M. STAMM AND H. TUCKER.

ROLLER BEARING.

APPLICATION FILED MAR. 15, 1920. RENEWED AUG. 5, 1922.

1,434,855. Patented Nov. 7, 1922.

Fig. 1.

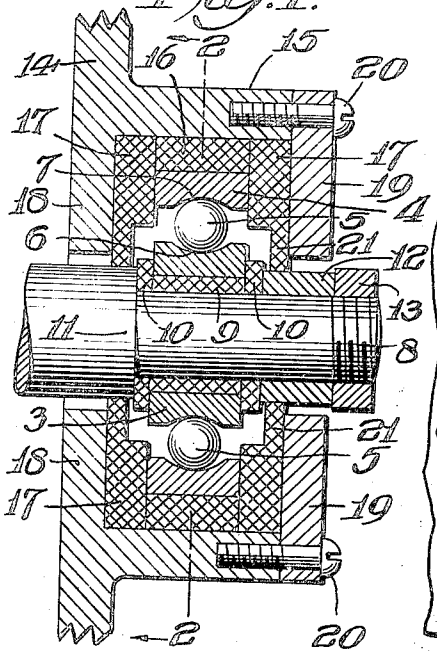


Fig. 2.

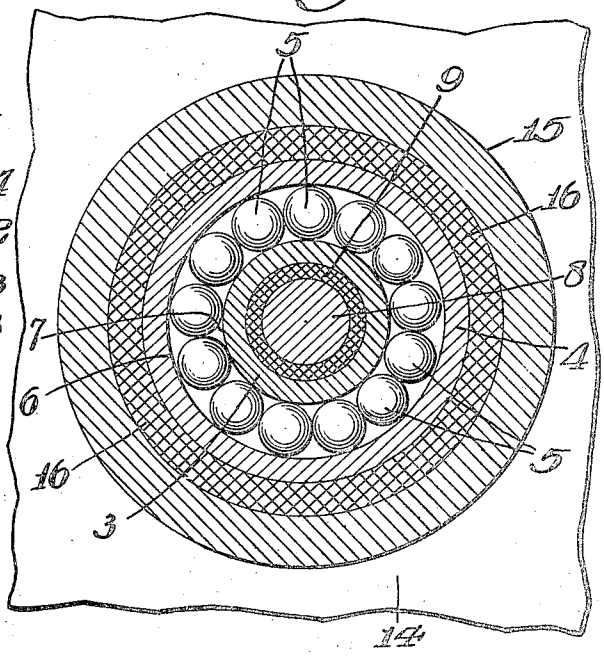


Fig. 3

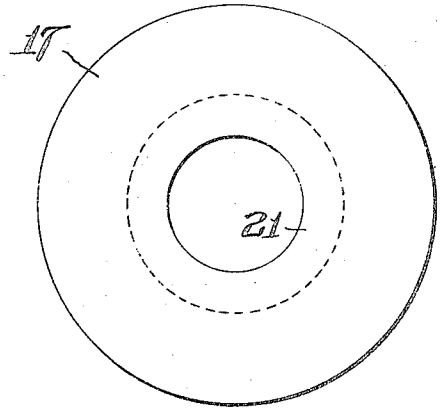


Fig. 4.

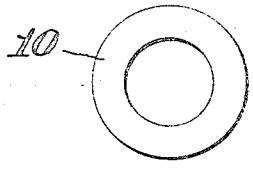
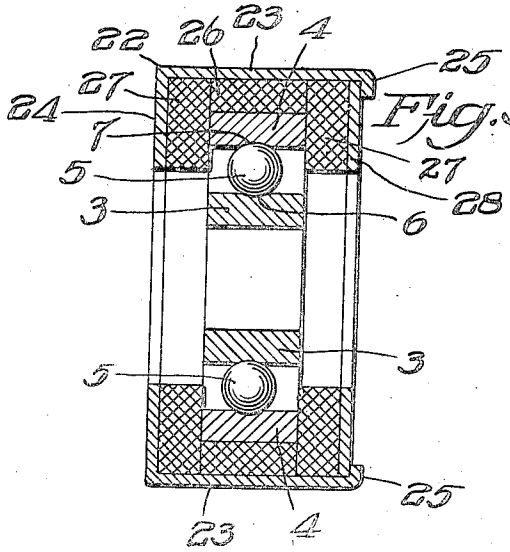


Fig. 5.



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Patented Nov. 7, 1922. 1,434,855

UNITED STATES PATENT OFFICE.

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ROLLER BEARING.

Application filed March 15, 1920, Serial No. 366,012. Renewed August 5, 1922. Serial No. 579,974.

To all whom it may concern:

Be it known that we, MAX STAMM and HARRY TUCKER, citizens of the United States, residing in the city of Philadelphia, State of Pennsylvania, have jointly invented certain new and useful Improvements in Roller Bearings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to improvements in roller bearings wherein inner and outer track rings are provided with anti-friction rolling elements interposed between them for the purpose of permitting one ring to be rotatably supported by the other.

Such devices, in well known and greatly varying types, are open to several objections, chief of which is the noise incident to the operation of the rolling elements, especially when run at high speed, an objection which has precluded their use in many devices such as motor driven organs, pianos, other musical instruments and houshold machines, where silent or nearly silent operation is exceedingly desirable. Another objection to such devices as now constructed is the lack of a lubricating chamber enclosing the moving parts and the clogging of such exposed elements by dust and foreign matter.

We seek to improve such devices in two respects, namely to neutralize the disturbing noises incident to the operation of the rolling elements, by the employment of interposed sound-deadening members operating to take up or absorb the sound waves created thereby, and to effect this by a novel construction and arrangement of such sound insulating member or members relatively to the outer race ring and to the supporting frame therefor, including a novel construction of such supporting frame, whereby the insulating member not only forms a sound proof chamber enclosing said track ring and rolling elements but is utilizable as a lubricating chamber and to exclude dust, while its walls, which directly surround the movable elements, being of sound deadening material, not only prevent egress of the objectionable sound waves but tend to neutralize the same by absorption.

Our invention which embodies a combination and arrangement of elements to perform these functions and accomplish these results comprises, in its best form, associating the outer track ring with a sound insulating and enclosing member of sound deadening material interposed between it and an exterior supporting frame, the latter being constructed as hereinafter described, and the insulating member being constructed to cooperate with the supporting frame held out of contact with the shaft, and also form the sealed enclosing and lubricating chamber aforesaid; also, preferably, providing, in combination therewith, a like insulating member between the inner track ring and the shaft, with adjustable means to secure it to the shaft and thereby separately sound-insulate said inner track ring from the shaft.

The invention consists in the novel construction, combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings, illustrating the invention,

Figure 1 is a longitudinal section through a roller bearing embodying our invention.

Figure 2 is a transverse section thereof, on line 2—2 of Fig. 1.

Figures 3 and 4 are face views of two of the sound deadening washers.

Figure 5 is a longitudinal section of a modified form of the bearing.

Referring to the drawings, 3 and 4 designate inner and outer concentric track rings, respectively, and interposed between them is the annular set of rolling elements 5, which, as herein illustrated are balls adapted to run in opposing annular grooves or tracks 6 and 7 in the opposing faces of the track rings 3 and 4, respectively, whereby one track ring may support the other through the interposed rolling elements and permit one track ring to be rotated relatively to the other.

The construction and operation of the concentric track rings and the interposed rolling elements, herein illustrated, are common and well known and no detailed description thereof is deemed necessary herein.

This art abounds in well known and greatly varying types of bearings employing inner and outer concentric track rings and interposed rolling elements which may be substituted for the similar parts above described without departing from our invention.

Referring now to Figs. 1, 2, 3 and 4, the inner track ring 3 surrounds and is carried by a shaft 8, and interposed between the ring 3 and the shaft 8 is a ring 9 of suitable sound deadening material. The ring 9 is

tightly fitted to the inner face of the track ring 3 and the face of the shaft 8 to connect the track ring 3 and shaft 8 and maintain them out of contact with each other. On the respective sides of the track ring 3 and ring 9 are washers 10 which surround and are fitted to the shaft 8 and which are formed of suitable sound deadening material. The track ring 3, the sound deadening ring 9 and washers 10 are all clamped together and to the shaft 8 by and between a shoulder 11 formed on the shaft 8 and a sleeve 12 slidable on the shaft 8 and forced toward the shoulder 11 by a nut 13 screwed on to the end of the shaft 8, as clearly shown in Fig. 1.

The outer track ring 4 is carried by a frame 14 having a projecting annular flange 15 which surrounds the track ring 4 in spaced relation thereto. Interposed between the track ring 4 and the flange 15 is a ring 16 of suitable sound deadening material, which is tightly fitted to the outer face of the track ring 4 and the inner face of the flange 15 to connect the track ring 4 and frame 14 and maintain them out of contact with each other. Washers 17 of suitable sound deadening material are provided on the respective sides of the track ring 4 and sound deadening ring 16. The track ring 4, the sound deadening ring 16 and washers 17 are all clamped together and to the frame 14 by and between a wall 18 of the frame 14 and an annular plate 19 fitted against the outer face of the flange 15 and secured thereto by screws 20 which penetrate the plate 19 and are screwed into the flange 15.

The washers 17 have inner portions 21 which are reduced in thickness and embrace the inner track ring 3 and sound deadening washers 10, in spaced relation thereto, and extend into close relationship or actual contact with the shaft 8 and the sleeve 12 thereon, to provide a dust proof and a grease or oil tight enclosure to contain a suitable lubricant for the track rings 3 and 4 and rolling elements 5.

It will be observed that the frame 14 is out of contact with the shaft 8 and that the plate 19 is out of contact with the sleeve 12 on the shaft 8, so that no noise incident to the operation of either the shaft 8 or parts carried thereby or incident to the frame 14 or parts carried thereby shall be transmitted from one to the other.

Any suitable sound deadening material may be employed in the rings 9 and 16 and washers 10 and 17, which has sound deadening properties in excess of such properties in the shaft 8 and frame 14, which are usually constructed of steel and cast iron, and which is sufficiently strong to withstand the strains to which it is subjected when the bearing is in service. The following are examples of such suitable sound deadening material: felt of suitable quality and hardness, compressed shredded metal with or without a mixture of textile fabric, compressed pieces of wire mesh with or without a mixture of textile fabric, and some metals which have sound deadening properties, such as suitable lead alloys.

The frame carrying the outer track ring 4 may support the shaft 8 and inner track ring 3 through the rolling element 5 while the shaft 8 and track ring 3 are rotated, or the shaft 8 carrying the inner track ring 3 may support the frame 14 carrying the outer track ring 4, through the rolling elements 5 while the frame 14 and track ring 4 are rotated around the shaft 8, in accordance with the requirements of the device in which the bearing is used. The specific design illustrated in Figs. 1 and 2 is particularly adapted for use in a device, wherein a shaft is supported and rotated in a frame structure, such as an electric motor.

When either the shaft 8 or frame 14 is rotated relatively to the others, the usual noise incident to the operation of the track rings 3 and 4 and rolling elements 5 is greatly deadened or substantially eliminated and prevented from being conducted from one to the other of the shaft 8 and frame 14, by the sound deadening rings 9 and 16 and washers 10 and 17.

It is not essential that the sound deadening elements be interposed between each track ring and the part which carries it. Very satisfactory results have been obtained when only one of the track rings was provided with sound deadening material interposed between it and the part which carried it, while the other track ring was mounted directly upon a steel or iron part which carried it.

In Fig. 5 we have shown a modification of the invention constructed to be sold as a separate unit to be inserted into a machine. In this modified form, the outer track ring 4 is carried by and enclosed in an outer steel shell 22, comprising a cylindrical portion 23 and end flanges 24 and 25. A ring 26 of sound deadening material surrounds the track ring 4 and is fitted between it and the cylindrical portion 23 to hold them spaced from and out of contact with each other; and washers 27 of sound deadening material are provided on the respective sides of the rings 4 and 26; and the rings 4 and 26, and washers 27 are firmly clamped together and to the shell 22 by and between the flange 24 thereof and an annular steel plate 28 interposed between the flange 25, and the adjacent washer 27 and held in place by the flange 25, the flange 25 having been bent or formed around the edge of the plate 28 to effect the clamping action in assembling the parts.

We claim as our invention:

1. In a ball-bearing the combination of in-

ner and outer race rings, rolling elements interposed between them permitting one ring to be rotatably supported by the other, a supporting frame associated with the outer of said race rings, said frame entirely surrounding the ring associated therewith at top and sides thereof, said elements having spaced walls one of which surrounds the other, a member of sound deadening material interposed and fully occupying said space between said walls and connecting said frame and the race ring associated therewith, and operating to sound-insulate said last mentioned elements, one from the other, and from the rolling elements.

2. In a ball-bearing, the combination of inner and outer race rings, rolling elements interposed between them and supporting the inner ring, a shaft carried by the inner race ring, a supporting frame surrounding the outer race ring, an annular body, of sound deadening material carried by said frame and interposed between it and the outer race ring and supporting the latter, and annular members of sound deadening material carried by said frame on the respective sides of the outer race ring and extending to parts of said shaft and providing a chambered enclosure for said rolling elements.

3. In a ball-bearing, in combination, outer and inner race rings, rolling elements interposed between them, a sound insulating member wholly surrounding the exterior face and sides of the outer race ring, and a frame to support said outer track ring and its insulating cover in operative relation to each other and to the inner race ring and rolling elements, said frame comprising an annular metallic ring provided with a horizontally projecting annular flange, and a removable annular ring adapted to be detachably secured to the periphery of said annular flange.

4. In a ball-bearing, in combination, outer and inner race rings, rolling elements interposed between them, a shaft, a sound insulating member wholly surrounding the exterior face and edge of the outer race ring, and having parts extending to the shaft, and a frame to support said outer race ring and its insulating cover in operative relation to each other and to the inner race ring and rolling elements, said frame comprising an annular metallic ring provided with a horizontal projecting annular flange and a removable annular ring adapted to be detachably supported by the peripheral edge of said annular flange.

5. In a ball-bearing, the combination of inner and outer race rings, rolling elements interposed between them, a shaft, sound insulating means between the shaft and the inner race ring, means to secure said last mentioned elements to the shaft, means adapted to support and wholly enclose the outer ring and operating also to rotatably support the inner race ring, and sound insulating means interposed between the outer race ring and its supporting frame, said means extending to the shaft and operating also to hold them out of contact with each other.

6. In a roller-bearing, the combination of inner and outer race rings, rolling elements interposed between them, a shaft, a sound deadening member between the inner race ring and shaft and wholly insulating it therefrom, adjustable means to hold said last mentioned elements in locked relation to the shaft, a supporting frame for the outer race ring, sound deadening means between it and said frame, said means being constructed and arranged to wholly enclose both inner and outer race rings and their adjunctive sound insulating members but in spaced relation thereto.

7. In a ball-bearing, in combination, outer and inner race rings, rolling elements interposed between them, a shaft on which the inner track ring is operatively supported, a sound insulating member composed of parts adapted to extend to the shaft and arranged to form a lubricating chamber enclosing both of said race rings and rolling elements, and an exterior annular supporting frame, constructed and arranged to surround the major part of said insulating member but maintained out of contact with the shaft and operating to support said outer race ring and its insulating member in operative relation to each other and to the inner race ring and rolling elements.

In testimony whereof, we have hereunto affixed our signatures this 27 day of February A. D. 1920.

MAX STAMM.
HARRY TUCKER.

Witnesses:
I. M. TUNIS,
ALEXANDER PARK.