

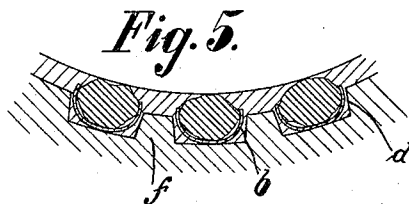
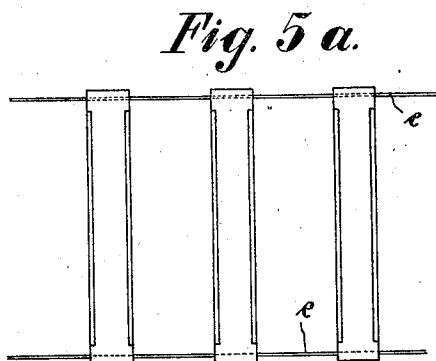
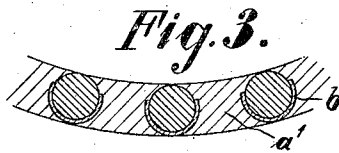
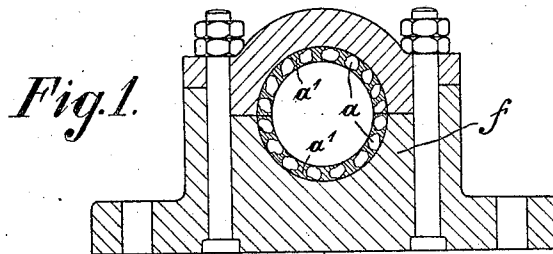
Oct. 16, 1923.

1,470,754

G. A. R. KÜHNE

LINER, BUSH, AND THE LIKE FOR BEARINGS AND PEDESTALS

Filed March 25, 1922



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UNITED STATES PATENT OFFICE.

GEORG AUGUST RUDOLF KÜHNE, OF HAMBURG, GERMANY, ASSIGNOR TO THE FIRM OF MASCHINEN- UND WELLENLAGER GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF HAMBURG, GERMANY.

LINER, BUSH, AND THE LIKE FOR BEARINGS AND PEDESTALS.

Application filed March 25, 1922. Serial No. 546,727.

To all whom it may concern:

Be it known that I, GEORG AUGUST RUDOLF KÜHNE, citizen of Germany, residing at Hamburg, Germany, have invented certain new and useful Improvements in Liners, Bushes, and the like, for Bearings and Pedestals (for which I have filed an application in Germany on November 25, 1921), of which the following is a specification.

It has been proposed to construct bearing shells or bearing boxes for shafts, spindles and the like of lumps of hard material embedded in a layer of soft metal, thus filling the intervals between the said lumps of hard material. When constructing bearing boxes in this manner it was the idea to use particularly hard stones such as flint in the soft metal or other suitable composition. However in practice it has been found that it is advisable to use not too hard stones. In fact trials have proved that the most suitable degree of hardness for the present purpose is between three and four. Particularly lime stone, shell stone and the like belonging to the group of calcareous spar have proved to be of extraordinary value. Also artificial stone can be used for this purpose as long as it has the desirable degree of hardness. By the term artificial stone I intend to apply all stony material which hardens or sets to the desired degree. Thus it has been proved that carbon such as is used for electric purposes for instance for electric lamps or for collectors and the like has given very good results.

It has also been found that bearing boxes of the description mentioned above now and then had the drawback that the lubricant finds its way out at the end of the bearing through the shell or liner. The cause of this is that minute cavities are created in pouring in the liquid mass, which cavities frequently combine to channels leading up to the very basis of the shell or liner. To avoid these inconveniences according to the present invention mountings or settings are provided on the rear side of the stones consisting of hard sheet metal. Such mountings cling snugly to the rear and lateral surfaces of the stones and therefore catch any lubricant that tends to pass through or by way of the stones.

In the drawing (Fig. 1) a pedestal is

shown having shells or lines of the description mentioned above, the stones *a* of suitable hardness being embedded in a layer of soft metal *a*¹ to form the liner or bushes.

Figs. 2, 3, 4 and 5 show cross sections of parts of a liner of various modifications constructed according to the present invention.

Figs. 2^a and 4^a are end views of the mountings shown in Figs. 2 and 4 respectively.

Fig. 5^a is an elevation, and

Fig. 5^b an end view of the mountings shown in Fig. 5.

When stones of irregular shape are held together by mountings as shown in Figs. 2 and 2^a the metal sheet is bent to U-shaped cross section similar to a gutter *b*, and the stones *a* are placed one after the other into this gutter, which is then pinched together intermediate of the stones at *c*. If desired the mountings may be serrated to form teeth *d* which are easily bent to snugly cling to the stones similar to the well known settings of precious stones.

If gutters as described are used the mounting of the bearing box is very much facilitated.

The stones may be given a regular shape if desired for instance such as that of balls or cylinders as is shown in Fig. 3. The gutter-like mounting *b* is then also formed to well suit the cylindrical shape of the stones. In Figs. 4 and 4^a the stones have the shape of a trapezium, in which case also the bent sheet metal strip will be given a corresponding cross section. In these instances it will be of advantage to use artificial stones such as lime stone, graphite, compressed or electro carbon and the like.

When longitudinal metal strips bent to U-shape or to the shape of a gutter are used, parallel to the ends of the shaft or bearing, they are first filled with the stones and then placed upright in the bearing box about a mandrel or core and then the liquid material such as white metal is poured in. This metal combines with the bent metal strips to form a unitary or compound body particularly when the metal strips are made of tinned iron, the tin of which forms an alloy with the white metal. It will be evident that, even if cavities or interstices happen to be present, there is no more any

possibility of the lubricant penetrating any further than just up to the rear surface of the stones.

For the sake of suitable manufacture it is advisable to connect the bent metal strips by annular wires *e* (Figs. 5^a and 5^b) which are fastened to these strips by passing them through corresponding openings at the ends or by bending the ends of the metal strips round these annular wires. Thus a cage is formed which can stand freely round the mandrel which after inserting the stones are telescoped over the mandrel inside the bearing, whereupon the white metal is poured in. Thus evidently by this cage the manufacture of the bearing box is very much facilitated.

When the wall of the liners or bushes is comparatively thin, longitudinal grooves *d* might be cut into the bearing body *f*, into which the stones *a* together with their mountings *b* are inserted (Fig. 6). Thus it is possible to use stones of greater dimensions than would correspond to the thickness of the liner or bush.

I claim:—

1. A bearing liner or bush composed of a layer of soft metal and of lumps of carbon, embedded in the said layer of soft metal, both lumps of carbon and soft metal forming the bearing surface.

2. A bearing liner or bush composed of

a layer of soft metal, stones, sheet metal strips bent to U-shape, into which the stones are inserted, metal rings connecting the metal strips to form a cage, the said cage together with the stones being embedded in the soft metal in such manner that both, the stones and the soft metal form the bearing surface.

3. A bearing for shafts, spindles and the like, comprising a bearing body and a liner, composed of a layer of soft metal and of stones, longitudinal grooves cut into the bearing body and the stones projecting into the grooves together with the soft metal, both stones and soft metal forming the bearing surface.

4. A bearing for shafts, spindles and the like, comprising a bearing body and a liner, composed of a layer of soft metal, stones and of metal strips bent to U-shape, and forming mountings for the stones, longitudinal grooves cut into the bearing body, the U-shaped metal strips being inserted together with the stones into the said longitudinal grooves in the bearing body, the soft metal and the stones both forming the bearing surface.

GEORG AUGUST RUDOLF KÜHNE. [L. s.]

Witnesses:

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