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H. L. JOHNSTON

COMPOSITION FOR NONMETALLIC GEARS

Filed July 12, 1920

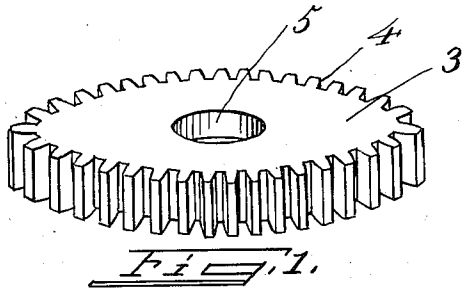


Fig. 1.

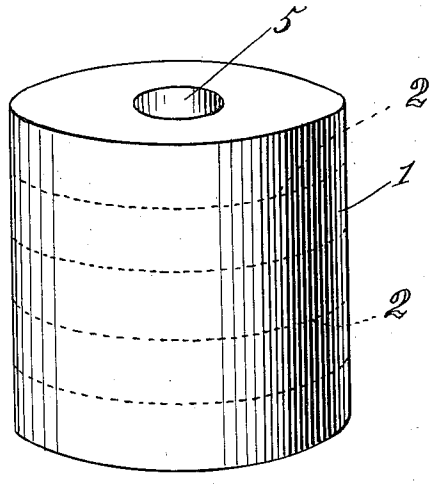


Fig. 2.

INVENTOR:
Herbert L. Johnston
BY Allen & Allen
ATTORNEYS.

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UNITED STATES PATENT OFFICE.

HERBERT L. JOHNSTON, OF TROY, OHIO, ASSIGNOR TO THE HOBART MANUFACTURING COMPANY, OF TROY, OHIO, A CORPORATION OF OHIO.

COMPOSITION FOR NONMETALLIC GEARS.

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To all whom it may concern:

Be it known that I, HERBERT L. JOHNSTON, a citizen of the United States, and a resident of Troy, in the county of Miami and State of Ohio, have invented certain new and useful Improvements in Composition for Nonmetallic Gears or the like, of which the following is a full, clear, and exact description, reference being had to the drawings, forming part of this specification.

My invention relates to non-metallic gears such as are widely used in the arts where strength, lightness and durability are desired together with silent running, and in one phase of my invention it relates further to gears held together by a binder comprising a phenolic condensation product.

It is my object to provide a non-metallic gear of a material which is both better and cheaper than woven or matted fiber, as in cloth or paper, and which due to its natural shape and its inherent nature can be readily formed directly into the desired cylindrical form or contour, together with a central hole where desired.

With cloth or paper gears the preliminary step is to build up layer upon layer of the material, then compress it and bind it in compressed shape and finally cut out of the completed sheet the circular disks, into which gear teeth are cut. With the material according to my discovery and invention, a cylindrical shaped piece may be formed directly and the disks produced without waste. As noted, also, in compressing the material the central hole may be provided by the utilization of a suitable core of proper shape and strength.

I accomplish the objects of my invention by the compression and forming into blanks of sponge, all as hereinafter more specifically pointed out and claimed.

In the drawings,

Figure 1 is a perspective of my improved gear.

Figure 2 is a perspective of a cylindrical body of compressed material.

The material according to my invention is made up preferably into a cylindrical shaped piece, as at 1, from which are cut the separator disks to form the gear blanks, as on lines 2, 2, transverse the piece 1. The disks 3 are then cut with teeth 4, and a central hole 5, or else in the formation of the cylindrical piece, the hole may be formed therein, in the pressing operation.

While cotton has been recognized as the best material for silent gears, I have found that sponge will make as good if not a better gear blank. The ordinary sponge as sold on the market is more expensive than cotton, but the culls of sponge are waste material and quite inexpensive.

In sorting sponge for the market there is a considerable quantity that is torn, discolored, mis-shapen and has holes so large as to be destructive of its value in general use and all of this "cull" material is rejected or trimmed away and is practically waste or sometimes used for a cheap filtering material. In addition to bad sponges, the sponges that are retained must, in the usual course of preparation for market, be trimmed, resulting in further waste material.

It is this by-product of the sponge industry which I desire to employ in the manufacture of silent gears, and in addition to being cheaper than regular sponge, I find it of considerable advantage to have the sponge material in small pieces. In fact, it is my information that a market for sponge which does not require a closely formed, well shaped mass will bring many sponges ashore from the divers, which are thrown overboard at the present time, as a total loss.

In forming the cylindrical piece, I take the sponge material in small pieces, impregnate it with a binder of a phenolic condensation product, of the same character as "bakelite", and compress the resulting mass in a cylindrical mold, in the presence of heat at a high pressure so that the sponge loses its porous character. The mold may have a central core, to form a uniform axial hole through the cylinder or this may be omitted, as desired.

I find that a given weight of sponge will form more mass of completed gear blank material, than a given weight of cotton, and not only this, but in view of the fact that I do not form a sheet of material, I am enabled to save the loss resultant from cutting out round blanks from a flat sheet, and from cutting out material to form the circular hole through the center of the blank.

Thus my gear blanks are produced much cheaper than the blanks of cotton and the resultant gears are just as good.

While I refer above to molding a cylinder of the new material, I do not wish to be limited to this method of procedure, as I could readily form individual blanks, and also by a proper forming of punch and die could form a complete gear with its teeth complete at a single operation.

Sponge, being a mineral and animal material as distinguished from vegetable, and being of extremely porous nature, results when combined with phenolic condensation products is a valuable addition to the arts and one which is distinct from all prior uses of the phenols, with which I am familiar. Furthermore while I have not experimented with any other forms of material to be used together with the sponge in compressed form, I wish to include within the scope of my invention such other cementitious material which when combined with a porous body and compressed will result in a permanent, nonfrangible body suitable for the uses above noted.

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

1. A new and useful material comprising sponge impregnated with a phenolic condensation product, the same being subjected to great pressure under influence of heat such as will convert the phenolic product into a solid.

2. A new and useful material for gear blanks comprising sponge impregnated with a phenolic condensation product, the same being subjected to great pressure under influence of heat such as will convert the phenolic product into a solid.

HERBERT L. JOHNSTON.