Feb. 19, 1957 N. P. HOFFSTEDT 2,781,985

BOBBIN

Filed June 12, 1953

Fig. 1

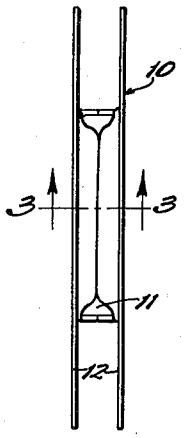


Fig. 2

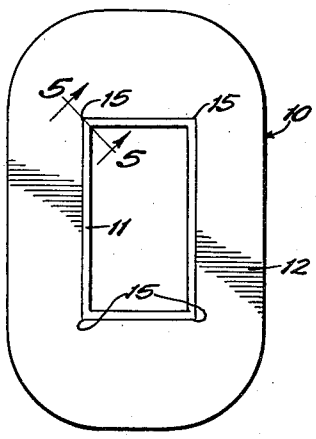


Fig. 4

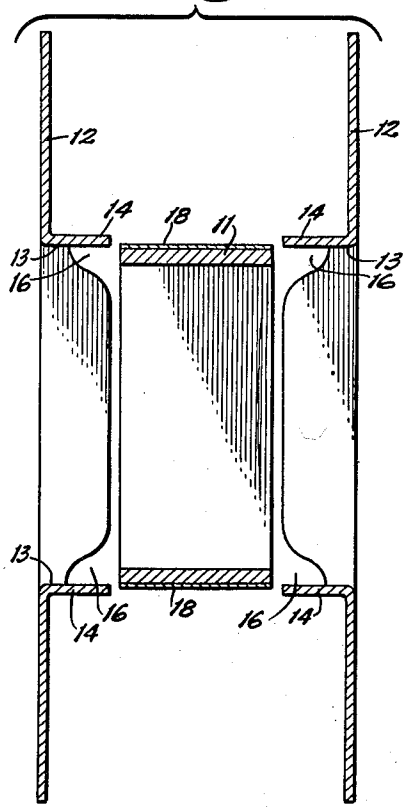


Fig. 3

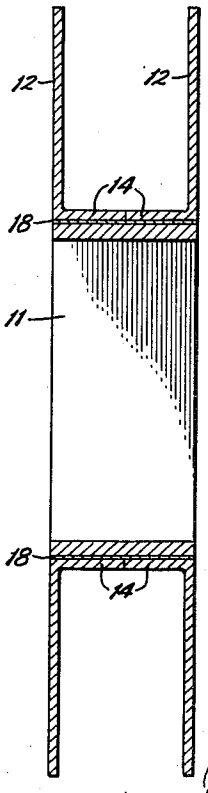
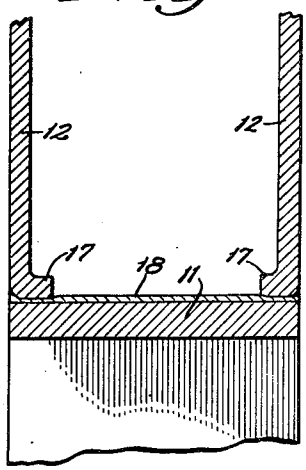


Fig. 5



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BOBBIN

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4 Claims. (Cl. 242—118)

This invention relates to bobbins, and in particular to bobbins of the type commonly used as a form for the winding of transformers and electrical coils thereon.

Bobbins or coil forms are used extensively in the electrical industry as supports upon which coils of wire are wound to form transformers, choke coils, etc. Conventionally, the bobbin construction includes a core having a flange mounted thereon adjacent each end. The flanges are usually provided with a central opening for receiving the core and are then secured to the core by swaging the core ends to lock the flanges in place. Where the core is square or rectangular or of some other polygonal or multiple sided construction resulting in corners that are often sharp, the corresponding corners of the central opening of the flange do not snugly engage the core corners and are frequently cut away to allow swaging without deforming of the flanges. Another construction is to provide the edges of the central opening with inwardly-extending bulges to permit swaging without distortion of the structure. In any event, the flanges have not satisfactorily enclosed the core, and openings or irregular fits were provided, particularly at the corner portions, or else inwardly-extending ribs provided a tight closure but were difficult to form and resulted in an undesirable obstruction that interfered with the subsequent coil winding operation and further resulted in a coil having varying axial dimensions. The cutting out of the corners is not satisfactory since the coil of wire subsequently wound upon the bobbin is not insulated by the flanges at the corner portions nor otherwise protected by the flanges.

An object of the invention is to provide a bobbin having a core with a plurality of sides meeting in corners and in which terminal flanges of the bobbin snugly engage the core throughout the entire periphery thereof and completely enclose the core. Another object is to provide a bobbin having a core that is polygonal in cross section with relatively sharp corners and flanges equipped with laterally-extending projections snugly receiving the core; the flanges providing necks at the corners of the core and between adjacent projections whereby the flanges enclose the core and provide a completely insulated space therebetween. Still another object is that of providing a bobbin structure as above described and in which the core is coated with a hard material providing swollen zones in the separations between adjacent projections at the corners of the core to firmly anchor the flanges upon the core. A further object is in providing a bobbin or the like for electrical coils and in which the bobbin includes a multiple sided core with relatively sharp corners having mounted thereon flanges equipped with projections snugly engaging the side of the core; adjacent projections at the corner of the core being spaced and separated by necks struck laterally from the flanges; a plastic coating on the core providing zones of enlargement within the spaces between the projections to lock the flanges upon the core, whereby the more precise and accurately dimensioned bobbins are provided at reduced cost while the flanges completely insulate windings subsequently supported thereon. Additional objects and advantages will appear as the specification proceeds.

An embodiment of my invention is illustrated in the accompanying drawing, in which—

Figure 1 is a side view in elevation of a bobbin constructed according to my invention; Fig. 2 is an end view in elevation of the bobbin; Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a sectional view similar to that of Fig. 3 but showing the parts in spaced-apart relation prior to their assembly; and Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

The structure of my invention consists of a bobbin 10 having a core 11 and terminal flanges 12 each equipped with a central aperture or opening 13 therethrough. Adjacent the opening 13, each of the terminal flanges 12 is equipped with a plurality of laterally-extending or inwardly-struck flanges or projections 14. As noted best in Fig. 2, the core 11 is rectangular in shape and this form is provided for simplicity of illustration and description. It is to be understood that the core 11 is polygonal or multiple sided and adjacent sides meet at corners 15 that are normally relatively sharp.

I prefer to provide an inwardly-extending projection 14 for each side wall of the core 11, and between adjacent projections 14 that meet at a corner 15 of the core, separations or spacings therebetween are provided. The separations or spacings are designated generally by the numeral 16 and are seen best in Figs. 1 and 4. Between adjacent projections 14 and in the spaces 16 at each corner of the core the flanges 12 are struck inwardly to provide necks 17. A neck 17 is positioned at each corner 15 of the core and together with the projections 14 completely enclose the core and provide a snug and regular fit, as is seen best in Fig. 2.

The core 11 and the terminal flanges 12 may be formed of any suitable material. In the usual construction the core 11 is formed of laminated paper, the laminations being secured together by adhesive or by other suitable means. The terminal flanges 12 may also be paper that is treated or otherwise made relatively stiff. It will be understood that the central aperture or opening 13 through each of the terminal flanges 12 will conform in size and shape to the contour of the core 11. It is also preferred that the passage formed by the inwardly-extending projections 14 and necks 17 together with the opening 13 provide a passage that snugly receives the core 11 therein.

After the core 11 and flanges 12 have been formed, they are assembled as illustrtaed in Fig. 4 and the flanges are rigidly secured upon the core 11 to provide a structure suitable for having electrical coils wound thereon and the flanges completely enclose the core and thereby completely insulate and protect a coil or transformer subsequently wound upon the bobbin. I prefer to secure the flanges 12 to the core 11 in the following manner. I coat the outer surface of the core 11 with a thin layer of normally hard material 18 that may be, for example, cellulose acetate. The core 11 with the outer hard layer of plastic or cellulose acetate thereon is snugly received within the central opening provided by each of the terminal flanges 12. The assembled bobbin is then placed in a chemical bath that is operative to soften the plastic layer 18. Exposure to the bath for an interval of from one to five seconds results in substantial swelling of the plastic layer which is in contact with the bath. As a result the plastic layer promptly swells, as is indicated in Fig. 5, and securely locks the flanges 12 in proper position upon the core 11.

Since spaces or separations are provided between adjacent projections 14 at the corners 15 of the core, the plastic layer 18 will swell in these separations and abut and engage the projections 14 as well as the necks 17.

These swollen zones will thereby lock or anchor the flanges **12** in rigid position upon the core **11**.

The chemical bath for swelling the plastic layer **18** may be any bath containing chemicals that will react with the particular plastic used to bring about a swelling thereof. If cellulose acetate is used for the coating **18**, the bath may be methyl isobutyl ketone. The method thus employed for securing the flanges **12** upon the core **11** and the chemical baths that may be employed to bring about a swelling of the plastic layer **18** is set out in detail in the application of William F. Stahl and Fred V. Collins, Serial No. 159,756, filed May 3, 1950, now Patent No. 2,644,651. Reference to this application may be made for details of both the method and bath composition.

The bobbin structure formed according to my invention is strong and stable and provides an excellent foundation upon which electrical coils may subsequently be wound. The projections **14** and necks **17** snugly receiving the core **11** provide a completely enclosed core zone between flanges that insulates the coil wound therein and protects it mechanically throughout and particularly at the corners **15** of the polygonal core.

While in the foregoing specification I have set forth a specific embodiment of my invention in considerable detail for purposes of illustration, it is apparent that those skilled in the art may depart from these details while still falling within the spirit of the invention.

I claim:

1. In a bobbin structure, a multiple-sided core, said core having a relatively thin coating over the outer surface thereof, said coating being a relatively hard material adapted to swell upon the application of suitable swelling agents thereto, and a flange mounted upon said core over said coating thereon, said flange being equipped with multiple projections, one for each side of said core, extending laterally therefrom in engagement with the coated sides of said core, said projections being relatively long for engagement with the sides of said core over extended areas thereof, said projections along the adjacent edges thereof which lie along each corner of said multiple-sided core being recessed from the outer edges inwardly toward said flange to define open areas, said open areas terminating spaced distances from said flange to provide restricted necks integral with said flange that grip said core at the corners thereof, said coating being swollen within the open areas defined by said projections and substantially abutting the projections and necks in the anchorage of said flange upon said core.

2. A bobbin structure adapted for use as a coil form for the winding of electrical coils thereon, said bobbin structure comprising a polygonal core having multiple sides meeting at corners extending longitudinally therealong, said core having the outer surface thereof coated with a normally hard material adapted to swell and maintain itself in swollen condition upon the application of suitable swelling agents thereto, a pair of flanges mounted upon said core, one adjacent each end thereof, each of said flanges having a plurality of inwardly extending projections, one for each side of said core, said projections lying along the coated sides of said core in contiguous relation therewith and the projections of the flanges being in substantially abutting relation intermediate said flanges, the adjacent projections of each flange being recessed at the corners of said core to provide substantially continuous open areas extending from flange to flange along the corners of said core, and each of said flanges being equipped with integral necks at the corners of said core to define the terminal sides of said recesses and being in gripping relation with the corners of said core, said coating being swollen to enlarged thickness in the open areas.

3. In a structure of the character described, a polygonal core, at least one flange mounted upon said core, said flange being equipped with a plurality of projections extending laterally therefrom in substantial engagement with sides of said core along substantial areas thereof, said projections which lie along a corner of said core being recessed from the outer edges inwardly toward said flange to define an open area, said open area terminating a spaced distance from said flange to provide a restricted neck integral with said flange and gripping that corner of said core, and a relatively hard material within the open area defined by such projections and in substantial abutment with the projections and said neck for anchoring said flange upon said core.

4. In combination, a multiple-sided member having corner portions between at least certain of the sides thereof, a flange mounted upon said member and being equipped with a plurality of projections extending laterally therefrom in engagement with sides of said member, said projections bordering each of the corners of said member being recessed from the outer edges inwardly toward said flange to define open areas, each of said open areas terminating a spaced distance from said flange to provide a restricted neck integral with said flange and gripping the corner of said member, said member at least in each of said open areas having a relatively thin coating over the surface thereof formed of a relatively hard material adapted to swell upon the application of suitable swelling agents thereto, said coating being swollen within each of said open areas and substantially abutting the projections and necks in the anchorage of said flange upon said member.

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