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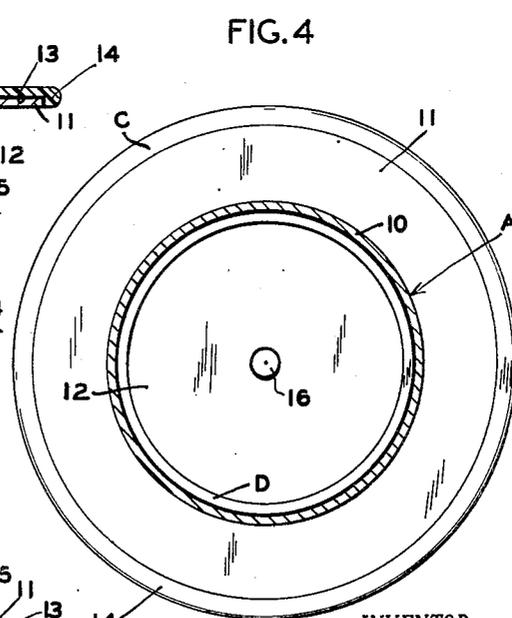
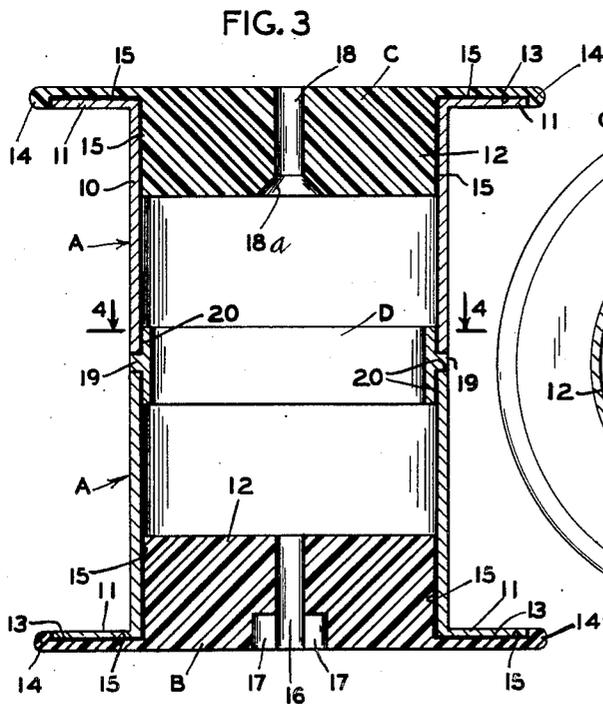
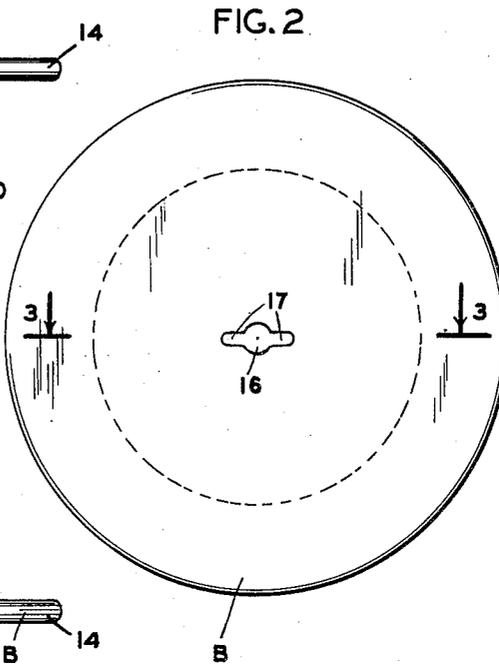
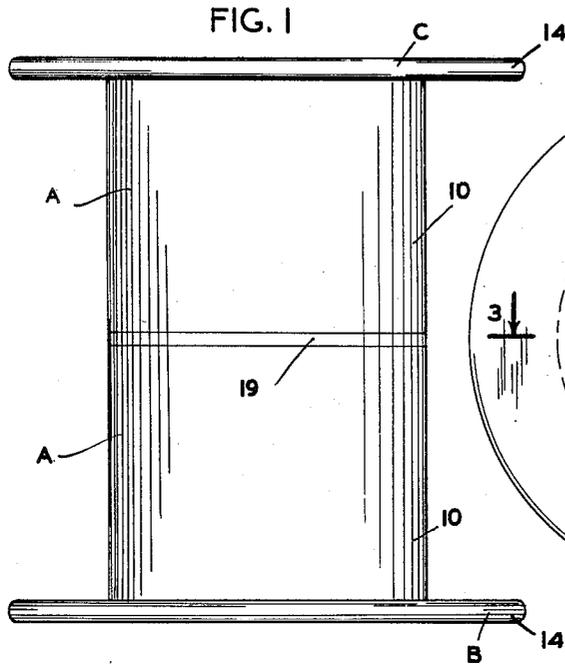
J. J. BLISS

2,527,520

FLANGED BOBBIN WITH PROTECTED EDGE

Filed June 3, 1949

2 Sheets-Sheet 1



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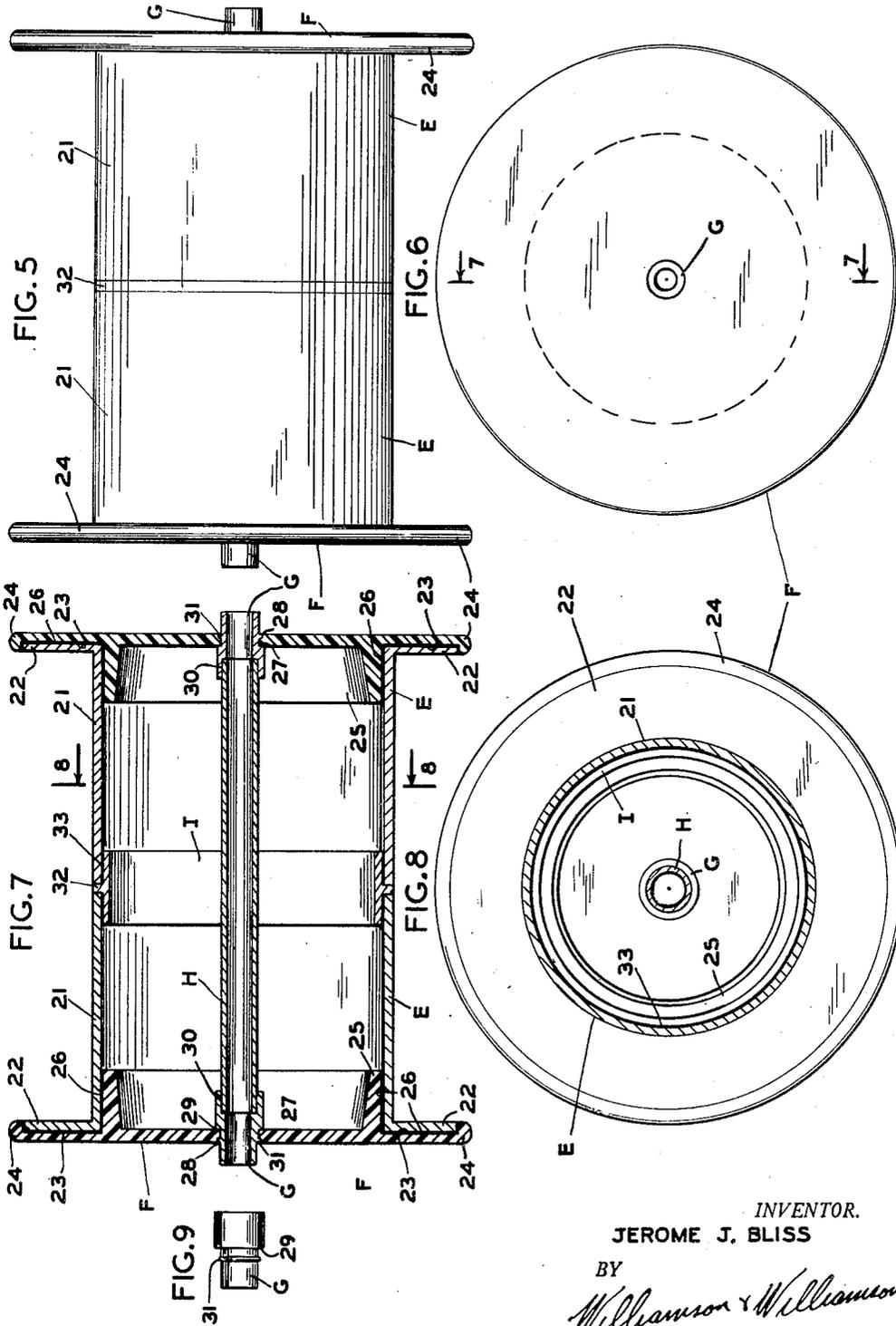
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UNITED STATES PATENT OFFICE

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FLANGED BOBBIN WITH PROTECTED EDGE

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16 Claims. (Cl. 242—118)

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This invention relates to bobbins, spools, or drums hereinafter generally classified as bobbins, on which textile thread or wire may be wound.

The usual textile bobbin now employed includes a central wooden barrel on which the thread is wound and separate end flanges formed of fiber and attached to the outer ends of the barrel. A great many difficulties are experienced in the use of such bobbins. On many of these bobbins the thread is wound under high tension and in many instances the thread after being twisted and wound on the bobbin is wetted in order to set the twist of the thread and as the thread dries it shrinks and exerts tremendous pressure not only on the barrel of the bobbin but endwise against the flanges of the bobbin. The wooden barrel due to the high pressure exerted on it, although originally accurately cylindrically formed, is not strong enough to resist the strain and often quickly becomes misshapen and must be discarded for the reason that it will not run true and in proper balance at high speed when so misshapen and the roughness of the barrel, due to the imperfections in the shape thereof, often results in the tearing or cutting of strands of thread wound thereon. Also, due to the end pressure exerted on the fiber bobbin flanges which are separate from the barrel these flanges tend to bow outwardly and separate from the barrel, thereby producing crevices or cracks between the ends of the barrel and the flanges within which thread may be caught to become frayed or torn during the winding or unwinding operation. The bowing out of the bobbin flanges also tends to cause the bobbin to run imperfectly as it is being rotated.

If, to give the bobbin adequate strength and to prevent the formation of thread catching cracks between the barrel and the end flanges there is substituted for the usual wooden barrel bobbin equipped with separate fiber end flanges a metal bobbin wherein a metal barrel and metal end flanges are employed, other difficulties result. In drawing off the thread from the bobbin the thread is often drawn off from one end of the bobbin and the thread thus rides against the peripheral edge of the end flange and if this end flange is nicked, marred, dented or cut so as to be otherwise than perfectly smooth, strands of the thread are liable to catch on the roughened portion of the end flange, causing the tearing of one or more strands of the thread. If bobbins having unprotected metal end flanges are provided these end flanges are subject to rapid deterioration through nicking, marring, denting or cutting during the handling of the bobbins, and

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thus bobbins having unprotected end flanges integral with the barrel portions are not a solution to the bobbin problem.

There is a disadvantage in employing cast bobbins made of metal or plastic due to inaccuracies that will result in the barrel and flanges in such cast bobbins. Also, if such cast bobbins are made from synthetic resins or other plastics, they do not have sufficient strength to resist the tremendous pressure to which the bobbins are subjected by the thread wound thereon. If the bobbins are made from the heavier metals, there is a disadvantage in their use inasmuch as many of these bobbins must be rotated at very high speeds and in bringing the bobbins up to speed there is a decided disadvantage in a heavy bobbin. Also, slight inaccuracies in the formation of the bobbin when made of heavy material give rise to difficulties in maintaining the bobbin in proper balance at high speeds to a greater extent than is the case when lighter bobbins are employed.

It is the object of the present invention to provide a novel and improved bobbin of cheap and simple construction which will eliminate all the difficulties heretofore experienced with other bobbins and above referred to.

More specifically, it is an object of the invention to provide a light weight exceedingly strong bobbin including a metallic member forming a barrel portion and a metallic flange at the outer end of the barrel portion and a head formed of synthetic resin, fiber or analogous non-metallic material and capable of being formed to provide a smooth peripheral edge which cannot be readily nicked, marred, or dented, the said head being recessed to receive the metallic flange and having an outer circumferential portion overlying the metallic flange, the inner side of the said circumferential portion lying flush with the inner side of the flange.

It is a further object to provide such a bobbin wherein the flange is attached to the head by means of an adhesive, and in particular, adhesive formed of synthetic resins.

The objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the different views, and in which

Fig. 1 is a view in front elevation of a bobbin embodying the invention;

Fig. 2 is a view in end elevation looking toward the bottom end of the bobbin shown in Fig. 1;

Fig. 3 is a vertical section taken through the

bobbin substantially on the line 3—3 of Fig. 2 as indicated by the arrows;

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 3 as indicated by the arrows;

Fig. 5 is a view in front elevation of a slightly different type of bobbin embodying the invention;

Fig. 6 is a view in end elevation of the bobbin shown in Fig. 5;

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 6 as indicated by the arrows;

Fig. 8 is a vertical section taken on the line 8—8 of Fig. 7 as indicated by the arrows; and

Fig. 9 is a vertical section taken through one of the Nylon plastic gudgeons as it will appear before being mounted in one of the heads of the bobbins shown in Figs. 5 to 8.

Referring first to the bobbin shown in Figs. 1 to 4, this bobbin comprises two metal drum members A, two heads B and C formed of non-metallic plastic or fiber material and a joining collar D which may be formed of metal, plastic, fiber or other material.

Each drum member A is preferably a stamping formed of aluminum sheet metal or an aluminum alloy of light weight, yet having great strength. Each drum member is accurately shaped to form an inner tubular barrel 10 and an outer circular flange 11 which is integral with the barrel 10 in the embodiment shown, concentric therewith and projects radially from the outer end of the barrel well beyond the barrel.

Each head B and C is formed of a tough, strong, shock resistant plastic or fiber of such a type that the peripheral edge of the head can be smoothly shaped and will be non-brittle and will have sufficient inherent resiliency that it cannot be readily nicked, marred, dented or cut through rough handling. Such materials as plastic, Nylon, certain of the synthetic resins and laminated cloth fiber such as employed in the making of fiber gears are typical of those that can be used in forming the heads B and C. The two heads B and C each have a central cylindrical portion 12 which snugly fits within the outer part of one of the barrel portions 10 to strengthen and support the outer part of the barrel portion. Also, each head B and C outwardly from its cylindrical portion 12 is provided with a recess 13 at its inner side shaped to snugly receive one of the flanges 11. Outwardly from the recess 13 each head B and C forms an outer circumferential portion 14 which overlies the outer edge of one of the flanges 11. The inner side of each circumferential portion 14 lies flush with the inner side of the flange 11 received within the recess 13 of the head on which the circumferential portion 14 is formed. The peripheral exterior edge of each circumferential portion 14 is very smoothly formed and preferably rounded as shown so as to permit the travel of thread thereover without catching any of the strands of the thread.

The two heads B and C are secured to the respective drum members A and for this purpose an adhesive 15 may be employed. The adhesive used is preferably a synthetic resin such as has been recently developed for bonding together a metal part and another part made of metal or other substance and which will have great strength when set. The adhesive 15 is employed not only between the outer part of the barrel 10 of the drum member A and the cylindrical portion 12 of the particular head secured therein, but it is also employed between the flange 11 and the adjacent recessed portion of the head receiving the flange. Actually, the recesses 13 are

made purposely slightly deeper than necessary to properly receive the flanges 11 so that irrespective of slight imperfections in the manufacture of the heads B and C or in the thickness of the flanges 11 as the drum members A are drawn from sheet metal the inner surfaces of the circumferential portions 14 of the heads may be brought exactly flush with the inner surfaces of the flanges 11. Sufficient adhesive 15 is employed between the flanges 11 and the recessed portions of the heads to completely fill the space between the flanges and the heads and to assure a thorough bonding action.

One of the heads, such as the head B, will be provided at its central portion with a spindle receiving aperture 16 which may join radial driving key receiving recesses 17 formed at the outer side of the head. The other head C may be equipped with a central opening 18 which is countersunk at its inner side at 18a to permit easy insertion therethrough of a spindle. It will be appreciated that if desired the two heads may be otherwise centrally formed to permit mounting of the bobbin on a spindle and to permit the bobbin to be driven if this is desired.

Preferably, the heads B and C are assembled with the drum members A before the two barrels of the drum members A are joined together. After the stampings and heads have been so assembled the two barrels 10 may be joined in alignment by means of a collar D having a central outwardly projecting flange 19 on its outer surface which will be disposed between the inner ends of the two barrels 10, whereby the collar serves to align the two barrels as the inner ends of the same are brought together. The collar D may be bonded to the inner ends of the two barrel portions 10 by an adhesive 20 such as described in securing the heads B and C to the stampings A or, if desired, the collar D may be secured to the barrel portions 10 in any other suitable manner, as by welding if made of metal or the like. When joined together one barrel forms a continuation of the other to form a winding core.

The bobbin produced as above described can be employed for the winding of textile thread or fine wire thereon. The barrels 10 being metal will have tremendous strength to prevent the same from being crushed or misshaped due to the pressure applied thereto by the thread or wire. As the flanges 11 are made integral with the barrels 10 it will be impossible for the flanges 11 to draw away from the barrels 10 under endwise thrust exerted by the thread on the bobbin. Therefore, cracks or crevices cannot develop for the catching of thread between the flanges 11 and the barrels 10. Also, the heads B and C act to reinforce the flanges 11 and the flanges act to reinforce the heads, making the end structures of the bobbin exceedingly strong to resist end thrust and preventing the flanges 11 from being warped or bent out of a true plane extending at right angles to the axis of rotation of the bobbin. The metal flanges 11, being somewhat resilient, act to reinforce the heads B and C so that if the bobbin is dropped as on a metal or concrete floor deflection of the circumferential portions 14 of the heads will not be sufficient due to the backing of the flanges 11 as to permit cracking or breakage of the heads B and C or portions thereof. Due to the fact that the circumferential portions 14 of the heads overlie the edges of the flanges 11 and due to the fact that the inner sides of the circumferential portions 14 are flush with the

inner sides of the flanges 11, the thread wound on the bobbin can be very easily drawn off the bobbin from one end of the same. By reason of the fact that the heads B and C are made of tough, strong and resilient non-metallic plastic or fiber the peripheral edges over which the threads run cannot be nicked, marred, or dented through handling so as to cause catching of strands of the thread as the thread runs over the circumferential portions 14 of the heads. In other words, the peripheral portions of the heads B and C are made true and smooth and the type of material employed for the heads is such that as the periphery of one of the heads is struck during rough handling of the bobbin the material is tough enough and resilient enough that it is almost impossible to nick, mar, dent or cut it as would be the case if a metal head were employed.

Referring now to Figs. 5, 6, 7, and 8, there is there shown a slightly different embodiment of the invention. The parts of this bobbin include metal drum members E, heads F, gudgeons G, a tubular strut H extending between the two gudgeons, and a collar I for joining together the inner ends of the stampings E.

The stampings E are similar to stampings A previously described, and include barrels 21 of tubular formation and circular flanges 22 which may be integrally formed with the barrels at the outer ends thereof and projecting radially therefrom in planes normal to the axis of rotation of the bobbin. The heads F are made of tough plastic or fiber as in the case of the heads B and C and each head is provided with a recess 23 at its inner side to receive one of the flanges 22 and it is further provided with a circumferential portion 24 overlying the edge of the adjacent flange 22 and having its inner surface flush with the inner surface of the flange 22. The peripheral edges of the heads F are smooth and rounded as in the case of the previously described construction. Each head has an inner flange 25 received within the outer part of the barrel 21 of the adjacent drum member E and, of course, the head closes the outer end of the barrel. The barrel 21 of each stamping is adhesively bonded to the flange 25 of the adjacent head, while the flange 22 of the stamping is similarly bonded to the recessed portion of the adjacent head by an adhesive 26 formed preferably of synthetic resin.

Each head F is provided with a central gudgeon receiving opening 27 and the outer portion of the head is outwardly grooved at 28 adjacent this opening. The gudgeons G as stated are made of plastic Nylon and they are equipped with exterior shoulders 29 for abutment against the inner sides of the heads F. The inner surfaces of the gudgeons are provided with rabbets 30 to receive the outer ends of the tube H. As a gudgeon is originally made, as shown in Fig. 9, it is provided with a rounded flange 31 intermediate the shoulder 29 and the outer end of the gudgeon, the diameter of this flange corresponding to the diameter of a groove 28 in a head F. In assembling one of the gudgeons G on one of the heads F the gudgeon is forced through the opening 27 from the inner side of the head, thereby causing the flange 31 of the gudgeon to compress and then expand into the groove 28 to produce an interlocking flange as shown at the outer portion of the head F opposing the shoulder 29 and thereby retaining the Nylon gudgeon in assembled position. It should perhaps be stated that plastic Nylon is the best material I have yet found for

the making of the gudgeons G inasmuch as it is tough, strong, makes an ideal high speed bearing for the spindle and yet it has the peculiar resilient quality allowing the compression of the flange 31 for insertion in the opening 27 in the head F and expansion of the flange into the groove 28 after insertion to lock the gudgeon in place. Other material having like properties may be employed instead of plastic Nylon and it will be understood that when plastic Nylon is referred to it is used in a broad enough sense to embrace equivalent other plastic materials.

After the gudgeons G have been assembled with the heads F and the gudgeon equipped heads have been secured to the stampings E, to assemble together the parts forming a single bobbin the collar I is applied to the inner end of one of the two barrels 21 with the central flange 32 of the collar bearing directly against the inner end of that barrel 21. Thereupon the tube H which is formed preferably of metal is placed so as to be received within the rabbeted portion 30 of one of the gudgeons and then the two barrels 21 of the two drum members E are brought into alignment and forced toward each other so that the outer ends of the tube H are received within rabbets 30 of the two gudgeons and the inner ends of the two barrels 21 are received, one at either side of the flange 32 of the collar I. Previous to this assembly the exterior surfaces of the collar I are coated with an adhesive material 33 formed preferably of a synthetic resin and thus when this adhesive material has set a strong bond will be made between the barrel portions 31 and the collar I. The two gudgeons G and the tube H forms a continuous passage within which a spindle for the mounting of the bobbin may be received. The bobbin thus produced has the advantages of the bobbin previously described and illustrated in Figs. 1 to 4.

The two drum members A of the bobbin shown in Figs. 1 to 4, and the two drum members E of the bobbin shown in Figs. 5 to 9 may be anodized prior to assembly to protect the surfaces thereof. When the drum members are anodized it is preferable to make the stepped collars D or I of some such plastic material as plastic Nylon, the outer edges of the flanges of which can be and are sanded or burnished off flush with the inner ends of the barrels 10 or 21 without machining of the parts. In cases when the drum members are not to be anodized the collars D and I may be made of metal and the edges of the flanges may be machined off evenly with the adjacent portions of the two barrels. In any case the flange of the collar acts to center the collar relative to the two barrels while the inner ends of the two barrels are being brought together in aligned relation and the flange of the collar spans the space between the two inner ends of the barrels and takes up for slight variations in thickness of these parts.

It will be seen that bobbins have been provided in accordance with the present invention which are inexpensive, light, strong and true and which will stand up under continuous use for a long period of time.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departure from the scope of the present invention which, generally stated, consists in the matter shown, and described, and set forth in the appended claims.

What I claim is:

1. A flanged bobbin comprising a metal drum

member having an inner tubular barrel and an outer radially projecting circular flange joining the outer end of said barrel, and a circular head formed of a tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented or cut, said head being secured to said flange at the outer side thereof and being recessed to snugly receive said flange, the circumferential portion of said head overlying the edge of said flange and being of smooth exterior formation, the inner side of the circumferential portion of said head lying flush with the inner side of said flange.

2. A flanged bobbin comprising a metal drum member having an inner tubular barrel and an outer circular flange joining the outer end of said barrel and projecting radially therefrom, and a circular head formed of a tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented or cut, said head having a central cylindrical portion projecting into the outer part of said barrel portion and secured thereto, said head being recessed to snugly receive said flange, the circumferential portion of said head overlying the edge of said flange and being of smooth exterior formation, the inner side of the circumferential portion of said head lying flush with the inner side of said flange.

3. A flanged bobbin comprising a metal drum member having an inner tubular barrel and an outer circular flange joining the outer end of said barrel and projecting radially therefrom, a circular head formed of a tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented or cut, said head at its inner side being recessed to snugly receive said flange, the circumferential portion of said head overlying the edge of said flange and being of smooth exterior formation, the inner side of the circumferential portion of said head lying flush with the inner side of said flange, and an adhesive bonding together said flange and said head.

4. The structure defined in claim 3, said head having a central cylindrical portion received within the outer part of said barrel and an adhesive bonding together said central cylindrical portion and said barrel.

5. A flanged bobbin comprising a metal drum member having an inner tubular barrel and an outer circular flange joining the outer end of said barrel and projecting radially therefrom, a circular head formed of a tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented or cut, said head at its inner side being recessed to snugly receive said flange, the circumferential portion of said head overlying the edge of said flange and being of smooth exterior formation, the inner side of the circumferential portion of said head lying flush with the inner side of said flange, and an adhesive formed of synthetic resin bonding together said flange and said head.

6. The structure defined in claim 5, said head having a central cylindrical portion received within the outer part of said barrel, and an adhesive of synthetic resin bonding together said central cylindrical portion and said barrel.

7. A flanged bobbin comprising a metal drum member having an inner tubular barrel and an outer circular flange joining the outer end of

said barrel, a circular head formed of a tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented, or cut, said head being secured to said flange at the outer side thereof and being recessed to snugly receive said flange, the circumferential portion of said head overlying the edge of said flange and being of smooth exterior formation, the inner side of the circumferential portion of said head lying flush with the inner side of said flange, a stepped collar attached to the inner end of said barrel and a tubular metal member attached to said stepped collar in alignment with said barrel and forming a continuation thereof.

8. The structure defined in claim 7, and an adhesive bonding said stepped collar to both said barrel and said tubular metal member.

9. The structure defined in claim 7 and an adhesive formed of synthetic resin bonding said stepped collar to said barrel and said tubular metal member.

10. The structure defined in claim 7, the exterior surface of said metal drum member and said tubular metal member being anodized and said stepped collar being formed of a tough, non-metallic material.

11. A flanged bobbin comprising a pair of metal drum members having inner tubular barrels and outer projecting circular flanges joining the outer ends of said barrels, a pair of circular heads formed of tough, resilient non-metallic material having the property of being shaped to form a smooth edge incapable of being readily nicked, marred, dented or cut, said heads being secured respectively to said flanges at the outer sides thereof and being recessed to snugly receive said flanges, the circumferential portions of said heads overlying the edges of the flanges received therein and being of smooth exterior formation, the inner sides of the circumferential portions of said heads lying flush with the inner sides of the flanges received therein, and means joining together the inner ends of said barrels in alignment.

12. The structure defined in claim 11, said means comprising a collar having an exterior flange formed thereon midway of its length, the two inner end portions of the barrels being received over said collar and the extreme inner end edges of said barrels being in abutment with the flange of said collar.

13. A bobbin comprising a pair of drum members having tubular barrels, means for joining the inner ends of the tubular barrels in alignment, a pair of heads secured to the outer ends of said barrels, said heads having central stepped apertures therein and spindle receiving Nylon gudgeons mounted in the stepped apertures of said heads, said gudgeons each having an exterior shoulder abutting one side of one of said heads and an exterior flange spaced from the shoulder compressible to be driven through one of the stepped apertures and received within the step of the aperture to interlock the gudgeons in place on the head.

14. A bobbin comprising a pair of drum members having tubular barrels, means for securing together the inner ends of said barrels in alignment, heads secured to the outer ends of said drum members, said heads having stepped central apertures therein, Nylon gudgeons mounted in said stepped apertures, said gudgeons having exterior shoulders bearing respectively against the inner sides of said head and exterior flange spaced from said shoulders compressible to be

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forced through said apertures and received within the steps thereof to interlock the gudgeons in place, the inner ends of said gudgeons being internally rabbeted, and a tube extending centrally within said barrels between the two gudgeons and having its ends received within the said rabbets of the gudgeons.

15. A bobbin comprising a pair of metal barrels having outturned flanges at their outer ends, means for securing together the inner ends of said barrels in aligned relation, and end heads of a tough, non-metallic material capable of being formed to provide a smooth peripheral edge incapable of being readily nicked, marred, dented or cut, the circumferential portions of said heads overlying the edges of said flanges and the inner sides of said circumferential portions lying flush with the inner surfaces of said flanges, and means securing said heads to said flanges.

16. A bobbin comprising a metal barrel having an outturned flange at one end and a head of

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a tough, non-metallic material capable of being formed to provide a smooth edge incapable of being readily nicked, marred, dented or cut, the circumferential portion of said head overlying the edge of said flange and the inner side of said circumferential portion lying flush with the inner surface of said flange, and means securing said head to said flange.

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