A wire holding barrel is disclosed constructed of parallel spaced apart flanges having four longitudinally extending, transversely curved staves attached in a longitudinal orientation between the flanges.
FIELD OF THE INVENTION

This invention relates generally to non-ferrous filament-holding devices for the transportation and holding of filaments of various types and thicknesses.

Previous to our invention, it had been the common practice within the non-ferrous filament-handling industry to construct a wire-holding device out of a continuous barrel portion disposed between a pair of end flanges. The barrel generally is tapered in order to prevent the wire from slipping downward if the tension on the wire should momentarily be released. Of course, in order to form a tapered barrel a large sheet of metal had to be blanked so as to form two curved sides and also two straight non-parallel sides. The tooling needed to stamp a large sheet of metal into this configuration tended to be large and costly. Additionally, it is difficult to roll into a barrel.

The prior art generally secured the barrel portion to the flanges by means of a number of tabs located on the top and bottom edges of the barrel which were inserted through the flange and then bent over to retain the barrel with respect to the flanges. Due to the extremely high forces which are exerted by wire being wound about the barrel the flanges are formed with an annular slot therein into which the top and bottom edges of the barrel are inserted to lend radial strength.

SUMMARY OF THE INVENTION

In accordance with the invention, a non-ferrous filament holding device is provided consisting of a pair of spaced apart end flanges and having at least three curved elongated staves longitudinally disposed between the end flanges and attached thereto.

This construction offers significant advantages. A primary advantage is that there is less cost in tooling the barrel than is presently involved in tooling prior art barrels. By the use of our invention a long length of metal having a particular thickness and width may be merely stamped with a die transversely to the longitudinal length thereof to form the staves having tabs at the ends thereof and then the staves may be easily curved about a proper radius. Additionally, if it is desired, the staves may be blanked along their longitudinal length in order to form a stave having non-parallel sides.

Additionally, by the use of a discreet number of staves significantly less material is utilized. This has obvious cost advantages and additionally provides for a lighter barrel which is, of course, very significant in terms of transportation cost and ease of handling.

Another significant advantage is that by the use of staves having small radius effective barrel form is not a perfect circle so that the wire wound about the barrel develops a set therein which prevents the inadvertent unwinding of the wire if the tension on the wire should be released.

Further, a barrel constructed in the manner of our invention does not experience the dishing of the flanges as is the case in the prior art.

Other objects and advantages of the invention will become apparent upon reading the detailed description of our invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an exploded perspective view of the elements of our barrel;

FIG. 2 is a view in side elevation of our barrel;

FIG. 3 is a view in top plan of our barrel; and

FIG. 4 is a view along line 4-4 of FIG. 3 shown with wire around the barrel.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings there is shown in FIG. 1 an exploded perspective of the barrel stave reel according to the present invention. The barrel stave reel includes a pair of flanges 11 and 13. The barrel, when constructed, has a longitudinal axis A extending centrally through the flanges 11 and 13 and the staves 15.

The flanges 11 and 13 can be constructed of a number of well-known materials. We have chosen to use the material known as Super-Wood. Each flange 11 and 13 may include a number of laminations of Super-Wood to form the desired thickness, and for our purposes we have found that a total thickness of approximately one-half inch is sufficient for nearly all applications. The diameter of the top flange 11 is usually approximately 1 inch smaller than the diameter of the bottom flange 13.

Each of the flanges 11 and 13 is provided with a central arbor hole 17 of a diameter greatly less than the diameter of the flanges and may be approximately 1½ inches. The holes 17 are concentric with each other and with the axis A of the barrel 10.

Each of the flanges 11 and 13 contains four slots 19 therein. The slots 19 have a predetermined slot length B—B and a slot depth extending from a top face 21 of each of the flanges to a bottom face 23 of the flanges.

We have chosen to construct our staves 15 out of 16-gauge hot rolled 10-20 steel. However, it should be appreciated that various other materials may be used provided that they contain the desired strength. Each stave contains longitudinally directed parallel side edges 25 and 27, a top edge 29, and a bottom edge 31. The top edge 29 of each stave 15 contains three generally longitudinally extending tabs 33 and the bottom edge 31 of each stave 15 contains three longitudinally directed tabs 35. As alluded to, the staves 15 can be formed from a very long and narrow sheet of the steel and then blanked into the desired shape. It should be appreciated that the blanking operation may also include a blank to form edges 25 and 27 into a converging relationship rather than a parallel relationship.

After the blanking operation the individual staves 15 may be curved in a direction transversely to the longitudinal direction of each stave to form the radially outwardly directed curved portion 37 of each of said staves. We have chosen to curve each stave 15 about a 1¼ inch radius. This radius of the curved portion of the stave should be at least six times the diameter of the filament so as to not damage the filament.

Referring now in particular to FIGS. 3 and 4, the disposition of the staves 15 with respect to the flanges 11 and 13 can be seen in addition to the manner in which the staves 15 are secured to the flanges 11 and 13. The elongated staves 15 are disposed longitudinally with respect to axis A between the flanges 11 and 13 and each stave 15 is laterally disposed with respect to the other staves 15.
Each slot length B-B of slots 19 corresponds to the length C-C along the three tabs 35 located on the top edge 29 and the bottom edge 31 of each of the staves 15. Each stave 15 includes projections 32 at each outside end of edges 29 and 31. In construction, the tabs 35 are inserted through the slots 19 with a first portion 39 of each tab 35 being disposed generally longitudinally with respect to axis A as that portion is located within each slot 19. The projections then bite into the Super-Wood flanges. A second portion 41 of each tab 33 and 35 (the end of each tab 33 and 35) extends beyond the top face 21 of flange 11 or the bottom face 23 of flange 13 and is bent over in a radially extending direction in order to secure each stave 15 to the flanges 11 and 13.

It can be seen in FIG. 3 that the disposed staves 15, although generally longitudinally extending with respect to axis A are oblique with respect thereto. It should be appreciated that the curved portion 37 of each of the staves 15 does not have to be defined by a constant radius but rather there could exist an increasing radius from top flange 11 to bottom flange 13.

Referring now to FIG. 4, there is shown a view along line 4-4 of FIG. 3 with a wire 43 wrapped around the barrel. By examining FIG. 4, it can be seen that all but the very ends 45 of each of the curved portions 37 of each stave 15 are in contact with the wire 43. This is desirable in order that the wire does not contact a sharp edge such as edge 25 or 27. Thus, with the individual staves properly disposed between the flanges 11 and 13, the curved portions 37 of each of the staves 15 cooperate to define an effective barrel for the purpose of wire winding. The effective barrel has a circumference corresponding to the inner layer of wire 43 shown generally as layer 49.

Shown in FIG. 4 is an imaginary circle 51 drawn from axis A and through the most outwardly directed point on each of the curved portions 37 of staves 15. It should be appreciated that in order to prevent edges 25 and 27 from damaging the wire 43 the radius of each stave 15 must not be greater than the radius of imaginary circle 51. If the staves have an increasing radius from flange 11 to flange 13, the radius must be true at each imaginary plane, for instance imaginary plane D-D (shown in FIG. 3) drawn normal to longitudinal axis A. Additionally, by having the radius of each curved portion 37 of each stave 15 be smaller than the radius of imaginary circle 51 along each imaginary plane D-D the wire 43 may be wound about the effective barrel to form a circumference different from that of a circle, and indeed something in the nature of a square having rounded corners, in order to provide a permanent set to the wire to prevent unraveling. This feature can be seen in FIG. 4 wherein the outermost strand 53 of wire 43 is shown separating from the effective barrel and because of the set imparted to the wire 43 the wire does not tend to unravel past the stave 15 shown furthermost to the left in FIG. 4.

We have experienced a lesser degree of dishing of our flanges than the dishing previously experienced in the prior art. By dishing what we mean is that due to the force exerted by the wire on the flanges, the flanges tend to bow upwardly near the outside periphery creating a dish looking appearance. This, of course, is highly undesirable particularly because it tends to cause permanent displacement along each lamination of the flange. We believe the decreased dishing is due at least in part to the fact that we don’t have an annular groove in the flanges for laterally supporting the barrel. The groove, of course, effectively decreases the thickness of the flange which makes it easier to cause dishing. Additionally we experience less dishing since by the use of our apparatus either less force is directed onto each flange or because of the use of a number of discrete staves the force pattern on the flanges causes decreased dishing. Nevertheless, because of the advantageous lack of dishing we are free to use thinner flanges which, of course, decreases cost and weight.

Thus it is apparent that there has been provided, in accordance with the invention, a barrel stave reel that fully satisfies the advantages set forth above. While the invention has been described in conjunction with a specific embodiment thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. For instance, it is not necessary that each stave 15 consist of a bent elongated piece of metal but rather each stave 15 could be a pipe or cylinder of the desired radius. Accordingly, it is intended to embrace all such alternatives, modifications, and variations as fall within the spirit and broad scope of the appended claims.

What is claimed is:

1. Apparatus for holding non-ferrous filament wound obliquely with respect to a longitudinal axis of said apparatus comprising:
   a. a pair of radially extending spaced apart and generally parallel flanges;
   b. at least three discrete elongated staves each having a curved portion, said staves being disposed longitudinally between said flanges and laterally spaced apart with each of said curved portions radially outwardly directed;
   c. said disposed staves defining an effective barrel for the winding of filament thereabout, said effective barrel having a first effective circumference near said other of said flanges which is larger than a second effective circumference near said other of said flanges for forming a tapered barrel;
   d. said curved portion of each of said staves defining a radius smaller than a radius of an imaginary circle drawn about said longitudinal axis through the most radially outward point of each of said staves; and
   e. means attaching said staves to said flanges.

2. The apparatus of claim 1 wherein said radius of said curved portion of each of said staves increases from one of said flanges to the other of said flanges.

3. Apparatus for holding non-ferrous filament wound obliquely with respect to a longitudinal axis of said apparatus, comprising:
   a. a first generally flat flange having closely spaced oppositely facing sides, said flange having at least three slots, each of said slots having a predetermined slot length and a depth extending from one of said sides to said second of said sides;
   b. a second generally flat flange having closely spaced oppositely facing sides, said second flange being disposed generally parallel with respect to said first flange and spaced apart therefrom, said second flange having at least three slots, each of said slots having a predetermined slot length and a depth extending from one of said sides to said other of said sides;
c. at least three discrete elongated staves each having a curved portion, said staves being of a quantity the same as the number of slots in each of said flanges, said staves being disposed longitudinally between said first and second flange and laterally spaced apart with each of said curved portions radially outwardly directed;
d. said disposed staves defining an effective barrel for the winding of filament thereabout, said effective barrel having first effective circumference near one of said flanges which is larger than a second effective circumference near said other of said flanges for forming a tapered barrel;
e. each of said staves having a top edge and a bottom edge;
f. said curved portion of each of said staves defining a radius smaller than a radius of an imaginary circle drawn about said longitudinal axis through the most radially outward point of each of said staves; and
g. each of said top and bottom edges of said staves having a projection thereon having a first longitudinally extending portion inserted through a corresponding slot in a flange and a second portion extending obliquely with respect to said first portion thus securing said staves to said flanges.

4. The apparatus of claim 3 wherein said radius of said curved portion of each of said staves increases from one of said flanges to the other of said flanges.

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