Feb. 22, 1955 J. F. LEAVER 2,702,675

BOBBIN SKEWER

Filed May 10, 1950 2 Sheets-Sheet 1

Fig. 1

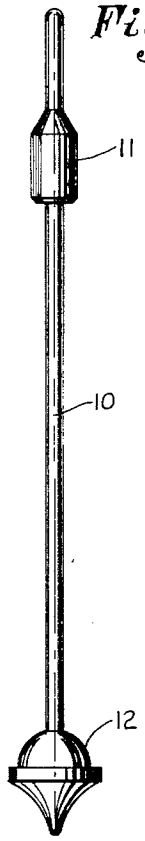


Fig. 2

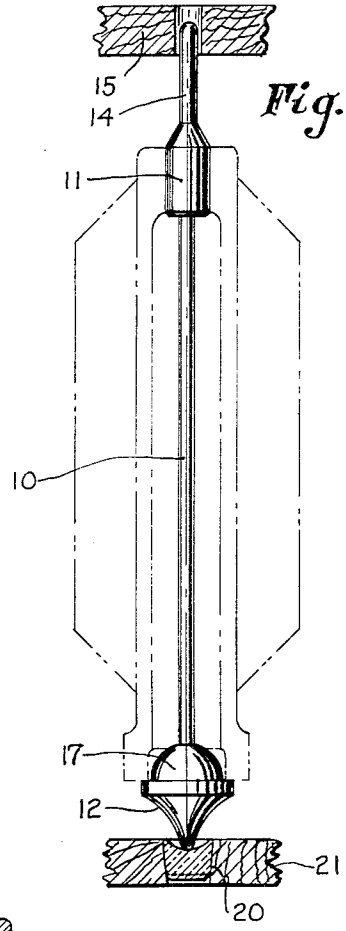


Fig. 3

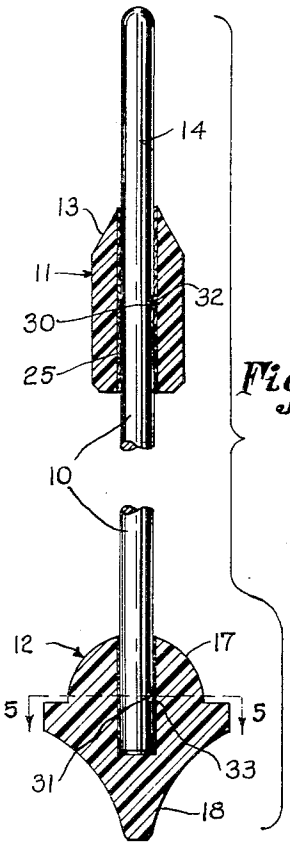


Fig. 4

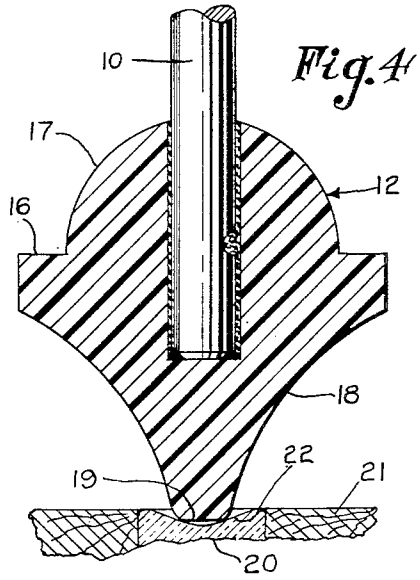
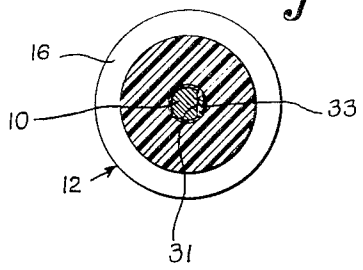


Fig. 5



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Fig.6

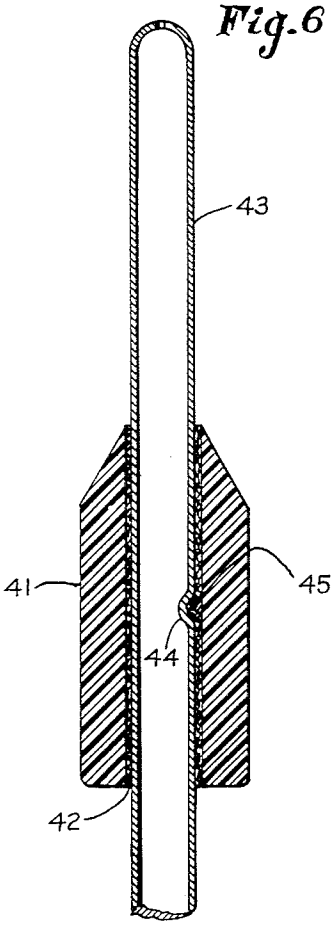


Fig.7

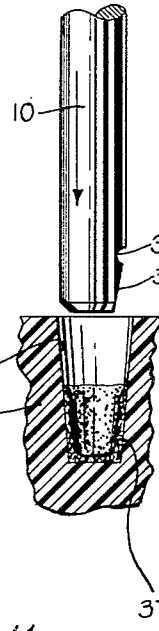


Fig.8

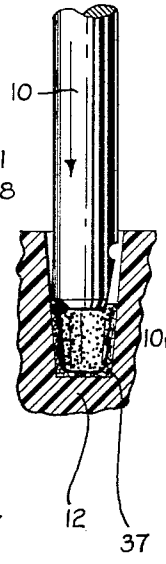


Fig.9

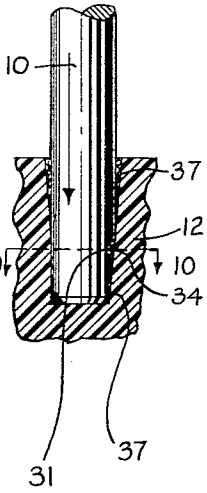


Fig.11

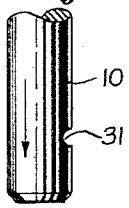


Fig.12

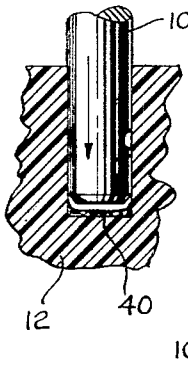


Fig.13

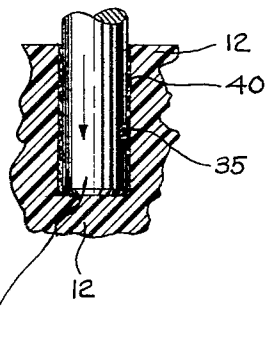
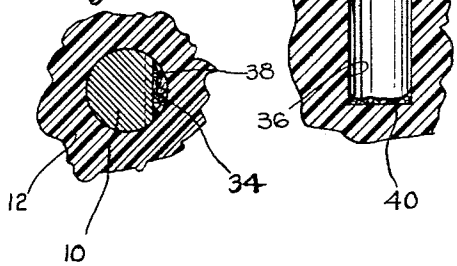


Fig.10



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BOBBIN SKEWER

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Application May 10, 1950, Serial No. 161,062

4 Claims. (Cl. 242—130)

This invention relates to bobbin skewers and is concerned particularly with improvements in that class of bobbin skewers used to support and hold bobbins in creels of textile thread or yarn processing machinery.

In this type of textile machinery the bobbins containing the roving from which the yarn is spun are carried by skewers which are supported vertically in creels, the lower end of each skewer having a pointed head the tip of which rests in a cup or concave step bearing, generally of glass, porcelain, or similar material, on a lower creel member and the upper end of the skewer being held loosely in a suitable centering device or received in a vertical hole presented by an upper creel member arranged to maintain the vertical position of the bobbin in the creel. The pointed head is provided with an annular flange of sufficient diameter to support the bobbin which is slipped down over the skewer staff and rests with its bottom upon this flange. The upper part of the head is shaped to fit within the lower end of the bore of the bobbin.

Previous to my invention, the bobbin skewers in common use usually have been made of an all-wood construction which form of skewer is found from practical experience not to give entire satisfaction because of many reasons among which is its short life due to the rough handling which it receives, and being made entirely of wood it is easily damaged due to the ready tendency of wood to shatter, splinter, crack or warp. It not infrequently happens in handling the full bobbin with the skewer inserted therein, that in the haste of substituting full bobbins for empty ones in the creel, the bobbin and skewer are accidentally dropped on the floor, and the bearing point or the bobbin supporting flange of the wooden skewer thereby broken, or the skewer itself shattered, so that the skewer is thereafter useless.

Furthermore, the lower or bearing end of the ordinary skewer being wholly of wood, wears rapidly and when the skewer becomes rough and blunt at the point it runs hard and irregularly in the creel during drawing off of the roving, and thus makes the tension irregular or too strong, and in the latter instance frequently stretches the rovings too much and oftentimes causes the rovings to be pulled apart. The ordinary wooden skewers have rough exterior surfaces which, furthermore, are always more or less affected by the weather or high moisture conditions and are apt to be further roughened thereby allowing lint and/or fly to stick to them and accumulate.

One object of my invention is to provide a bobbin skewer of simple construction having smooth hard exterior surfaces, not subject to splitting, splintering, cracking or becoming roughened, and more durable in use than wooden skewers previously used for like purposes.

Another object of my invention is to provide a bobbin skewer constructed of material of relatively high impact and tensile strength whereby the useful life thereof is greatly prolonged and whereby the possibility of breakage or the likelihood of injury to the lower bearing point thereof when a loaded skewer is accidentally dropped point downwardly on a floor is practically eliminated.

Another object is to provide a bobbin skewer of the type indicated comprising a slender skewer staff with plastic bobbin engaging and supporting members rigidly secured thereto and of such physical and structural characteristics that they may be formed as uniform molded plastic shapes, and wherein the bearing or contact surface of the lower bearing end of the skewer will present

substantially a constant coefficient of friction with the creel cup.

Another object is to provide a bobbin skewer of the type indicated in which the bearing or contact surface of the lower end of the skewer with bearing surface of the cup or step bearing in the creel will be flat and linear instead of as a pivot and will provide a sufficient and uniform braking action on the skewer and thus maintain the tension on the roving uniform.

Another object is to provide a bobbin skewer having exterior surfaces subject to attaining a high luster and a scuff-proof finish, and formed of material with the characteristics of an insulator of static electricity so that there will be no tendency for lint and/or fly to be attracted and cling thereto.

Another object is to provide a bobbin skewer of the type indicated in which the plastic bobbin engaging and supporting members are rigidly secured to the skewer staff to prevent them from turning thereon or becoming displaced longitudinally thereof.

A further object is to provide a method of affixing the plastic bobbin engaging and supporting members to the skewer staff to secure a rigid permanent joinder therewith.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of a representative form of bobbin skewer embodying my invention;

Fig. 2 is a side elevational view of the bobbin skewer shown in Fig. 1 as it appears when placed in a creel, the bobbin with its full yarn package being indicated in dot and dash outline;

Fig. 3 is a fragmentary view, on enlarged scale, partly in elevation and partly in vertical section, showing the upper and lower end portions of the bobbin skewer illustrated in Figs. 1 and 2;

Fig. 4 is a detail view, on greatly enlarged scale, partly in elevation and partly in vertical section, of the lower portion of the bobbin skewer showing the novel manner of bearing contact of the tip portion of the pointed skewer head with the cup or step bearing therefor mounted in the creel board;

Fig. 5 is a detail cross-sectional view taken on the line 5—5 of Fig. 3 as viewed in the direction of the arrows;

Fig. 6 is a detail sectional view, on greatly enlarged scale, of the upper end portion of a modified form of bobbin skewer embodying my invention;

Fig. 7 is a fragmentary view in vertical section through the socket part of a lower bobbin support or head member which is formed of a rigid molded thermoplastic synthetic resin composition showing the application of a solvent material to the lower wall surfaces of the socket part before the insertion of the lower end portion of the skewer staff therein;

Fig. 8 is a view similar to Fig. 7 in which the skewer staff has been inserted partially into the socket part of the head member and just prior to contact with the solvent softened thermoplastic wall portions of the socket part;

Fig. 9 is a view similar to Figs. 7 and 8 and illustrates the final assembly of the parts after the skewer staff has been pressed the full depth of the socket and the solvent softened thermoplastic wall portions thereof have been compressed and squeezed up along the sides of the staff into the side notch therein to form the interlocked anchoring element fixing the head to the skewer staff;

Fig. 10 is a cross-sectional view taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a fragmentary view in vertical section through the socket part of a lower bobbin support or head member which is formed of a rigid molded thermosetting synthetic resin composition showing the application of an adhesive material to the bottom end wall of the socket part before the insertion of the lower end portion of the skewer staff therein;

Fig. 12 is a view similar to Fig. 11 in which the skewer staff has been inserted partially into the socket part of the

head member and shown with the end of the skewer staff positioned just short of contact with the adhesive material at the bottom of the socket; and

Fig. 13 is a view similar to Figs. 11 and 12 but showing the final assembly of the parts with the adhesive material squeezed up along the sides of the skewer staff and into the notch therein to firmly anchor the parts after the adhesive has set.

Broadly stated, my invention contemplates a bobbin skewer construction provided with bobbin supporting members which are composed of a rigid molded organic plastic material, and in which one of the bobbin supporting members constitutes a head member situated at the lower end of the skewer and presenting a tapered tip which is shaped to rest upon and have annular bearing contact instead of point contact with the concaved surface of the usual cup or step bearing for the skewer mounted in a lower bar or creel board. More specifically, the skewer construction includes a cylindrical staff or spindle of relatively slender proportions which has affixed thereto but spaced from its upper end a tubular bobbin engaging member for supporting and centering the upper end of a bobbin while secured to the lower end of the staff or spindle is a pointed head member which supports and centers the lower end of the bobbin. The bottom end of the tapered tip of said head member is flat and disposed in a plane at right angles to the axis of the head. The tip has bearing contact with and is supported by the concaved surface of the lower cup or step bearing in the creel for the skewer solely by the peripheral edge of said flat end whereby a frictional drag is set up between the bearing portion of the tip of said head and the step bearing sufficient to permit uniform draw-off of the yarn from the full bobbin yet will prevent free spinning of the skewer in said step bearing when the yarn supply carried by the bobbin approaches depletion.

Referring to Figs. 2 and 3 of the drawings, the present improved bobbin skewer is shown as comprising a slender cylindrical staff or spindle **10** which may be formed of steel rod, tubing, or even of wood, and has affixed thereto in spaced relation thereon upper and lower bobbin engaging and supporting members **11** and **12** which consist of rigid molded synthetic plastic bodies formed of a suitable thermoplastic or of thermosetting synthetic resin composition molded under conditions of heat and pressure to a hard smooth product of the desired shape and size. The upper bobbin engaging member **11** is shown as being of tubular shape formed with a tapering upper end **13** and is affixed to the staff **10** so as to be well spaced from the upper end thereof but situated at the proper position on the staff **10** to support and center the upper end of a bobbin when the same is slipped down over the skewer with the lower end of the bobbin resting upon the lower bobbin engaging and supporting member or head **12**. The upper end portion **14** of the staff **10** projecting axially beyond the upper bobbin supporting member **11** is adapted to be suitably journaled in a top bar or an upper creel board **15**, as shown in Fig. 2.

The lower bobbin engaging and supporting member or head **12** is fast on the lower end of the staff **10** and is shown in Figs. 3 and 4 as being provided with a flat annular flange or shoulder **16** on its upper side to support the bottom end of a bobbin **16**, see Fig. 2, and the upper part **17** is rounded to provided a button which fits within the lower end of the bobbin. The lower part of the bobbin support **12** is formed as a surface of revolution and tapers downwardly on a concave curve to terminate in the pointed bearing tip portion **18**. As shown in Fig. 4, the end of the tip **18** is flat transversely thereof, as indicated at **19**, and has annular bearing contact with the concaved surface of the cup or step bearing **20** for the skewer, mounted in a lower bar or creel board **21**, only at the circular boundary edge of said tip where its flat bottom end meets with the concave side surface of the tip **18**. The area of this flat end **19** is made such that the peripheral edges thereof will provide a substantially uniform frictional drag between the bearing portion of the tip **18** and the concaved surface **22** of the cup or step bearing **20** to permit uniform draw-off of the yarn from the full bobbin yet will be sufficient to prevent the skewer from spinning loosely in said step bearing when the yarn supply carried by the bobbin approaches depletion.

Among the essential or desirable properties of my bobbin skewer are those of being substantially static-free, having high impact and tensile strength and high resistance to abrasion, and presenting exterior surfaces of high luster and scuff-proof finish to which lint and/or fly will not stick and cling. The thermosetting synthetic resins which when molded into their final rigid hardened state under conditions of heat and pressure are found to possess these essential or desirable properties. The thermosetting phenolic molding compositions commercially known under the trade names of "Bakelite," "Durez" are examples of plastic molding compositions which may be used satisfactorily for forming the rigid molded plastic bobbin support members **11** and **12**. Such plastic bobbin engaging and supporting members may be made of rigid molded thermoplastic material, if desired, but such material does not possess the high resistance to wear and freedom from static charges as the thermosetting plastics.

By use of rigid molded plastic products for the bobbin supporting members **11** and **12** the connection of these members to the staff **10** is made feasible by the action of either a solvent on the plastic bodies where the members **11** and **12** are formed of a thermoplastic material, or by use of an adhesive material where the parts are formed of a thermosetting plastic. As shown in Fig. 3, the upper bobbin support member **11** is provided with an axial bore **25** therethrough which bore is cylindrical when the member is formed of a thermosetting plastic. However, when the member **11** is formed of a thermoplastic material, the bore **25** is provided with a slight taper and becomes gradually smaller toward the end **13** and is of an order such that at substantially the median plane of the member **11** the bore will have substantially the same diameter as the staff or spindle **10**. The upper end of the button **17** of the bobbin supporting member **12** is recessed inwardly to provide a socket **36** (see Figs. 7 and 11) the walls of which, when the member **12** is formed of a thermoplastic material, taper and become gradually smaller toward the bottom of the socket whereby at a point substantially in the plane containing the annular shoulder **16** the socket will have substantially the same diameter as the lower end of the staff or spindle **10**, as shown in Fig. 8. The socket **28**, however, will be provided with a cylindrical bore when the member **12** is formed of a thermosetting plastic, see Figs. 11, 12 and 13. The staff **10** is provided with upper and lower exterior notches **30** and **31** respectively, see Figs. 3 and 4, formed therein at points which will be situated in the aforesaid median planes when the bobbin supporting members **11** and **12** respectively are affixed to the staff **10**. The connection between the bobbin supports **11** and **12** and the staff **10** is effected in interlocking fashion with the respective notches thereof as indicated at **32** and **33** in Fig. 3 by either a solvent lock **34** (see Figs. 7, 8 and 9) or by an adhesive lock **35**, see Figs. 11, 12 and 13, with the inner surface of the bore **25** of the bobbin supporting member **11** and the socket **28** of the bobbin supporting member **12** respectively, the solvent softened thermoplastic material and the adhesive material respectively forming a permanent bond with the skewer staff to prevent the parts from turning thereon or from being displaced longitudinally thereof.

In Figs. 7, 8, and 9 there is shown one method of fixedly securing the head member **12** to the lower end of the staff **10**, and also illustrating the finished article resulting therefrom. Thus, in Fig. 7 there is shown the lower section of the staff **10** and a fragmentary section of the head member **12** containing the socket part thereof to be connected with the staff **10**. In practicing the method of Figs. 7 to 9, the head **12** which is formed of thermoplastic organic material has applied to the lower tapered wall portions and the bottom end of the socket **36** a layer or coating **37** of a suitable resin solvent, such as acetone, cellulose acetate, or cellulose nitrate of a satisfactory consistency to be brushed in application. The lower end portion of the staff **10** is provided with a tapered flat or slab portion **38**, see Figs. 7 and 10, extending from the lower curve of the notch **31** to the tip of the staff, and the various diameters of the staff end portion and the socket **36** are so designed that the bottom end edge of the staff can be placed so that it will make circumferential contact with the solvent softened thermoplastic material of the tapered side walls of the socket approximately midway between the top and bottom thereof. When this occurs, the lower end of the staff **10** is further forced axially into the socket to substantially the full depth thereof and the solvent softened thermoplastic wall portions thereof will have been compressed

by the lower end of the staff and squeezed up along the sides of the staff into the side notch **31** therein to form the interlocking anchoring element **34** when set and fixing the head **12** to the skewer staff against rotation thereon.

In Figs. 11, 12 and 13 are shown another method of making the assembly and joining the head **12** to the lower end portion of the staff **10**. On this alternative method, a suitable adhesive material **40** is applied to the bottom end of the socket **36** of the head member **12** which, in this case, is formed of a molded thermosetting resin composition. The side walls of the socket **36** are cylindrical instead of tapering, and the various diameters of the lower end of the staff **10** and the socket **36** are so designed that there will be provided a slight clearance between the two members into which the adhesive material **40** will be forced by the lower end of the staff on being forced axially into the socket to the final position illustrated in Fig. 13.

Referring to Fig. 6 of the drawing, a modified form of bobbin skewer embodying the invention is illustrated. In this form, the upper tubular bobbin support **41** of rigid molded organic material is fixedly secured by a suitable adhesive material **42** to the upper end portion of a tubular staff or spindle **43**. The outer periphery of the tubing is indented on one side, as by providing it with a transverse exterior notch or crease **44** therein, which when filled with the adhesive material **42** provides the interlocked anchoring element **45** permanently securing the bobbin support in a non-rotatable manner on the hollow staff or spindle **43**.

It will be observed from the foregoing specification that the present invention provides a novel and improved form of bobbin skewer which is of simple and compact construction to adapt it for economical manufacture, has uniform frictional characteristics on its bearing surfaces, is clean-running, is non-conducting with respect to static electricity and thereby has no tendency to attract lint and/or fly, is non-absorptive with respect to oil or lubricants, is true-running, and has no tendency to warp. Furthermore, the bobbin engaging and supporting members **11** and **12** being constructed of rigid molded plastic shapes provide portions on the skewer staff which are of extremely strong and dense structure, proof against injury under continuous use, but in which the plastic material nevertheless is somewhat resilient so that if the skewer is subjected to rough handling, such as by being dropped on a cement floor, or by being brought forcefully into contact with adjacent objects, it will resist severe impact without splitting, chipping, splintering or denting as is the case with ordinary bobbin skewers made entirely of wood. Furthermore, all exterior portions of the improved skewer present a smooth surface to which lint and/or fly will not stick and accumulate. The plastic members **11** and **12** may be molded in accordance with any particular contour and dimensions, as desired, and also may comprise either compression molded thermosetting plastic shapes or injection molded thermoplastic bodies without departing from the spirit or scope of the invention.

While I have illustrated and described two different embodiments of the invention I recognize that many additional modifications and variations of my invention are possible without departing from the spirit or the scope of the invention as it is defined by the appended claims. Therefore, it should be understood that I do not wish to be limited to the particular forms shown, or to the details

or construction thereof, and that the forms of the invention herein illustrated and described are intended to be illustrative only and not limiting the scope of the invention.

Having described my invention what is claimed is:

1. In combination, a creel step bearing member having a concave top bearing surface, and a skewer having a lower bobbin supporting member including a pointed portion the tip of which rests upon and runs in said concave bearing surface of said creel step, the lower end of the tip of the pointed portion of said bobbin supporting member being a flat circular surface disposed at right angles to the longitudinal axis of the skewer and having sufficient area whereby the operative bearing contact made by said tip with the concave bearing surface of said creel step bearing member is solely at a flat annular portion of said tip end surface bordering its periphery.

2. In combination, a creel step bearing member having a concave top bearing surface, and a bobbin skewer having its lower end loosely received in and supported by said concave step bearing surface, said bobbin skewer including a vertical staff with a head member fast on the lower end of the staff and having a pointed portion the tip of which forms the lower bearing end of the skewer, the end of said tip having annular bearing engagement at its peripheral edge with said concave step bearing surface and at no other point therewith.

3. In combination, a creel step bearing member having a concave top bearing surface, and a bobbin skewer including a vertical staff with a head member fast on the lower end of said staff and having a pointed portion the tip of which rests upon and turns in said concave bearing surface of said creel step member, the lower end of the tip of said pointed head portion terminating in a flat annular surface adjoining its peripheral edge having operative bearing engagement with the concave bearing surface of said creel step bearing member and forming the sole bearing contact of the skewer therewith.

4. A skewer for use in rotatively supporting a textile bobbin upon a creel step bearing having a concave top supporting surface, said skewer comprising a staff provided with an upper tubular bobbin engaging member spaced from the upper end of the staff, and a pointed head member fast on the lower end of said staff for supporting the lower end of a bobbin, the tip of said pointed head forming the lower bearing end of the skewer and terminating in a flat circular end surface of sufficient area to provide an annular portion bordering its peripheral edge to rest against and form the sole bearing contact of the skewer with the concave supporting surface in the top of the creel step bearing member.

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