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# UNITED STATES PATENT OFFICE

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## COMPOSITION FOR OILLESS BEARINGS AND PROCESS FOR PRODUCING SAME

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This invention relates to a new composition that is intended to be used for oilless bearings.

One object of my invention is to provide a metal bearing, which, in addition to being self-lubricating, is of such a character that it will not heat up easily, it will not cut or wear rapidly and it can be used successfully as an end thrust bearing which cooperates with a thrust collar on a rotating shaft to form a gas-tight seal around said shaft.

Another object is to provide a novel process for producing the composition used to form such a bearing.

The new composition that I have devised is composed of Babbitt metal, finely divided graphite, finely-divided mica and sulphur, mixed preferably in approximately the following proportions: i. e.—

1 part Babbitt metal
½ part graphite
½ part mica
¼ part sulphur

In producing said composition I first heat a certain quantity of Babbitt metal to the melting point of such metal, and thereafter, while said metal is in a molten state, I add to and thoroughly mix with the same a quantity of flour graphite equal to approximately one-half the amount of Babbitt metal and a quantity of ground mica equal to approximately one-half the amount of Babbitt metal, said mixture being stirred or agitated in such a way as to insure a thorough and uniform distribution of the graphite and mica throughout the entire mass of Babbitt metal, and being maintained at a temperature at or slightly above the melting point of Babbitt metal, during the mixing operation. The temperature of this mixture is then reduced slightly and a small amount of paraffin and a quantity of sulphur equal to approximately one-fourth the amount of Babbitt metal are added to the mixture and thoroughly distributed through the same, the mixture being maintained at a sufficiently low temperature during the time the paraffin and sulphur are being added to same to eliminate the possibility of the sulphur flashing. Good results will be obtained if the mixture is maintained at a temperature slightly above the melting point of sulphur at the time the sulphur and paraffin are added, for such a temperature will cause the mixture to be sufficiently plastic to enable the sulphur and paraffin to be mixed with same by a stirring operation, and it will not be high enough to cause the sulphur to flash. The quantity of paraffin that is added to the mixture may vary within certain limits, but in most instances I use a quantity of paraffin equal to approximately one-eighth the amount of Babbitt metal.

After the sulphur and paraffin have been mixed with the other ingredients, as above described, the mixture is introduced into a heated die or mold consisting of a cylinder provided with a plunger, and it is then subjected to sufficient pressure or impact to condense the mass and cause the ingredients constituting same to be combined into a solid bearing that is hard enough to have great wear-resisting properties and which is of sufficiently fine grain and texture to produce a smooth, non-porous surface, which, when arranged in engagement with a co-operating smooth surface, will form a gas-tight joint. The plunger has a working fit in the cylinder, and accordingly, when the plunger is forced into the cylinder, most of the paraffin, which is then in a liquid state, will escape through the space between the plunger and cylinder, thus leaving only a slight trace of the paraffin in the composition. The temperature of the die or mold in which the composition is compacted or solidified may vary within certain limits, but it should be considerably below the melting point of Babbitt metal.

Due to the fact that the composition above described contains graphite, mica and sulphur, the bearing formed from said composition will be self-lubricating, and another desirable feature of said bearing is that it will not heat up rapidly, due to the presence of the sulphur in the composition. There is only a slight trace of the paraffin left at the completion of the compacting or solidifying

operation, but the paraffin performs a very important function in the operation of pressing, impacting or compressing the composition, in that it tends to hold the granules of the composition together during the compacting operation.

The composition above described can be used to form various kinds of oilless bearings, but it is particularly adapted for use as an end thrust bearing for a refrigerating machine that co-operates with a collar on a rotating shaft to form a gas-tight seal, due to the fact that it will not overheat easily, it will not cut under ordinary usage and it is of sufficiently fine grain and texture to prevent gases from leaking through the joint between the bearing and the thrust collar on the shaft which contacts with the bearing.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A composition for oilless bearings composed of the following ingredients, mixed in approximately the proportion specified: 1 part Babbitt metal, ½ part finely-divided graphite, ½ part finely-divided mica, ¼ part sulphur.

2. A process for producing a composition for bearings, characterized by adding finely-divided graphite, and finely-divided mica to a mass of molten Babbitt metal and thoroughly distributing the same through said metal, and thereafter incorporating sulphur in said mixture while the mixture is maintained at a temperature low enough to prevent the sulphur from flashing.

3. A process for producing a composition for bearings, characterized by melting a quantity of Babbitt metal, adding flour graphite and ground mica to said metal and distributing the same throughout the mass of metal while the metal is in a molten state, and thereafter reducing the temperature of said mixture slightly and adding sulphur and a small quantity of paraffin to same.

4. A process for producing an oilless bearing characterized by adding finely-divided graphite and finely-divided mica to a mass of molten Babbitt metal and thoroughly distributing said ingredients through said metal, adding sulphur and a small quantity of paraffin to said mixture when the mixture is at a temperature low enough to prevent the sulphur from flashing, and thereafter subjecting said mixture to pressure or impact so as to compact or condense the ingredients into a solid body.

5. A process for producing an oilless bearing, characterized by melting a quantity of Babbitt metal, adding to said mass an amount of flour graphite and an amount of ground mica, each equal to approximately one-half the amount of Babbitt metal and thoroughly distributing said graphite and mica through the molten metal, reducing the temperature of said mixture slightly and then adding to same a small quantity of paraffin and a quantity of sulphur approximately equal to one-fourth the amount of Babbitt metal, the paraffin and sulphur being stirred through the mixture while it is in a plastic state, and thereafter introducing said mixture into a heated mold or die and subjecting it to pressure or impact so as to condense the mixture into a solid body.

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