

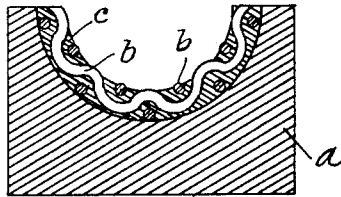
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METHOD OF MAKING COPPER-LEAD BEARINGS

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METHOD OF MAKING COPPER-LEAD BEARINGS

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2 Claims. (Cl. 29—149.5)

This invention relates to copper-lead bearings which are especially adapted for the bearings in aeroplanes.

For high duty bearings alloys of copper and lead have been found specially suitable. Such bearings usually consist of a supporting steel shell into which a thin lining of the copper-lead alloy has been cast.

Owing to the large difference between the melting points of copper and lead it is extremely difficult to have full control of the structure of the solidified alloy and to obtain a homogeneous and fine distribution of the lead particles through the skeleton of the copper. Very often a large percentage of a series of finished bearings must be scrapped after X-ray examination has shown that the lead has segregated in some heavy particles and left other areas without the necessary fine particles of lead.

Another drawback of the method hitherto used is that the cast layer must first be at least $\frac{1}{8}$ of an inch thick, it being impossible to cast only a thin lining of less than $\frac{1}{2}$ or $\frac{1}{4}$ inch of the copper lead alloy on or in a steel shell, and that heavy risers or feedheads must be used. 95 per cent of the alloy originally cast has to be cut off as risers and machined from the surplus of the thickness of the lining cast. Therefore the weight of metal really cast is 10 to 20 times the weight of the final lining in the bearing. According to the present improved method the copper skeleton of a copper-lead bearing is made of a copper-wire cloth. By suitable choice of the diameter of the wire and the width of the meshes of the copper-wire cloth the structure of the copper lead bearing can be accurately controlled with regard to the proportion of copper to lead and with regard to the size and regular distribution of the lead particles. For making such bearings one or more layers of copper-wire cloth are wound on or in the steel shell (which may be superficially tinned) and then impregnated or infiltrated with the lead by dipping the whole into molten lead.

By this method copper-lead linings can be obtained with a ratio of copper to lead of about 20 to 80 up to about 50 to 50. If a lower percentage of lead is desired the copper-wire cloth can first be passed through rollers in order to flatten the cross points of the longitudinal and transverse wires. The distance between the two surfaces of a wire cloth is usually twice the thickness of the wires because at each crossing two wires are lying across one another. By passing the cloth through rollers the crossings can be

flattened out and any distance between the two surfaces of the rolled wire cloth between twice the diameter of the wires and about 0.7 of the original diameter of the wire can be obtained. By using such rolled wire-cloth for the here described method a ratio of copper to lead of up to 85 to 15 can be obtained.

In a copper-lead bearing made according to this method the weight of copper and lead employed is only slightly above the weight of the two metals in the finished bearings.

To finish the bearing for use it is not necessary to machine any surplus out of the crude bearing but the so called press finishing can be used which consists in pressing a mandrel or a ball, the diameter of which corresponds to the desired final diameter of the bearing, through the opening of the bearing.

To obtain an exact fit the outer side of the steel shell may be machined on the lathe.

According to the method described copper and lead are not melted together but the copper is used in a form of a woven cloth and only the lead is melted and brought into the pores of the cloth in liquid form. This provides a very important advantage as it is possible in this way to separately alloy both the copper and the lead in any suitable or desirable way. For instance, instead of making the skeleton of the bearing of copper, it may be made of tin-copper-bronze or phosphorus-copper-bronze or beryllium-copper-bronze, and the lead may be alloyed with antimony or bismuth or tin or sodium or calcium etc.

Whereas the ordinary method of preparing lead-copper bearings does not allow any accurate control of the structure and arrangement of the particles or of the composition of the skeleton and the composition of the segregated particles, the improved method permits of full control of all these important details, and out of one hundred bearings produced one hundred perfect bearings can be obtained, whereas according to the method used up to now out of one hundred bearings made very often 20 to 90 had to be scrapped after X-ray examination. The results of this new method are so certain that the expensive X-ray examination of the finished bearings can be dispensed with.

The annexed drawing shows a cross-section of a bearing made according to the present invention. *a* is the steel shell, *b* the copper wire netting, and *c* the lead or lead alloy filling the pores between the wires.

We claim:

1. The method of making copper-lead bearings which comprises passing one or more layers of a cloth woven from a wire containing copper through rollers, combining the said layers with a steel shell, and thereafter filling the pores of the copper cloth with a molten metal substantially consisting of lead in such a manner that on the surface of the bearing particles of a metal substantially consisting of lead are inserted between particles containing copper.
2. The method of making copper-lead bearings which comprises passing one or more layers of a cloth woven from a wire containing copper through rollers, combining the said layers with a steel shell, and thereafter filling the pores of the copper cloth with a molten metal consisting of a lead alloy in such a manner that on the surface of the bearing particles of a metal substantially consisting of lead are inserted between particles containing copper.

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