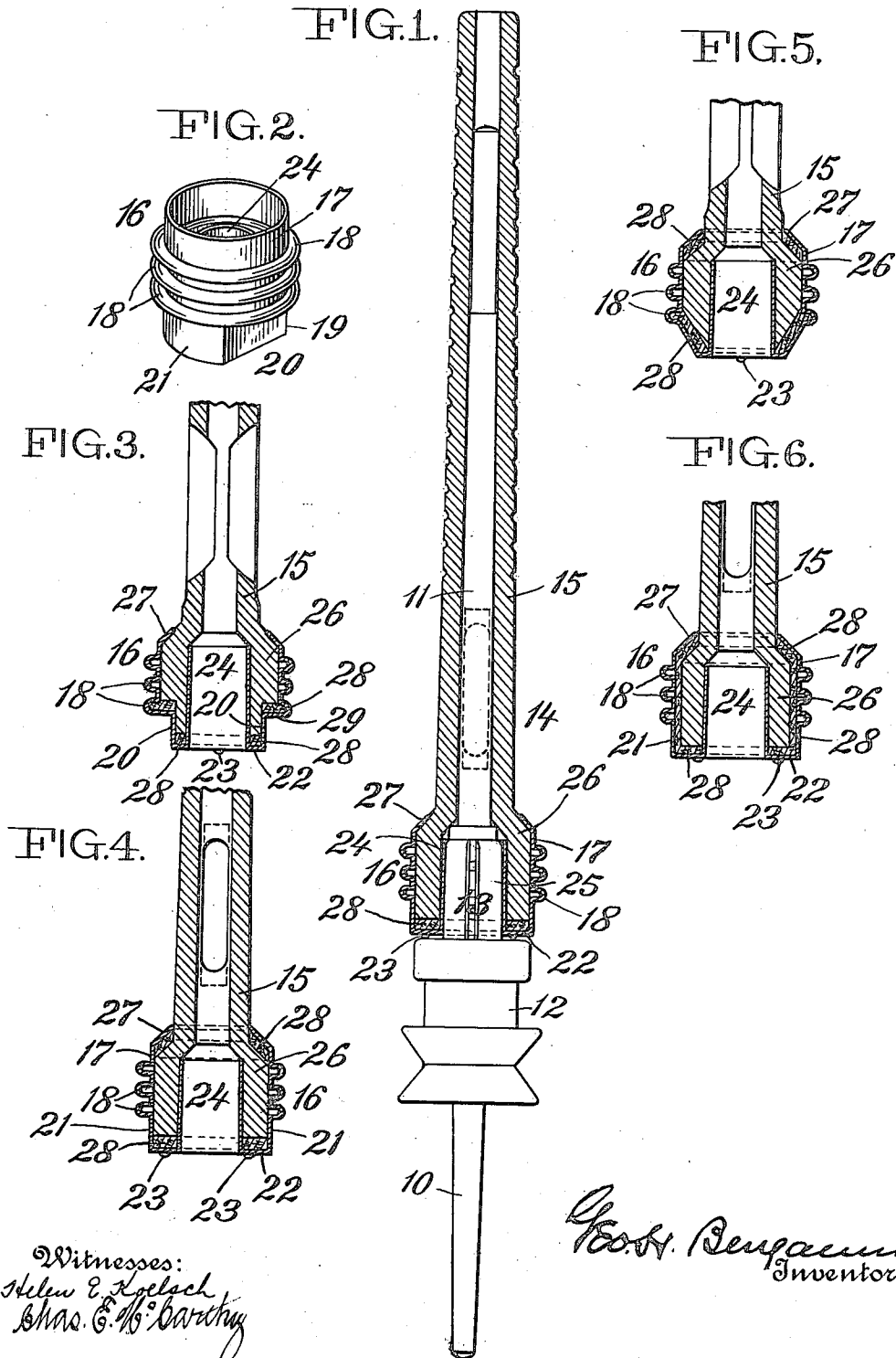


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BOBBIN.

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1,237,457.

Patented Aug. 21, 1917.



Witnesses:
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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE HILLARD BENJAMIN, a citizen of the United States, residing at New York city, in the county and State of New York, have invented certain new and useful Improvements in Bobbins, of which the following is a specification.

My invention relates to bobbins of the type consisting of a shank made of wood or other material which has a tendency to expand and contract when subjected to heat and moisture and subsequently dried, and a base formed wholly or in part of metal, and adapted to surround the lower portion or head of the shank, and which in practice, coats with the spindle which imparts rotation to the bobbin and which is subjected to heavy blows when the bobbin is inserted into and removed from a shuttle, as is the practice in automatic looms.

In bobbins of the type described, it is found difficult to permanently secure the base to the shank. The expansion and contraction of the shank serves to change the diameter of the head of the shank relative to that of the base, and the blows to which the base is subjected act to loosen the base. When the shank and base are not firmly united, it is difficult to place the bobbin upon a spindle, and further, almost impossible to introduce the bobbin into a shuttle. The object of my invention, therefore, is to effect a permanent union between the shank and the base, and to insure effective coöperation between the bobbin and the spindle, and the bobbin and the shuttle.

The accompanying drawing will serve to illustrate the mechanical features of my invention, in which, Figure 1 is an elevation of a spindle with a centrifugal clutch and a vertical section of a bobbin. Fig. 2 is a perspective view of a base detached from the bobbin. Figs. 3, 4, 5 and 6 are vertical sections through a base and bobbin, showing modifications of the arrangement shown in Fig. 1.

Referring to the drawings, 10 indicates a spindle, having a shank portion 11, whirl 12 and clutch 13. Located on the spindle is a bobbin 14, composed of a shank 15, which may be of wood, compressed paper or other similar material, preferably a material which will not expand and contract when subjected to "steaming," otherwise of a material which

will absorb a treating material, when treated as hereinafter described; and a base 16.

I do not limit myself in any wise to the shape of the base. That shown in the drawing consists of an annulus having an outer wall 17, corrugated to form spaced rings 18, a bottom portion 19 which has two straight sides 20 and two curved sides 21. The horizontal lower wall 22 of the bottom portion 19 is provided with depending points 23 and an inner tubular wall 24, and corresponds in vertical height with that of the clutch faces 25. The base 16 is, as stated, annular in shape, and situated in the cavity of the annulus is the lower end or head 26 of the shank 15.

The construction so far as described, presents no features of novelty, with the exception of the shape described for the base shown in Fig. 2. I will now describe the method of securing the base 16 to the shank 15, as disclosed in the various figures.

Preferably, the shank 15 is first thoroughly dried to remove any moisture, after which it is inserted in a hot fluid "addition product" of phenol and formaldehyde, which product is free from water and will permeate the entire body of the shank. Preferably the temperature of the hot addition product is insufficient to polymerize the addition product, during the immersion of the bobbin. A temperature of about 50° centigrade may be employed. The time of immersion will depend upon the character of the material forming the shank; generally from fifteen to thirty minutes' immersion will be sufficient. The immersion may take place under pressure if desired. The bobbins are then removed from the liquid and dried, either in the atmosphere or at a low temperature. This drying, however, is not essential. The bobbin after being removed from the liquid, is then inserted into the base 16 and the top of the base 27 rolled down upon the shank 15. The whole bobbin is then introduced into an oven and subjected to a temperature of 100° centigrade for several hours. The temperature acts to convert the "addition product," which impregnates the material of the bobbin, from a liquid into a hard, infusible body, insoluble in acids and most alkalis.

It will be seen from the above description, that after the treatment by the "addition

product," expansion and contraction of the shank cannot occur, as no moisture will find its way into the substance of the shank, and consequently a firm union between the shank and the base results.

In order to insure as against any possible expansion and contraction of the head 26 of the shank 15, I may insert a compressible material 28 between the shank 15 and the base 16.

In Fig. 1, the compressible material, which is preferably cork, is inserted between the bottom of the head 26 and the inner surface of the bottom wall 22 of the base 16.

In Fig. 3 the material 28 is placed as in Fig. 1 and also a second body of the material upon a shelf 29, which corresponds to the position of the bottom of the lowest ring 18 of the base.

In Fig. 4 the material 28 is placed as in Fig. 1 and also between the top of the head 26 of the shank 15 and the inner surface of the top 27 of the outer wall 17 of the annulus.

In Fig. 5 the material 28 is placed substantially the same as in Fig. 4, the only difference being that the base has a different shape and consequently the material at the lower part of the base is inclined instead of being horizontal.

In Fig. 6 the material 28 is placed as in Fig. 4, and also surrounds the head 26 of the shank 15, so that there is in effect, an envelop of compressible material surrounding the head and between the head and the inner wall of the annulus.

I do not limit myself in any wise to the particular location of the compressible material. It may be placed otherwise than as shown. The purpose of this material, as previously indicated, is to compensate for any expansion and contraction which may take place in the shank, its head or in the base. Any change in diameter of the head of the shank, when treated as described, is practically negligible. Change of diameter of the base will amount to very little, but

may occur to a slight extent when the bobbin is subjected to a high temperature, as in "steaming."

The compressible material 28 may be used with bobbins which are not treated with the "addition product" as described, in which case the material is made thicker than when used in connection with bobbins which have been treated with the "addition product." The treatment with the "addition product" is useful in that it not only prevents expansion and contraction of the bobbin at its head and thus prevents the shank from separating from the base, but also prevents any splitting, cracking, shivering, or splintering of the top of the bobbin, which is a frequent occurrence in bobbins as heretofore treated, owing to the very rough way in which they are handled when doffing empty bobbins, and which makes the bobbins useless for spinning purposes.

I wish it understood that my improved method of treating the bobbins may be employed irrespective of whether a separable base is or is not used; that is, it may be employed with bobbins having spaced rings of wire secured to their outer surface with or without a center tube which coacts with the spindle clutch.

Having thus described my invention, I claim:

A bobbin comprising a shank having a head portion and impregnated with a material which is insoluble in acids and most of the alkalis, a base lineally, substantially co-extensive with the head portion and shaped to inclose the outer and inner surfaces and bottom thereof, and a body of compressible material situated between the head and the base.

In testimony whereof, I affix my signature, in the presence of two witnesses.

GEORGE HILLARD BENJAMIN.

Witnesses:

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HELEN E. KOELSCH.