

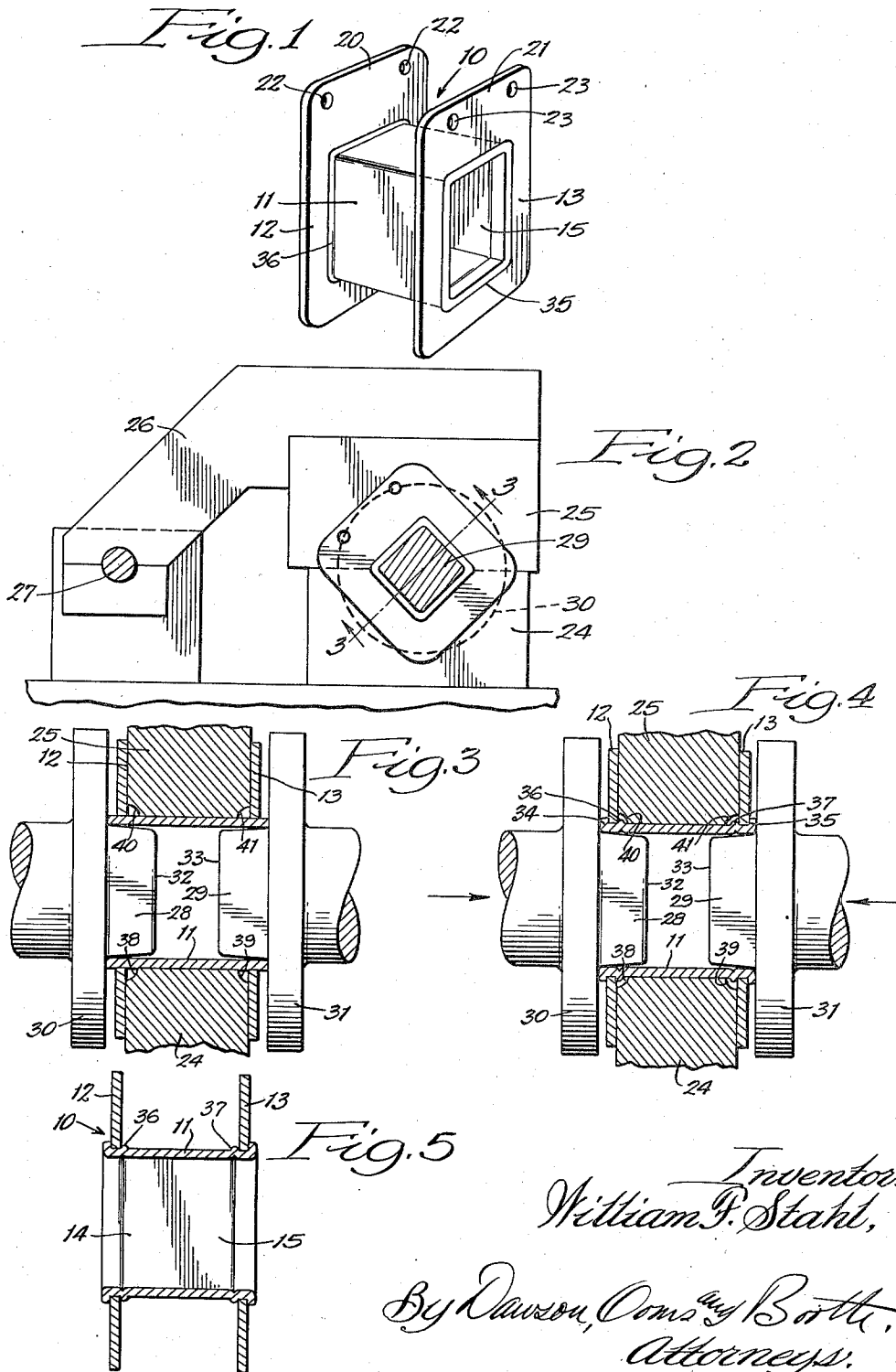
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METHOD AND APPARATUS FOR FORMING BOBBINS AND THE LIKE

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METHOD AND APPARATUS FOR FORMING
BOBBINS AND THE LIKE

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6 Claims. (Cl. 93—1)

This invention relates to a method and apparatus for forming bobbins and the like, and more particularly for forming bobbins having tubular cores and centrally-apertured flanges at the ends thereof, with the flanges locked in position on the ends of the bobbin by outwardly-swaged core ends and by annular ribs on the core immediately adjacent the flanges.

An object of the invention is to provide in a method for forming bobbins and the like, a single operation in which the ends of the core may be outwardly swaged to lock the flanges on the core, and annular ribs formed in the core immediately adjacent the flanges and on the sides thereof opposite to the sides which engage the swaged ends. Another object is to provide a method and apparatus for applying pressure simultaneously to both ends of a core having flanges disposed thereon adjacent the ends thereof, the pressure being exerted outwardly and also toward the longitudinal center of the core. Yet another object is to support against outward expansion the central portion of the core disposed between the flanges and spaced inwardly therefrom so that when the ends of the core are simultaneously swaged, a small rib or projection will be formed at each end of the core between the flange and the portion which is supported against outward expansion.

Another object of the invention is to provide apparatus for releasably supporting the central portion of the core of a bobbin or the like, the portion being disposed between the end flanges on the core and spaced therefrom, and to simultaneously outwardly swage the ends of the core and, in the swaging operation, to apply to the ends of the core a pressure toward the longitudinal center of the core. A further object is to provide a bobbin construction in which the end flanges are securely locked in position on the core against longitudinal movement in either direction.

Other features and advantages will appear from the following specification and drawing, in which—

Fig. 1 is a perspective view of a bobbin illustrating the invention; Fig. 2 is a front elevational view of the bobbin in position in the apparatus for supporting the central portion of the core against outward expansion; Fig. 3 is a longitudinal sectional view taken along the line 3—3 of Fig. 2; Fig. 4 is a longitudinal sectional view similar to the view of Fig. 3 but showing the forming of the ribs in the core; and Fig. 5 is a

longitudinal sectional view of the bobbin shown in Fig. 1.

The invention contemplates the locking of flanges in position at the ends of the core of the bobbin by outwardly swaging the ends of the core to engage one side of each flange and by forming a rib or projection on the other side of each flange. In a single operation, the ends of the core are swaged and the projections or ribs are formed on the core. In the embodiment of the invention described herein, the bobbin 10 includes a tubular core 11 and end flanges 12 and 13. The core 11 may be made of laminated paper strips and may be rectangular in cross section shape as illustrated, or, if desired, may be polygonal or circular in cross section shape. As used herein, the term "tubular" is intended to include polygonal and circular tubular shapes.

The flanges 12 and 13 may be rectangular in shape, as illustrated, and may be provided with central rectangular apertures 14 and 15. The flanges may also be circular or any other suitable shape, and the central apertures 14 and 15 should be of a shape corresponding to the cross section shape of the tubular core. Thus, if the core is circular in cross section shape, the central aperture of each of the flanges should be circular. The flanges may be made of any suitable material, preferably of a material which is an effective electrical insulator. For example, paper, fiber, or composition flanges may be used.

If desired, one of the sides 20 and 21 of each of the flanges 12 and 13 may be elongated and provided with apertures 22 and 23, respectively, through which electrical connections may be received.

The apparatus for forming the bobbin may include a support member 24 and a clamp 25 which are adapted to engage opposite sides of the core 11. The support member 24 may be of metal and may be of such a shape as to snugly receive one-half of the periphery of the core, as seen in Fig. 2. Thus, when the core is rectangular in shape, the support 24 is provided with a recess in the shape of a broad V for receiving the core, the arms of the V being disposed at angles of 90° with respect to each other. The clamp 25 is equipped with a similar recess for receiving and engaging the other half of the periphery of the core.

As seen in Figs. 3 and 4, the support 24 and clamp 25 may be of a width substantially the same as the distance between the flanges 12 and 13 of the core 11. The support 24 may be equipped with annular recesses 38 and 39 at the

ends thereof and at the inner periphery of the support adjacent the core 11 which is engaged thereby. Similarly, the clamp 25 may be provided with a pair of annular recesses 40 and 41. The support 24 and clamp 25 are thus adapted to engage and support the entire periphery of the central portion of the core between the flanges 12 and 13 and spaced inwardly therefrom. The clamp 25 is mounted on an arm 26, which, in turn, is pivotally supported by the shaft 27. With this construction, the arm 26 and the clamp 25 carried thereby may be moved about the shaft 27 to release the clamp 25 from engagement with the core 11.

A pair of swage heads 28 and 29, equipped with enlarged rear portions 30 and 31, are mounted for engagement with the ends of the core 11. The swage heads 28 and 29 are tapered slightly inwardly toward their respective ends 32 and 33. The swage heads 28 and 29 may be mounted on suitable plungers for moving the swage heads toward the ends of the core and bringing the same into engagement therewith.

The apparatus includes means for simultaneously bringing the swage heads 28 and 29 into engagement with the ends of the core 11 in order that the swage heads may simultaneously exert on both ends of the core 11 an outward pressure and also a pressure toward the longitudinal center of the core. The apparatus also may include means for shifting the position of the clamp 25. This latter apparatus may be synchronized with the mechanism for moving the swage heads so that the clamp 25 is brought into engagement with the core 11 immediately before the swage heads are brought into engagement with the ends of the core and the clamp 25 is released from engagement with the core 11 when the swage heads are released from engagement with the end of the core.

Any suitable apparatus such, for example, as the apparatus described in Seever Patent No. 2,249,983, may be used for this purpose. Preferably, positive means, such as a conventional hydraulic piston and cylinder arrangement, may be substituted for the spring means shown in the Seever patent for bringing the clamp 25 into engagement with the core 11 and for releasing the clamp from such engagement.

In the forming of the bobbin, the core 11, with the flanges 12 and 13 on the ends thereof, is placed on the support 24, with the support engaging the entire periphery of the lower half of the central portion of the core between the flanges and spaced inwardly therefrom. The clamp 25 is then brought into engagement with the entire upper half of said central portion of the core, and the swage heads 28 and 29 are simultaneously brought into engagement with the opposite ends of the core 11.

The swage heads 28 and 29 exert pressure on the ends of the core 11, the pressure being outward and also being toward the longitudinal center of the core along a line parallel with the axis of the core. When the swage heads exert pressure on the ends of the core, the ends of the core are turned outwardly, as seen at 34 and 35, and at the same time the longitudinal pressure exerted on the ends of the core causes the formation of the ribs 36 and 37 in the portions of the core between the flanges 12 and 13 and the adjacent sides of the portions of the support 24 and clamp 25 engaging the core 11. The ribs 36 and 37 will normally extend entirely about the periphery of the core and serve with the swaged

end portions 34 and 35 to lock the flanges therebetween.

The formation of the locking ribs 36 and 37 apparently results from the longitudinal pressure on the paper core. The support 24 and clamp 25 tightly engage the central portion of the core to prevent outward expansion thereof. Simultaneously, the flanges 12 and 13 engage the portions immediately adjacent the swaged ends 34 and 35. The only portions, therefore, in which the ribs may be formed are those which are between the flanges 12 and 13 and the support 24 and clamp 25. This outward expansion or bulge in the core is sufficient to prevent the adjacent flange from passing thereover and thus locks the flange against movement away from the end of the core.

The recesses 38, 39, 40 and 41 permit the formation of a rib about the periphery of the core 11 immediately adjacent the flanges 12 and 13. The sides of the support 24 and clamp 25, which are outward of said recesses, as illustrated, may be in engagement with the inner sides of the flanges or, if desired, may be spaced slightly away from the flanges. If the sides of the support 24 and clamp 25 engage the sides of the flanges, then upon the swaging operation the flanges will be slightly distorted. Since the flanges will normally be made of a material which possesses a certain amount of resilience, the removal of the support 24 and clamp 25 will permit the flanges to spring back to their original position. If the sides of the support 24 and clamp 25, which are outward of the recesses, are spaced slightly away from the flanges, the flanges will not be distorted by the swaging operation. However, in this instance, the support 24 and clamp 25 should be centered with respect to the body of the core between the flanges 12 and 13 before the swaging operation takes place.

Although the invention has been described in connection with a specific embodiment, such description is for the purpose of illustration only. It will, therefore, be understood that changes and modifications may be readily made without departing from the spirit and scope of the invention.

I claim:

1. A method of forming bobbins and the like, comprising placing at each end of a tubular core a centrally-apertured flange with the core snugly received within the aperture in the flange, supporting against outward expansion the central portion of the core disposed between said flanges and spaced therefrom, and by exerting pressure on each of said ends urging said ends toward the longitudinal center of the core and driving said core outwardly into the spaces between said central portion and said flanges thereby forming a rib in the core between said central portion and each of said flanges and also forming swaged ends to lock the flanges on the core.

2. A method of forming bobbins and the like, comprising placing on each end of a tubular paper core a centrally-apertured flange with the core received snugly within the aperture in said flange, applying to the central portion of the core between the flanges and spaced therefrom means for engaging and supporting against outward expansion substantially the entire periphery of said portion of the core, and by exerting pressure on each of said ends urging said ends toward the longitudinal center of the core along the axis of the core and driving said core outwardly into the spaces between said central portion and said

flanges thereby forming a rib in the core between said central portion and each of said flanges and also locking the flanges on the core.

3. A method of forming bobbins and the like, comprising placing on each end of a laminated tubular paper core a centrally-apertured flange with the flange corresponding in cross section shape to the cross section shape of the end of the core and with the core being snugly received within the aperture in the flange, applying to a portion of the core between said flanges and spaced only slightly therefrom means for engaging and supporting against outward expansion substantially the entire periphery of said portion of the core, simultaneously bringing swage heads having enlarged rear portions into engagement with the opposed ends of the core, and by urging each of said swage heads against the adjacent core end exerting on the end of the core pressure toward the longitudinal center of the core along a line parallel to the axis of the core and driving said core outwardly into the spaces between said portion and said flanges, thereby forming a rib extending transversely about the periphery of the rib between each of said flanges and the portion of the core engaged by said means and also swaging the ends of the core outwardly to lock the flanges on the core.

4. Apparatus of the character described for forming bobbins and the like, comprising a core support receiving the central longitudinal portion of a laminated paper tubular core, a pivotally-mounted clamp above said support and adapted to confine the core thereon, said clamp having an annular recess adjacent the junction of said core and the flanges on the ends of the

core and leaving free and unengaged the flange-carrying end portions, plungers aligned with said core on opposite sides of said support, swage heads having enlarged rear portions carried by said plungers and adapted to enter said core and exert on said end edge portions of the core outward pressure and pressure toward the longitudinal center of the core along a line parallel with the axis thereof, and means for bringing said heads simultaneously into engagement with the ends of said core.

5. Apparatus of the character described for forming bobbins and the like, comprising clamping means for engaging the central tubular portion of the bobbins between the end flanges thereof to support said tubular portion against outward expansion, said clamping means having an annular recess adjacent the juncture of said end flanges and said tubular portion, and swage heads having enlarged rear portions adapted to enter the ends of the tubular portion of the bobbins and to exert on the ends of this portion outward pressure and pressure toward the longitudinal center of this portion.

6. A method of forming bobbins and the like, comprising placing on each end of a tubular paper core a centrally-apertured flange with the core received snugly within the aperture in said flange, supporting the core centrally between said flanges while leaving free spaces immediately adjacent the junctions between said flanges and said core, and swaging the ends of said core to thereby drive said core outwardly into said spaces so as to form ridges engaging the inner side of said flanges.

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