

# UNITED STATES PATENT OFFICE.

PHILIP H. HOLMES, OF GARDINER, MAINE.

## COMPOSITION FOR JOURNAL-BEARINGS.

SPECIFICATION forming part of Letters Patent No. 454,354, dated June 16, 1891.

Application filed January 7, 1891. Serial No. 377,027. (No specimens.)

*To all whom it may concern:*

Be it known that I, PHILIP H. HOLMES, of Gardiner, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in a Composition of Matter; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved composition of matter adapted for the manufacture of journal-bearings, packings, and various other articles where two parts come into frictional contact.

In carrying out my invention I take plumbago, preferably in a finely-divided form, and floated, so as to obtain as pure an article as possible, and I mix this with fiber, preferably in a finely-divided state. The relative proportions of these two materials may vary somewhat, according to the character of the article to be produced; but in all cases the plumbago is in excess, in order to get the most efficient lubricating surface consistent with strength. For journal-box bearings or spindle-bearings, for instance, I can use proportions extending from four parts, by weight, of plumbago to one of fiber up to fifteen parts, by weight, of plumbago to one of fiber. These proportions may be varied, however, and still insure good results.

Where wood or equivalent vegetable fiber is used it is finely divided and mixed with the plumbago in water, and the composition, in a more or less plastic condition, is then placed in a mold corresponding in shape with the article to be produced. It is there subjected to powerful pressure for the purpose of expelling the water from the material and for molding the mass into the desired shape or form. The fiber acts as a felting and entangling material for the fine graphite-powder, and at this molding stage of the process, moreover, it acts somewhat as a filter, retaining the graphite and preventing it from escaping with the water through the perforations of the mold. After the article has been molded under pressure and most of the water expelled it is removed from the mold and completely dried in any suitable or convenient manner. I then impregnate and saturate this molded and dried article with a drying-oil, and for this purpose it is best to immerse the article in a bath of hot oil. The mass may be more or less saturated with oil, according to the character of use for which the completed article is intended. For some purposes it is preferable to thoroughly saturate and impregnate the mass with oil, while in other cases a less degree of saturation will answer all purposes. The oil I prefer to use is linseed-oil; but I do not wish to restrict myself to any particular kind of oil.

It is sometimes preferable to place the oiled article in a closed vessel heated to a sufficient temperature to assist in driving the oil into the interstices of the composition; but the presence of the fine fibers throughout the body of plumbago is an important element in getting the oil thoroughly into the whole mass of the molded article. The material thus thoroughly impregnated with the drying-oil is then placed in a suitable retort or oven, and is there subjected to a sufficient degree of heat to harden, set, and solidify the mass by developing a resinous film throughout the intimate mixture of fiber and plumbago. In other words, the drying-oil impregnates the fiber and enters the interstices between the particles of plumbago and fiber and operates to cover such particles with a coating, which becomes hard and has a binding, solidifying, and hardening effect upon the mass and renders it of sufficient strength to become self-sustaining and capable of withstanding the hard usage and severe strains to which it may be subjected.

The main body or basis of the composition produced is the plumbago, which material is specially adapted for bearings for journal-boxes and other articles subjected to frictional wear, owing to the excellent lubricating qualities of the plumbago and its capacity for long-continued use without wearing away to any appreciable extent. The plumbago is preferably in such excess in the composition that on a casual inspection of the completed article the fiber and hardened or resinified drying oil are not noticeable.

The fiber, which is intimately combined with the powdered plumbago and which is preferably soft-wood fiber finely divided, serves as a binder to thoroughly bind together the finely-



powdered plumbago in the desired form and to impart solidity and strength to the completed article. This is due to the fact that the finely-divided fiber when intimately  
5 mixed with the powdered plumbago forms a bond which confines the plumbago against displacement, and as the fiber and the hardened or resinous drying-oil ramify throughout the entire mass, there will be imparted to  
10 it a firm and cohesive solidity and hardness which enable the article to preserve its form and shape, although in use it may be subjected to great weight or pressure or wear. The molded and hardened journal-bearing of  
15 the composition described is, furthermore, both water-proof and oil-proof, which is a valuable and important feature, as it enables journals or spindles to run in oil or water without injury to the plumbago bearing.

20 I do not desire to claim in this application the process set forth of preparing the composition, nor do I wish to restrict myself to the use of said process, which forms the subject of a separate application for a patent  
25 filed of even date herewith.

I claim as my invention—

1. A molded and hardened composition for bearings, &c., and consisting, essentially, of plumbago, wood, or other vegetable fiber, and

a drying-oil, the plumbago being in excess, 30  
substantially as described.

2. A composition of matter consisting, essentially, of a mixture of plumbago, fiber, and a drying-oil molded into desired form and solidified and hardened by heat, substan- 35  
tially as set forth.

3. A composition of matter consisting of a base of plumbago, a binder of finely-divided wood or other vegetable fiber, and a drying-oil molded under pressure into the desired 40  
form and solidified and hardened by heat, substantially as set forth.

4. A molded composition for bearings, &c., and consisting of plumbago, fiber, and hardened linseed-oil, the plumbago being in excess, 45  
substantially as described.

5. A molded composition for bearings, &c., and consisting of plumbago, wood fiber, and linseed oil, in about the proportions substan- 50  
tially as specified.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PHILIP H. HOLMES.

Witnesses:

G. N. HARRIS,  
JOHN SPARHAWK, Jr.