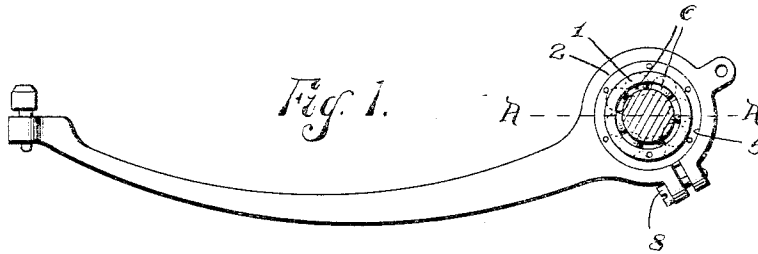


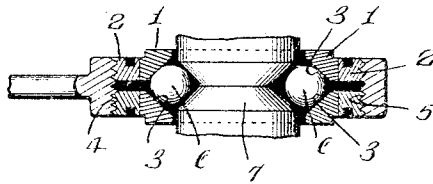
A. T. BROWN.  
 TYPE BAR ANTIFRICTION BEARING.  
 APPLICATION FILED FEB. 14, 1912.

1,159,645.

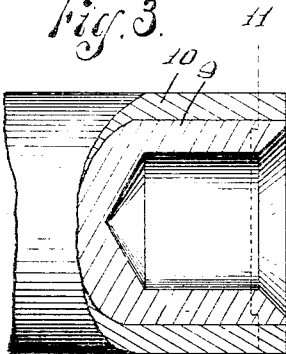
Patented Nov. 9, 1915.



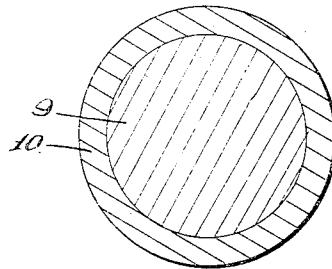
*Fig. 2.*



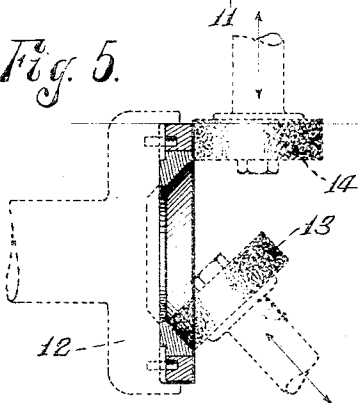
*Fig. 3.*



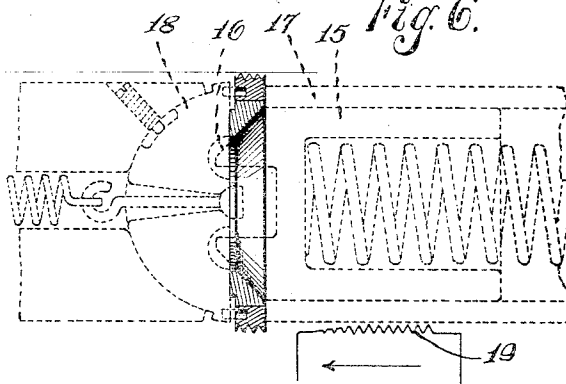
*Fig. 4.*



*Fig. 5.*



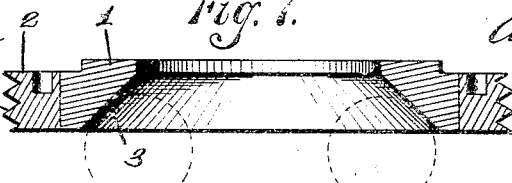
*Fig. 6.*



WITNESSES:

*Chas. Young*  
*S. Davis*

*Fig. 7.*



INVENTOR

*Alexander T. Brown*

BY

*Carson Hall Bodess*

ATTORNEYS

# UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

## TYPE-BAR ANTIFRICTION-BEARING.

1,159,645.

Specification of Letters Patent.

Patented Nov. 9, 1915.

Application filed February 14, 1912. Serial No. 677,578.

*To all whom it may concern:*

Be it known that I, ALEXANDER T. BROWN, of Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Type-Bar Antifriction-Bearing, of which the following is a specification.

My invention relates to a blank for forming a thin ring-shaped type bar bearing member provided with a peripheral thread at one edge and a hardened conical, or beveled, ball race surface at its other edge, and in which the axis of the thread will be coincident with the axis of the cone, of which said race surface is a peripheral section or zone.

In describing this invention, reference is had to the accompanying drawing, in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of a type bar and a bearing embodying my invention. Fig. 2 is a sectional view, partly in elevation, on line A—A, Fig. 1. Fig. 3 is a fragmentary view, partly in section, of a cylindrical bar from which members of my bearing are formed. Fig. 4 is a cross-sectional view through the bar, shown in Fig. 3. Fig. 5 is a sectional view of a partially completed bearing member, tools for operation thereupon being shown in dotted lines. Fig. 6 is a sectional view of the completed bearing member, additional tools being illustrated in dotted lines and diagrammatically. Fig. 7 is an enlarged view of the complete bearing member.

The invention is illustrated in connection with the type bar and supporting segment employed in the well-known Smith-Premier typewriting machine. The type bar is provided at one end with a type block and at its other end with an eye inclosing a set of anti-friction balls held between a ball race formed in the supporting segment, and a corresponding race formed by complementary bearing members adjustably supported within the eye.

As is well-known to those skilled in the art, it is necessary that the type bar shall be of minimum width in the direction of the axis on which it turns so that the number of bars required in a typewriting machine can be accommodated in the limited space available, which, in a visible typewriting machine wherein the bars are not superimposed, is considerable less than an arc of 190°. Consequently, the bearing members afore-

said, which are in the form of rings located within the eye of the type bar, must be very thin in relation to their diameter. Each ring is provided with a surface at one edge constituting one wall of a ball race, which must be of maximum hardness for resisting wear, and at its other edge with a thread for engaging a complementary thread in the wall of the eye, or, a fixed support for the ring, so that the ring may be moved in an axial direction for properly adjusting the bearing.

In order that a ball race, formed by a pair of ring bearing members, may be of uniform size throughout, so as to prevent undue cramping of the balls at certain points in the race as the bar is oscillated, it is absolutely essential that the axes of the spirals of the threads in the rings shall be coincident with the axes of the cones of which the hardened bearing surfaces of the rings constitute sections. In the manufacture of these bearing members, it is necessary to cut the threads in the blank prior to subjecting the same to the hardening process for properly hardening the surface which is to constitute the wall of a ball race, and, owing to the thinness of the blank, this hardening treatment frequently results in the distortion thereof with a consequent twisting of the threaded edge in reference to the bearing surface, or a displacement of the axis of the spiral of the threads in reference to that of the cone, a section of which forms the bearing surface aforesaid. My invention seeks to entirely eliminate this serious fault.

By my invention bearing members are composed of inner and outer metal portions united together and of different character so that when one of said members, in the course of its manufacture, is submitted to one of the well-known hardening processes, one of the portions of the member hardens, and the other remains soft, or relatively soft, and the bearing surface of said member which engages the anti-friction members, is formed upon the hardened portion thereof, and the machined surface, as the peripheral threads, for supporting or securing the bearing member in the eye of the type bar, or connecting the same to a suitable support, is formed on the softer portion of the bearing member concentric with the hardened bearing surface and after the formation of said hardened bearing surface.

The inner and outer portions of the bear-

ing member may be formed of two different metals, the portion to become hardened, of steel, and the other portion of bronze, or said other portion may be composed of a relatively soft steel which will not harden to the same extent as the steel to be provided with a surface to engage the antifriction members. Preferably, the inner portion of the bearing member is hardened and provided with a bearing surface for engaging the antifriction members, and the outer portion is soft, or relatively soft, and is provided with a machined surface, as a threaded surface, for engaging a suitable support, as the eye of a type bar, but obviously the outer portion may be formed of the hardening metal, and the inner portion of the soft, or relatively soft, metal, in which event, the surface for engaging the antifriction members will be provided on the outer portion of the bearing member, and the securing surface will be provided on the soft inner portion of said bearing member.

A bearing member, constructed as described, is not only readily machined to form the securing surface therefor after the hardening of the portion of the bearing member which resists the wear of the antifriction members, but such a bearing member is liable to only a minimum amount of distortion since the softer metal holds the hardening metal in place to a greater or less extent, and further, such a member is absolutely true when in use, since the retaining surface is formed after the bearing surface and true relatively thereto.

1 and 2 designate respectively the inner and outer portions of a bearing member embodying my invention; and 3 and 4 designate respectively the finished bearing surface provided on the inner hardened portion 1, and the finished securing or threaded surface provided on the outer soft portion 2.

5 is the threaded eye of a type bar coacting with the threaded peripheries of the bearing members; and 6 are the antifriction members, or balls, engaging the surfaces 3 which form a raceway for said balls, and also engaging a suitable support 7. The eye 5 is preferably split transversely and provided with projecting ears and a screw 8 passed through said ears for clamping the bearing members in their adjusted position in the eye 5.

The blanks constituting the subject-matter of this application are preferably formed by suitable tools, such as those of a turret lathe, from a bar or other piece having an internal core 9 of steel suitable for hardening, and an external shell or wrapper 10 of material resisting hardening, or material hardening to a less extent than the core 9. In Fig. 3, I have shown a portion of such a bar and the internal cavity formed therein

by one or more of the machine tools operating to produce the blank from which my bearing member is formed, a line 11 indicating the plane in which a cutoff tool operates to sever the partially finished bearing member from the bar. The partially formed blank, cut, as described, from a bar such as illustrated in Fig. 3, is hardened by any well known process, such as the case-hardening method, or by heating the same and cooling in water, oil or other fluid. In the hardening process, the inner portion of the blank becomes hard, and the outer portion thereof remains soft, or relatively soft, and as previously stated, the outer soft, or relatively soft portion, tends to minimize the amount of distortion of the bearing member due to its subjection to the hardening process. The bearing surface 3 is then formed upon the blank by suitable tools, such as a chuck 12 and a rotating grinding tool 13, as shown in Fig. 5. The end face of the bearing member meeting the larger end of the surface 3 is trued or faced by a grinding tool 14, preferably, while said member is held by the chuck 12. After the formation of the surface 3, suitable tools operate to form the surface 4 concentric with said surface 3, such tools coacting with the surface 3 and the trued end face of the bearing member to support the blank on said surface 3 in order that the surface 4 may be absolutely concentric with the surface 3 or the axis of the spiral of the thread coincident with the axis of the cone of which the surface 3 is a section.

In Fig. 6, I have indicated by dotted lines, a spring centering mandrel 15 having a conical face 16 for engaging the face 3, and opposing members 17 and 18 for clamping the bearing member and holding the same upon the mandrel 15, and I have shown diagrammatically a threading or chasing tool 19 for forming the threaded surface 4.

To those skilled in the art, it will be readily apparent that bearing members constructed from blanks embodying my invention, are particularly accurate and efficient in operation.

What I claim, is:—

1. A blank for forming a thin ring-shaped bearing member of a type bar, said blank having the wall of a ball race at one edge thereof and a surface to receive a thread in its other edge, said blank being formed in two sections, the one, having the ball race being hardened to a greater degree than the other, substantially as and for the purpose described.

2. A blank for forming a thin ring-shaped bearing member of a type bar, said blank comprising an inner section provided at its inner edge with a ball race wall constituting the section of a cone, and an outer section united to the periphery of the inner

section, and of a material which hardens to a lesser degree than the inner sections when the blank is subjected to a hardening process, said outer section having a periphery for receiving a screw thread, substantially as and for the purpose specified.

In testimony whereof, I have hereunto signed my name in the presence of two at-

testing witnesses, at Syracuse, in the county of Onondaga, in the State of New York, 10  
this 26th day of January 1912.

ALEXANDER T. BROWN.

Witnesses:

C. E. TOMLINSON,  
INEZ A. STILWELL.