Jan. 7, 1930. G. A. JESSOP 1,742,256

BEARING FOR TURBINE SHAFTS

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Fig. 1.

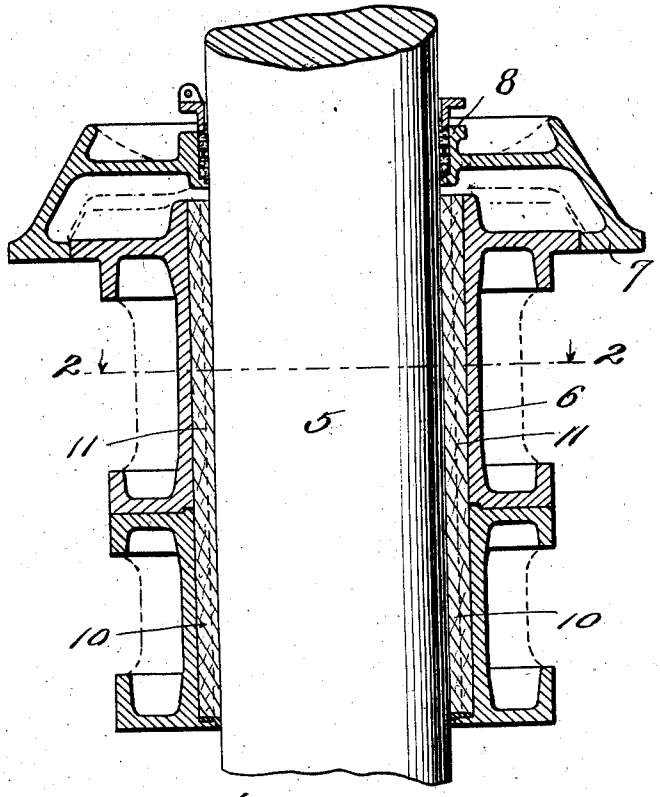
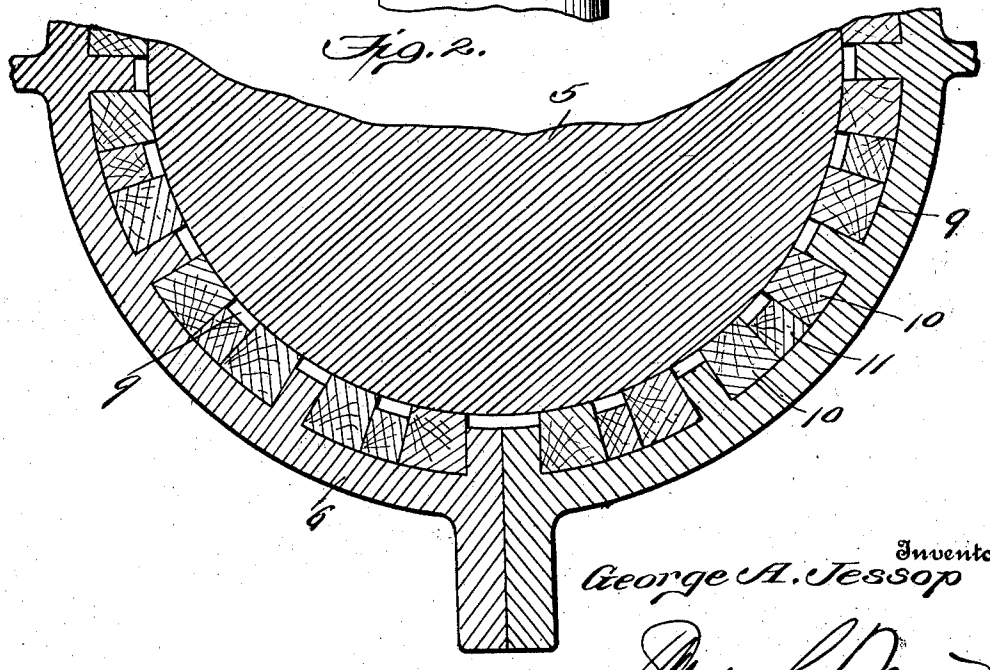


Fig. 2.



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Fig. 3.

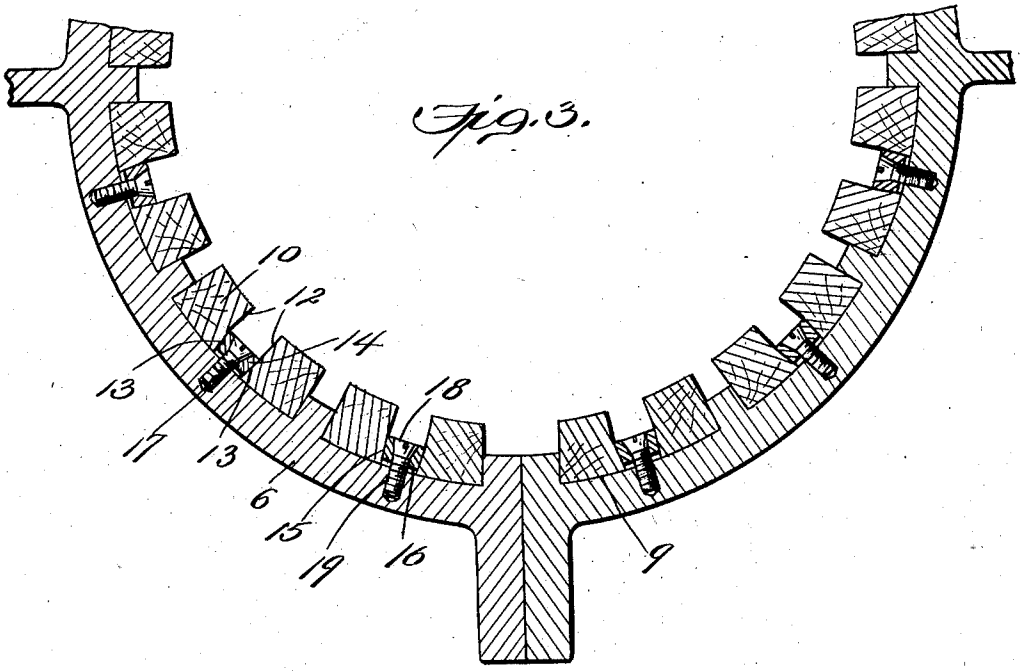
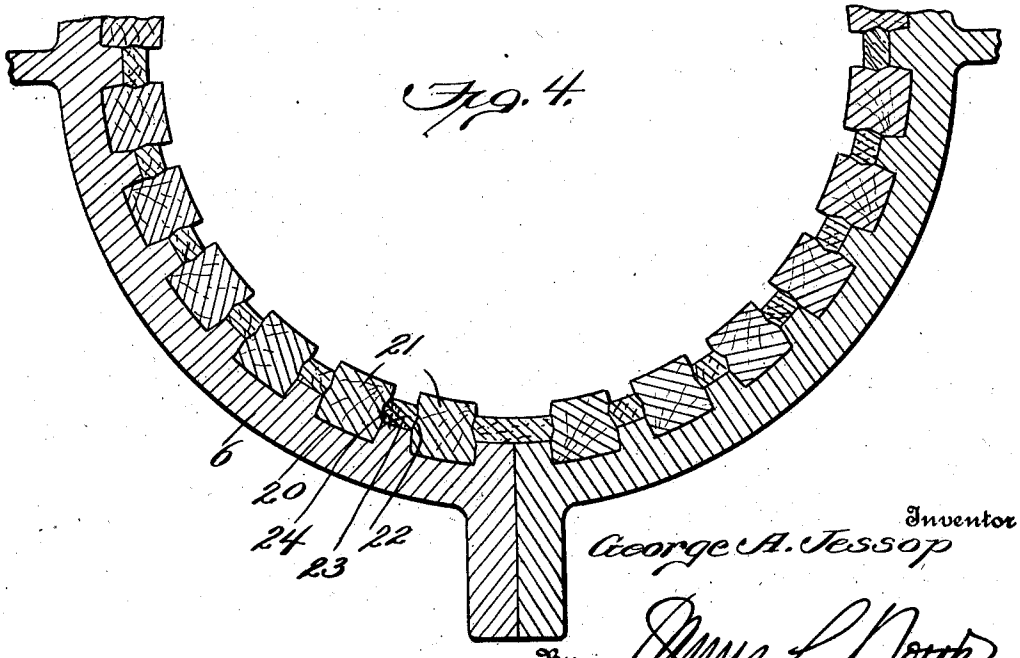


Fig. 4.



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UNITED STATES PATENT OFFICE

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BEARING FOR TURBINE SHAFTS

Application filed September 18, 1924. Serial No. 738,505.

This invention relates to bearings for turbine and analogous shafts, and particularly to a lignumvitæ bearing.

The method of placing lignumvitæ strips in bearings as usually practiced heretofore was to core out any desired number of grooves or spaces in the container or holding means for the strips, with the sides of the grooves or spaces radially disposed, that is, pointing towards the center of the bearing. The lignumvitæ strips were then planed and fitted in these grooves or spaces. It is impossible to cast these grooves or spaces of exactly the same dimensions, or, so that each groove or space will be of the same width and general shape throughout its length, and consequently a great deal of work was necessary to properly fit the lignumvitæ strips in the grooves or spaces formed by casting. Planing the grooves or spaces has also been practiced to effect a proper fitting of the strips in the grooves or spaces.

All of the usual methods heretofore pursued to reliably and effectively associate the lignumvitæ strips with the cast grooves or spaces of a container or carrying means therefor have proved to be very laborious and expensive. It is necessary to very tightly fit these strips in the container or carrying means, in view of the fact that after such placement, the container with the strips therein is placed in a lathe or boring machine and the inner portions or edges of the strips dressed or bored to the exact diameter desired.

One object of the present invention, therefore, is to eliminate as much as possible the work required to fit lignumvitæ strips in a cast container or carrying means formed with grooves or spaces to receive the strips and to hold the latter in place with greater security than by the methods heretofore practiced.

A further object of the invention is to reduce the number of strip-receiving grooves or spaces usually required in a container or carrying means about one-half and thereby correspondingly reduce the cost of handling and molding the containers or carrying means in a foundry.

A still further object of the invention is to advantageously construct containers or carrying means for lignumvitæ strips by increasing the dimensions of the grooves or spaces therefor and providing for a more rigid anchorage and retention of the said containers or carrying means in the molds, with materially less liability of losing the casting due to breaking or washing.

With these and other objects and advantages in view, the invention consists in the novel construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

In the drawings:

Fig. 1 is a transverse vertical section of a bearing embodying the features of the invention.

Fig. 2 is an enlarged horizontal section of a portion of the container or carrying means and lignumvitæ strips disposed around a portion of a turbine shaft and taken in the plane of the line 2—2, Fig. 1.

Fig. 3 is a view similar to Fig. 2, showing a modified construction.

Fig. 4 is a view similar to Fig. 3, showing a further modified construction.

The improved bearing is shown applied to a turbine shaft 5 in association with which is shown a container or carrying means 6 surrounding the shaft and mounted as usual in and secured to a turbine frame structure, a part 7 of which is shown as having an upper well known form of bearing component 8. The features of the invention are not limited to application to any precise bearing as it is intended that the same be applied to any shaft and cooperating mechanism with which they may be practically and efficiently operable. The illustration of the turbine shaft 5 in the drawings is, therefore, to be understood as but one of the many applications that may be made of the improved bearing.

The container or carrying means 6 is preferably formed of suitable metal in sections, as shown by Figs. 2, 3 and 4, and suitably secured, and referring to the preferred form of bearing shown by Fig. 2, the inner side or portion of the said container or carrying means 6 is provided with relatively wide grooves or spaces 9. Within a given inner

diameter the container or carrying means in the present instance as compared to similar devices heretofore constructed is formed with about one-half of the number of grooves or spaces 9, and as a consequence in the construction of the grooves only half the number of cores are required, and the time, labor and cost of production is therefore materially reduced or minimized. Moreover, cores of larger dimensions are utilized and can be more rigidly secured and held in place in the mold. In the preferred structure as shown by Fig. 2 the lignumvitæ strips 10 are cut and planed to an exact predetermined size and two of the strips are placed in each groove or space 9. A mortise strip 11 is then fitted between each two lignumvitæ strips and driven tightly in place. These mortise strips 11 are of less inward extent than the lignumvitæ strips 10 and have their inner edges terminating preferably in line with the inner wall of the container or carrying means 6. The mortise strips are also made of much softer wood than lignumvitæ and can therefore be more easily worked, with material saving in time, and particularly in view of the fact that only one mortise strip is interposed between each two strips of lignumvitæ. In view of the fact that lignumvitæ wood is very hard and tough and requires considerably more time and effort to plane, fit and drive than the softer wood used for the mortise strips, the association of the lignumvitæ strips and the securing means therefor, or the mortise strips, is greatly facilitated, and furthermore, the lignumvitæ strips are effectively and tightly secured in the container or carrying means and particularly during the necessary operation of boring the lignumvitæ strips to a proper diameter. Actual use of the improved bearing constructed as specified, or embodying the lignumvitæ strips and the mortise strips of softer wood, has proven the success and efficiency of the improved bearing, especially in the boring operation, which, as a matter of fact, imposes a more severe test on the securement of the lignumvitæ strips than the actual operation or association thereof with or around a shaft or when applied.

In the form of the improved bearing shown by Fig. 3 the same general construction of the grooves or spaces to receive the lignumvitæ is embodied and corresponding reference characters applied thereto as in the preferred form of the bearing shown by Fig. 2, but in this modified form the inner opposing sides 12 of the lignumvitæ strips 10 have outwardly converging portions or inclinations, as at 13, and therein are fitted mortise strips 14 having opposite inclined side edges 15, and at regular intervals these strips are bored or formed with openings 16, to receive fastening screws 17 having their heads 18 countersunk in the inner side portions of the mortise strips and their screw-threaded shanks engaging screw-threaded openings 19 radially formed in the container or carrying means 6 in central relation to the grooves or spaces 9. The mortise strips 14 in this modified structure may be formed of steel, wood or other material adapted for the purpose.

In the further modified construction shown by Fig. 4 the container or carrying means 6 has a plurality of grooves 20 formed the full length of the inner side thereof, to receive lignumvitæ strips 21 having their sides formed with angular recesses 22 between the inner and outer edges thereof, to receive mortise strips 23, which have their opposite side edges constructed with projections 24, corresponding in contour to the recesses 22. The mortise strips 23 as shown by Fig. 4 are driven down between the lignumvitæ strips 21 and tightly secure the said strips 21, in view of the engagement of the recesses 22 by the side projections 24 of the said mortise strips.

From the foregoing it will be seen that each of the forms of the improved bearing comprises a mortise strip interposed between the lignumvitæ strips, and in the forms of the bearing shown by Figs. 2 and 3, the grooves or spaces 9 for the lignumvitæ strips are wide enough to admit two of the said strips and the interposed mortise strip. The fastening devices, or the screws 17 shown by Fig. 3, serve as incidental fastening means for the mortise strips, and in the forms shown by Figs. 2 and 4, the mortise strips are used alone without fastening means other than frictional and recess and projection engagement of the associated parts, or the lignumvitæ and mortise strips.

The essential features contemplated by the invention are, the reduction of work necessary to devise a container or carrying means for the bearing strips by minimizing the number of grooves usually employed and required to hold the water-lubricated bearing strips in place and the element of expensive loss frequently incident to the production of these containers or carrying means, and the yielding strips between the hard strips which directly engage the shaft to compensate for irregularity of the spaces or grooves for receiving said hard strips and insure a frictional binding between the adjacent portions of the hard and yielding strips of such positive character as to reliably hold the hard strips in place during dressing operations of the inner edges of the said latter strips to render these edges true and of the proper dimensions relatively to the shaft with which the hard bearing strips have engagement, and further, to also hold these hard strips against any tendency to looseness or displacement when in engagement with the shaft. The reduction of the number of grooves in the container or carrying means and the use of yielding strips in association with the hard bear-

ing strips minimizes the cost of preparing the grooves in the container or carrying means by materially eliminating machine dressing operations relatively to the walls of the grooves. The hard and yielding strips are of uniform lengths, both sets of strips being approximately of the same length as the grooves of the container or carrying means so that an equal bearing contact or engagement of the hard strips may be had with relation to the shaft continually throughout the length of the container or carrying means.

It is proposed to use the improved means for holding lignumvitæ strips as hereinbefore described in connection with well known adjustable bearings, the adjustability of the bearings of this character not in the least affecting the features of the present invention which relate to the securement of the lignumvitæ strips in a fixed and reliable manner in the container or carrying means, and moreover, the latter means may be modified in its general construction for adaptation or application to various forms of bearing organizations and mechanisms. It is obvious that changes in the proportions, dimensions and minor details of construction may be adopted without departing from the spirit of the invention.

What is claimed as new is:

1. In a bearing of the class specified, the combination of a container having relatively wide grooves formed in the inner side thereof, a pair of hard wood bearing strips mounted in each groove and extending inwardly beyond the inner terminals of the grooves, and securing strips of softer wood material interposed between each two of the bearing strips, the bearing strips being wedged at their sides opposite those engaged by the securing strips against the walls of the grooves of the container, the bearing strips and securing strips continuing lengthwise throughout the interior of the container.

2. In a bearing of the class specified, the combination of a container having relatively wide grooves, a number of bearing strips of hard wood material removably mounted in each of the grooves, and securing strips of a different and softer wood material individually and removably mounted between and engaging the adjacent sides of pairs of the bearing strips and frictionally engaging the latter, the bearing and securing strips being lengthwise continuous over the interior of the container.

3. In a bearing of the class specified, the combination of a container having relatively wide grooves formed in the inner side thereof, bearing strips of hard wood removably mounted in each of the grooves, and securing strips of softer material individually interposed between and engaging the adjacent side edges of pairs of the bearing strips and of compressible wood texture to positively fix the bearing strips in the grooves.

4. In a bearing of the class specified, the combination of a container having relatively wide grooves formed in the inner side thereof, a plurality of bearing strips mounted in each groove and constructed of hard wood material of a water lubricating character, and securing strips of softer wood material individually interposed between and engaging the side edges of each two of the bearing strips of less inward extent than said bearing strips, the bearing and securing strips continuing lengthwise over the interior of the container in substantially parallel relation.

In testimony whereof I have hereunto set my hand.

GEORGE A. JESSOP.