Sept. 29, 1953 G. BITZER 2,653,906

ANTICORROSION NEEDLE MOUNTING

Filed Aug. 23, 1950

FIG. 1.

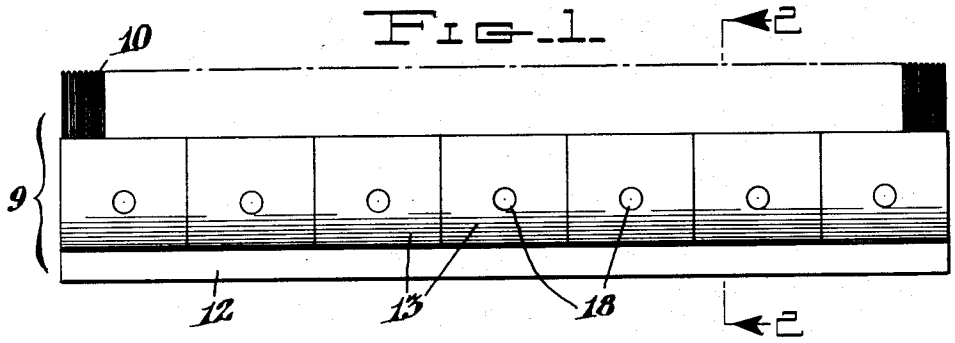


FIG. 2.

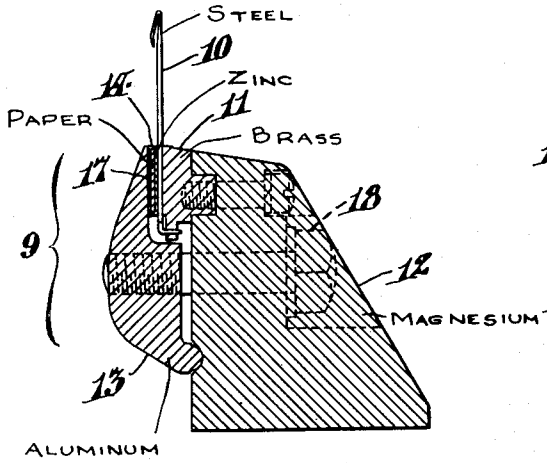


FIG. 3.

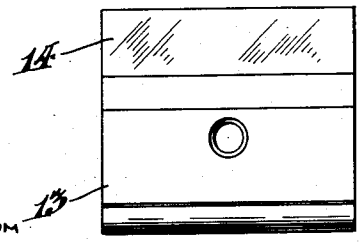


FIG. 4.

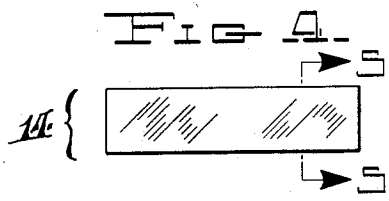


FIG. 5.

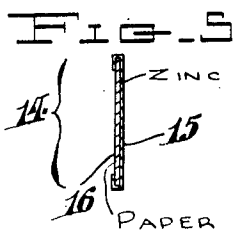


FIG. 6.

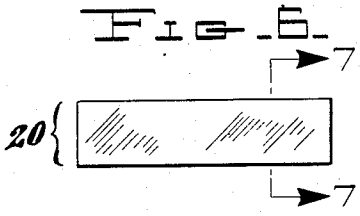
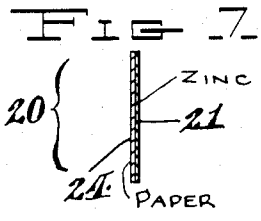


FIG. 7.



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ANTICORROSION NEEDLE MOUNTING

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4 Claims. (Cl. 204—197)

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The present invention relates to the protection of knitting machine needles against corrosion while arranged in needle bar assemblies for full-fashioned or other knitting machines having brass or like beds for united needle mountings and using carbon steel needles.

For mechanical reasons, needle bars of magnesium and cooperating clamps of other light metal such as aluminum have come into wide use along with brass needle beds, the latter being used because of the ready machinability of the brass. Even before the present popularity of this combination of magnesium and aluminum parts, liners of paper or other yielding material were usually employed between the clamps and the needles on one side, and beds of brass or other material high in copper were used between the bars and the needles on the other side. Aluminum clamps are used in preference to magnesium, also for mixed mechanical and electrolytic reasons. At about the time light alloys had become popular for needle bars and clamps, synthetic, and especially nylon, yarns began to be largely used. Such yarns require moistening in special solutions to soften the sizing on the yarn in order to make the yarn sufficiently pliable in the knitting process which results in some of the sizing adhering to the needles. In order to clean the sizing from the needles special cleaning fluids are used which have a material corrosive action on the needles. However, where certain protective routines are followed after using the cleaning fluids most of the corrosion can be avoided but in many instances such protective routines are neglected with resulting damage to the needles. Before the advent of the light alloys in needle supports, some difficulty was caused by corrosion but means were found to overcome it without having to resort to certain special constructions or methods suggested for this purpose in the patented art, so that said special constructions and methods were not commonly in use if used at all. As has been stated, corrosion occurs when aluminum clamps are used even though the fluid seemingly responsible for the corrosive action, a liquid known as "Kali Needle Cleaner," is alkaline. This cleaner fluid has a pH value of 8.6. A peculiarity is that magnesium clamps do not cause corrosion of the needles with liquids employed in connection with nylon yarns whereas aluminum clamps do so, although an undesirable amount of corrosion of the clamps occurs when they are essentially of magnesium.

An object of the invention is to provide a means for reducing the needle corrosion in assemblies of the character indicated to a minimum.

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Another object of the invention is to provide a liner unit adapted to provide the desired protection against corrosion while of a character capable of economical manufacture and convenient and reliable in use.

Thus, it is expected that this invention will provide an efficient arrangement for protecting the knitting needles under conditions presently existing in the flat knitting trades.

Further objects of the invention will be apparent to those conversant with the art from the following description taken with the accompanying drawings.

The invention consists in the features, combination and arrangement of the parts hereinafter described and particularly pointed out in the claims.

Referring to the drawings:

Figure 1 is an elevation of a needle bar assembly for a full-fashioned knitting machine including the bar proper, the needles and the clamps;

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is an elevation of one of the clamps shown in Figs. 1 and 2 having thereon one form of liner unit in accordance with the invention;

Fig. 4 is an elevation of one face of the form of liner unit shown in Fig. 3;

Fig. 5 is a section taken on the line 5—5 of Fig. 4;

Fig. 6 is an elevation of a liner unit also according to the invention but of a different form from that shown in Figs. 3 to 5; and

Fig. 7 is a section taken on the line 7—7 of Fig. 6.

Referring to Figs. 1 and 2 of the drawing, the needle bar assembly 9 according to the present invention comprises knitting needles 10 of carbon steel, a needle bed 11 of brass having a base essentially of copper, a needle bar 12 of light weight material such as magnesium, clamps 13 essentially of aluminum and a liner unit 14 intermediate the needles and the clamps.

As shown in Fig. 2, the clamps 13 are held in clamping relation to the needles 10 by bolts 18 which extend through the bar 12 into the clamps 13.

The preferred form of liner unit 14 has a layer 15 essentially of zinc interposed between the needles and a layer 16 having absorbent characteristics essentially similar to those of paper, the layer of paper contacting the clamps 13 and held thereto by a layer of adhesive 17 such as glue or shellac and constituting a clamp assembly as shown in Figs. 2 and 3. The zinc layer 15, as

shown in Figs. 2 to 5, inclusive, is in the form of a foil and is connected to the paper layer 16 by folding the edges of the foil over the edges of the paper as shown in Fig. 5.

Also, the layer, especially when formed around the paper as shown and described, greatly reduces the amount of liquid which will stand in contact with the needles under average conditions and for the majority of the time, so that corrosion is reduced for this reason as well as for reasons which will presently appear.

In a further form of liner unit 20 according to the invention, as shown in Figs. 6 and 7, a layer 21 of metal zinc has been sprayed on the surface of a layer 24 of paper and thereby caused to adhere to it. The liner unit 20 is also secured to the clamp 13 by applying a layer of adhesive to the paper layer 24.

The needle bar 12, as hereinbefore set forth, is made of magnesium or an alloy predominately of magnesium but for reasons of lightness only, the metal of the needle bar proper having no noticeable effect on the corrosion of the needles so long as there is a needle bed of brass or other metal essentially copper intermediate the bar proper and the needles.

In the hereinabove description, a phrase "essentially" copper is used in relation to a certain metal part and by this is meant that the metal part in question contains enough copper to dominate the electro-motive force characteristics of the part. Similarly, where the word "essentially" is used in connection with a particular metal in another part, the word is used to indicate that the particular metal mentioned dominates the electro-motive force characteristics of the part.

Without attempting to present a complete explanation of the cause of relatively rapid corrosive action on the needles, it appears that with the brass bed, which is low in the electro-motive force series, on one side of the steel needles, which are higher in the electro-motive force series than brass, and the aluminum clamps on the other side of the needles, aluminum being higher in the electro-motive force series than steel, the expected path of flow of electric current will be from the brass to the aluminum clamp through the steel needles, returning through the liquid. Under these conditions substantially no current passes from the needles to the liquid. However, the aluminum being the anode, the anodic oxidising effect either causes the aluminum clamp to develop a protective oxide coating on its surface which retards the flow of electric current between the clamp and needles or in some other way reduces the aluminum below the steel needles in the electro-motive force series and thereby causes the needles to become the anode and concentrates the corrosive anode action of the liquids on the needles. Thereby, by interposing the zinc layer adjacent the needles, the zinc being high in the electro-motive force series and not subject to the formation of protective coating in the presence of the liquids

hereinbefore set forth, it acts to restore the complete metallic circuit to lead the current away from as well as to the needles and thereby substantially arrest the corrosive action of the various liquids on the needles by avoiding anodic oxidation thereof.

While in the forms of invention shown, zinc is the only metal described as providing the necessary means to restore the normal free flow of electro-current between the various metals, any other metal may be substituted having similar electro-conductivity properties and which will not form its own protective coating through contact with the various liquids hereinbefore set forth. Further, the zinc or other similar metal may be used as a coating on the clamp or one of the other elements of the needle bar assembly with like results.

Of course, the improvements specifically shown and described by which the above results are obtained, can be changed and modified in various ways without departing from the invention herein disclosed and hereinafter claimed.

Having thus described my invention, I claim:

1. In a knitting machine, a needle assembly comprising a needle bed essentially of copper, needle receiving slots in said bed, bare steel needles fitting in said slots in contact with said bed, a clamp holding said needles against said bed, and an essentially zinc material interposed between said clamp and said needles.

2. In a knitting machine, a needle assembly comprising a needle bed essentially of copper, needle receiving slots in said bed, bare steel needles fitting in said slots in contact with said bed, a clamp essentially of aluminum holding said needles against said bed, and an essentially zinc material interposed between said clamp and said needles.

3. In a knitting machine, a needle assembly comprising a brass needle bed, needle receiving slots in said bed, bare steel needles fitting in said slots and in contact with said bed, a clamp holding said needles against said bed, and a layer of zinc interposed between said clamp and said needles.

4. In a knitting machine, a needle assembly comprising a brass needle bed, needle receiving slots in said bed, bare steel needles fitting in said slots and in contact with said bed, a clamp holding said needles against said bed, and a liner unit intermediate said needle bed and said clamp and composed of an absorbent portion and zinc portion with the latter in contact with the needles.

GOTTLOB BITZER.

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