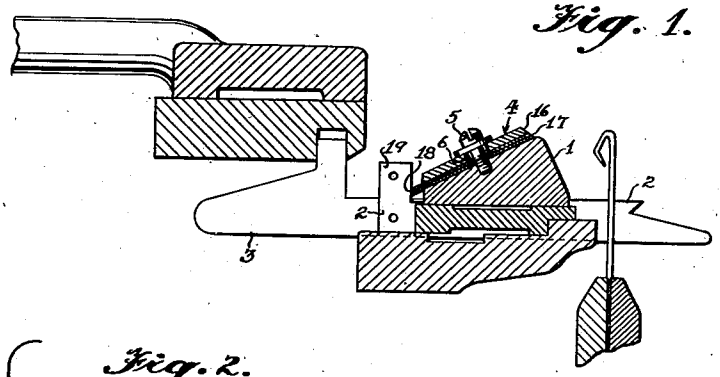
Sept. 2, 1947. F. G. WEISBECKER 2,426,803

KNITTING MACHINE ATTACHMENT

Filed May 8, 1946

Fig. 1.



PRIOR ART.

Fig. 2.

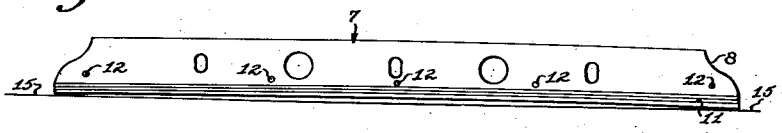


Fig. 3.



Fig. 4.

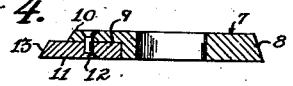


Fig. 5.

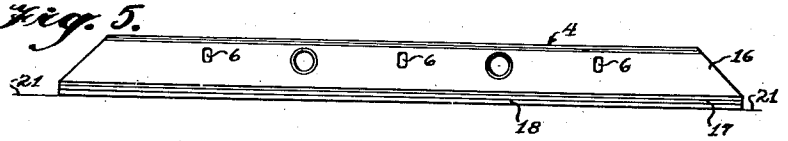
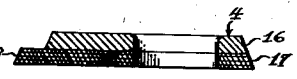


Fig. 6



Fig. 7.



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2,426,803

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KNITTING MACHINE ATTACHMENT

Frank G. Weisbecker, Glenside, Pa.

Application May 8, 1946, Serial No. 668,200

3 Claims. (Cl. 66—110)

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This invention relates to improvements in knitting machines and more particularly to improvements in verge plates for straight knitting machines.

In a straight knitting machine of the type now generally used in the production of full-fashioned hosiery, there usually are a number of knitting sections for simultaneously producing a corresponding number of hosiery blanks. Each conventional knitting section includes one or more yarn carriers, a series of needles, a series of sinkers and dividers, sinker and divider operating means, and a verge plate. The yarn carriers lay yarn along the series of sinkers and dividers and adjacent the series of needles. The sinkers and dividers are then advanced according to the usual practice to sink the laid yarn between the needles, the forward movement of the sinkers and dividers being limited by an edge of the verge plate. For this purpose, the verge plate has a so-called sinker stop edge which is engaged by the sinkers and dividers to arrest them, in alignment, at the proper forward position.

The objections to all-metal and wholly non-metallic verge plates and the advantages of combining the best features of both by making a verge plate with a metallic body and a non-metallic sinker stop edge strip are set out in U. S. Patents Nos. 2,162,660, dated June 13, 1939, and 2,227,403, dated December 31, 1940, to Frank G. Weisbecker. Reference may be made to these patents for a full description of the above mentioned objections and advantages.

To overcome the objections to all-metal verge plates, namely, sinker rebound and irregular stop edge wear, and the objections to non-metallic verge plates, namely, warping and bending, the aforementioned patents and also U. S. Patent No. 2,080,353, dated May 11, 1937, to Bay et al., attempted to combine the advantages of both forms of construction. In all the patents mentioned, a verge plate body formed of metal, to provide the rigidity and strength necessary to prevent warping, was equipped with a sinker stop edge strip formed of non-metallic material, to provide the shock absorbing properties necessary to reduce or eliminate sinker rebound and also to provide better wear resisting properties. These non-metallic strips were secured to the rear edge of the metallic verge plate body by various means. In the patents to Weisbecker, the under surface of the rear edge of the metallic verge plate body was provided with a longitudinally extending recess. The non-metallic sinker stop edge strip was secured in this recess by rivets, although it was

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stated that other securing means could be employed. In the patent to Bay et al., the non-metallic strip was pressed in a longitudinal groove formed in the rear edge of the metallic verge plate body. All patents mentioned above used a stop edge strip of plastic composition material, which was found to be best suited for the purpose.

It has been determined that, although the constructions disclosed in the aforementioned patents overcame certain objections to all-metal verge plates, notably, sinker rebound and irregular stop edge wear, metallic verge plate bodies constructed with a plastic composition sinker stop edge strip have been found to have other objections. In actual practice, it has been found that the sinker stop edge strips, used in the above mentioned patents, which were formed of a plurality of layers of woven fabric impregnated and bonded together by a phenolic condensation product, shrink with age, while the metallic body has no corresponding change in dimensions upon aging. Such shrinkage of thermosetting resinous compositions upon aging is well known. In the patent to Bay et al., such shrinkage caused the stop edge strip to pull out of the groove in the metallic verge plate body and render the verge plate useless. In the Weisbecker patents, the shrinkage caused the metallic body of the verge plate to warp under the tension exerted thereon by the rivets securing the plastic stop edge strip to the body. The warping of the metallic body seriously affects the use of the verge plate on a knitting machine as will be described hereinafter.

The objection to verge plates constructed with a plastic composition sinker stop edge strip are overcome by the present invention which provides a verge plate construction combining the advantages of both entirely non-metallic and entirely metallic verge plates, but with the attendant objections of neither.

It is, therefore, an object of this invention to provide a verge plate construction with a wear resisting sinker stop edge which will reduce or eliminate sinker rebound, but which possesses sufficient rigidity so that it will not warp to the extent of interfering with the knitting operation.

The foregoing and other objects of this invention will appear from the following description, the appended claims, and the accompanying drawings in which:

Figure 1 is a sectional view of part of the loop forming mechanism of a full-fashioned knitting

machine provided with a verge plate constructed in accordance with the present invention.

Figures 2 and 3 are plan, and rear elevational views respectively of a verge plate constructed in accordance with the prior art.

Figure 4 is a cross-sectional view taken on line 4—4 of Figure 3.

Figures 5 and 6 are plan and rear elevational views respectively of a verge plate constructed in accordance with the present invention.

Figure 7 is a cross-sectional view taken on line 7—7 of Figure 6.

Referring now to the drawings, Figure 1 shows a sinker head including a cap or top 1, a sinker 2, and a divider 3 of a knitting section in a conventional straight, full-fashioned knitting machine. In a conventional full-fashioned knitting machine, a series of sinkers 2 and a series of dividers 3 are associated with each sinker head top 1. For a further disclosure of loop forming mechanism in a full-fashioned, straight knitting machine, reference may be had to the book by Max C. Miller, entitled "Knitting Full-Fashioned Hosiery" and published by McGraw-Hill Book Company, Inc. of New York, with a copyright notice dated 1937.

In the operation of a straight knitting machine, the sinkers 2 and dividers 3 are advanced and retracted in loop forming operations according to the usual practice. The sinkers 2 and dividers 3 have their forward movement limited by a verge plate 4 embodying the present invention. The verge plate 4 is secured to the top 1 by screws 5 extending through elongated openings 6 in the plate and threaded into the top.

Figures 2, 3, and 4 show a verge plate 7 constructed in accordance with the aforementioned Patent No. 2,162,660 ready for use on a knitting machine. A bar or plate-like metallic body member 8 is provided with a recess 9 in the undersurface of the rearward end 10. A sinker stop edge strip 11 of plastic composition material is secured in the recess by rivets 12. The strip 11 projects rearwardly of the body member 8 to provide a stop edge 13. The verge plate 7 is illustrated after the plastic stop edge strip 11 has shrunk with age. In the unrestrained position viewed in Figure 3, it will be noted that the shrinkage has resulted in a downward bowing or bending of both ends of the verge plate in a longitudinal plane perpendicular thereto with resulting concavity of the undersurface of the verge plate. The bending is caused for the same reason that a bimetallic thermostatic element bends upon changes in temperature. The concavity clearly is demonstrated by reference to the straight line 14—14. This undersurface concavity in itself is not objectionable because when the verge plate is placed in position for use upon a knitting machine, the securing screws are tightened sufficiently to flatten the plate against the top 1 and eliminate the undersurface concavity. In the unrestrained position viewed in Figure 2, however, a warping or bending of the verge plate 7 is shown which seriously affects its operation on a knitting machine. Because the stop edge strip 11 is secured to the body member 8 along only the rearward end 10 of the body member, the longitudinal tension which results from shrinkage of the strip causes a bowing or bending of the verge plate 7 in its own plane with a consequent concavity in the sinker stop edge 13. The concavity clearly is demonstrated by reference to the straight line 15—15. This configuration allows the sinkers near the center of the

plate to project farther than those near the ends of the plate, resulting in the formation of larger loops in the center than at each end. Accordingly, the machine knits more loosely in the center than at either end, thus marring the appearance of the fabric and detracting from its value. The stop edge concavity in the plane of the plate is not eliminated by the screws securing the verge plate to the top 1 since the screws exert force only in a direction perpendicular to the plane of the verge plate.

As shown in Figures 1, 5, 6, and 7, the verge plate 4 of this invention comprises a bar or plate-like metallic top portion 16 and an underlying non-metallic bottom portion 17. The bottom portion 17 is of greater width than the top portion 16 and projects a short distance rearwardly thereof to provide a sinker stop edge 18 for controlling and limiting the forward movement of the sinkers 2. This limiting action will be clear from Figure 1 which shows a sinker 2 at its extreme forward position with the front edge of its upstanding butt 19 in engagement with the stop edge 18. The metallic top portion 16 provides the necessary strength and rigidity to the verge plate 4 while the non-metallic bottom portion 17 provides the necessary wear resisting and shock absorbing qualities. Preferably the top and bottom portions are of substantially the same thickness, but these ratios may vary within reasonable limits depending upon the materials which compose the respective portions.

The top portion 16 preferably is composed of brass or other material of suitable strength and rigidity, while the bottom portion 17 may be composed of a thermosetting resinous composition, or other material having suitable wear resisting and shock absorbing qualities. In practice, it has been found that the preferred non-metallic material is a fibrous phenol condensate composition comprising, for example, a plurality of layers of woven fabric impregnated and bonded together by a phenolic condensation product. Experience shows that this preferred non-metallic composition is more durable than a metallic stop edge and has superior wear resisting qualities as well as acting to cushion the shock when the sinkers are arrested at the limit of their forward movement.

The top portion 16 and bottom portion 17 are secured together to form the verge plate 4. The securing means may be screws, rivets, cement, or the like. I prefer, however, to use a synthetic glue to provide a complete bond between both portions of the plate 4 along their contiguous surfaces. The preferred cement or glue is a viscous, thermoplastic adhesive based on synthetic components and comprises a solid solution in methyl ethyl ketone. It is particularly advantageous as a bonding cement in the present invention because it is not affected by any of the liquids commonly used in a hosiery mill, such as oil, gasoline, carbon-tetrachloride, etc. If rivets or screws are used instead of cement to secure the top and bottom portions of the verge plate 4, the portions should be secured together in such a manner that shrinkage of the bottom portion will not cause bending of the plate in its own plane. Accordingly, securing rivets or screws preferably should be positioned adjacent the front and rear edges of the top portion 16 or along longitudinal substantially parallel lines symmetrically arranged with respect to the longitudinal center line of the top portion, in order to avoid the objections found in earlier verge

plates having a non-metallic stop edge strip secured to a metallic body portion adjacent only one edge thereof.

Referring now to Figures 5 and 6, wherein the verge plate 4 constructed in accordance with the present invention is shown ready for use on a knitting machine, it will be seen that the rear elevational view (Figure 6) discloses an undersurface concavity which clearly is seen by reference to the straight line 20—20. This concavity or bending in a longitudinal plane perpendicular to the plane of the verge plate is caused by shrinkage of the plastic bottom portion 17 with age in exactly the same manner as the construction shown in Figure 3. As previously explained in connection with the construction shown in Figure 3, however, this bending or warping in a longitudinal plane perpendicular to the plane of the verge plate is not objectionable because the fastening screws 5 may be tightened sufficiently to flatten the verge plate 4 upon the sinker head top 1 and thereby eliminate the undersurface concavity of the plate when it is in use on a knitting machine.

The plan view (Figure 5) discloses the sinker stop edge 18 as a straight line 21—21. This feature permits uniform advancement of the sinkers 2 and dividers 3 with consequent formation of loops of regular size. No warping or bending of the plate 4 in its own plane occurs upon shrinkage of the plastic non-metallic bottom portion 17, because both top and bottom portions are secured together in such a manner that such shrinkage will not cause bending of the plate in its own plane.

Stated in another manner, shrinkage of the bottom portion 17 will not place the front and rear ends of the top portion 16 under unequal longitudinal forces which would cause bending of the verge plate in its own plane.

The foregoing is illustrative, and it will be understood that this invention includes all modifications and embodiments coming within the scope of the appended claims.

I claim:

1. For use with the sinker head and movable sinkers of a straight knitting machine, a verge plate adapted to be secured to the sinker head and having a rearward edge for limiting the travel of said sinkers, said verge plate comprising: two substantially flat, relatively thin, bar-like portions of a length substantially greater than the width thereof secured together face to face, one of said portions being composed of a non-metallic material having wear resisting and shock absorbing properties and being of a width greater than the other portion and projecting rearwardly thereof to provide said sinker travel limiting edge,

said other portion being composed of a metallic material having properties of rigidity and strength, said non-metallic portion being subject to contraction relative to said metallic portion, said portions being secured together substantially symmetrically with respect to the longitudinal centerline of said metallic portion so that contraction of said non-metallic portion relative to said metallic portion will not exert unbalanced longitudinal forces on opposite sides of said centerline tending to bend said verge plate in its own plane.

2. For use with the sinker head and movable sinkers of a straight knitting machine, a verge plate adapted to be secured to the sinker head and having a rearward edge for limiting the travel of said sinkers, said verge plate comprising: two substantially flat, relatively thin, bar-like portions of a length substantially greater than the width thereof secured together face to face, one of said portions being composed of a non-metallic material having wear resisting and shock absorbing properties and being of a width greater than the other portion and projecting rearwardly thereof to provide said sinker travel limiting edge, said other portion being composed of a metallic material having properties of rigidity and strength, said non-metallic portion being subject to contraction relative to said metallic portion, said portions being secured together by cementitious means bonding an entire face of said metallic portion to the contiguous face of said non-metallic portion so that contraction of said non-metallic portion relative to said metallic portion will not exert unsymmetrical longitudinal forces on said metallic portion tending to bend said verge plate in its own plane.

3. The structure set forth in claim 1 wherein the non-metallic material is a phenol condensate composition.

FRANK G. WEISBECKER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,080,353	Bay et al.	May 11, 1937
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2,227,403	Weisbecker	Dec. 31, 1940
2,384,451	Brumbach	Sept. 11, 1945

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4,341	Great Britain	1882