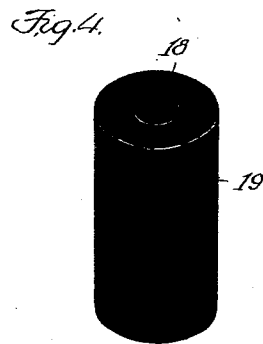
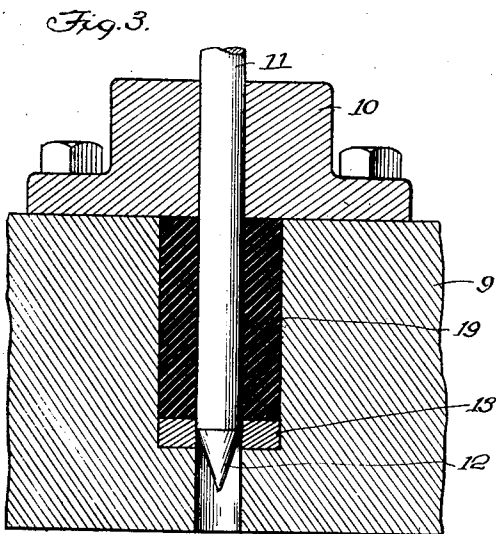
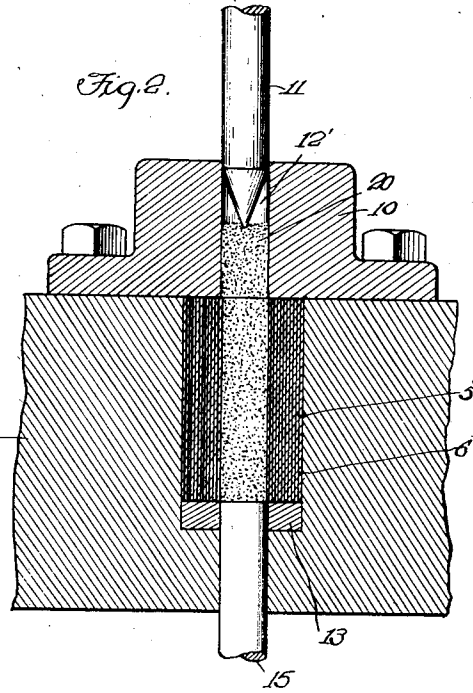
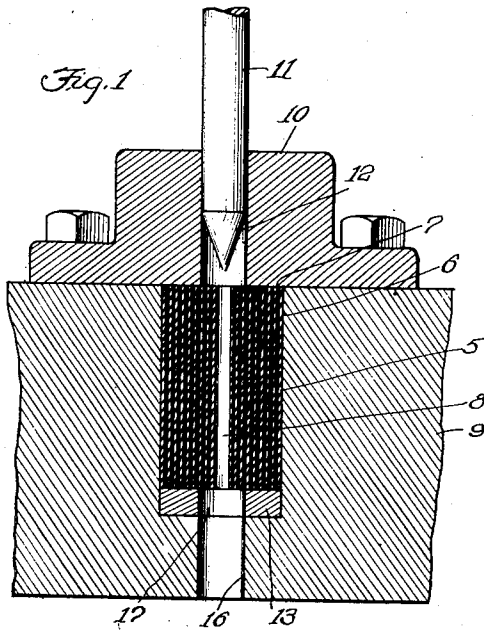


V. G. APPLE.
METHOD OF MAKING SELF LUBRICATING BEARINGS.
APPLICATION FILED OCT. 11, 1920.

1,409,148.

Patented Mar. 14, 1922.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING SELF-LUBRICATING BEARINGS.

1,409,148.

Specification of Letters Patent.

Patented Mar. 14, 1922.

Application filed October 11, 1920. Serial No. 416,308.

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Methods of Making Self-Lubricating Bearings, of which the following is a specification.

This invention relates to improvements in a method of making self-lubricating bearings.

One of the objects of the invention is to improve the manner of making self-lubricating bearings, whereby to cheapen the cost of production and better the quality of the product.

Another object is to provide a new and useful article of manufacture.

In carrying the invention into effect, I provide a foraminous strip of fabric, preferably wire cloth, although coarse mesh fiber fabric, such for example as cotton or linen, more or less porous, will answer the purpose. I then prepare a compound of finely divided graphite and phenolic condensation product, or other similar material that hardens by application of heat. I then cover one side of the fabric with the compound distributed thereon in a layer of uniform and sufficient thickness. It is well to mix the graphite with the condensation product in a liquid form to thereby make a paste, although the powdered condensation product when thoroughly mixed with the graphite may be used. I now roll the strip thus prepared, into helical cylindrical form with the inner convolutions much smaller in diameter than the ultimate diameter of the bearing. I then apply pressure, from the interior of the cylinder thus made, outwardly or radially and uniformly to compact the walls of the cylinder, lubricating pulverulent and binder and to enlarge the inner diameter of the cylinder to the size required for the finished bearing. This operation also forces the lubricating material into the meshes of the convoluted strip and the distribution is substantially uniform throughout the bearing cylinder. The compacted cylinder is then baked to cause the adhesive substance to harden. After the structure thus made has been baked there is thus produced a bearing that is self-lubricating having the highest efficiency and well adapted for the purpose intended.

Other objects will readily appear.

Fig. 1 shows a die within which the convoluted strip is contained to have its diameter increased and its walls compacted by insertion of the plunger or punch rod.

Fig. 2 shows a modification of Fig. 1 showing another manner of increasing the density of the side walls and inserting the lubricant.

Fig. 3 shows the plunger or punch rod inserted, and

Fig. 4 is an isometric perspective view of the finished bearing.

In the drawings—

5 shows the convoluted cylinder of fabric or wire cloth 6, window screen cloth will answer, with the graphite and binder 7 therebetween. The cylinder has a relatively small internal diameter. The cylinder consists of a fiber fabric or wire cloth of the character described made into a strip of suitable width, which is equal to the length it is to be made, having deposited thereon a compound of finely divided graphite incorporated properly with a condensation product, or other substance possessing substantially the same characteristics, and the strip thus coated or covered, is wound into cylindrical form, as shown in Fig. 1.

When the cylinder is thus made, it is put into a die 9 having a guide 10 thereon and a plunger 11 is forced into the interior of the cylinder 5. The plunger, for convenience of operation, is provided with a pointed end 12. In the bottom of the opening, in the die 9, there is placed a washer or ring 13, which, in the beginning of the operation, that is, of forcing the plunger 7 into the interior of the cylinder 5, a plug or part of the shaft 15 may be inserted and held in the opening 16 temporarily to prevent any of the material from the cylinder 5 entering the opening 17 in the washer or ring 13.

About the time the point 12 approaches the ring 13, the plug or shaft 15 is removed and then the plunger 11 is forced entirely through the cylinder 5. The plunger 11 is of diameter corresponding with the diameter of the opening 18 in the finished product 19. After the plunger 11 has been forced through the structure 5, in the manner heretofore described, the die may be placed in a suitable muffler or furnace and heated to the desired temperature until the binder incorporated with the graphite be-

comes hardened by the effect of the heat, after which the structure is removed from the die and it is ready to be placed in the bearing support for a rotatable shaft.

5 In Fig. 2 is shown a powdered compound, such as heretofore described, indicated by the reference character 20, and a plunger 11 having a relatively sharp end 12' and I have shown guide portion 10 partly filled
10 with a compound so that when the plunger is pushed through structure 5', the compound will be forced radially into the meshes of the wire cloth or fabric 6'. In this instance the fabric is wound without
15 placing all of the material on the surface of the fabric before it is convoluted in the manner described.

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

20 1. The method of making self-lubricating bearings which consists in rolling a strip of fabric into a cylinder and forcing lubricating material into the interstices thereof
25 by radially directed pressure.

2. The method of making self-lubricating bearings which consists in rolling a strip of fabric into a cylinder having a relatively small internal diameter and forcing
30 lubricating material into the interstices thereof by radially directed pressure and coincidentally increasing the internal diameter thereof.

3. The method of making self-lubricat-

ing bearings which consists in providing a 35 strip of fabric; mixing finely divided lubricating material and a suitable binder; covering the strip with the mixture; rolling the strip and covering into a cylinder having a relatively small internal diameter; 40 compacting the walls of the cylinder by radially directed pressure and coincidentally increasing the internal diameter of said cylinder, to provide a bearing surface.

4. The method of making self-lubricating 45 bearings which consists in providing a strip of fabric; mixing finely divided graphite with a phenolic condensation product; covering the strip with the mixture; rolling the strip and covering into a cylinder hav- 50 ing a smaller internal diameter than the finished bearing is to have; compacting and reducing the thickness of the wall of the cylinder by application of radially directed pressure then baking the cylinder to harden 55 the adhesive.

5. The method of making a bearing which consists in winding a foraminous strip into helical form with its internal diameter smaller than the ultimate diameter of the 60 bearing; forcing graphite into the interstices by radially directed pressure, enlarging the bearing opening and making said opening and outer surface concentric in one operation. 65

In testimony whereof I hereunto subscribed my name.

VINCENT G. APPLE.