June 14, 1955 A. J. COBERT 2,710,528

VERGE PLATE

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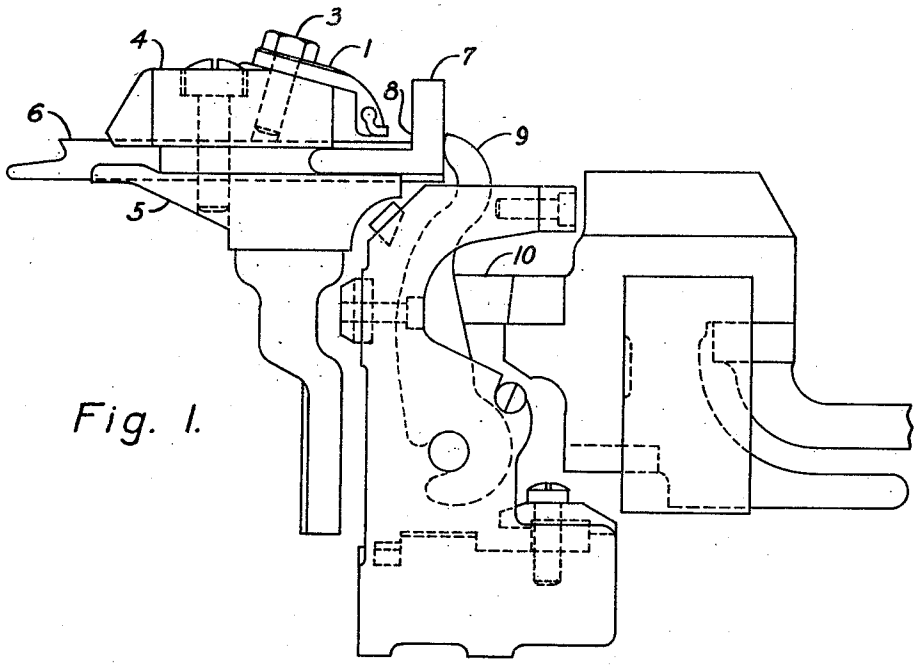


Fig. 1.

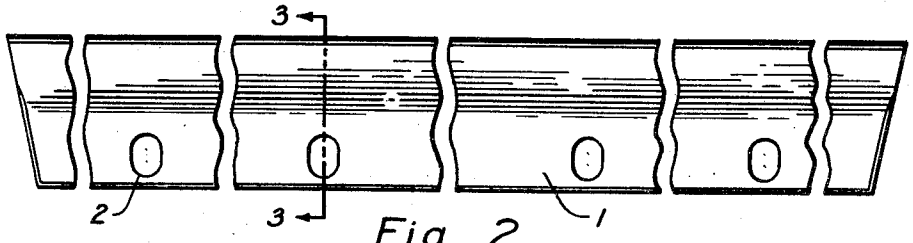


Fig. 2.

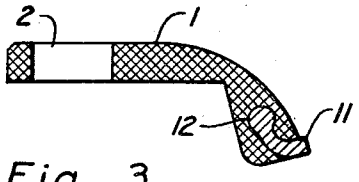


Fig. 3.

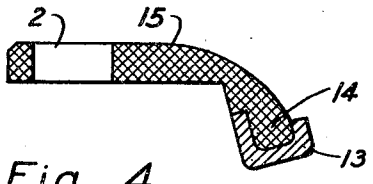


Fig. 4.

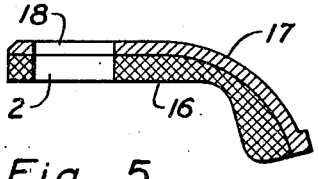


Fig. 5.

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VERGE PLATE

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This invention relates to a verge plate for a sinker type knitting machine such as those used in the manufacture of full-fashioned hosiery and more particularly to a long-wearing verge plate which cushions the impact of the sinker butts.

In straight knitting machines of the type now generally used in the production of full-fashioned hosiery, there are usually a plurality of knitting sections for producing a number of hosiery blanks. Each section includes one or more thread carriers, a series of needles, sinkers, dividers, sinker and divider operating means and a verge plate. The thread carriers lay thread along the series of sinkers and dividers adjacent the series of needles. The sinkers and dividers are then advanced to sink the thread between the needles, the forward movement of the sinkers being limited by an edge of the verge plate. The limiting or sinker stop edge of the verge plate is abutted by the sinkers to stop them in alignment at the proper position.

When the sinkers are stopped properly by the verge plate on a line, the knitting machine forms loops of equal length across the knitting field. When the stoppage of the sinkers is uneven, due to irregular wearing of the verge plate, the loops formed are unequal in length, resulting in an inferior product.

In high-speed operation of such knitting machines, which is essential for profitable operation, the sinkers are driven forward continually by their jacks against the striking edge of the verge plate at high speed and with considerable impact. The striking of the sinkers against a solid metal verge plate causes the verge plate and the sinker head to which it is attached to vibrate. This vibration and the abutting of metal to metal makes the sinkers rebound or fly back from contact with the verge plate. The rebound of the sinkers often causes their breakage and causes irregular loop formation, resulting in the production of imperfect fabric.

In order to cushion the impact of the sinkers and to reduce the consequent vibration transmitted to the bed of the machine and rebound of the sinkers, it has been rather common practice to utilize verge plates having striker edges formed of a relatively soft material, such as a laminated woven fabric impregnated and bonded together by a phenolic condensation product. Verge plates made in that manner serve to cushion the blows of the sinkers, but their edges wear rapidly, since the spring-tempered steel of the sinker butts is much harder than the material of the verge plate edge. Consequently, with such a verge plate, the verge plate or its edge is cut into very quickly and must be renewed frequently. Verge plates made of soft materials do not wear uniformly and, unless they are renewed frequently, the sinkers sink the thread to different depths, the loop formation is uneven and the finished product is inferior.

The same objections apply to verge plates having striking edges made of brass, which is considerably softer than the spring-tempered steel of the sinker butts. Mild or cold rolled steel is harder than brass and has been used in verge plates but it also is softer than the spring-tempered steel of the sinkers. A verge plate made entirely of hardened carbon steel gives the best wear, as it is approximately as hard as the steel of the sinker butt, but such a verge plate or any verge plate made of rigid metal is so inflexible and the consequent shock to the sinkers is so great that the sinkers will crack across their throats, breaking off their noses, especially at high speeds of operation. Also, a verge plate made entirely of hardened carbon steel will cause considerable rebound of the sinkers, resulting from the abutting of metal upon metal. This causes uneven loop formation, with resultant lower quality of the knitted fabric, and sometimes also causes the breaking of needles.

One object of my invention is to provide a verge plate having sufficient springiness to reduce rebound of the sinkers and to cushion the vibration-producing shock transmitted through the verge plate to the body of the machine.

Another object is to provide a composite verge plate having long-wearing characteristics, at the same time absorbing the shock of the sinkers and reducing their rebound.

The foregoing and other objects, features and advantages of this invention will be apparent from the following description and from the accompanying drawings of preferred embodiments, it being understood that the detailed description and drawings are merely illustrative of the invention, which is defined in the claims.

In the drawings,

Figure 1 is a diagrammatic vertical section through the sinker head and jack head portions of a full-fashioned knitting machine having one form of my inproved verge plate applied thereto.

Figure 2 is a plan view of a verge plate made in accordance with my invention.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a cross sectional view of a modified form of my invention.

Figure 5 is a cross sectional view of another modification.

Like reference numerals refer to like parts throughout the several figures of the drawings.

According to my invention, a composite verge plate is formed having a longitudinally-extending body portion 1 of relatively soft, nonmetallic material, this body portion being in the shape of a long base bar or strip. This body portion may be formed of any suitable material, for example, nylon, an acrylic resin like those sold under the trade-marks "Lucite" and "Plexiglas," a cellulose acetate plastic like that sold under the trade-mark "Plastacele," a tetrafluoroethylene resin such as that sold under the trade-mark "Teflon," or a synthetic resin comprising a phenolic condensation product like that sold under the trade-mark "Bakelite." It may also very suitably be formed of a plurality of layers of woven fabric impregnated and bonded together by a phenolic condensation product, such as cured laminated fabric impregnated with a stabilized thermosetting plastic, like that sold under the trade-mark "Synthane." This latter material is so treated that it does not contract or expand with moderate temperature changes or changes in moisture content and is readily machineable. The body portion is provided with a plurality of slightly elongated bolt holes 2 for the reception of bolts 3 by means of which it can be adjustably fastened in place on the sinker cover 4. As may be seen in Figure 3, the base bar 1 is formed with a relatively thin central section intermediate the striking edge and the portion secured by the bolts 3 to the sinker cover 4. The bar extends downwardly, in cantilever fashion, from the portion secured by the bolts to the portion containing the striking edge. This thin central section in

cantilever shape imparts resilience to the verge plate and thus cushions the impact of the sinkers against its striking edge.

The grooved sinker cover 4 forms with a grooved sinker bed 5, a plurality of channels in which the sinkers 6 are slidably supported. Each sinker is provided with a reenforced butt 7 having a striker surface 8 at its forward portion. When the sinker 6 is thrown forward in the sinker head by the movement imparted to the jack 9 by the slur cock 10, the surface 8 of its butt 7 strikes against the striking edge of the verge plate 1, which arrests the forward movement of the sinker.

In the first embodiment of my invention illustrated in cross section in Figure 3, the sinker abutting edge of the verge plate is a longitudinally-extending strip or insert 11 of a hard steel, such as hardened high-carbon or alloy steel. The steel of which the sinker abutting or strike-receiving edge strip 11 is made is preferably hardened to approximately the same temper as that of the sinker butts 7. This strip is formed in its portion away from the striker edge in the shape of a bead or enlarged portion 12 about which the phenolic bonded fabric or other material of the main body portion 1 is molded to hold the insert securely in place.

The sinker abutting edge strip 11 takes the original shock of the striking of the sinker butts 7 against it and transfers the shock to the relatively soft material of the main body portion 1 of the verge plate, which cushions and damps the vibrations set up by the sinker impacts. Thus, the striker edge has some resiliency so that the sinkers will not rebound very much and will not be cracked at high speeds of operation. At the same time, since the striker edge is made of metal of approximately the same hardness as that of the sinker butts, the edge will not wear rapidly. Also, the small amount of wear it experiences will be uniform, so that the proper alignment of the sinkers will be maintained at all times. The limit line of travel of the sinkers can be accurately set by adjustment of the bolts 3 in the bolt holes 2.

In the modification illustrated in Figure 4, the striking edge is formed in the shape of a channel 13, also of hardened high-carbon or alloy steel, which is preferably press fitted or clamped about a slightly enlarged bead 14 formed at the rearward edge of the main body portion 15. The body portion 15 is of the same material as the body portion 1 in Figures 2 and 3, and, like the latter, has suitable bolt holes 2 through which bolts can be inserted to hold the verge plate in place on the sinker cover 4. If desired, the channel 13 may also be bonded by heat and pressure to the main body portion.

Another modification of my invention is illustrated in Figure 5, in which the main body portion 16 of "Synthane" or other suitable material is steel clad with a thin strip of hardened high-carbon or alloy steel 17 extending over the entire upper surface of the main body portion. The steel strip 17 is bonded or cemented with heat to the main body portion 16. The steel strip may also be fastened to the main body portion 16 by means of a synthetic glue which is not affected by any of the liquids commonly used in a hosiery mill. Such a glue is a viscous, thermoplastic adhesive based on synthetic components and comprises a solid solution in methyl ethyl ketone. If desired, the steel layer 17 may, in addition, have a channel like that illustrated in Figure 4 formed at its striking edge and press fitted or clamped about the rearward edge of the main body portion. The main body portion or bar 16 has bolt holes 2 and the steel layer 17 has openings 18 in registry therewith for the reception of bolts to hold the verge plate in place on the sinker cover 4.

As may clearly be seen in Figures 4 and 5, the body portions 15 and 16 of the two modifications are, like the body portion 1 in Figure 3, made with thin central sections and extend downwardly, in cantilever fashion, from the portions attached to the sinker cover to the portions containing the striking edges. The thin central sections

in cantilever shapes make the verge plates resilient and thereby cushion the blows of the sinkers against the striking edges.

It will be understood that, if desired, the steel striking edges illustrated in Figures 4 and 5 can also be riveted or screwed to the main body portions.

Although hardened steel having a relatively high carbon content or a hardened alloy steel is preferred, it will be understood that the sinker abutting edge strips may be formed of any relatively hard metal or of other hard material.

By my invention there is provided a verge plate which will wear a long time. Also, the verge plate is sufficiently resilient to prevent the initial shock of impact of the sinker butts against it from cracking the sinkers across their throats. The resiliency of the verge plate is also sufficient to reduce the rebound, or bouncing back, of the sinkers after striking the verge plate. Thus, the loops formed are uniform in size. Replacement of the verge plate is necessary only at very infrequent intervals.

I claim:

1. A composite verge plate for full-fashioned knitting machines comprising a body of machineable nonmetallic material and a strike-receiving portion supported therefrom formed of hard metal.

2. A verge plate for a sinker type knitting machine comprising a longitudinally-extending body portion formed of a machineable nonmetallic vibration damping material and a longitudinally-extending strike-receiving portion of hard metal supported by said body portion.

3. A verge plate for a sinker type knitting machine comprising a body portion of a machineable nonmetallic material having a striking edge insert of hard metal.

4. A composite verge plate for a sinker type knitting machine comprising a nonmetallic base member and a metallic striking edge member mounted thereon, said striking edge member being adapted to receive the blows of the sinkers and said base member being adapted to cushion and damp said blows.

5. A verge plate comprising a longitudinally-extending base strip of a machineable nonmetallic material and a longitudinally-extending striking edge strip of hardened steel fastened to said base strip.

6. A verge plate for a sinker type knitting machine comprising a longitudinally-extending base bar of nonmetallic material and a strip of hardened high-carbon steel forming the sinker abutting edge of said verge plate, said steel strip being attached to said base bar.

7. A verge plate for a sinker type knitting machine comprising a longitudinally-extending base strip of a laminated fabric impregnated with a phenolic condensation product and a stop edge strip of hard steel attached to said base strip.

8. A verge plate for a sinker type knitting machine comprising a stop edge strip of hard steel and a longitudinally-extending base strip of a synthetic resinous material molded about the step edge strip.

9. A composite verge plate for a sinker type knitting machine comprising a longitudinally-extending base strip of a synthetic resinous material and a sinker abutting edge strip of hardened alloy steel fastened to said base strip.

10. A verge plate for sinker type knitting machines comprising a machineable nonmetallic main body and an impact edge of metal, said main body having a relatively thinned section and said impact edge being supported in cantilever fashion by said thinned section, the springiness of said thinned section and the material of said nonmetallic body serving to cushion the impact of the sinkers against said impact edge.

11. A verge plate for a sinker type knitting machine comprising a body portion of a machineable nonmetallic material and a striking edge of a hard metal embedded in the body portion.

12. A verge plate for a sinker type knitting machine comprising a body portion of a machineable nonmetallic

material and a channel-shaped striking edge of hard metal attached to the body portion.

13. A verge plate for a sinker type knitting machine comprising a main body of a machineable nonmetallic material having a relatively thin center section and a striking edge of hard metal supported in cantilever fashion by said thin section.

14. A verge plate for a sinker type knitting machine comprising a main body of a resinous material and an impact edge of hardened steel, said main body having an enlarged outer edge and said impact edge being supported in cantilever fashion by said enlarged outer edge of said main body and said main body having a center section relatively thinner than said outer edge.

15. A verge plate for a sinker type knitting machine comprising a main body portion of a machineable nonmetallic material and a striking edge strip of hardened steel attached to the top of said main body portion.

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