June 13, 1939. F. G. WEISBECKER 2,162,660

KNITTING MACHINE

Filed Dec. 7, 1937

Fig. I

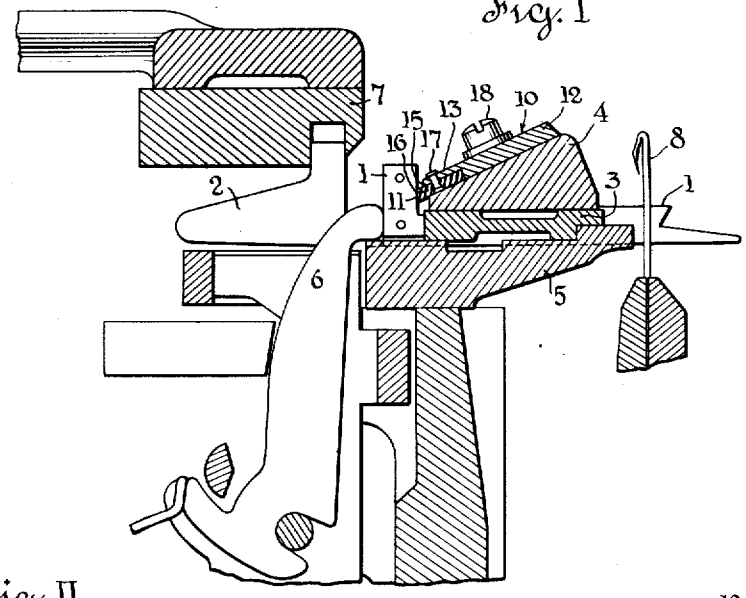


Fig. II

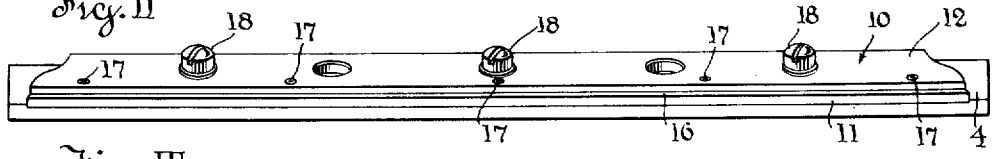


Fig IV

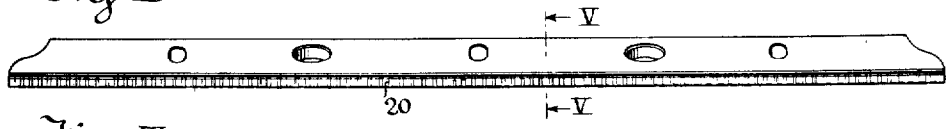


Fig. III

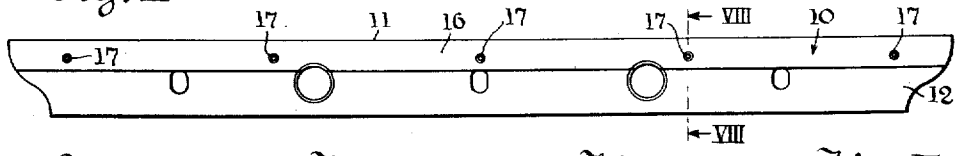


Fig. V

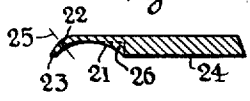


Fig. VI

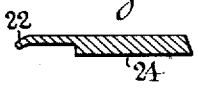


Fig. VII

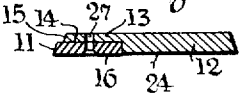


Fig. IX

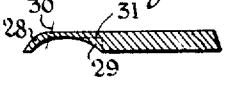
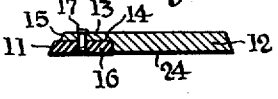


Fig. VIII



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2,162,660

KNITTING MACHINE

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Application December 7, 1937, Serial No. 178,570

9 Claims. (Cl. 66—110)

This invention relates to the art of knitting machines; and more particularly to an improved verge plate construction for use with the loop-forming mechanism or sinker-head assembly of full-fashioned knitting machines, and to a method for making such verge plates.

The sinker-head assembly of conventional full-fashioned knitting machines includes a sinker-head and a plurality of sinkers and dividers. These sinkers and dividers are slidably arranged in the sinker-head and are projected to cooperate with the knitting needles in forming loops across the extent of the knitting field. The sinker-head assembly also includes a verge plate for arresting the sinkers on the same line at the limit of their forward travel, so that all of the new loops in the knitting field will be formed of equal length. The useful life of conventional verge plates is relatively short as the continual pounding of the sinkers slowly, but certainly, wears grooves in the sinker stop edges of the verge plates. Since these grooves are not formed uniformly, the verge plates will in time fail to stop the sinkers on the same line. The sinkers will then be projected different distances in their looping operations and form loops of unequal length. The longer loops occurring repeatedly in certain wales will form sinker lines which detract from the appearance of the completed stocking and substantially reduce its value. Heretofore, the practice has been to discard the old verge plates as soon as they have worn to the extent of permitting sinker lines to occur in the knitted fabric, and to provide the sinker-head assemblies with entirely new verge plates. According to the present invention, it is no longer necessary to discard the worn verge plates. These verge plates may now be rebuilt so as to perform their intended function with at least the same efficiency that characterised their original performance. By rebuilding worn verge plates and thereby prolonging their useful life, a considerable saving may be secured. The cost of rebuilding a worn verge plate in accordance with this invention may be substantially less than the cost of an entirely new verge plate.

The verge plate, heretofore in general use, consists of an elongated metallic bar formed from a single piece of metal. When the sinkers strike a verge plate of such an all-metal construction, they have a tendency to rebound to an appreciable extent and cause the production of imperfect fabric. These prior art verge plates, due to their all-metal construction, also transmit the impact of the sinkers to adjacent parts of the machine and further increase the possibility of the fabric being imperfectly knit. To overcome these objections to all-metal verge plates, it has been heretofore proposed to substitute in their place verge plates formed entirely of non-metallic material. While these non-metallic verge plates absorb at least part of the shock of the sinker impacts and thereby reduce or eliminate sinker rebound, they frequently warp to such an extent that they do not properly control the travel of the sinkers and dividers. A warped verge plate is apt to permit the sinkers to be projected to different extents and to form loops of irregular size. Such irregularity in loop size mars the appearance of the fabric and detracts from its value.

These objections to all-metal and wholly non-metallic verge plates are overcome by the present invention, which provides a verge plate construction having the advantages of both the prior art constructions.

It is, therefore, an object of this invention to provide a method for making verge plates.

Another object is to provide a method for re-building verge plates of all-metal construction.

A still further object is to provide a method for rebuilding worn verge plates.

Another object is to provide an improved verge plate construction.

Another object is to provide a verge plate construction which combines the advantages of the prior art verge plates made entirely of metal and those made entirely of non-metallic material.

A further object is to provide a novel verge plate construction, in which the sinker stop edge may be readily and conveniently replaced.

The foregoing and other objects of this invention will appear from the following description, the appended claims, and the accompanying drawing.

In the drawing, Fig. I is a sectional view of a portion of a loop-forming mechanism of a full-fashioned knitting machine, including a verge plate made in accordance with this invention.

Fig. II is a rear elevational view of the verge plate and upper portion of the sinker-head shown in Fig. I.

Fig. III is a bottom plan view of the verge plate shown in Figs. I and II.

Fig. IV is a perspective view of a worn verge plate, of conventional all-metal construction, which may be rebuilt in accordance with this invention.

Figs. V, VI, VII and VIII are transverse cross-sectional views to illustrate successive stages in

rebuilding the verge plate of Fig. IV in accordance with this invention, Fig. V being also a view taken on line V—V of Fig. IV and Fig. VIII being a view taken on line VIII—VIII of Fig. III.

Fig. IX is a transverse cross-sectional view of a conventional all-metal verge plate to illustrate another method for rebuilding the same in accordance with this invention.

The loop-forming mechanism of a full-fashioned knitting machine

Referring now to Fig. I, this figure shows certain parts of the loop-forming mechanism of a conventional full-fashioned knitting machine, only those parts being illustrated which are helpful in understanding this invention. Conventional parts shown in Fig. I include a sinker 1, a divider 2, a spacer 3, a sinker-head having a top 4 and a base 5, a sinker operating jack 6, a catch bar 7 and a knitting needle 8. It will be understood that the usual full-fashioned knitting machine has a plurality of sinkers 1, a plurality of dividers 2 alternating with sinkers 1, a plurality of needles 8, and a jack 6 for each sinker 1. In the usual operation of this loop-forming mechanism, the jacks 6 operate the sinkers 1 in succession to sink the yarn, previously laid thereon by a yarn carrier (not shown), between adjacent needles 8 across the entire knitting field. The dividers 2 are then advanced simultaneously by the catch bar 7 to sink the yarn between the remaining needles 8. The needles 8 subsequently are shifted downwardly, and the sinkers 1 and dividers 2 are retracted as a group by the catch bar 7.

A verge plate in accordance with this invention

A verge plate embodying the present invention is indicated by the numerol 10 in Fig. I and is shown in that figure as occupying substantially the same operative position as the conventional verge plates therefore in general use. The rearward edge 11 of the verge plate 10 provides a stop for limiting and controlling the forward movement of the sinkers 1, as will be clear from Fig. I, which shows a sinker 1 at its extreme forward position and in engagement with the stop edge 11.

Referring now to Figs. I, II, III and VIII, the verge plate 10 of this invention may include an elongated bar or plate 12 of metal or other suitable material which is not apt to warp when anchored to the sinker-head top 4. The rearward end of the bar 12 is of reduced thickness to provide a flange 13 overlying a recess 14 extending inwardly from the outer flange edge 15 and along the underside of the bar 12 (see particularly Fig. VIII). A strip 16 is positioned within the recess 14 and secured to flange 13 in any suitable manner, as for example, by means of rivets 17. The strip 16 has its rearward portion extending beyond the flange edge 15 to provide the desired sinker stop edge 11 (see for example Fig. I).

The strip 16 may be of the same metal as the bar 12 or of a different metal chosen for its better wear resistant properties or for other obvious reasons. It is preferred, however, that the strip 16 be formed of a suitable non-metallic material which will act to cushion the shock when the sinkers 1 are arrested at the limit of their forward movement. The strip 16 might be composed of bakelite, or hard rubber, but 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 phenol condensate. Experience shows that this preferred non-metallic composition is more durable than metallic edge verge plates and has superior wear-resisting properties.

The strip 16 may have a thickness no greater than, or approximately the same as, the depth of the recess 14. The strip 16, however, when made of non-metallic material, preferably has a thickness somewhat greater than the depth of the recess 14 in which it is received (see Fig. VIII). When the strip 16 is of such thickness, it may fill the recess 14 and be firmly held against warping, or movement, by the flange 13 and the upper surface of a sinker-head top 4 when the verge plate 10 is anchored to sinker-head top 4 by means of screws 18 as shown in Figs. I and II. By providing the strip 16 with a thickness exceeding the depth of recess 14, the flange 13 and sinker-head top 4 may be provided with a firmer grip on the strip 16 when the screws 18 are tightened, thereby avoiding the warping or undesired accidental movement of the strip 16.

A method for rebuilding a verge plate in accordance with this invention

A conventional verge plate of all-metal construction is shown in Figs. IV and V. Fig. IV also illustrates at 20 the grooved sinker stop edge which characterizes worn all-metal verge plates. Each vertically extending groove has been formed by the continual pounding of a sinker 1 or a divider 2. It will be noted from Fig. V that the illustrated conventional verge plate has a longitudinally extending channel 21 in its lower side. One side of the channel 21 is bounded by a depending, curved lip 22 to provide a sinker stop edge. The extreme end 23 of lip 22 lies in substantially the same plane as the lower side 24 of the verge plate. This worn verge plate of Figs. IV and V may be rebuilt and have its usefulness restored in the following manner. The lower portion of lip 22 and the worn sinker stop edge, which lie beyond or below the line indicated at 25 in Fig. V and extend longitudinally of the verge plate, are suitably removed. The longitudinal portion of the verge plate indicated at 26 within dotted lines in Fig. V is also suitably removed. This removal of rearward and lower longitudinal portions of the all-metal verge plate may be carried out by conventional grinding, cutting or machining operations. The verge plate will now appear as shown in Fig. VI. The remaining curved portion of lip 22 (see Fig. VI) may now be straightened in suitable manner so as to provide with adjacent portions of the verge plate the straight flange 13 of Fig. VII. If desired, the straightening of the upper portion of lip 22 may take place before the removal of the verge plate portion 26, or the lip 22 may be straightened before its lower end is removed. After the preceding operations, the modified verge plate may have the cross-sectional shape of the plate or bar 12 in Fig. VII, which is provided with a straight flange 13 having its upper and lower sides in parallel planes and its lower side set back from the underside 24 of the remainder of the verge plate to provide the recess 14. A strip 16 of the size and character described above is now held in the recess 14 while a series of rivet-receiving apertures (see 27 in Fig. VII) are formed through both the flange 13 and the strip 16. Such procedure will provide the respective openings in the strip 16 and flange 13 in alignment and avoid the possibility of the strip 16 buckling between

adjacent rivets when secured in place. Rivet pins 17, which may be hollow, are now inserted through the formed aligned openings 27 from the flange side thereof, the rivet heads engaging the upper side of the flange 13 to properly position the rivet pins 17 for the upsetting operation. With the rivet pins 17 in this position, their lower ends within the strip 16 are upset, as by means of a punch, to securely hold the strip 16 to the flange 13. The length of the rivet pins 17 and the upsetting operation are preferably such that the upset rivet ends will be countersunk in the strip 16 (see Fig. VIII) and not extend beyond the underside 24 of the bar 12. With this arrangement of the rivets 17, they will not be in a position to interfere with strip 16 being somewhat compressed or squeezed between flange 13 and sinker-head top 4 when the verge plate 10 is secured in position by means of the screws 18.

In certain cases, it may be desirable and permissible to rebuild a worn verge plate without the lip straightening step explained above in connection with Figs. VI and VII. For example, the worn verge plate may have a transverse cross-sectional shape as shown in Fig. IX and have the slot 14 (of Fig. VIII) formed simply by removing the longitudinal portions 28 and 29 of the verge plate which are respectively positioned beyond the line 30 and within the dotted line 31 of Fig. IX. The old verge plate would then have a cross-sectional shape corresponding to that of the bar 12 in Figs. VII and VIII. The Fig. IX verge plate in its modified form may then be provided with a strip 16 in the manner described with respect to Figs. VII and VIII so that when rebuilt it will appear substantially as shown in Figs. I, II, III and VIII.

After the strip 16 has been secured in place, its edge 11 is preferably machined to a straight surface and bevelled to the desired angle in the manner necessary to coact with the sinkers 1 (see Fig. I) for limiting their forward movement to the same extent of travel thereby producing loops of uniform length across the entire knitting field. While the strip 16 is preferably secured to flange 13 by riveting, it may be secured in place by other means, such as screws, cement or the like which permit the strip 16 to be removed and replaced when desired. The above described rivets 17 also may be readily removed in any convenient conventional manner when it is desired to replace the strip 16.

While this invention has been explained in connection with the rebuilding of certain types of worn verge plates, it is also applicable to the rebuilding of other types of worn verge plates, as well as new verge plates of all-metal construction where a non-metallic sinker stop cushion edge is desired.

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

I claim:

1. A method of rebuilding a metallic verge plate having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate to provide the same with a longitudinal recess extending inwardly from the rearward edge and along the underside thereof, forming a strip with a width greater than that of said recess and with a thickness corresponding approximately to the depth of said recess, and securing said trip in said recess with its rearward edge extending beyond said rearward plate edge.

2. A method of rebuilding a metallic verge plate having a rearward, depending, longitudinal lip to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate including at least the lower portion of said depending lip to provide a longitudinal recess extending inwardly from the rearward edge and along the underside thereof, forming a strip with a width greater than that of said recess, placing said strip in said recess with its rearward edge extending beyond said rearward plate edge, and securing said strip to said metallic plate.

3. A method of rebuilding a metallic verge plate having a rearward, depending, longitudinal lip to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate including at least the lower portion of said depending lip, straightening the upper portion of said lip to provide a rearwardly extending flange overlying a longitudinal recess extending inwardly from the rearward edge and along the underside of the metallic plate, forming a strip of non-metallic material and with a width somewhat greater than the width of said recess, placing said strip in said recess with the rearward edge of the strip extending beyond the rearward edge of said metallic plate, and riveting the strip to said flange with the lower heads of the rivets countersunk in said strip.

4. A method of rebuilding a metallic verge plate having a rearward, depending, longitudinal lip to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate including at least the lower portion of said depending lip to provide a rearwardly extending flange overlying a longitudinal recess extending inwardly from the rearward edge and along the underside of the metallic plate, forming a strip of non-metallic material and with a width and thickness somewhat greater than the width and depth, respectively, of said recess, placing said strip in said recess with the underface of said trip extending somewhat beyond the adjacent underface of the metallic plate and with the rearward edge of the strip extending beyond the rearward edge of said metallic plate, forming a series of rivet receiving openings through both said flange and said strip, placing rivets in said openings from said flange side, and upsetting the lower ends of said rivets to countersink the same in said strip.

5. A method of rebuilding a metallic verge plate having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate to provide a rearwardly extending flange overlying a longitudinal recess extending inwardly from the rearward edge and along the underside of the metallic plate, forming a strip of non-metallic material and with a width somewhat greater than the width of said recess, placing said strip in said recess with the rearward edge of the strip extending beyond the rearward edge of said metallic plate, forming a series of rivet receiving openings through both said flange and said strip, placing rivets in said openings from said flange side, and upsetting the lower ends of said rivets to countersink the same in said strip.

6. A method of rebuilding a metallic verge plate

having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate to provide a rearwardly extending flange overlying a longitudinal recess extending inwardly from the rearward edge and along the underside of the metallic plate, forming a strip of non-metallic material and with a width somewhat greater than the width of said recess and with a thickness corresponding approximately to the depth of said recess, placing said strip in said recess with the rearward edge of the strip extending beyond the rearward edge of said metallic plate, forming a series of rivet receiving openings through both said flange and said strip, placing rivets in said openings from said flange side, and upsetting the lower ends of said rivets to countersink the same in said strip.

7. For use with the sinker-head and movable sinkers of a knitting machine, a verge plate having a rearward edge for limiting the travel of said sinkers, said verge plate comprising a bar having a longitudinal recess extending inwardly from its rearward edge and along the underside thereof, a relatively flexible strip arranged in said recess, and means securing said strip to said bar with a portion of said strip extending beyond said rearward bar edge to provide said sinker travel limiting edge, said strip having a thickness the same as or greater than the depth of said recess, whereby when the verge plate is secured to a sinker-head, said strip will be arranged between and engaged by said bar and the sinker-head to avoid warping or misplacement of the said strip, and said bar and strip are adjustable on said sinker-head as a unit.

8. A method of rebuilding a metallic verge plate having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing said sinker stop edge and providing said verge plate with a longitudinal recess extending inwardly from the rearward edge and along the underside thereof, forming a sinker stop strip, and securing said strip in said recess with the rearward edge of said trip extending beyond said rearward plate edge.

9. A method of rebuilding a metallic verge plate having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing said sinker stop edge and providing said verge plate with a longitudinal recess extending inwardly from the rearward edge and along the underside thereof, forming a sinker stop strip, securing said strip in said recess with the rearward edge of said trip extending beyond said rearward plate edge, and forming said rearward strip edge into a sinker stop edge.

FRANK G. WEISBECKER.

CERTIFICATE OF CORRECTION.

Patent No. 2,162,660. June 13, 1939.

FRANK G. WEISBECKER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 42, for the word "therefore" read heretofore; and second column, line 22, strike out the article "the"; page 3, first column, line 75, claim 1, for "trip" read strip; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of August, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

having a rearward longitudinal edge to provide a stop for sinkers when in use in a knitting machine, said method comprising removing portions of said verge plate to provide a rearwardly extending flange overlying a longitudinal recess extending inwardly from the rearward edge and along the underside of the metallic plate, forming a strip of non-metallic material and with a width somewhat greater than the width of said recess and with a thickness corresponding approximately to the depth of said recess, placing said strip in said recess with the rearward edge of the strip extending beyond the rearward edge of said metallic plate, forming a series of rivet receiving openings through both said flange and said strip, placing rivets in said openings from said flange side, and upsetting the lower ends of said rivets to countersink the same in said strip.

7. For use with the sinker-head and movable sinkers of a knitting machine, a verge plate having a rearward edge for limiting the travel of said sinkers, said verge plate comprising a bar having a longitudinal recess extending inwardly from its rearward edge and along the underside thereof, a relatively flexible strip arranged in said recess, and means securing said strip to said bar with a portion of said strip extending beyond said rearward bar edge to provide said sinker travel limiting edge, said strip having a thickness the same as or greater than the depth of said recess, whereby when the verge plate is secured to a sinker-head, said strip will be arranged between and engaged by said bar and the sinker-head to avoid warping or misplacement of the said strip, and said bar and strip are adjustable on said sinker-head as a unit.

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