary bearing in the direction of load applied to said main bearing, whereby said auxiliary bearing member is operative to hold a shaft journaled in said bearings steadily against a predetermined portion of said main bearing, thereby to hold such shaft against lateral movement, said auxiliary bearing being supported from said main bearing so as to be movable with said main bearing as an incident to adjustment thereof, whereby the biasing force applied to said auxiliary bearing remains substantially constant notwithstanding adjustment of said main bearing.

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References Cited in the file of this patent

UNITED STATES PATENTS		
Number	Name	Date
1,038,006	Shaw	Sept. 10, 1912
1,167,375	Brock	Jan. 11, 1916
1,278,443	Davis	Sept. 10, 1918
2,437,733	Fincher	Mar. 16, 1948