March 13, 1928.

1,662,238

H. J. DAVIS

SPOOL OR BOBBIN

Filed March 23, 1927

Fig. 1.

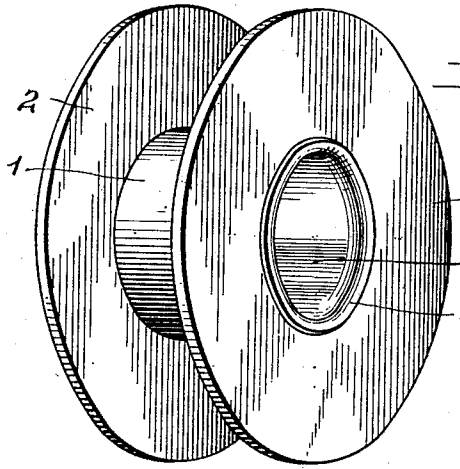


Fig. 2.

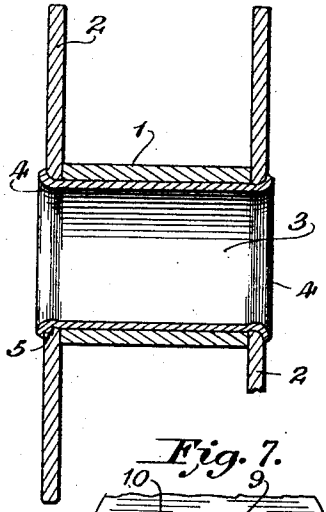


Fig. 3.

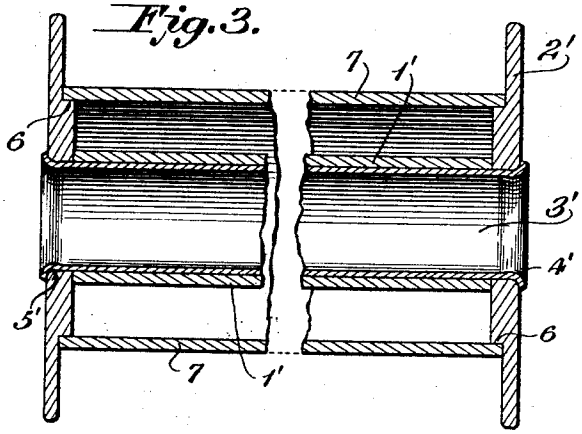


Fig. 7.

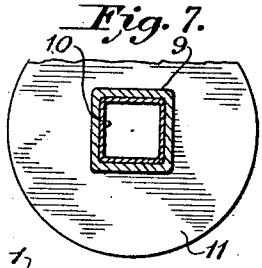


Fig. 5.

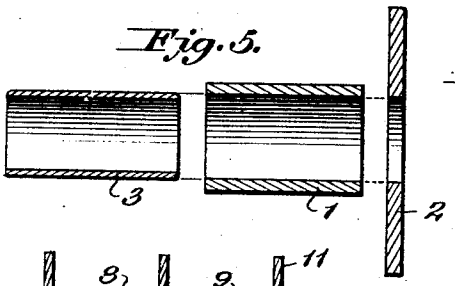
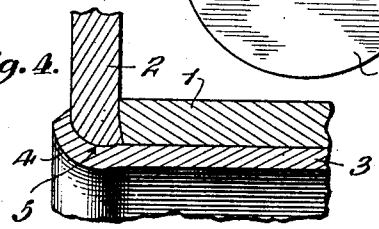


Fig. 4.



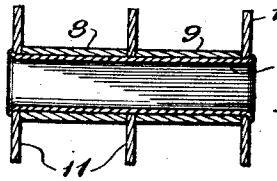


Fig. 6.

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UNITED STATES PATENT OFFICE.

HOMER J. DAVIS, OF WILMINGTON, DELAWARE.

SPOOL OR BOBBIN.

Application filed March 23, 1927. Serial No. 177,721.

This invention relates to improvements in the construction of spools or bobbins generally adapted for use in receiving and winding insulated electric wire, enameled wire, or similar material; silk, cotton and other threads or like materials and in larger sizes of such bobbins or spools, for winding cotton, silk and other piece goods or other textile materials, the invention having for an object to provide, as an article of manufacture, a spool or bobbin having the barrel and head portions thereof firmly and rigidly clamped or secured in assembled relation by a tubular or sleeve like metal element over which the barrel and relatively spaced heads are snugly engaged, whereupon the opposite and extended ends of the metal element are swaged or flaringly bent outwardly into clinching engagement with the adjacent portions of said heads, hence, firmly and bindly uniting the assembled parts and affording thereby at a minimum production cost, a construction possessing materially greater strength, resistance and permanency and longer wearing or usage qualities than those forms of types of similar devices now prevalent in the art.

It may also be stated to be an object of the invention to provide the improved construction with a novel form of clamping or assembling element, the same being of an outside diameter approximately corresponding to the inside diameter of the barrel and heads, whereby to snugly receive the same thereover, whereupon the extended opposite ends of the said element are bent or swaged outwardly into clinching engagement with adjacent portions of the heads, forming in the outer periphery of the element, with such outward bending or swaging, circumferentially extending ways or grooves in which portions of the heads are engaged and thus, firmly secured with the added aforesaid clinching engagement.

Other objects of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by those skilled in the art to which it appertains, I have in the accompanying illustrative drawings and in the detailed description based thereupon, set out one possible embodiment of my invention.

In these drawings:

Figure 1 is a perspective of the improved spool or bobbin,

Figure 2 is a longitudinal section therethrough,

Figure 3 is a fragmentary longitudinal section through a slightly modified form of the spool or bobbin,

Figure 4 is an enlarged fragmentary detail in longitudinal section showing the manner in which the clamping or assembling element is received by and engaged with the spool barrel and heads,

Figure 5 is a disassembled detail in section illustrating the mode of relative arrangement and size of the bobbin or spool barrel, heads and clamping or assembling element,

Figure 6 is a longitudinal section through another modified form of the spool or bobbin, and

Figure 7 is a transverse section of the same.

Having more particular reference to the drawings, in connection with which like characters of reference will designate corresponding parts throughout, the improved bobbin or spool may be stated to comprise a barrel 1 and head pieces 2, these particular parts of the construction being preferably formed of vulcanized fibre, which as will be understood, is produced by a chemical reaction on pure rag cellulose paper, in contradistinction to that form of product known in the parlance of the trade as fibre or pasteboard, this matter being a mechanical product of the paper mills or board mills and being made up principally of pulp, old paper, etc., as raw material. However, while I have qualified to some extent the materials from which the barrel and heads of my improved bobbin or spool are to be constructed, it will be fully understood that various other forms of materials may, at times, be substituted therefor, such as preference or peculiar conditions may dictate.

As will be noted, the respective inside diameters of the barrel 1 and the heads 2 correspond and likewise, the heads 2 are of complemental size and formation.

A tubular assembling or clamping element 3 is provided the construction, this element being preferably formed of brass or of a metal possessing similar properties and convenient features of working; the outside di-

ameter of the element 3 being the same or approximately the same as the inside diameters of the barrel 1 and the heads 2, whereby the latter may be snugly engaged over the outer peripheral surface of the element 3 as is indicated in the Figures 2 and 5. Also, the length of the tubular assembling or clamping elements 3 is greater than the width of the bobbin composed, in part of the assembled barrel and heads 2, thus causing the opposite ends of such element to be extended for distances beyond the outer and adjacent sides of the relatively spaced heads 2.

Following the arrangement or assembling of the parts of the bobbin or spool construction and identified herein by the numerals 1, 2 and 3, the barrel being intermediately arranged as respects the heads 2 and being snugly engaged over the element 3 as are the opposed and spaced heads 2, the extended ends of the clamping element 3 are swaged or flaringly bent outwardly, by suitable means, to that form as is indicated by the numeral 4, whereupon the extremities of the element will have binding or clinching like engagement with adjacent portions of the outer sides of the heads 2 and consequently thereupon, will effect a positive or firm uniting of the barrel 1 and heads 2 by the resultant binding like action. Because of this, it will be understood and appreciated that the elements of construction of the bobbin or spool, will be positively and rigidly interconnected with respect to each other and thus rendered relatively immovable, hence producing a bobbin or spool construction possessing materially greater strength, resistance and permanency as well as longer wearing or usage qualities than is had by those types of designs of bobbins or spools now prevalent in the art.

Due to the flaringly outwardly bending or swage of the opposite ends of the assembling or clamping element 3, as is indicated by the numeral 4, it will be noted that circumferentially disposed or extending ways or grooves will be formed in the outer peripheral surface of the element 3 adjacent such extended ends and the points of engagement of the element with the heads 2. Because of this, seats will be afforded for receiving the now compressed rounded outer corner edges of the holes in the relatively spaced heads 2, thus giving greater rigidity to their positioning with respect to the adjacent or abutting ends of the barrel 1 and also, materially and advantageously bracing said heads against undesired relative movement or outward lateral displacement from the element 3; such circumferentially disposed ways or grooves being designated for convenience by the numeral 5 and exaggerated in their showing through the medium of the Figure 4.

In the Figure 3 I have shown a slightly modified form of bobbin or spool, wherein the barrel 1′ and heads 2′ are provided, these parts or elements of construction being assembled in much the same fashion as is described in connection with the embodiment illustrated in the Figures 1 and 2; that is, being positioned in juxtaposed relation and having a tubular assembling or clamping element 3′ snugly engaged therethrough, the opposite ends of said element being extended for distances beyond the outer sides of the relatively spaced heads 2′ whereupon these extended ends are flaringly bent or swaged to positions as is shown or indicated by the numeral 4′, the extremities of the bent or swaged portions clinchingly engaged portions of the heads 2′ and thus bindingly interconnecting the barrel 1′ and the heads 2′, and giving to this resultant construction, marked qualities of rigidity, strength, resistance and wear or usage. Also, it is to be noted at this point, that by the peculiar methods practiced in swaging or flaringly bending the opposite ends of the tubular element 6′, circumferentially disposed ways or grooves 5′ will be formed therein adjacent these portions 4′ and over or about their outer peripheral surfaces; the ways or grooves serving to receive therein adjacent portions of the heads 2′ compressing the outer corner edges of the holes in the outer heads to conform to the somewhat rounded shape of the element 3′ and thus, adding further to the rigidity of the assembled construction and materially lessening the liability of lateral outward disengagement of the heads 2′ from the opposite ends of the clamping element 3′.

In this particular form of bobbin or spool as shown in the Figure 3, it will be noted that the outer portions of the inner sides of the heads 2′ are circumferentially chamfered, thus providing upon said inner sides of the heads 2′ annular inwardly disposed shoulders 6, which shoulders in turn are adapted to snugly receive thereupon a secondary or false barrel 7, the latter being of a materially greater size or diameter than is the barrel 1′ and providing thereby, a bobbin or spool affording a reduced or smaller winding space; such constructions being especially advantageous for use in the winding of threads or similar lengths of material as is commonly used in textile mills.

In the Figures 6 and 7, I have disclosed still another modified form of the bobbin or spool. In this particular form of the invention, it will be noted that I provide a device wherein the winding surfaces are in multiple, that is, two or more separate and distinct winding surfaces are afforded thereby, the construction being preferably arrived at by the snug arranging of barrels 8

and 9 upon a somewhat elongated metal tubular assembling and clamping element 10, while heads 11 are also snugly engaged over the said element 10, certain of the heads being positioned adjacent the opposite extremities of the element 10 whereas the intermediate head is arranged between the adjacent or inner ends of the barrels 8 and 9. In this way, it will be understood that with the flaring bending or swaging of the extended extremities of the tubular element 10, the outer extremities thereof will be bindingly and clinchingly engaged with the adjacent sides of the outermost heads 11, thus firmly interconnecting the elements 8, 9 and 11 represented by the construction in such a manner as to render the same relatively immovable and relatively rigid; the intermediate head 10 being bindingly and clampingly arranged or secured in its respective position between the inner ends of the barrels 8 and 9 and thus secured against relative movement or displacement.

At the respective points of flaringly bending or swaging of the opposite ends of the element 10, it will be noted that peripherally disposed grooves are formed in the outer surface thereof and into these grooves or ways, adjacent portion of the outermost heads 10 are received, compressing and somewhat rounding the outer edges of the holes in said heads to conform to the general shape or contour of said flaringly bent or swaged ends, thus, as described in the preceeding embodiments of the invention, lending to the rigidity and strength of the resulting construction and additionally, lessening the liability of undue pulling or lateral outward displacement of said heads from said element 10.

It is timely to note that the assembling or clamping element indentified by the numeral 10 in this latter embodiment of the invention is square or substantially square in cross section, rather than circular, as was the case with the corresponding elements in the preceeding embodiments herein. This particular shape of assembling or clamping element is desirable under certain conditions or where certain or pecular requirements for a winding surface are had and as will be noted upon reference to the Figure 7, the cross sectional shape of the barrels 8 and 9 and the openings formed in the heads 11 correspond thereto and are of a size such as will insure their respective snug engagement over the outer surface of the element 10.

Also, if desirable, that form of the invention as illustrated in the Figure 3 may be constructed to provide a multiplicity of winding spaces i. e. one or more heads 2′ intermediately of the relative opposed heads secured to or mounted upon the opposite extremities of the assembling or clamping element 3′.

That the construction of the elements of my improved bobbin or spool may be clearly understood from perusal of this specification, it is deemed in order to state at this time that the vulcanized fibre heads employed in connection with the different embodiments of the device illustrated herein of the inner marginal portions thereof, that is, those portions of the heads adjacent the holes or concentric openings formed therethrough, shaped perfectly square as is illustrated in the Figure 5; similarly, that the marginal extremities of the barrel or barrels employed in the bobbins or spools are also squarely or angularly shaped as is illustrated in the said Figure 5. When, however, the elements of the bobbins or spools are assembled and are subjected to that pressure needed to flaringly bend, swage or rivet the outer extremities of the tubular elements 3, 3′ or 10, it will be understood that the inner marginal portions of said heads, that is, the portions bordering the holes therethrough and the marginal extremities of the barrel or barrels employed will be slightly rounded or curved as is illustrated in the Figure 4, this being due to the somewhat yieldable character of the material from which said heads and barrels are constructed. Should, however, harder materials be employed for the construction of the heads and barrels of the bobbins or spools, it may be that in these instances the stressed marginal portions of the heads and of the barrel or barrels will not be distorted or changed from their original shapes, which are to be understood as being perfectly square or angular, as hereinbefore described and as is shown in the aforesaid Figure 5.

In the somewhat distorted formation of the stress portions of the head and the barrel illustrated in the Figure 4, it will be understood that a positive and binding contact will be established between these elements and between the clinchingly and bindingly engaged anchoring element employed in conjunction therewith and consequently upon this, that the rigidity and stability of the resultant product will be materially enhanced, rather than detracted from by said distortion.

Manifestly, the construction shown is capable of considerable modification and such modification as is within the scope of my claims, I consider within the spirit of my invention.

I claim:

1. As an article of manufacture, a spool consisting of coaxially disposed barrel like bodies of different cross sectional sizes, the smaller of said barrels being arranged within the other and in relatively spaced relation to the same, heads adjacent the opposite extremities of said barrels having portions of their inner sides formed with shouldered

parts adapted to snugly and bindingly receive the adjacent opposite ends of the larger barrel thereover, such barrels and heads being each formed of a hardened composite material, and a tubular metal element bindingly received in and extended through the innermost and smaller of said barrels, said elements being of a length greater than the length of either of the barrels and having its extremities extended for distances beyond the adjacent ends of that barrel receiving the same and having said heads engaged over the same and the extremities of the barrel being outwardly swaged upon themselves whereby to bindingly and clampingly engage adjacent portions of the barrel to bindingly and clampingly secure the same with respect to each of said barrels.

2. As an article of manufacture a spool consisting of a barrel like body portion and heads adjacent the opposite ends thereof and in abutting engagement therewith, said barrel and heads being formed of hardened material, and a metal tube bindingly received in and extended through the barrel and heads, the opposite ends of said metal tube being swaged, forming circumferentially disposed seats receiving the inner marginal portions of said heads and bearing directly against the same, and clampingly interconnecting the latter with the opposite and adjacent ends of the barrel like body portion, the swaged ends of the metal tube terminating in a plan substantially coincidental with that of the outer peripheral surface of the barrel like body portion imparting direct inward pressure upon those portions of the heads contacting with the barrel like body portion ends whereby to inwardly offset the same and effect an interfitting and interlocking engagement with said body portion ends.

In witness whereof I have hereunto set my hand.

HOMER J. DAVIS.