United States Patent [19]

Zientara et al.

[11] **3,898,699**

[45] **Aug. 12, 1975**

[54] **CAP HAVING KNITTED CROWN AND CROCHETED BRIM AND METHOD FOR MAKING THE SAME**

[75] Inventors: **Donald Zientara**, Greendale; **Richard A. Smith**, Brookfield, both of Wis.

[73] Assignee: **Zwicker Knitting Mills**, Appleton, Wis.

[22] Filed: **Mar. 5, 1974**

[21] Appl. No.: **448,252**

[52] **U.S. Cl.** **2/192**; 2/201; 66/171

[51] **Int. Cl.**[2] **A42C 1/00**

[58] **Field of Search** ..... 2/192, 201, 175, 198, 200, 2/195, 178; 66/172 R, 190, 171

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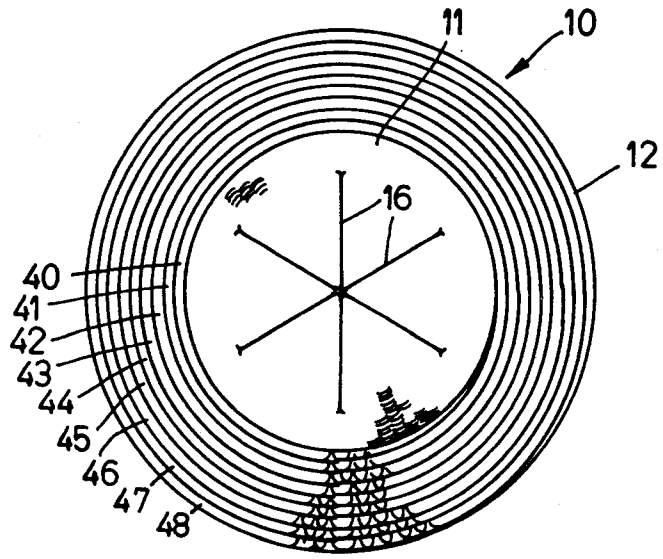
Primary Examiner—Richard J. Scanlan, Jr.
Assistant Examiner—Peter Nerbun
Attorney, Agent, or Firm—James E. Niles

[57] **ABSTRACT**

A cap or hat comprises a knitted crown (formed of a single or double layer of material) closed at the top and a relatively stiff crocheted brim extending entirely around and outwardly from the bottom edge of the crown. The method of forming a cap with a single-layered crown comprises the steps of knitting a tubular sleeve, sewing the top end of the crown closed, and crocheting two strands of yarn into a continuous band first to and around the entire bottom edge of the crown and then in successive rows outwardly from the bottom edge of the crown. The method of forming a cap with a double-layered crown comprises the steps of knitting a tubular sleeve, folding said sleeve to form an inner crown portion and an outer crown portion having a folded lower edge, sewing the top end of the crown closed, and crocheting the brim to the bottom edge of the crown in the aforesaid manner.

11 Claims, 23 Drawing Figures



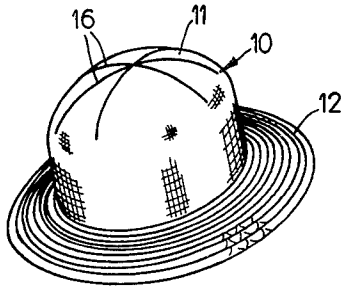


FIG. 1

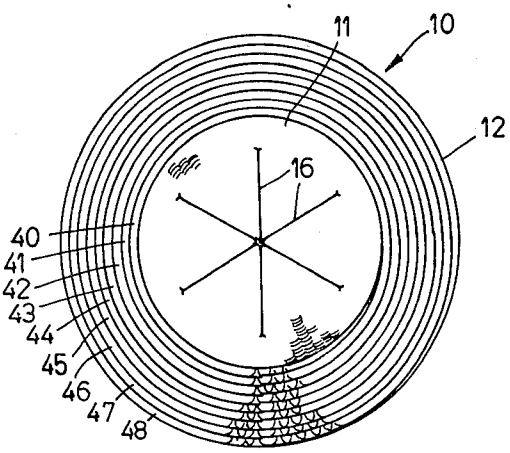


FIG. 1A

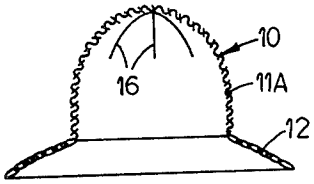


FIG. 2

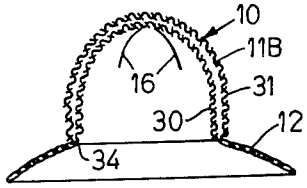


FIG. 3

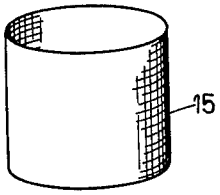


FIG. 4

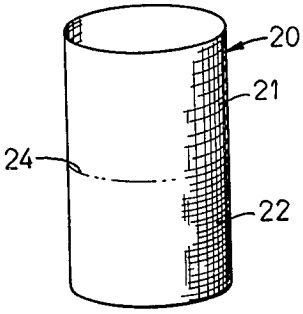


FIG. 6

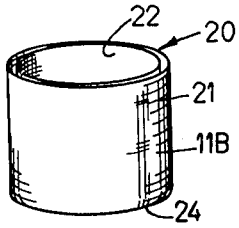


FIG. 7

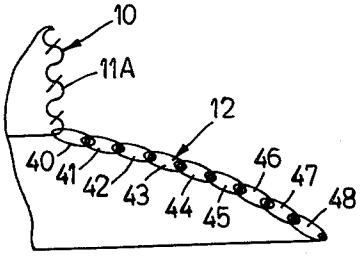


FIG. 5

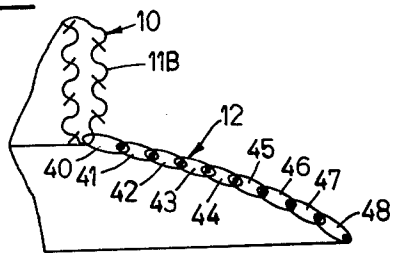


FIG. 8

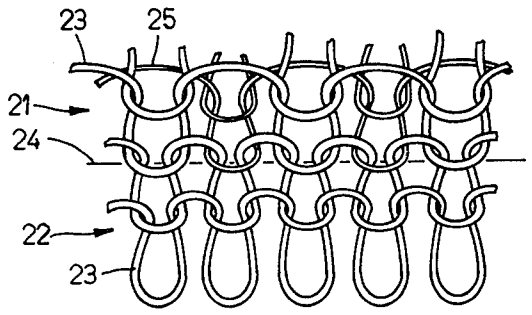


FIG. 9

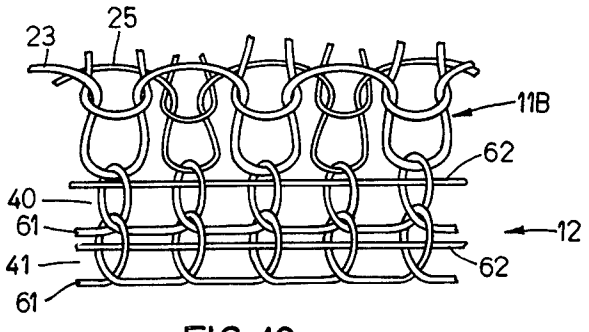


FIG. 10

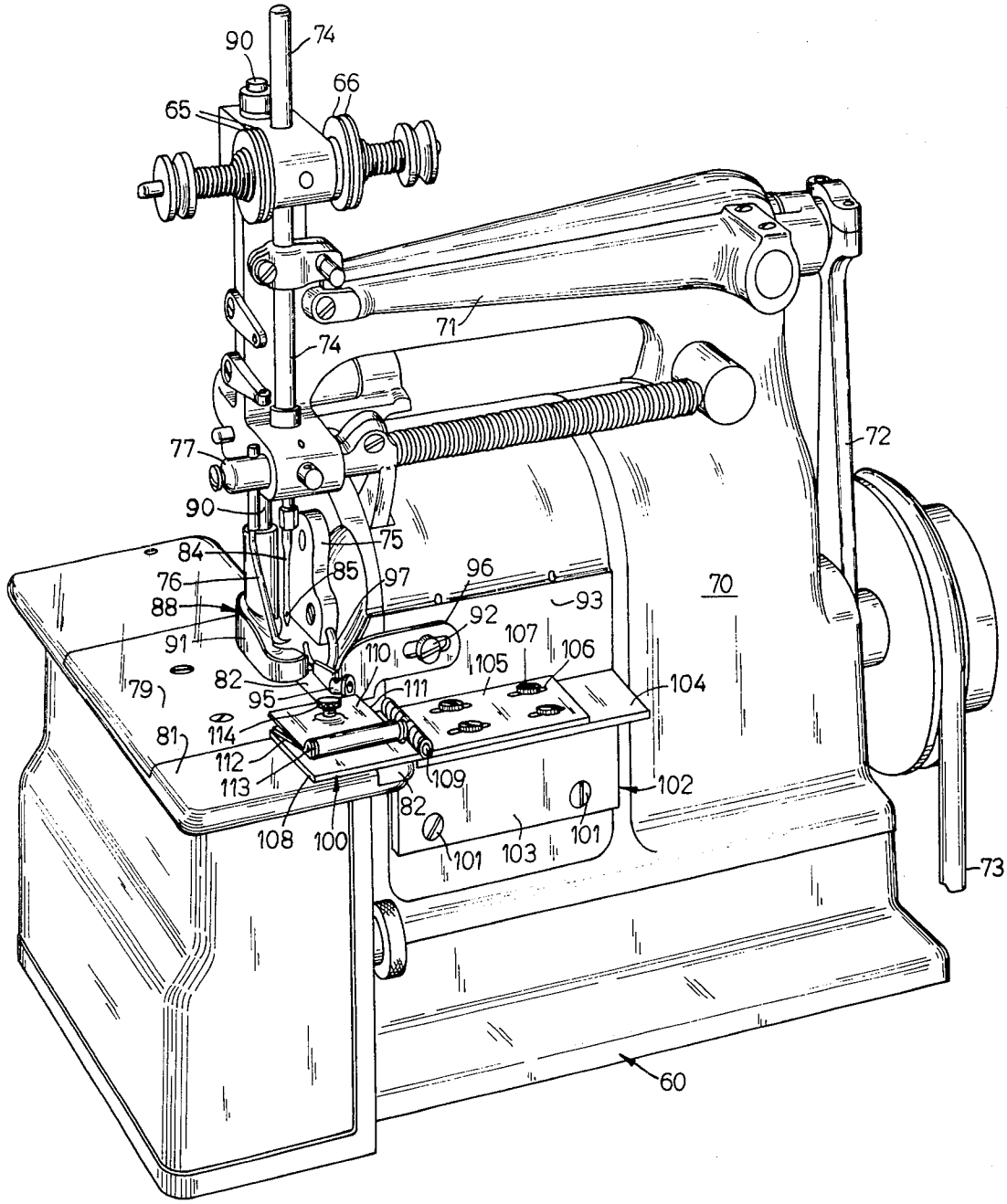

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FIG. 11

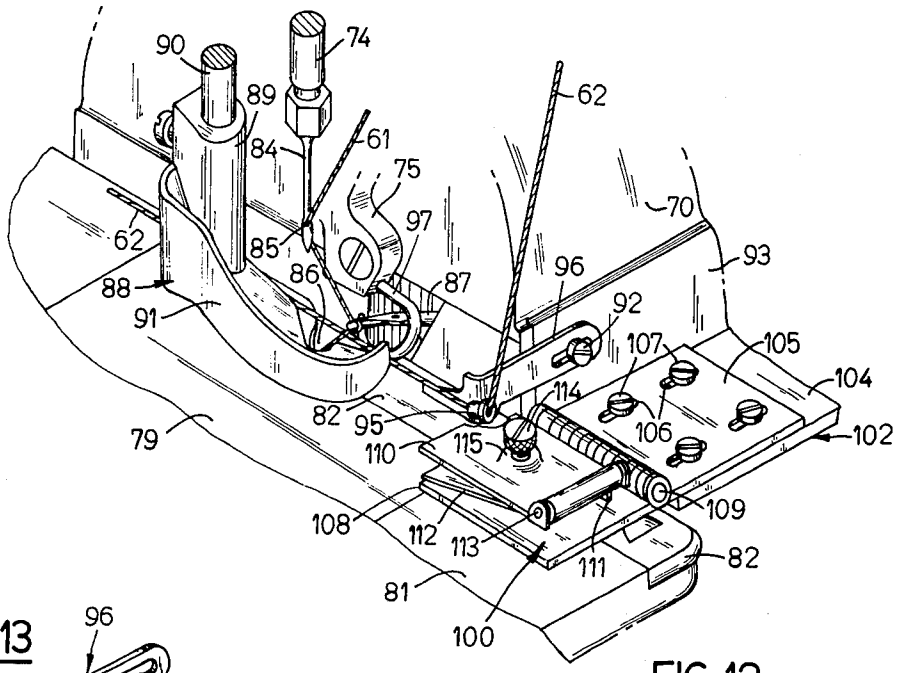

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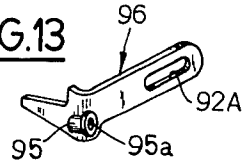
FIG. 13



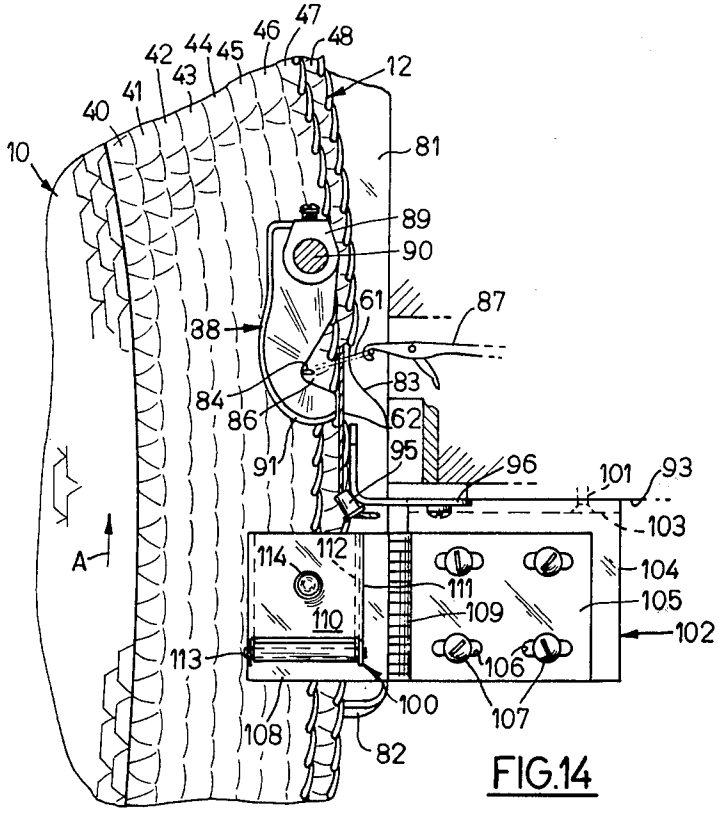


FIG. 14

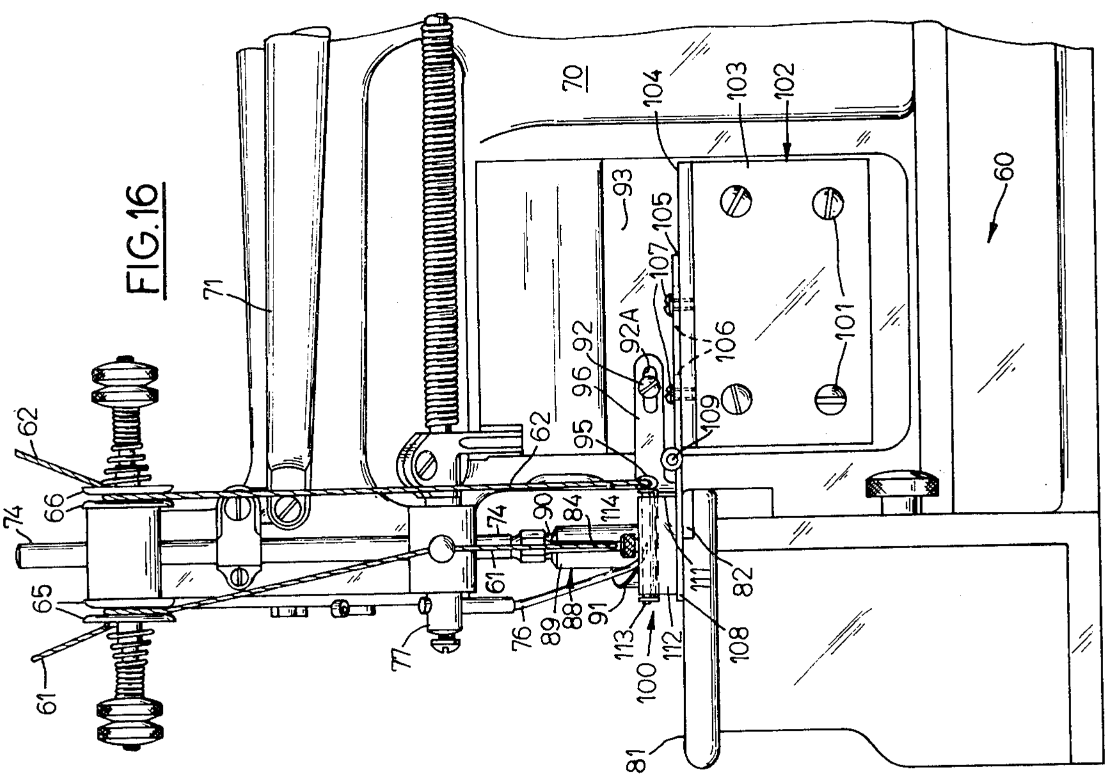

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FIG.16

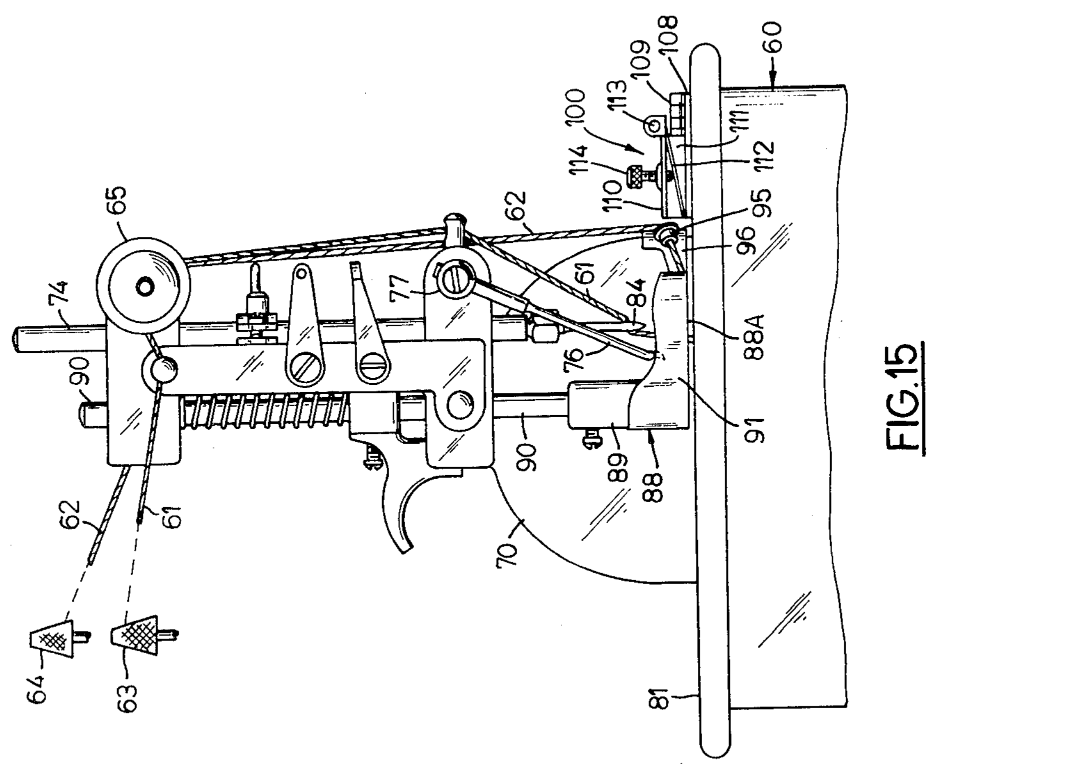
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FIG.15

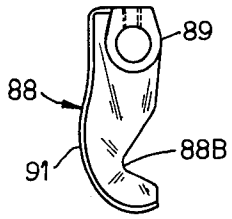

FIG. 17

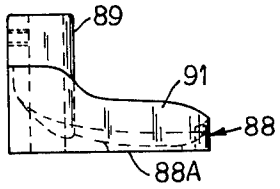

FIG. 18

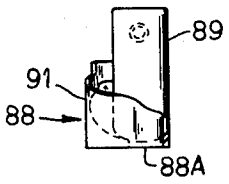

FIG. 19

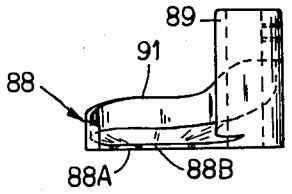

FIG. 20

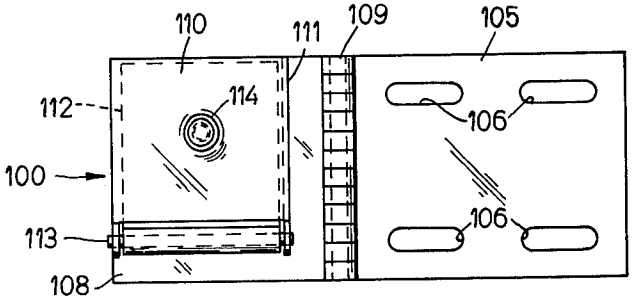

FIG. 21

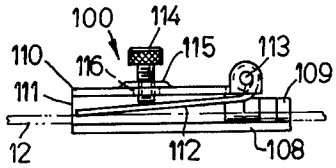

FIG. 22

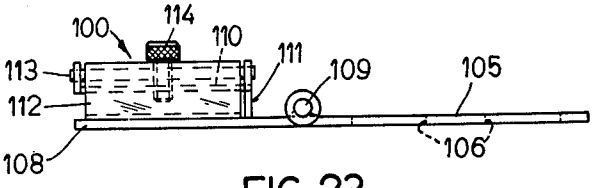

FIG. 23

CAP HAVING KNITTED CROWN AND CROCHETED BRIM AND METHOD FOR MAKING THE SAME

BACKGROUND OF THE INVENTION

1. Field of Use

This invention relates generally to caps or hats having knitted crowns and crocheted brims and to methods for making the same.

2. Description of the Prior Art

It is desirable for utilitarian and aesthetic reasons to provide a hat or cap, especially suited for winter use by girls or women, having a relatively flexible knitted crown (formed of a single or double layer of material) and a relatively stiffer but still flexible brim extending entirely around and outwardly from the bottom edge of the crown. Attempts to manufacture such a cap in one piece by means of conventional knitting machines which produce a tubular knitted sleeve have not been satisfactory because that portion of the sleeve which is to serve as the brim has little or no tendency to extend outwardly from the lower edge of the crown. This is the case even though different knitting stitches (i.e., tighter stitches) are used for the brim. This difficulty results from the fact that conventional knitting machines for producing the tubular sleeve employ a predetermined number of needles and, therefore, necessarily provide the same number of stitches in each row of stitching in the crown and the brim. It is not possible on such conventional knitting machines to produce a brim containing increasingly larger numbers of stitches in successive rows forming the brim because it is not commercially practicable to continuously change the number of needles on the machine as the brim is being formed.

SUMMARY OF THE INVENTION

A cap or hat in accordance with the present invention comprises a relatively flexible knitted crown and a relatively stiff crocheted brim extending entirely around and outwardly from the bottom edge of the crown. The crown comprises either a single or a double layer of knitted material. A cap with a single layered crown is formed of a tubular knitted sleeve having a lower edge to which the crocheted brim is attached and closed at the top by a conventional six-way sew-across. A cap with a double layered crown is formed of a tubular knitted sleeve which is folded inwardly of itself to provide an inner crown portion and an outer crown portion and a lower folded edge to which the crocheted brim is attached. The double layered crown is closed at the top by a conventional six-way sew across and the inner and outer crown portions may comprise tighter and looser knitting stitches, respectively.

Apparatus for crocheting the aforesaid outwardly extending relatively stiff brim around the lower edge of either the single-layered or double-layered crown of the cap comprises a crocheting machine having a stitch tongue, a reciprocably movable standard needle and a reciprocably movable latch hook for operating upon a main first strand of yarn to form a continuous band of crocheted stitches and to secure the band around the lower edge of the crown and then in successive rows to form a brim, a novel eyelet mounted on the machine for guiding a loose second strand of yarn along the stitch tongue and through the stitches formed thereon to provide a binder thread or stay cord, a novel foot attachment to inhibit accidental pushing of the workpiece into the needle area of the machine, and a novel adjustable tensing means for gripping the workpiece being fed into the machine to apply a predetermined amount of tension thereto to control the tightness of the crocheted stitches and thereby regulate the stiffness of the brim being formed.

CROSS REFERENCE TO RELATED APPLICATION

This application is related to U.S. Ser. No. **448253**, filed Mar. **5, 1974**, by Tony C. Kaminski, entitled "Apparatus for Crocheting A Brim On Cap" and having the same assignee as the present application and allowed on Dec. **19, 1974.**

Drawings

FIG. **1** is a perspective view of a cap or hat in accordance with the invention;

FIG. **1A** is a top plan view of the hat or cap shown in FIG. **1**;

FIG. **2** is a vertical cross-section view of a cap such as shown in FIG. **1** but having a single-layered crown;

FIG. **3** is a view similar to FIG. **2** but showing a cap having a double-layered crown;

FIG. **4** is a perspective view of a sleeve used to make a hat such as shown in FIGS. **1** and **2**;

FIG. **5** is an enlarged cross-section view of the bottom portion of the crown of the hat shown in FIG. **2** and the brim attached thereto;

FIG. **6** is a perspective view of a sleeve used to make a hat such as shown in FIGS. **1** and **3**;

FIG. **7** is a perspective view of the sleeve shown in FIG. **6**, showing a portion of the sleeve inwardly folded as during one step of manufacture;

FIG. **8** is an enlarged cross-section view of the bottom portion of the crown of the hat shown in FIG. **3** and the brim attached thereto;

FIG. **9** is an enlarged plan view of the knitting stitches that may be employed on either side of the fold line in the sleeve shown in FIG. **6**;

FIG. **10** is an enlarged plan view of the crocheting stitches forming the brim and showing their association to the bottom edge of crown such as shown in FIGS. **5** and **9**;

FIG. **11** is a perspective view of a crocheting machine modified in accordance with the invention to include a presser foot attachment, a tensioning attachment and a fabric edge guide and binder thread feed in accordance with the invention;

FIG. **12** is an enlarged perspective view of a portion of the machine shown in FIG. **11**;

FIG. **13** is a perspective view of the fabric edge guide and binder thread feed shown in FIG. **12**;

FIG. **14** is a top plan view of the portion of the machine shown in FIG. **12** and showing a cap brim being crocheted thereon;

FIG. **15** is a side elevational view of the left end of the machine shown in FIG. **11**;

FIG. **16** is a front elevational view of the left end of the machine shown in FIG. **11**;

FIGS. **17, 18, 19** and **20** are views of the top, left side, front and right side, respectively, of the presser foot attachment in accordance with the invention shown in FIGS. **11, 12, 14, 15** and **16**; and

FIGS. **21, 22** and **23** are views of the top, left side and right side, respectively, of the tensioning attachment in accordance with the invention shown in FIGS. **11, 12,** 14, 15 and **16.**

DESCRIPTION OF A PREFERRED EMBODIMENT

The Cap and Method for Making

Referring to FIG. **1**, the numeral **10** designates a hat or cap having a knitted relatively flexible crown **11** and a relatively stiffer but still flexible crocheted brim **12** in accordance with the invention. Crown **11** may take the form of a single layered crown **11A** comprising a single layer of knitted material, as shown in FIG. **2**, or may take the form of a double-layered crown **11B** comprising a double layer of knitted material, as shown in FIG. **3**.

Single-layered crown **11A** is formed of a tubular cloth sleeve **15**, shown in FIG. **4**, which is fabricated, for example, of yarn and formed by a suitable knitting stitch on a conventional tubular knitting machine. The upper open end of sleeve **15** is gathered and sewn closed by thread in a conventional six-way sew as indicated by numeral **16** in FIGS. **1**, **1A** and **2**.

Double-layered crown **11B** is formed of a tubular cloth sleeve **20**, shown in FIG. **6**, which is fabricated, for example, of yarn and formed by a suitable knitting stitch or stitches on a conventional tubular knitting machine. Sleeve **20** comprises an upper sleeve portion **21** and an integrally formed lower sleeve portion **22**, which portions may comprise knitting stitches of the same type or of different types. FIG. **6**, for example, shows portions **21** and **22** of sleeve **20** as comprising different types of knitting stitches on either side of a fold line **24**. The stitches in portion **21** comprises two strands of yarn **23** and **25** and those in portion **22** comprises only strand **23**, as FIG. **9** shows. Thus, the stitches in upper portion **21** might typically be more decorative than those in portion **22** of sleeve **20**. As FIG. **7** shows, the lower sleeve portion **22** of sleeve **20** is folded upwardly and inwardly of upper sleeve portion **21** along the fold line **24** to form the crown **11B** having an inner crown portion **30** and an outer crown portion **31**, respectively, and a folded lower edge **34** or **24**. The upper open ends of sleeve **20** shown in FIG. **7** are gathered and sewn closed by thread in a conventional six-way sew as indicated by numeral **16** in FIGS. **1**, **1A**, **2** and **3**.

Single-layered crown **11A** and double-layered crown **11B** are provided at their bottom edges with the crocheted brim **12** as shown in FIGS. **5** and **8**, respectively. FIG. **10** is a plan view showing the manner in which the stitches forming crocheted brim **12** typically engage the bottom edge of double-layered crown **11B** and it is to be understood that single-layered crown **11A** is engaged by the crocheting stitches in a similar manner.

As FIGS. **1A**, **5**, **8** and **10** show, the brim **12** comprises nine row of crocheted stitches designated by the numerals **40** through **48**. However, a greater or lesser number of rows may be provided, depending on the brim width desired for a particular cap **10**. As FIGS. **1A** and **10** show, the rows are formed by a continuous band of crocheted stitches, with the first row of band **40** being secured to and around the bottom edge of the crown **11A** or **11B**, and each successive row being secured to the preceding row. As is apparent, each successive row is of greater diameter and therefore contains a greater number of successive stitches than a preceding row.

As FIG. **14** shows, the continuous band of crocheting is formed on or by a conventional crocheting machine **60** such as is described in U.S. Pat. No. **1,244,155** to J. M. Merrow issued Oct. **23**, **1917** and in a bulletin published by The Merrow Machine Company, **23** Laurel Street, Hartford, Conn., entitled "The Merrow Plane Crochet Blanket Hemming and Edging and Shell Stitch Machines," describing a Style **22F** machine, hereinafter described, which is modified in accordance with the present invention in three ways as hereinafter explained to provide a crocheted band embodying two strands of yarn **61** and **62**, to maintain a predetermined tension on the crocheted band as it is being formed and applied, and to maintain the cap fabric clear of interference with the machine mechanism. The strand of yarn (or needle thread) **61** which forms the main crocheted stitch is maintained under greater tension by the tension discs **65** as it is supplied, as FIG. **15** shows, from its cone **63**, than the tension imposed by the tension discs **66** on the supplemental strand of yarn **62** which runs from cone **64**, which serves as a binder thread or stay cord, and extends through each stitch formed by strand **61**, as FIG. **10** shows. If preferred, strand **60** could run free and by-pass the tension discs **66**. The stay cord **62** serves to stiffen the brim **12** (by increasing its bulk) and prevent unraveling if a stitch of strand **61** is cut or broken when the cap is being manufactured or in use. The degree or amount of tension applied to the crocheted band at it is formed is also a factor in the stiffness of brim **12**, i.e., the greater the degree of tension, the stiffer the brim **12**, and vice-versa.

To summarize, a cap or hat comprises a knitted crown (formed of a single or double layer of material) closed at the top and a relatively stiff crocheted brim extending entirely around and outwardly from the bottom edge of the crown. The method of forming a cap with a single-layered crown comprises the steps of knitting a tubular sleeve, sewing the top end of the crown closed, and crocheting two strands of yarn into a continuous band first to and around the entire bottom edge of the crown and then in successive rows outwardly from the bottom edge of the crown. The method of forming a cap with a double-layered crown comprises the steps of knitting a tubular sleeve, folding said sleeve to form an inner crown portion and an outer crown portion having a folded lower edge, sewing the top end of the crown closed, and crocheting the brim to the bottom edge of the crown in the aforesaid manner.

The Apparatus

The apparatus in accordance with the invention (comprising machine **60** and the hereinafter described attachments and modifications) for providing a crocheted brim **12** for a cap **10** in accordance with the invention is shown in FIGS. **11** through **23**. As FIG. **11** shows, machine **60** generally comprises a supporting frame or housing **70** on which a needle lever **71** is pivotally mounted for reciprocating movement, being driven by an eccentric rod **72** which, in turn, is driven by a motor driven drive belt **73**. Lever **71** is connected to impart reciprocating vertical movement to a needle bar **74**. Housing **70** also encloses other conventional components necessary to operate a feed dog (not visible), a stitch controller carrier cap **75**, a latch hook **87**, and a spreader needle **76** on the end of a rocker shaft **77**. Machine **60** further comprises a flat horizontal work plate **81** and a needle plate **79** upon which the workpiece (i.e., the cap crown **11A** or **11B**) lies and is fed (in the direction of arrow A in FIG. **14**) by the operator. A flat, removable stitch tongue or finger plate

82 lies flush with the upper surface of plate 81 and has a tapered projection 83 around which the crocheted stitches are formed and off of which the stitches slide as the work progresses. A standard driven eye pointed needle 84 having an eye 85 at its lower end through which main strand 61 extends, is reciprocably movable in a vertical path through the workpiece and through an opening 86 in needle plate 79 at the left side of finger plate 82. A presser foot attachment 88 is provided to prevent upward movement of the workpiece from needle plate 79 as the needle 84 pierces and is then withdrawn from the workpiece. Presser foot attachment 88 comprises a hollow shank 89 which adapts it for attachment to the presser foot lifter 90 and further comprises a curved upwardly extending side portion 91 to prevent portions of the workpiece from accidentally being pushed into the path of needle 84 or other movable components. Presser foot 88 comprises a flat base portion 88A which is notched at one side as at 88B to accommodate standard needle 84. The curved portion 91 is shaped so as to prevent it from snagging or catching on cloth materials pushed thereagainst. A standard driven latch hook or latch needle 87 mounted in a movable carrier (not shown) for engagement with main strand 61 is disposed for reciprocating movement in horizontal paths (toward and away from the path of needle 84) alternately above and below finger plate 82. A driven curved spreader needle 76 is provided at the left of needle 84 to ensure appropriate engagement of and disengagement of main strand 61 from the latch hook 87. A cast off horn 97 movable in a generally circular path is provided to maintain the formed stitches on stitch tongue 82 out of the path of movement of other components. A generally L-shaped fabric edge guide 96 is adjustably mounted above and to the right of the stitch tongue 82 by means of a screw 92 which extends through an elongated slot 92A in the shank in the edge guide 96 and engages frame cap 93 and determines the extent to which the workpiece may be moved laterally into the machine.

In accordance with the invention, edge guide 96 is provided with a hollow cylindrical binder cord eyelet 95, preferably welded thereto at the outside corner thereof, having a hole 95*a* through which the binder cord 62 extends and by which cord 62 is directed along the upper surface of the stitch tongue 82 and through the stitches formed thereon. As edge guide 96 is moved or adjusted, the eyelet 95 is also correspondingly moved or adjusted so that the stay cord is directed in the proper path to enable it to pass along the upper surface of the stitch tongue 82 and through the stitches being formed thereon.

In further accordance with the invention, a tensioning device or assembly 100 is provided to maintain a preceding crocheted row and the next successive row is being formed and attached thereto under desired tension.

Generally considered, the crocheting machine 60 comprises support frame 70 and the flat horizontal work plate 81 and the needle area toward and through which the workpiece is fed across said work plate along a path in a predetermined direction. The tensioning device 100 applies adjustable predetermined pressure on the workpiece as it moves in the predetermined direction along the path. The tensioning device 100 generally comprises an adjustment plate or bracket 105 rigidly secured to the support frame 70 and a swing plate 108 pivotally connected to said bracket and movable between one position wherein it rests on said work plate in said path of said workpiece and another position clear of said path. A tension screw support plate or member 110 is rigidly mounted on the swing plate 108 in spaced apart relationship therefrom A tension plate 112 is mounted between the swing plate 108 and the tension screw support member 110 and is pivotally connected to the tension screw support member 110 and is pivotably connected to the tension screw support member. The tension plate 112 and swing plate 108 define a space in the path of the workpiece when said swing plate is in the said one position, through which a portion of said workpiece passes. A tension screw 114 is adjustably supported on the tension screw support member 110 and is engageable with the pivotable tension plate 112 to limit the spacing between the tension plate 112 and the swing plate 108 to thereby adjustably control the amount of tension applied to the workpiece. More specifically considered, the tensioning device 100 comprises an L-shaped attachment plate 102 having a vertical portion 103 and a horizontal portion 104. Portion 103 is rigidly secured to a rigid portion of machine 60 such as the frame cap 93, as by bolts or screws 101. An adjustment plate or bracket 105 having elongated bolt-receiving slots 106 is secured to portion 104 of plate 102 by bolts 107. A pivotable bottom or swing plate 108 is pivotably connected to adjustment plate 105 by a hinge pin or pintle 109 and is swingable out of the way when not in use. Tensioning device or assembly 100 further comprises a top screw support plate or member 110 which is rigidly supported on and in spaced apart relationship from swing plate 108 by a side bracket 111 welded therebetween. A movable tension plate 112 is disposed between the swing plate 108 and top plate 110 and has its rear edge pivotally connected to the rear edge of top plate 110 by a hinge pin or pintle 113. An adjustable threaded tension screw 114 extends through a threaded collar 115 rigidly secured to the upper side of top plate 110 and through a hole 116 in top plate 110 into engagement with the upper surface of movable tension plate 112. The workpiece being crocheted is fed between swing plate 110 and tension plate 112 and the extent to which screw 114 is turned in or out determines the position of tension plate 112 and, thus, the tensioning force applied to the workpiece. Thus, feeding of work under constant desired tension is possible despite the fact that the machine is being operated by different personnel who may otherwise apply different degrees of tension under conventional hand feeding.

To summarize, apparatus for crocheting an outwardly extending relatively stiff brim around the lower edge of the crown of a cap comprises a crocheting machine having a stitch tongue, a reciprocably movable standard needle and a reciprocably movable latch hook for operating upon a main first strand of yarn to form a continuous band of crocheted stitches and to secure the band around the lower edge of the crown and then in successive rows to form a brim, a novel eyelet mounted on the machine for guiding a loose second strand of yarn along the stitch tongue and through the stitches formed thereon to provide a binder thread or stay cord, a novel foot attachment to inhibit accidental pushing of the workpiece into the needle area of the machine, and a novel adjustable tensing means for gripping the workpiece being fed into the machine to apply

a predetermined amount of tension thereto to control the tightness of the crocheted stitches and thereby regulate the stiffness of the brim being formed.

1. A cap comprising: a crown formed of a knitted tubular sleeve having a lower edge and a relatively stiff crocheted brim connected to and extending entirely around and outwardly from said edge, said crocheted brim comprising a continuous band of crocheted stitching connected to and around said lower edge of said crown spirally wound to extend outwardly therefrom in successive rows, each row being secured by stitching to an adjacent row.

2. A cap according to claim **1** wherein said brim is relatively stiffer than said crown.

3. A cap according to claim **2** wherein said band is formed of a main strand of yarn forming stitches and a second strand of yarn extending through said stitches to serve as a stay cord.

4. A cap according to claim **1** wherein said crown is a single layered crown formed of a knitted tubular sleeve.

5. A cap according to claim **3,** wherein said crown is a single layered crown formed of a knitted tubular sleeve.

6. A cap according to claim **1** wherein said crown is a double layered crown formed of a tubular sleeve folded inwardly on itself and having a folded lower edge.

7. A cap according to claim **3** wherein said crown is a double layered crown formed of a tubular sleeve folded inwardly on itself and having a folded lower edge.

8. A method of making a cap comprising the steps of: providing a knitted tubular sleeve having a lower edge around its bottom opening to serve as a crown, crocheting a continuous band of stitching to and entirely around said lower edge, said band being spirally wound to extend outwardly therefrom in successive rows, each row being secured by stitching to an adjacent row to serve as a relatively stiff brim.

9. A method according to claim **8** including the step of closing the top opening of said tubular sleeve.

10. A method of making a cap comprising the steps of: providing a knitted tubular sleeve, folding said sleeve inwardly of itself to form a crown having a folded lower edge around its bottom opening, crocheting a continuous band of stitching to and entirely around said folded lower edge, said band being spirally wound to extend outwardly therefrom in successive rows, each row being secured by stitching to an adjacent row to serve as a relatively stiff brim.

11. A method according to claim **10** including the step of closing the top opening of said tubular sleeve.

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