The present invention relates to loop lifting implements for use in knitting machines, and to a method of producing the same. The invention is specifically herein disclosed as embodied in points together with their supports or holders. These points herein disclosed together with their holders are particularly adapted for use in narrowing as well as in the formation of picot, lace or other designs on the so-called cotton type full-fashioned hosiery machine, although the invention in its broader aspects is not limited to any specific purpose, being equally applicable to any type of knitting machine quill or points and its holder.

The ordinary point or loop lifting implement as used on cotton machines is formed of a round piece of wire with a butt, offset at approximately right angles to the shank and with the lower or pointed end, for some distance along its shank, milled or die-struck to form a groove for later engagement with the beard, hook and shank of spring beard needles.

While the art of milling, striking, coin stamping or otherwise forming the groove of these points has been developed to a remarkable degree of accuracy, it is nevertheless difficult to assure that the grooves are absolutely central with the outer portion of the shank of the points. It is also impractical to have the groove of nearly the point width, for by so doing the edges of the groove break down and present rough surfaces against which the yarn of the loops will later be cut or otherwise disturbed. The extreme depth of groove is also not attainable without running the risk of splitting the stock at the groove bottom.

The present method of mounting points in their supports is to drill small holes in the supports, in which the butts of the points are placed. The drilling of these holes is expensive, due to their extremely small diameter, and in many cases results in the running off or disalignment of the drill, so that when a point is later inserted in this out-of-square hole, the point is twisted, which makes it difficult for later alignment with any needle with which it later may be associated. Also in the bending of the butt of the point, it sometimes happens that the bending is not parallel to the point groove which will cause the point to be twisted when it is inserted in its support.

In carrying out the present invention, a novel and improved loop lifting point is provided which is shaped along its needle engaging portion from a thin, flat ribbon molded into a substantially U-shaped groove which will be of a uniform maximum width and depth as compared to the whole width of the implement, with smooth edges to prevent chafing or cutting of the yarn.

Another feature of the invention consists in the provision of a loop lifting point having a laterally offset butt or rib arranged to engage in a corresponding groove in the loop lifting point support to prevent endwise movement of the point and its upper shank portion V-shaped to engage with a corresponding V-shaped slot in the support to prevent any possible turning or twisting of the point in its support when the points are clamped together.

The present invention also contemplates the provision of a novel and improved method of producing a loop lifting point having the characteristics above described.

With these and other objects in view as may hereinafter appear, the several features of the invention consist also in the devices, combinations and arrangement of parts and in the steps of the method hereinafter described and claimed, which together with the advantages to be obtained thereby will be readily understood by one skilled in the art from the following description taken in connection with the accompanying drawing, in which Fig. 1 is an end view illustrating a preferred form of loop lifting point and the supporting bar; Fig. 2 is a partial section taken on the line 2—2 of Fig. 1 showing the point grooves in the point support bar and the points engaging therewith; Fig. 3 is an enlarged detail view in side elevation of the new loop lifting point illustrated in Figs. 1 and 2; Fig. 4 is a front elevation of the points shown in Fig. 3; Fig. 5 is a top plan view of the loop lifting point shown in Figs. 3 and 4; Fig. 6 is a cross section taken on the line 6—6 of Fig. 3; Fig. 7 is a section taken on the line 1—1 of Fig. 3; Fig. 8 is a view in side elevation of a modified form of loop lifting point incorporating valuable features of the present invention; Fig. 9 is a view in front elevation of the loop lifting point shown in Fig. 8; Fig. 10 is a cross section taken on the line 10—10 of Fig. 8; Fig. 11 is a cross section taken on the line 11—11 of Fig. 8; Fig. 12 is a view in side elevation showing another modified form of loop lifting point; Fig. 13 is a view in front elevation of the loop lifting point shown in Fig. 12; Fig. 14 is a sectional view taken on the line 14—14 of Fig. 12; and Fig. 15 is a sectional view taken on the line 15—15 of Fig. 12.

Referring specifically to the drawing, a preferred form of loop lifting point embodying the several features of the invention is disclosed in Figs. 1 to 7. The loop lifting point shown in
these figures is produced from thin, flat stock which is molded at its lower or needle engaging end into a substantially U-shaped groove 16 to receive the needle beard. The groove formed in this manner is of a uniform maximum width, being the full width of the implement less only the wall thickness. Further, the inside of the groove, will, by the very nature of production, be smooth. The upper portion of the shank indi-
ated at 18 is V-shaped to fit into a correspond-
ing V-shaped groove 19 in the support 22, and is provided at its upper end with a laterally offset nib or butt 24 which fits into a corresponding groove 26 cut in the support 22 lengthwise of the support, and at right angles to the V-shaped slots 28. The points are held in position in the support 22 by means of the usual cover plate 28 and clamping screws 30. With this construction, each point is held in position against a twisting or turning movement by the engagement of the V-shaped shank with the slot, the offset nib 24 being utilized only to prevent lengthwise movement of the point in the support.

A modified form of point incorporating the several features of the present invention, is shown in Figs. 8 to 11 inclusive. The point shown in these figures is formed as in the usual process from a round piece of wire having at its upper end a butt 32 offset at approximately right angles to the shank 34 which is preferably ground on its back side to a substantial V shape for rigidly engaging with the corresponding V-shaped slot in the support. The lower or needle engaging portion of the point disclosed in these figures, is stamped or rolled out into a thin, flat shape or ribbon, and is then molded to form a substantially U-shaped groove to receive the needle beard. The loop lifting point constructed in this manner incorporates the principal advantages of the loop lifting point shown in Figs. 1 to 7, in which the shank portion of the point is shaped to fit into locking engagement with its slot, and the lower or needle engaging portion of the point is of uniform maximum width and with smooth edges.

Another modified form of loop lifting point is shown in Figs. 12 to 15 inclusive. The loop lifting point shown in these figures is made from square stock which is set at an angle to fit into the corresponding V-shaped slot in the needle support, and is flattened at its lower end into a thin, flat section which is molded as in the previous instances, to form a substantially U-shaped needle engaging groove 36.

It will be readily seen that a loop lifting point constructed as herein disclosed and in accordance with the method above described, can be manufactured cheaply and efficiently as compared with the points now in use, and with a higher degree of accuracy which is desirable for the proper operation of these elements in actual use. The relatively great width and depth of the needle beard receiving groove as compared to the total width and thickness of the point which it is possible to use, greatly increases the probability that the needle and its beard will safely engage in the groove, and the manner of mounting the points so that they are supported against turning or twisting for a considerable length along the shank, insures an exact alignment of these points at all times under the varying strains of actual working conditions and variations in point manufacture.

The nature and scope of the invention having been indicated, and several specific embodiments incorporating the several features thereof, together with the method of producing the same, having been specifically described, what is claimed is:

1. A needle loop lifting implement for removing a loop from a spring beard knitting needle comprising a flat piece of stock shaped at its lower end to provide a needle eye engaging tip, a rounded portion adjacent thereto to receive the upper end of a needle, a V-shaped shank, and a laterally offset flat upper end.

2. The combination with a loop lifting implement support having V-shaped grooves, a slot normal to said grooves running lengthwise of the support, and a cover plate therefor, of a needle loop lifting implement for removing a loop from a knitting needle having a needle eye engaging tip, a needle engaging portion adjacent thereto flattened to form a thin ribbon of substantially uniform thickness molded to form a U-shaped needle engaging groove, a shank portion having a V-shaped ridge to engage in one of said V-shaped grooves, and an offset nib for engaging in said slot.

3. A needle loop lifting implement for removing a loop from a spring beard knitting needle having the needle engaging portion of its shank flattened to form a substantially uniform thickness and molded to provide a U-shaped groove of maximum depth and width consistent with given external dimensions of the implement in cross section for cooperative engagement with spring beard knitting needles to receive the beard portion of a spring needle, said grooved portion terminating at its lower end in a forwardly inclined tip pointed to engage within the eye of a spring beard needle.

4. A needle loop lifting implement for removing a loop from a spring beard knitting needle comprising a wire having at its upper end a laterally offset nib, a V-shaped ridge on the shank portion for engaging its support, a needle engaging portion flattened to a thin ribbon of substantially uniform thickness molded to form a U-shaped needle beard receiving groove and provided at its lower end with a needle eye engaging tip.

5. A needle loop lifting implement for removing a loop from a spring beard knitting needle comprising a wire having a square cross section provided at its upper end with an offset nib and having its needle engaging portion flattened normal of said cross-section to form a thin ribbon of substantially uniform thickness molded to form a U-shaped needle beard engaging groove, and further provided at its lower end with a needle eye engaging tip.

6. A method of producing a needle loop lifting implement having a needle beard receiving groove of maximum depth and width consistent with given external dimensions of the implement in cross section for cooperative engagement with spring beard knitting needles which comprises molding a thin ribbon-shaped strip of stock of substantially uniform thickness into a substantially U-shaped needle beard receiving groove and shaping the lower end thereof into a forwardly inclined needle eye engaging tip.

7. A method of producing a needle loop lifting implement which comprises bending one end of a wire having a circular cross section to form a nib, shaping the wire to form a V-shaped ridge on the shank, flattening the needle engaging portion of the loop lifting point to a thin ribbon of substantially uniform cross section, molding said ribbon into a substantially U-shaped needle beard receiv-
ing groove, and shaping the end thereof to form a needle eye engaging tip.

8. A method of producing a needle loop lifting implement having a needle beard receiving groove of maximum depth and width consistent with given external dimensions of the implement in cross section for cooperative engagement with a spring beard knitting needle which comprises flattening the needle engaging portion of the implement into a thin ribbon of substantially uniform thickness, molding said ribbon into a substantially U-shaped needle receiving groove, and further shaping the end thereof to form a forwardly inclined needle eye engaging tip.

9. A method of producing a needle loop lifting implement which comprises molding a thin ribbon-shaped strip of stock into a V shape along the shank portion of the implement, molding the needle engaging portion of the implement to form a substantially U-shaped needle receiving groove, and further shaping the end thereof to form a needle eye engaging tip.

10. A loop lifting implement for spring beard needles adapted for use with a support having V-shaped grooves, a slot normal to said grooves running lengthwise of the support and a cover plate thereof, comprising a curved point shaped to engage in the eye of the needle, a portion adjacent thereto formed of flat stock bent to provide a thin, hollowed beard and needle receiving portion of uniform thickness in cross section, a shank portion having a V-shaped ridge to engage in said groove, and an offset nib for engaging in said slot.

11. A loop lifting implement for spring beard needles having a recess adjacent thereto and a cover plate, comprising a curved point shaped to engage in the eye of the needle, a portion adjacent thereto formed of flat stock bent to provide a thin, hollowed beard and a needle receiving portion of uniform thickness in cross-section, a shank portion having a V-shaped ridge to engage in said groove, and an offset nib to engage in said recess.

12. A loop lifting implement for spring beard needles adapted for use with a support having a V-shaped groove for each of said implements, a recess formed at an angle of said groove and a cover plate, comprising a needle eye engaging tip, a hollowed portion adjacent thereto to receive the beard and upper end of the needle, a shank portion having a V-shaped ridge to engage in said groove, and an offset nib for engaging in said recess.

13. A loop lifting implement for spring beard needles adapted for use with a support having V-shaped grooves, a slot normal to said grooves running lengthwise of the support, and a cover plate therefor, comprising a needle eye and beard engaging portion, a shank portion having a V-shaped ridge to engage in said groove, and an offset nib for engaging in said slot.

14. A support for holding knitting machine implements having V-shaped shanks and offset butts, said support being provided with V-shaped grooves similarly shaped and adapted to receive the shanks of said implements and prevent them from turning, a groove at right angles to said V-shaped grooves to receive the butts of the implements, and a cover plate to hold the implements in the support.

15. A support for holding knitting machine implements having V-shaped shanks and offset butts, said support being provided with V-shaped grooves similarly shaped and adapted to receive the shanks of said implements and prevent them from turning, a recess corresponding to and formed at an angle to each of said V-shaped grooves to receive said offset butts, and a cover plate to hold the implements on said support.

16. A loop lifting implement for spring beard needles having the needle engaging portion thereof formed of flat stock bent to provide a thin hollowed beard and needle receiving portion of uniform thickness in cross section with the hollow part thereof of a maximum depth and width consistent with given external dimensions of the implement in cross section and terminating at its lower end in a forwardly inclined tip pointed to engage within the eye of the needle.

17. A loop lifting implement for spring beard needles having the needle engaging portion of its shank bent from a flat ribbon of a uniform thickness to provide a thin hollowed beard and needle receiving portion with an internal surface of maximum width and depth consistent with given external dimensions in cross section, and terminating at its lower end in a forwardly inclined tip pointed to engage with the eye of the needle.

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