

L. T. FREDERICK.  
METHOD OF MAKING RODS, CYLINDERS, AND THE LIKE.  
APPLICATION FILED MAY 15, 1917.

1,323,039.

Patented Nov. 25, 1919.

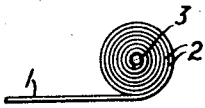


Fig. 1.

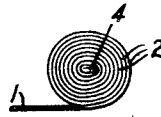


Fig. 2.

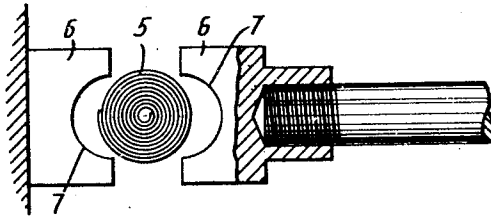


Fig. 3.

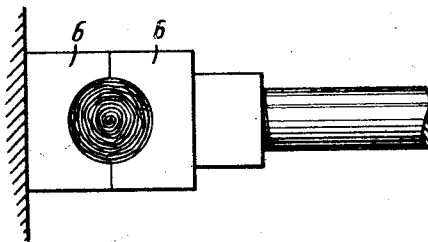


Fig. 4.

WITNESSES:

*Fred. A. Lind.*  
*R. D. Brown*

INVENTOR

*Louis T. Frederick*  
BY  
*Wesley C. Barr*  
ATTORNEY

# UNITED STATES PATENT OFFICE.

LOUIS T. FREDERICK, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WEST-  
INGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF  
PENNSYLVANIA.

## METHOD OF MAKING RODS, CYLINDERS, AND THE LIKE.

1,323,039.

Specification of Letters Patent.

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Application filed May 15, 1917. Serial No. 168,667.

### *To all whom it may concern:*

Be it known that I, LOUIS T. FREDERICK, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of Making Rods, Cylinders, and the like, of which the following is a specification.

My invention relates to the manufacture of rods, cylinders and other solid bodies composed of fibrous material and a binder, and it has for its object to provide a method of producing rods and other objects of the above-indicated character which shall be capable of producing products of superior strength and uniformity in a rapid and economical manner.

My process is illustrated in the accompanying drawing in which Figure 1 is an end view of a roll of material adapted to be formed into a rod according to my process. Fig. 2 is an end view, similar to Fig. 1, showing another method of winding the material into roll form. Fig. 3 is an end elevational view of a portion of a mold adapted to complete rods and cylinders in accordance with my invention, and Fig. 4 is a view, similar to Fig. 3, but showing the mold in its closed position.

Rods and cylinders for use in electrical insulation and for other purposes are commonly made by superposing a number of sheets of paper or cloth impregnated or coated with a binder, applying heat and pressure to the superposed laminations to cause the laminations to firmly adhere, forming a solid plate, dividing the resulting plate into sections and turning the sections in a lathe with ordinary wood-working tools. Rods made in this manner have the disadvantage that the parallel laminations of which they are composed are exposed on the surfaces of the rods and may be split apart to a greater or less degree, either in the turning operation or in the subsequent use of the rods.

According to my present invention, I produce strong and substantially homogeneous rods, cylinders and other solid objects by forming a substantially solid roll of fabric associated with a binder and pressing the roll of fabric in a heated mold, whereby the binder is softened and the several convolutions composing the roll of material are

caused to adhere firmly together, the resulting object being dense, hard and hornlike in structure.

In carrying out my process, the first step consists in providing a web of paper, cloth or other absorbent sheet material coated or impregnated with a binder which may variously consist of a phenolic condensation product or of any suitable varnish gum or gum resin such, for example, as shellac, copal, kauri, acaroids and the like. The sheet material is wound into a roll slightly larger in diameter than the rod or cylinder that is to be formed. As shown in Fig. 1, a web of sheet material 1 is wound in a plurality of convolutions 2 upon a very slender mandrel 3 which is preferably removed from the roll before the molding operation but which may, if desired, be left permanently within the rod.

Another method of preliminarily winding the roll of treated fabric is shown in Fig. 2. According to this method, the edge of the web is first crimped or folded as shown at 4 to form a foundation upon which to wind the remaining convolutions, the roll formed in this manner being therefore formed of similar material throughout.

The next step in my process consists in placing the roll 5 of fabric prepared in either of the ways described above or in any other suitable manner in a heated mold, the jaws of which, indicated at 6 in Figs. 3 and 4, are provided with working faces 7 conforming in shape and size to the outline of the finished rod or cylinder. The jaws 6 are movably mounted upon suitable supports and are provided with means (not shown) for forcing the jaws together under heavy pressure and with suitable heating means. When the jaws are forced together, as shown in Fig. 4, the roll of fabric is compressed and the adhesive material is softened, the laminations being slightly distorted, as shown upon an exaggerated scale in Fig. 4. The heat and pressure are continued sufficiently to cause the binder to thoroughly penetrate the fabric and to render the entire mass of material homogeneous and solid. If the binder consists of a phenolic condensation product or other substance which is adapted to harden under the influence of heat and pressure, the hot pressing operation is continued long enough to

transform the binder into its hard condition. If, on the contrary, the binder consists of a varnish gum which is permanently soft when heated, the hot molding operation is continued only long enough to render the material thoroughly compact and uniform and the mold is then cooled in order to permit the binder to set.

Molded objects made in the manner described above are exceedingly tough and strong by reason of their spiral structure. It is to be understood that my invention is not restricted to the use of any specific forms of apparatus for winding the fabric into rolls or for applying molding pressure thereto. It is also to be understood that my invention is not restricted to the use of any particular absorbent sheet material or to any specific kind of binder and that no other limitations are to be imposed upon my invention unless indicated in the appended claims.

I claim as my invention:

1. The process of making solid rods, cylinders and the like that comprises forming a roll of fibrous sheet material and a binder affected by heat, and applying heat and transverse pressure to the said roll of material in a mold.

2. The process of making rods, cylinders and the like that comprises crimping one edge of a sheet of fibrous material associated with a binder affected by heat, winding the said sheet in a plurality of convolu-

tions around the said crimped edge of the sheet and applying heat and transverse pressure to the roll of material in a mold.

3. The process of making solid rods, cylinders and the like that comprises forming a roll of fibrous sheet material and a binder that is adapted to soften when heated and to harden under the influence of pressure and further heat, and applying heat and transverse pressure to the said roll of material in a mold.

4. The process of making rods, cylinders and the like that comprises crimping one edge of a sheet of fibrous material impregnated with a binder comprising a phenolic condensation product, winding the said sheet in a plurality of convolutions around the said crimped edge of the sheet and applying heat and pressure to the roll of material in a mold.

5. The process of making rods, cylinders and the like that comprises crimping one edge of a sheet of fibrous material associated with a binder comprising a phenolic condensation product, winding the said sheet in a plurality of convolutions around the said crimped edge of the sheet and applying heat and transverse pressure to the roll of material in a mold.

In testimony whereof, I have hereunto subscribed my name this 23rd day of April, 1917.

LOUIS T. FREDERICK.