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METAL WINDING CONE

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FIG. 1.

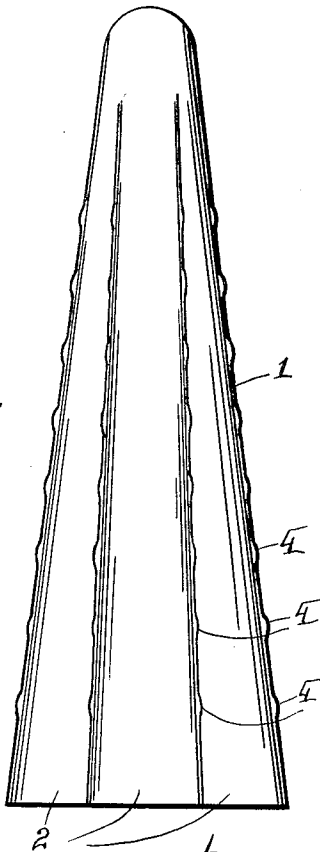
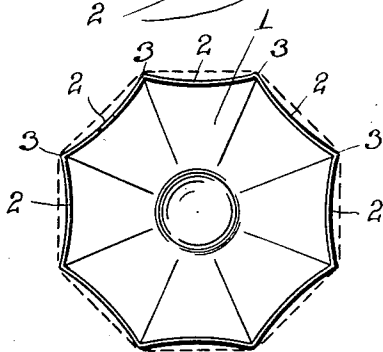


FIG. 2.

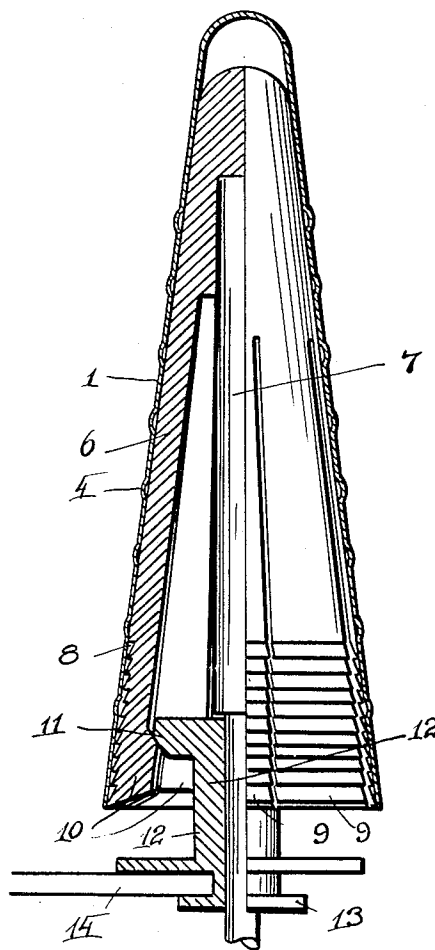


FIG. 3.

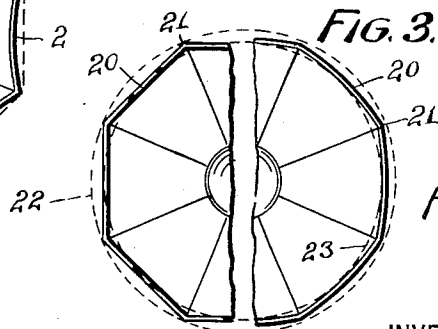


FIG. 4.

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METAL WINDING CONE

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8 Claims. (Cl. 242—121)

This invention relates to metal cones adapted to have wound thereon yarn, thread or the like for use in knitting machines and the invention has for its object to so construct this cone that the supporting mandrel will firmly hold it fast thereon during many repeated uses.

This and other objects of this invention will be apparent from the drawing, the specification and the appended claims forming a part thereof.

10 In the accompanying drawing:

Figure 1 is a side elevation of one of the embodiments of the cone.

Figure 2 is a bottom plan view of the cone illustrated in Figure 1.

15 Figure 3 is a vertical sectional view of the cone mounted on a supporting mandrel with the mandrel partly in section to illustrate the operating mechanism thereof.

Figure 4 is a bottom plan view of a modified form of the winding cone, showing the expanded and unexpanded forms.

In the several figures of the drawing like reference numerals indicate like parts.

25 Metal cones have heretofore been used to have yarn, thread or the like wound thereon but the construction of these cones has been such that the supporting mandrel will hold these cones fixed thereon for but a short time. This is due to the fact that the walls of these cones are made rigid or non-yielding so that the wear caused by the repeated use of the cones quickly increases the inside diameter of the cone to a point where the mandrel will no longer hold the cone fixed thereon. The supporting mandrels which are used in connection with the cones are of the expanding type but expand very slightly and once the inside diameter of a cone has been enlarged by wear it will no longer be gripped thereby and held against rotation thereon. The cone is then useless and must be thrown away as so much scrap metal.

35 In my present invention I have materially increased the useful life of such a cone by making the walls of the cone yielding so that the wear of the inside cone surfaces cannot affect the gripping action between the cone and the mandrel.

45 In the figures of the drawing I have illustrated in detail one of the several advantageous forms of the embodiment of the invention but I do not wish to restrict myself to this disclosure but may depart therefrom in several respects within the scope of the invention defined by the claims.

50 The device, as shown, is that of a hollow frusto-conical body 1 which is drawn from sheet metal, preferably aluminum, because of its extremely light weight. The cross section of the conical body is preferably octagon-shaped with the sides 2 of the octagon slightly concaved instead of flat. The ridges 3 between the sides 60 are struck out at suitable intervals to form the

lugs 4 thereon in order to prevent the yarn or thread wound on the cone from sliding off therefrom. The yarn, when wound on the cone over the concaved sides, encircles the octagon-shaped body thereof as illustrated in dotted line in Figure 2 and bridges the concaved sides to form a series of longitudinal ventilating ducts underneath the yarn or thread thru which air can pass to keep the yarn in the proper condition.

65 One of the types of mandrels used in connection with the cones is illustrated in Figure 3 and comprises a conical body 6 which is partially hollow and is mounted on the pin 7. The lower portion of the conically-shaped mandrel is provided with a series of concentric angular grooves 8 forming sharp ridges on the outside of the mandrel. The hollow portion of the conical mandrel is slitted longitudinally to divide this portion of the mandrel into a series of yielding fingers 9, 9 which can be expanded to grip the cone which is placed over the mandrel. On the inside of the fingers 9, 9 near the lower end thereof are provided the cam ridges 10, 10 which are adapted to be forced outwardly on the longitudinal movement of the collar 11 on the pin 7. The collar is normally located in the hollow section of the mandrel and behind the cam lugs 10, 10 and in this position the mandrel is in its contracted position ready to receive a cone. After the cone is placed over the mandrel, the collar 11 is moved on the pin 7 to force the fingers outwardly against the inside of the cone and thus hold the cone firmly in place on the mandrel.

85 The collar 11 has an extension 12 with a grooved collar 13 provided on the end of it into which engages a suitable operating lever 14 which, when operated, will move the collar and expand or contract the lower portion of the mandrel as above pointed out.

90 The concave sides of the conical body provide enough give to the wall of the cone after yarn or thread has been wound on it so that the mandrel, no matter how little it expands and contracts, will securely grip the cone and hold it firmly against rotation thereon. By the use of the yielding wall sections which allow the body of the cone to expand and contract, even a solid mandrel will hold the cone firmly against rotation but practically all mills are equipped with expanding mandrels because most cones used at the present time are made of paper and the walls of these cones are constructed so that they cannot yield but must be held by the expansion of the mandrel.

105 The concaved sides of the cone serve as individual spring members which project into the hollow portion of the cone to engage the wall of the mandrel. As the thread of yarn wound on the cone bridges the yielding sides of the cone it will not affect the yielding action of

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these sides but allows the mandrel to expand within the cone against the yielding sides in order to hold it fast thereon. The yielding action of the sides of the cone is thus not affected by any pressure exerted by the thread or yarn that is wound on the cone so that as the yarn or thread is unwound from the cone the removal of it will not release the grip the mandrel has on the cone.

In expanding the concaved sides they are convexed outwardly at the middle to an extent where the direct distance between consecutive corners is shortened. This has the result that the corners are drawn inwardly thereby decreasing the diameter of the spool at the corners as explained in the next paragraph.

In Figure 4 I have shown a modified form of the winding cone in which the sides instead of being concaved are made flat or straight. This has an advantage in that the expansion of the straight sides 20, 20 of this cone by the engagement of the mandrel results in a contraction of the ridges 21, 21. This is illustrated in the figure in which one half is shown in its normal unexpanded condition while the other half is shown in its expanded condition. The outer dotted line circle indicated by reference numeral 22 represents the normal outer diameter of the cone and shows that in its unexpanded form the ridges 22 make contact with this circle while in the expanded form the ridges are slightly withdrawn from it. This shows that the outside diameter of the cone is slightly reduced on the expansion of the cone. Reference numeral 23 indicates the mandrel with which the cone is expanded and the relative position of this circle on both the expanded and unexpanded half of the cone and shows to what extent the straight sides are flexed outwardly in order to contract the ridges inwardly.

When therefore one of the cones is mounted on a mandrel its outside diameter is held reduced by the mandrel while the yarn or thread is wound up thereon. As soon however as the cone is withdrawn from the mandrel the cone expands against the thread adding a certain amount of tension against the thread which serves to firmly hold the thread on the cone and prevents its slipping off therefrom.

I claim:

1. A winding spool for knitting machines and the like in combination with a spindle, said spool comprising a hollow body of sheet material having a polygonal cross section with angular edges and substantially straight sides along its winding section, the straight sides of the polygonal cross section being expansible outwardly in the middle thereof to slightly curve the sides outwardly straighten the angle of the edges and draw the edges inwardly so as to reduce the outside diameter of the spool on the expansion of the inside diameter of the spool by the spindle.

2. A winding spool for knitting machines and the like in combination with a spindle, having a circular cross section, said spool comprising a hollow body of sheet material having a polygonal cross section along its winding section, the sides of the polygonal cross section being straight to permit the outward expansion by the supporting spindle at their point of contact causing a slight reduction of the outside diameter of the spool by

slightly decreasing the distance between consecutive edges of the spool.

3. A winding spool for knitting machines and the like in combination with a spindle having a circular cross section, said spool comprising a hollow body of sheet material having a polygonal cross section along its winding section, the sides of the polygonal cross section being concaved inwardly and adapted to be convexed outwardly by the supporting spindle at their point of contact causing a slight reduction of the outside diameter of the spool by slightly decreasing the distance between consecutive edges of the spool.

4. A winding spool for knitting machines and the like in combination with an expanding spindle, said spool comprising a hollow body of sheet material having a polygonal cross section with angular edges and substantially straight sides along the winding portion of the spool, the polygonal cross section providing a point to point contact between the middle of consecutive sides thereof and the spindle so as to straighten the angle of the edges of the spool and reduce the outside diameter of the spool on the mounting of the spool on the spindle.

5. A winding spool for knitting machines and the like in combination with an expanding spindle, said spool comprising a hollow body of sheet material having a polygonal cross section with angular edges and substantially straight sides along the winding portion of the spool, the polygonal cross section providing a point to point contact between the middle of consecutive sides thereof and the spindle so as to straighten the angle of the edges of the spool and reduce the outside diameter of the spool on the mounting of the spool on the spindle and means for keeping the yarn from sliding off the edges of the spool, said means being yielding with the edges of the spool on the expansion of the sides of the spool by the spindle.

6. A winding spool for knitting machines and the like in combination with an expanding spindle, said spool comprising a hollow body of sheet material having a polygonal cross section with angular edges and substantially straight sides arranged to have the sides thereof make tangential contact at the middle thereof with the periphery of the spindle so as to spread the angle of the edges and convex the sides on the expansion of the spindle into the spool.

7. A winding spool for knitting machines and the like in combination with an expanding spindle, said spool comprising a hollow body of sheet material having a polygonal cross section with substantially straight sides to have the sides make contact with the periphery of the spindle at the middle thereof and be convexed outwardly by the expansion of said spindle.

8. In combination with a supporting spindle, of a tubular spool having a polygonal cross section with uniformly spaced angular corners extending longitudinally along the winding portion thereof and outwardly yielding sides connecting said corners, said spindle being adapted to expand the yielding sides outwardly at the middle thereof on the insertion of the spindle into the spool and thereby reducing the diameter of the spool at the corners thereof.

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