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FRICTION BEARING ALLOY
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- (71) Applicant(s)
ELEKTRO-THERMIT GMBH
- (72) Inventor(s)
MICHAEL BOHSMANN; ROLF KORING; MANFRED RUHLE; MICHAEL STEINHORST
- (74) Attorney or Agent
SPRUSON & FERGUSON , GPO Box 3898, SYDNEY NSW 2001
- (56) Prior Art Documents
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- (57) Claim

1. A plain bearing alloy based on tin, antimony and copper, comprising 6 to 15% by weight of antimony, 3 to 10% by weight of copper, 0.05 to 1% by weight of silver and 0.1 to 2% by weight of zinc, the remainder being tin.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

Name and Address
of Applicant: Elektro-Thermit GmbH
Gerlingstrasse 65
45139 Essen
GERMANY

Actual Inventor(s): Michael Bohsmann, Rolf Koring, Manfred Ruhle and
Michael Steinhurst

Address for Service: Spruson & Ferguson, Patent Attorneys
Level 33 St Martins Tower, 31 Market Street
Sydney, New South Wales, 2000, Australia

Invention Title: Friction Bearing Alloy

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

Friction Bearing Alloy

Field of Invention

The invention relates to plain bearing alloys based on tin.

Background Information and Prior Art

5 Bearing materials based on lead and tin have good sliding, running-in, embedding and emergency running properties.

If the bearing is subjected to higher thermal stresses or if the static and dynamic load on the bearing is higher, it is necessary to use tin based bearing metals.

10 There are national and international standards for such friction bearing alloys, such as DIN ISO 4381, as well as manufacturers specifications, such as TEGO V 738 (Th. Goldschmidt AG). Such an alloy has good sliding qualities, a high static and dynamic load carrying capability in the hydrodynamic range, a high wear resistance, as well as a high elevated
15 temperature hardness and natural stability. They find use in turbines, compressors, pistons and expansion machines.

Common components of all of these alloys are tin, antimony and copper in different amounts, depending on the use.

20 In order to increase the technical properties to a higher level, cadmium, nickel and arsenic are added to some of the alloys. This is done, for example, in the case of the alloy $\text{SnSb}_8\text{Cu}_4\text{Cd}$ of DIN ISO 4381, as well as, for example, in the case of the alloy TEGO V 738, which has the following composition:

(parts by weight)

Pb	maximum 0.06%
Sn	80.5%
Cd	1.2%
Cu	5.5%
Sb	12.0%
Ni	0.3%
As	0.5%

25 Although it would be desirable, from the point of view of protecting the environment, to work without the poisonous metals, Cd, Ni and As, these metals nevertheless were indispensable since, from the point of view of the grain refining and the compression strength achieved, industrially meaningful alternatives were not known.



Object of the Invention

An object of the present invention is a plain bearing alloy. The inventive alloy has none of the aforementioned metals as components and yet does not forfeit the necessary properties, compared to the state of the art.

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Summary of the Invention

The invention accordingly relates to a plain bearing alloy based on tin, which consists of 6 to 15% by weight of antimony, 3 to 10% by weight of copper, 0.05 to 1% by weight of silver and 0.1 to 2% by weight of zinc, the remainder being tin.

10 Advantageously, the silver contents are 0.05 to 0.15% by weight and the zinc contents are 0.5 to 0.7% by weight.

Particularly preferred are a silver content of 0.1% by weight and a zinc content of 0.6% by weight.

15 Inventive plain bearings surprisingly moreover even show advantages with respect to mechanical properties compared to plain bearings of the state of the art, as can be seen from the comparison of the technological data with that for TEGO V 738.

	TEGO V 738	like TEGO V 738, however, without Cd, Ni, As, but with 0.1% Ag, 0.6% Zn
0.2% compression limit	80 N/mm ²	90 N/mm ²

As can be seen by the value of the 0.2% compression limit, an advantage of about 10% is achieved, which results in a corresponding
20 increase in the permissible compression stress.

The alloy also is significantly more resistant to impact/bending fatigue test stresses.

The alloy is processed far more easily during casting as well as soldering, since pores are not formed even under unfavourable conditions.

The claims defining the invention are as follows:

1. A plain bearing alloy based on tin, antimony and copper, comprising 6 to 15% by weight of antimony, 3 to 10% by weight of copper, 0.05 to 1% by weight of silver and 0.1 to 2% by weight of zinc, the remainder being tin.
- 5 2. The alloy of claim 1, wherein the silver content is 0.05 to 0.15% by weight.
3. The alloy of claim 2, wherein the silver content is 0.1% by weight.
4. The alloy of any one of claims 1 to 3, wherein the zinc content is 0.5 to 0.7% be weight.
5. The alloy of claims 1, 2 or 3, wherein the zinc content is 0.6% by weight.

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Dated 27 November, 1995**Elektro-Thermit GmbH****Patent Attorneys for the Applicant/Nominated Person****SPRUSON & FERGUSON**

Friction Bearing Alloy

Abstract

The invention relates to a friction bearing alloy on a tin basis with antimony and copper, the alloy consisting of 6 to 15% by weight of antimony, 3 to 10% by weight of copper, 0.05 to 1% by weight of silver and 0.1 to 2% by weight of zinc, the remainder being tin.

