

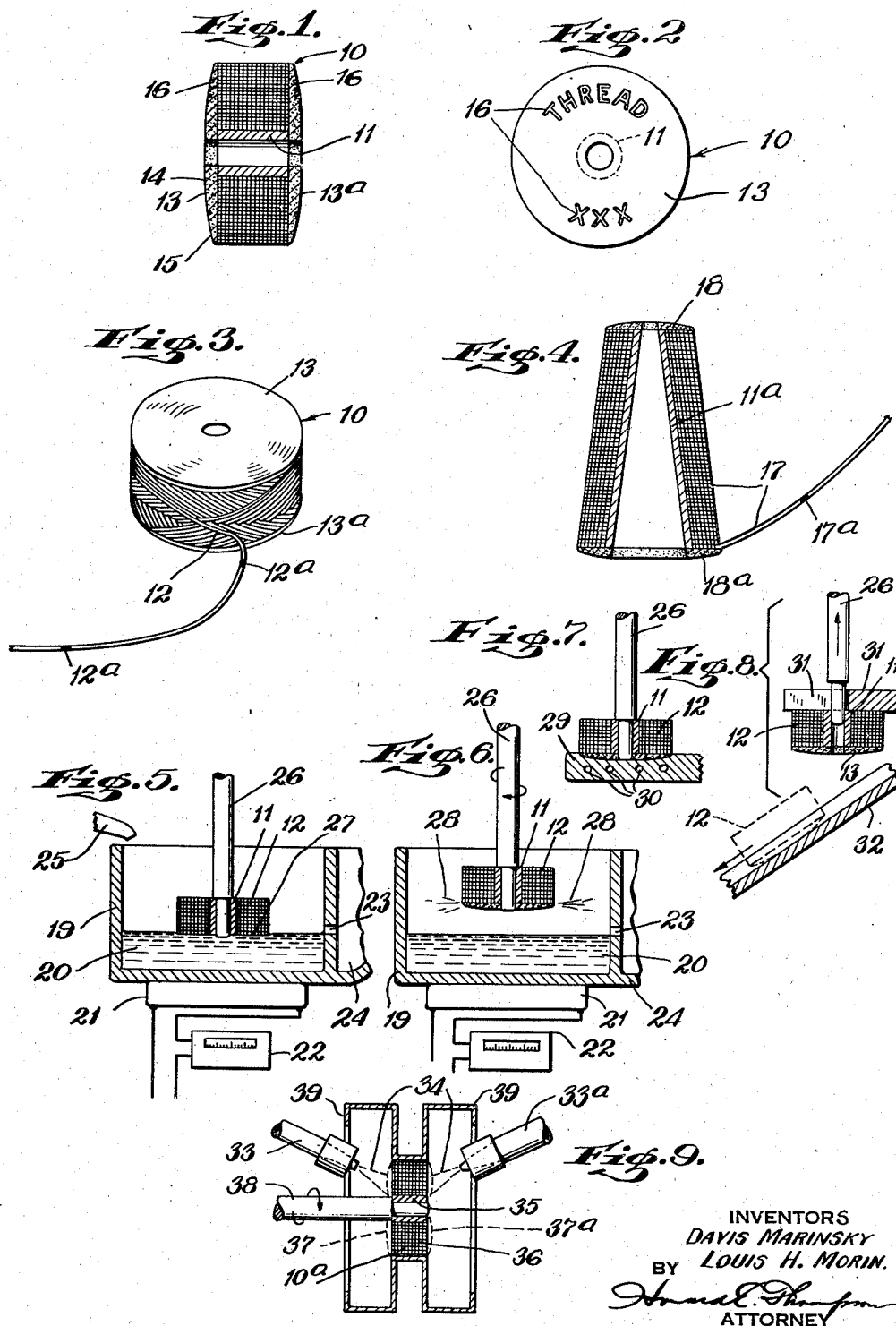
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THREAD SPOOL AND THE METHOD OF CONSTRUCTING THE SAME

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THREAD SPOOL AND THE METHOD OF
CONSTRUCTING THE SAME

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This invention relates to thread spools such as spools used in connection with the shuttles of sewing machines or to any other type and kind of spool for supporting threads, lines, cords, wires and the like. More particularly the invention relates to the method of constructing end flanges of spooled strands of the type and kind under consideration wherein the strands are cross-wound on the spools so that each winding will engage part of the spool flanges for the purpose of preventing accidental or undesirable unravelling of the strand, and still further in using wax or paraffin flanges which will also give to the strand waxing or lubricating properties. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a sectional view through a bobbin showing one method of carrying the invention into effect.

Fig. 2 is a face view of the bobbin as seen in Fig. 1.

Fig. 3 is a perspective view of the bobbin indicating part of the thread unravelled therefrom.

Fig. 4 is a view similar to Fig. 1 showing another adaptation of the invention.

Fig. 5 is a diagrammatic view illustrating the step of dipping a bobbin wound upon a tubular core or mandrel and applying a waxed flange to one surface thereof.

Fig. 6 is a diagrammatic view similar to Fig. 5 indicating the next step in the operation.

Fig. 7 is a diagrammatic view showing the step of forming a name or mark impression on the surface of the flange.

Fig. 8 is a view showing the method of stripping the flanged bobbin from a supporting spindle and the delivery of the product onto a chute, and

Fig. 9 is a diagrammatic view showing another method of applying the plastic flanges to both side surfaces of the bobbin thread.

In the construction of various types and kinds of spools of the character under consideration, that is to say, spools for the bobbin threads used in the shuttles of sewing machines, and in other thread spools, including fish-line spools and cord or strand spools, and in fact spools of wire, it has been the common practice to use metal, wood, paper or other materials in the construction of the flange portions thereof or the side discs of the spool. There have been spools constructed

of combinations of wood and metal, paper and metal, etc., but in all structures of this type and kind, the cost of the spool has been expensive and these spools when the thread or other strand has been consumed, represented an outstanding waste. Furthermore, the bobbins of this type and kind have been objectionable in their use in connection with high speed sewing machines, by reason of the unravelling of the thread on the bobbin in the quick stopping of the machine.

It is the purpose of our invention to economize on the construction of spools of the type and kind under consideration, and in illustrating one adaptation of the invention, we refer to the method of treating or processing spools, bearing in mind that the same principles of this invention are applicable to the construction of spools of any other type and kind especially wherein the strands are wound in crossed relationship.

In Figs. 1, 2 and 3 of the drawing is shown a finished bobbin spool 10 comprising a tubular or other core or mandrel 11 upon which is wound in the crossed relationship illustrated in Fig. 3 the thread 12 used upon the bobbin in question. It will be understood that this thread may be of any texture, color and the like to suit the intended purpose. Upon opposite side surfaces of the wound threads and the ends of the tubular core or mandrel 11 are arranged facings 13, 13a of wax, paraffin, or other similar materials or compositions suitable for the intended purpose. These facings are thicker at the central axial portions 14 thereof than the outer peripheral edges 15 and extend to the greatest diameter of the spool so as to contact the outermost threads thereon. The facings 13, 13a may be said to form the flanges of the spool, and these flanges have trade-marks or other impressions 16 formed on the outer surfaces thereof. It will of course be understood that the marks can be applied to one surface only, if desired. The facings 13, 13a may be transparent or translucent or of any desired color depending upon the pigment used, and in fact, one facing or flange 13 may be of one color and the other facing or flange 13a may be of a contrasting color.

By reason of the cross-winding of the thread or strand 12, it will appear that each winding extends to the peripheral edge of the spool and therefore will contact at least one of the flanges 13, 13a so that in unravelling or removing the strand 12 from the spool, spaced waxed sections 12a will be arranged thereon as indicated in Fig. 3 of the drawing. These waxed sections will supply the strand with a sufficient amount of wax or

lubricant to facilitate the use of the strand in sewing machines, and even though a colored wax be employed in the flanges which might be contrasting to the color of the thread, the spreading of the waxed points 12a in passing through a machine will render the wax coloring substantially, if not entirely, invisible in the resulting stitch. This would be especially true in the lighter shades, whereas in darker wax shades a slight representation may appear, but this would not be objectionable. It will of course be apparent that in most instances the coloring of the flanges will be consistent with the coloring of the thread employed. The wax flanges will also facilitate the use of bobbins of the type and kind, in sewing machine shuttles, and it will also appear that in the consumption of the thread, the flanges 13, 13a will be substantially consumed. In this connection it must be understood that the illustrations in the accompanying drawing are purely diagrammatic for clearness of showing and that the wax film upon the surfaces of the bobbin forming the flanges will in fact be relatively thin.

In Fig. 4 of the drawing one of many other adaptations of the invention is illustrated. In this showing, a conical tubular core 11a is shown upon which is wound the cord, thread or other strand 17. At 18, 18a is shown the composition end flanges similar to the flanges 13, 13a which will form, by reason of the cross-winding of the cord or strand upon the core 11a, waxed sections 17a at spaced intervals longitudinally of the strand 17 the same as the sections 12a. The only difference is that the section 17a will be spaced further apart in that the spool shown in Fig. 4 is of greater width than the spool shown in Figs. 1 to 3 inclusive. It will of course be apparent that the threads or strands 12, 17 may be said to be secured to the flanges 13, 13a, 18, 18a, but this securing is not sufficient to prevent free unwinding of the threads or strands, but to the contrary is sufficient to retain the threads or strands against accidental unraveling. This is especially desirable in the use of bobbin spools in high speed sewing machines especially of the factory type, the operation of which is constantly stopped. This securing means will prevent the unravelling of threads on the bobbin spool as will be apparent.

While it will be understood that the facings or flanges of composition material having the characteristics herein defined can be applied by hand dipping or otherwise. It is desirable in the commercial production of wound spools of this type and kind for supply to the trade to apply these flanges or facings in an automatic manner.

In Figs. 5 to 8 inclusive, we have diagrammatically illustrated one method of applying the facings, and in Figs. 5 and 6, 19 represents a vat or tank in which wax, paraffin, or other types of materials of this kind, or compositions having wax or paraffin bases, is arranged as indicated at 20 and heated by an electric heating coil or other suitable heating means, 21. In employing the electric coil, a thermostat or other control 22 will be used to maintain any desired temperature of the material 20. At 23 is shown an overflow into a supplemental receptacle 24 so as to maintain a fixed level of the material 20 in the container or vat 19. Suitable means may be provided as at 25 for replacing the material as consumed by introducing granular or other composition particles into the container or by injecting intermittently heated material

from a pre-heating source and part of which may represent the overflow to the receptacle 24.

At 26 is shown a spindle upon the end of which may be applied the wound spool consisting of the tubular core 11 and the threads 12. The spool may be applied to the spindle 26 by hand or automatically through the medium of a suitable machine having a hopper or other feed of the wound spools for delivery and mounting upon the spindle. After being mounted on the spindle, the spindle is operated to move the spool in the direction of the material 20. This movement is sufficient to contact one side surface 27 of the spool with the material 20, the spool being held in this position for a short period of time. The spindle 26 is held against rotation at this particular stage, after which the spindle 26 is raised in the position shown in Fig. 6 and is then quickly rotated by suitable means so that, through the action of centrifugal force, the soft and unhardened wax will be discharged from the spool in the manner indicated at 28 in Fig. 6. This action will cause, by reason of the greater centrifugal action at the periphery of the spool, the arrangement of a thinner layer of the wax at said peripheral edge than at the central axial portion of the spool, thus producing the rounded or radial tapered effect which is illustrated in Fig. 1 of the drawing.

After the surplus wax has been removed, the spindle 26 is raised and then moved into engagement with an impression plate 29 preferably cooled by the circulation of water through tubes 30 therein. The plate has impressions for forming markings such as 16 shown in Fig. 2 of the drawing in the wax facing or flanges while still in a warm and relatively soft state.

The next operation consists in moving the spindle upwardly while supporting a stripper plate 31 adjacent the spindle so as to strip the spool from the spindle 26 in the manner illustrated in Fig. 8 of the drawing. The stripped spool will then drop onto a chute or other conveyor 32 for conveying the single-faced or flanged spool back into the same machine in which it will be reversed for a second dipping or facing operation, or in operating a series of machines, the spool may be conveyed from the first processing machine to the next processing machine for applying the second surfacing. This will be of course desirable and necessary when applying different colored facings or flanges on opposite sides of the spool. After the second or final facing or flange has been applied, the spool will be stripped from the spindle and applied to a conveyor such as 32 for transmission to suitable packaging, boxing or other means, depending entirely upon the manner of merchandising the product in question. In operating at high speeds, it will be apparent that the spools when fully treated or surfaced may be passed through suitable cooling or chilling means to thoroughly harden the facings or flanges before wrapping, packing or other disposal thereof.

At this time it is well to bear in mind that waxes and paraffins of various characteristics may be employed. This is also true of the compositions that may be used considering the same from the standpoint of hardness of the material or other characteristics thereof which would adapt the materials to distinct uses. For example in the production of bobbins, the different materials may be used in conjunction with dif-

ferent types and kinds of threads, whereas in processing cords or similar spools such as illustrated in Fig. 4, compositions of different characteristics may be employed. Here again this would be true in connection with the production of fish-line spools and wire spools. As a matter of fact it is within the spirit of the invention to produce flanges or facings for spools of the type and kind under consideration of any kind of plastic material. In some instances, this may be solely for the purpose of forming the flanges and not necessarily to incorporate the adhering characteristics heretofore mentioned. From this latter standpoint, it will be apparent that such compositions need not necessarily include wax or paraffin bases.

In Fig. 9 of the drawing we have illustrated diagrammatically another method of applying the flanges or facings to the spool. In this figure, 33, 33a represents two spray nozzles for spraying as indicated at 34, a suitable composition upon both side surfaces of a spool 10a consisting of a tubular core 35 with the threads or strands 36 wound thereon. In forming flanges or facings 37, 37a at opposite sides of the spool as indicated in dotted lines in Fig. 9, the flanges are similar to the flanges 13, 13a as will be apparent. The spool 10a will be arranged upon a spindle 38 which will be revolved slowly in spraying the material on the side surfaces of the spool. When the spray is shut off by suitable means, the speed of rotation of the spool or the spindle 38 may be increased so that the surplus of coating material will be cast off by centrifugal action, the same as taught in Fig. 6 of the drawing, the material passing into hoods 39 arranged at each side of the spool in the manner illustrated. Thereafter, the spindle with the coated spool thereon may be moved out of the hoods and then a stripper plate like 31 will be arranged to engage the surface 37, and a die plate similar to 29 moved into engagement with the surface 37a, after which the last named die plate will be removed and the spool will be stripped off by the first mentioned stripper plate and delivered by a chute or other conveyor to a packing or distributing point. In this arrangement the stripper plate employed may also form a die plate.

It will of course be apparent that in some instances the spool may be sprayed or otherwise coated on one side only, and the steps of the process as illustrated in Figs. 7 and 8 may be carried out in the individual treatment of the separate sides. In this connection it will be understood that in a continuous process, it will be desirable to use in the second stage of stripping, a stripper plate having a surface conforming substantially to the contour of the coating material, rather than a flat plate as is shown in Fig. 8.

It will also be understood that the dies, such as 29, may be used not only to apply marks of identification, but also to give a definite contour to the flanges or side surfaces of the spool, and to produce smooth, finished outer surfaces thereon.

In forming the facings or flanges on the spool, it will be understood that the plastic material employed will impregnate the thread at the points 12a, 17a, and these impregnated points or sections will be arranged on each winding by reason of the contact with at least one of the facings, flanges or heads of the spool.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. The herein described method of forming the

side flanges or facings of spools, which consists in arranging a spool body consisting of cross-wound strands upon a supporting spindle, then applying a heated wax-like composition to at least one surface of said strand body, then rotating said spindle at high speed to throw off unsolidified portions of said composition through the action of centrifugal force, and then chilling and shaping the applied composition material to form the facing of said spool.

2. The herein described method of forming the side flanges or facings of spools, which consists in arranging a spool body consisting of cross-wound strands upon a supporting spindle, then applying a heated wax-like composition to one surface of said strand body, then rotating said spindle at high speed to throw off unsolidified portions of said composition through the action of centrifugal force, then chilling and shaping the applied composition material to form one facing of said spool, then applying the product thus formed on a spindle to expose the uncovered surface of said body, and then applying a composition to said surface, again rotating the spindle to remove surplus composition, and finally chilling and shaping the second surface to complete the formation of the spool.

3. The herein described method of producing spools of the character described, which consists in first winding upon a suitable core a strand of material in cross-windings to form a circumferential strand body on said core, each turn of the windings extending to opposite sides of said body, and then applying a heated wax base composition directly to the side surfaces of said strand body to form coatings on the sides of the spool directly contacting each of the turns of the strand where exposed at the sides of said spool.

4. The herein described method of producing spools of the character described, which consists in first winding upon a suitable core a strand of material in cross-windings to form a circumferential strand body on said core, each turn of the windings extending to opposite sides of said body, then applying a heated wax base composition directly to the side surfaces of said strand body to form coatings on the sides of the spool directly contacting each of the turns of the strand where exposed at the sides of said spool, and then chilling and shaping the coatings to the desired contour.

5. A spool of strand-like material comprising a core with the strand-like material wound in cross relationship thereon to expose each turn of the winding at at least one side of the spool, a thin wax coating extending from the core to the outermost windings of the strand on the spool at each side of the spool to contact the exposed turns of the strand at said sides, the coating forming at each side of the spool walls constituting the sole support and cover for the strand material of said spool, and the inherent properties of the wax walls being such as to unite with the exposed portion of the windings of said strand to retain the windings or turns against accidental unravelling.

6. A spool of strand-like material comprising a core with the strand-like material wound in cross relationship thereon to expose each turn of the winding at at least one side of the spool, a thin wax coating extending from the core to the outermost windings of the strand on the spool at each side of the spool to contact the exposed turns of the strand at said sides, the coating forming at each side of the spool walls constitut-

ing the sole support and cover for the strand material of said spool, the inherent properties of the wax walls being such as to unite with the exposed portion of the windings of said strand
5 to retain the windings or turns against accidental unravelling, and at least one of the coatings being of a color substantially similar to the color of the strand on said spool, and impressions on the outer surface of at least one of said coat-
10 ings for characterizing the spool.

7. In a thread spool of the character described having a cross-winding of the thread on the spool

to expose each turn of the thread at at least on side of the spool, means comprising side surface of the spool contacting and uniting with each turn or winding of the thread at the sides of the spool forming on the thread when removed from the spool a lubricated section at longitudinally spaced intervals on said thread equal to the length of each turn or winding of the thread on the spool.

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