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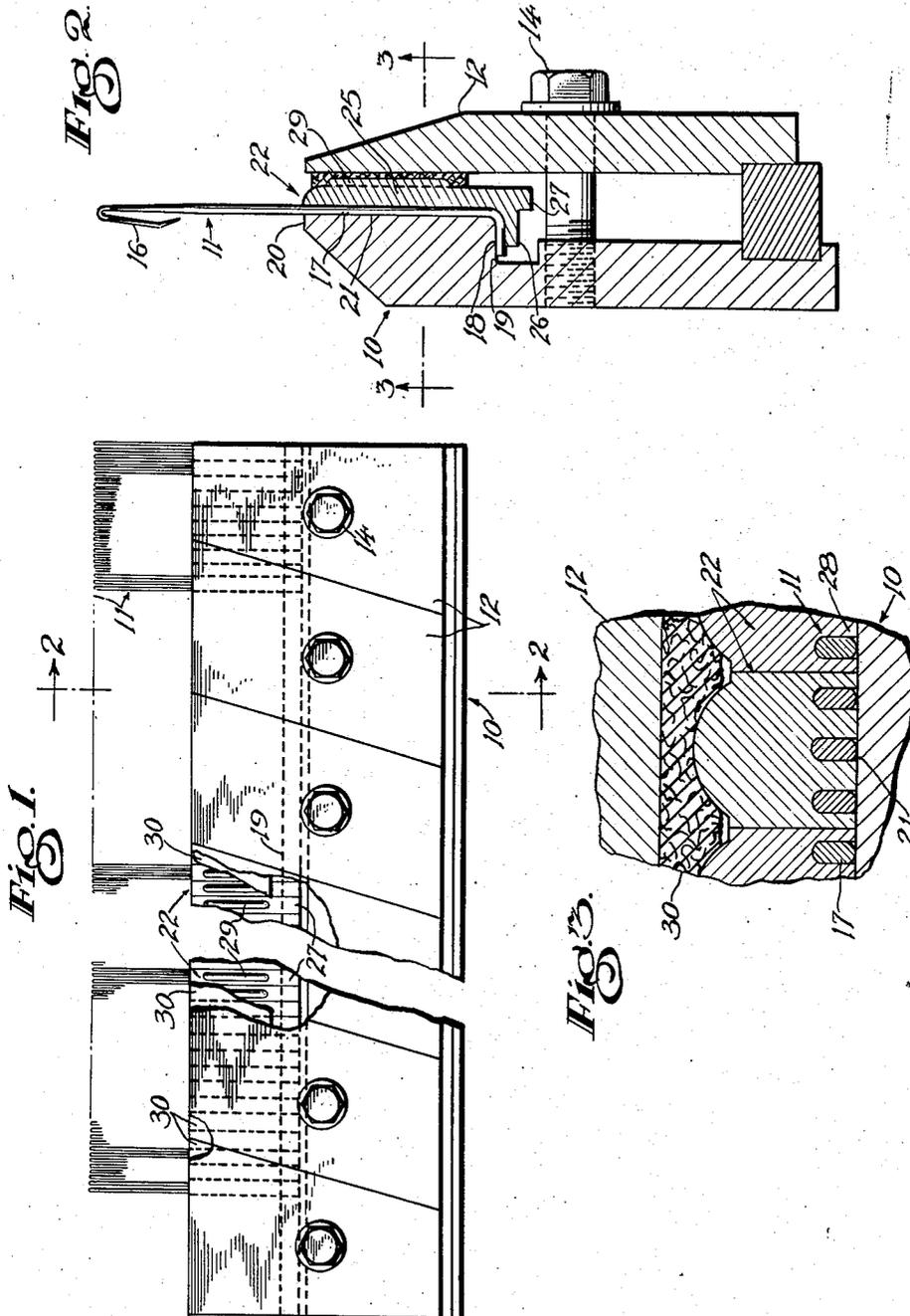
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NEEDLE MOUNTING FOR KNITTING MACHINES

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2 Sheets-Sheet 1



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Fig. 4.

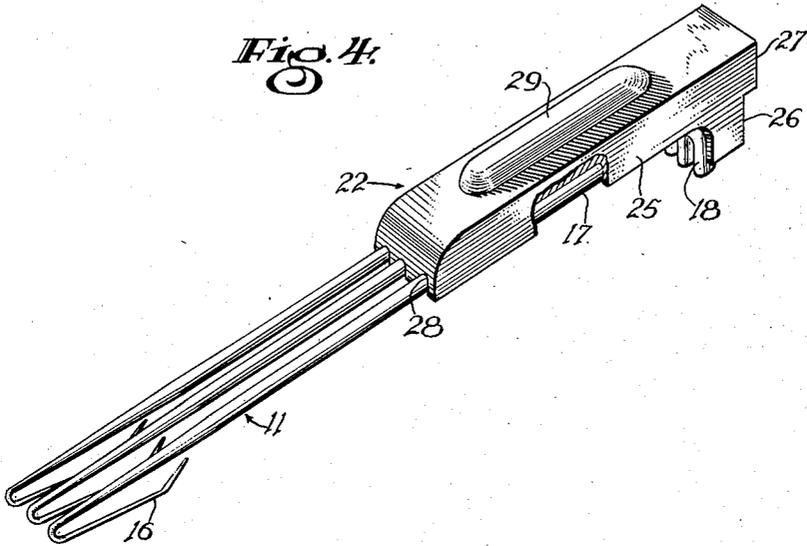
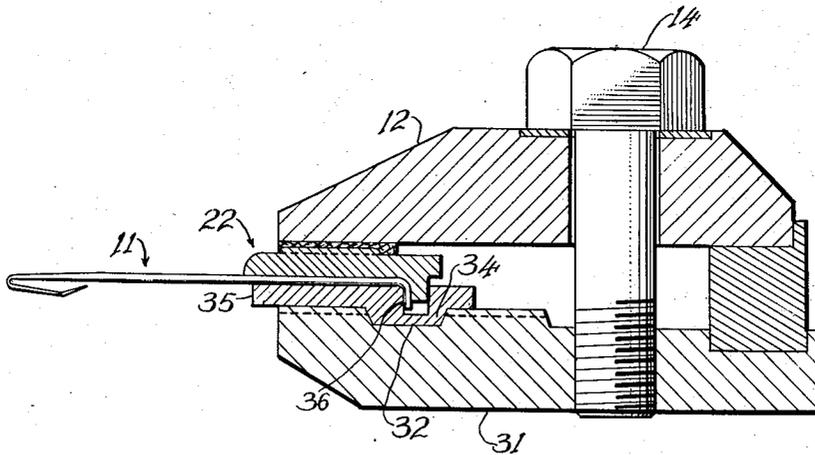


Fig. 5.



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## NEEDLE MOUNTING FOR KNITTING MACHINES

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15 Claims. (Cl. 66-114)

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The present invention relates to knitting element mountings for use in knitting machines of various kinds which utilize either flat or circular beds of needles and associated elements. However, for purposes of illustration, the invention will be described in connection with flat type knitting machines, for example, tricot knitting machines.

The needle bed of such a flat knitting machine generally comprises an elongate bar, means for mounting and aligning thousands of knitting elements such as needles or the like side by side on the bar, and clamping means for maintaining the needles on the bar in their predetermined arrangement.

It is desirable that the needles of such knitting machines be readily removable and replaceable in the event a needle is broken or damaged and requires removal and replacement by a new needle. It is also desirable that the needle bed structures of machines which are operated at high speeds (for example 250 to 500 cycles per minute) possess sufficient strength to withstand the forces to which they are subjected under conditions of such high speed operation. In order to meet these requirements, one form of needle bed in use at present utilizes lead blocks of about one or two inches in width having as many as forty needles per inch cast therein. One objection to such blocks is that in the event a single needle is broken the entire block must be removed and replaced. This requires that knitting mills have on hand a large number of spare blocks which of course involves a considerable investment. Another objection to such needle blocks is that their use results in a very heavy needle bed structure which necessitates a heavy frame and bed supporting structure and sturdy mechanism for moving the bed. The high mass of the frame and the moving elements of the operating mechanism limits the speed at which the machine can be safely operated.

Another form of needle bed has been proposed to overcome the difficulties and objections just mentioned which comprises a needle bar having a row of small holes or perforations arranged for receiving the butts of so called butted needles, and clamping means for holding the needles in place on the bar. While this structure is light in weight to adapt it for high speed operation and the needles are individually removable and replaceable, considerable difficulty is encountered in trying to locate a broken needle and to remove the same. This is due primarily to the location of the bed and lack of working space

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in back of the needle bar of a knitting machine when the warp threads are arranged for knitting. Access to the needles thus is difficult, and, in attempting to pick out a broken needle and to remove the same, adjacent needles may be disturbed or broken or the warp threads may be damaged. Consequently, such needle bed structures are impractical.

Accordingly, an object of the present invention is to provide a novel and improved knitting element mounting for knitting machines which is not subject to any of the foregoing disadvantages and objections, but yet is light in weight, is sufficiently strong, and enables broken or damaged elements to be removed and replaced in a convenient manner.

Another object is to provide a knitting element mounting of the foregoing character which is simple in construction and economical to manufacture and install.

A further object is to provide such a knitting element mounting wherein individual needles or similar elements may be readily replaced practically as easily as a needle block but without requiring a large quantity of spare parts other than extra needles to be kept on hand.

A still further object is to provide such a knitting element mounting which can be utilized in connection with bars of existing knitting machines designed for using knitting element blocks and which can be embodied in specially designed knitting element bar assemblies.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects are accomplished by providing a knitting element assembly comprising a member formed of moldable material or the like and a plurality of knitting elements removably embedded in the member. These members are constructed and arranged for cooperation with a mounting bar or an adapter carried by the bar and clamping means of the bed structure to mount the knitting elements in proper operating position.

In a preferred embodiment of the invention about to be described in detail, the knitting elements constitute needles although it will be appreciated that the present invention may likewise be applied to other elements associated with

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the needles such as sinkers or plush points and the like.

In the drawings:

Fig. 1 is a fragmentary elevational view, partly in section, of the needle bed of a flat knitting machine such as a tricot knitting machine having needle bed elements in accordance with the invention.

Fig. 2 is an enlarged sectional view taken along the line 2—2 on Fig. 1.

Fig. 3 is a further enlarged fragmentary sectional view taken along the line 3—3 on Fig. 2, illustrating in detail the manner in which the shanks of the needles are embedded in the holding members.

Fig. 4 is a perspective view of a needle assembly.

Fig. 5 is a sectional view similar to Fig. 2, illustrating the invention utilized in connection with an adaptor associated with the needle bar of the type designed for receiving lead needle blocks.

Referring to the drawings in detail and more particularly to Figs. 1 and 2 thereof, there is shown a portion of a needle bed assembly generally comprising an elongate bar 10, a plurality of butted needles 11 assembled and supported in the manner about to be described, and a plurality of adjacently disposed clamp members 12 removably secured to the bar by bolts 14 in the customary manner to secure the needles on the bar.

As shown in Figs. 2 and 3, the needles are of the type having a barb or eye 16 at the upper or exposed end, a shank 17 of generally oval cross-section and a butt or heel 18 at the other or lower end of the shank adapted to engage a wall or shoulder 19 spaced from and extending parallel to the free or upper edge 20 of the bar 10 along its length. More specifically, the needle shanks and butts as viewed in cross-section herein have flat side walls and have arcuate upper and lower edges or sides. The bar 10 has a generally flat surface 21 between its forward edge 20 and its shoulder 19 on which needle holders 22, in accordance with the invention, are adapted to be placed.

The details of one of the needle assemblies including the needles 11 and a holder 22 are best illustrated in Figs. 2 to 4. As shown, the needle holder is in the form of a generally L-shaped block formed of lead or moldable plastic material comprising a long or shank arm 25, a short or butt arm 26, an outwardly extending projection 27 at the junction of the arms serving to facilitate gripping the holder, a plurality of substantially parallel L-shaped grooves 28 at the inner surfaces of the arms each adapted for receiving a needle 11, and a rib 29 on the outer surface of the arm 25 preferably parallel to the groove portions in this arm. The shanks fit into the groove portions in the arm 25 and the butts fit into the groove portions in the arm 26. The blocks may be relatively thin and narrow and may be formed with a small number of grooves 28, for example, three as illustrated; but, if desired, the blocks may have a width of about one inch and may be formed with as many as about forty grooves without sacrificing certain advantages of the present invention.

As shown in Fig. 3, the grooves are formed to snugly receive and frictionally retain the shank and butt of the needles therein, but are substantially unobstructed at the entrance thereof to provide for removing a broken or damaged needle and replacing a new needle. Preferably, the block surrounds all but one side of the needles

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to expose one side of the shank and the butt thereof for engagement by the needle bar surface 21 and the shoulder 19, respectively. Such close fit may be provided by either molding the needles into the blocks or molding the blocks with grooves accurately dimensioned to receive and engage the needles. In order to facilitate removal of the needles from the holder, the butts extend outwardly of the free end of the arm 26 a short distance (Figs. 2 and 4) to enable this exposed portion to be manually or otherwise engaged.

In practice, needle assemblies, as shown in Fig. 4, are provided by either of the aforementioned methods; and, with the clamps 12 removed from the bar 10, are placed side by side on the needle bar with the inner side of the arms 25 superimposed on the bar surface 21 and the inner side of the arms 26 against the shoulder 19, whereby the shanks and butts of the needles engage the surface 21 and the shoulder 19, respectively. A strip 30 of felt or similar material is laid across the outer surface of the arms 25, and the clamps 12 are applied to secure the needle assemblies on the bar with the ribs 29 embedded in the felt strip to prevent sidewise shifting of the needle holding blocks (Fig. 2). The needles so assembled in the bed have their shanks firmly clamped to resist bending forces and have their butts positioned against the shoulder to align the free ends of the needles and to resist forces tending to pull the needles out of the bed during knitting operations.

In the event a needle is broken or damaged and requires replacement, the clamp 12 holding the assembly in which such needle is located is removed, and this assembly is removed from the bed by gripping the extension 27 either manually or by means of tweezers. This removing operation can be readily performed without disturbing the remainder of the needle bed or damaging adjacent needles or the warp threads. The removed assembly can then be taken to a convenient location where the impaired needle may be removed and a new needle may be placed into the empty groove with the greatest of ease. Alternatively, the entire assembly including the block and all of the needles may be replaced by a new assembly, and the imperfect assembly may be repaired at leisure after the knitting machine is in operation again to thereby minimize the duration of time the machine is idle. In both instances after an assembly is replaced, the clamp is again secured to put the bed in working order.

The needle bed, so far described, includes a bar 10 specially designed to accommodate the needle assemblies in accordance with the invention. This bar is of light weight construction, and the needle holders by being relatively thin are light in weight whereby a needle bed assembly is provided having a low mass to adapt the bed assembly for high speed knitting operations.

In Fig. 5, a needle bed assembly is illustrated wherein the present invention is utilized in connection with a needle bar element 31 designed for receiving the customary leaded needle blocks. This element has a lengthwise extending recess 32 therein which is now used for receiving a lengthwise extending rib or projection 34 on one side of an adaptor bar 35 preferably formed of lightweight metal or suitable plastic material. The opposite side of the bar 35 is formed with a wall or shoulder 36 which corresponds in function to the shoulder 19 (Figs. 2 to 4) and thus is adapted to provide a stop for the butts of the

needles and the butt arm 26 of the holders. Each needle assembly corresponds to that shown in Fig. 4, and removal and replacement is effected in the same manner as described in connection with the embodiment illustrated in Figs. 1 to 4.

The term "butted needles" as used herein and the appended claims is intended to include needles of the type generally known as elbow needles, such needles having an offset shank portion provided with a butt at the end thereof.

From the foregoing description, it will be seen that the present invention provides novel, improved needle mounting and supporting structure which is useful in connection with new or existing needle bars of knitting machines. The structure has all the desirable features, namely, lightweight, ruggedness and adaptability for rapid and easy repair, and does not have one or more of the objectionable features of the structures heretofore proposed. The structure in accordance with the invention is simple and economical, and improves the overall economy in operating the knitting machines to which it is applied both from an operating and maintenance viewpoint.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. A knitting element assembly of the class described consisting of a member formed with L-shaped grooves on the surface thereof, and a plurality of butted knitting elements each having a shank portion and a butt portion removably embedded in one of said grooves of said member.

2. A needle assembly of the class described consisting of a member having an L-shaped needle bed engaging surface, and a plurality of butted needles each molded in said member with one side thereof exposed on the needle bed element engaging surface to removably embed said needles in said member.

3. A needle assembly of the class described consisting of a member formed of moldable material having an L-shaped needle bed engaging surface, and a plurality of butted needles each having a shank portion and a butt portion molded in said member with at least one side of said shank and butt portions exposed on the needle bed element engaging surface of said member to removably embed said needles in said member.

4. A needle assembly adapted for attachment to a needle bed element of a knitting machine, said assembly comprising a needle holding member having a surface on one side thereof arranged to face the needle bed element and formed with a plurality of substantially parallel grooves, and butted needles each having a shank portion removably embedded in one of said grooves and having a butt portion extending outwardly of said surface in the direction of the needle bed element.

5. An assembly according to claim 4, wherein said member has a projection of the side opposite said first mentioned side thereof.

6. An assembly according to claim 4, wherein said member has a portion extending outwardly beyond said shanks at the butt end thereof.

7. A needle assembly adapted for attachment to a needle bed element of a knitting machine, said assembly comprising a substantially L-

shaped needle holding member having a pair of arms provided with portions of a plurality of substantially parallel L-shaped grooves at the inner surfaces thereof, and an L-shaped needle for each groove having a shank and a butt, said needles having a portion of their shanks removably embedded in the portion of the grooves formed in one of said arms and having a portion of their butts removably embedded in the portion of the grooves formed in said other arm.

8. An assembly according to claim 7, wherein said member has a projection on the outer surface of said arm.

9. An assembly according to claim 7, wherein said member has an outwardly extending projection at the junction of said arms.

10. As an article of manufacture, a needle assembly adapted for attachment to a needle bed element of a knitting machine, said assembly comprising a substantially L-shaped needle holding member having a pair of arms provided with portions of a plurality of substantially parallel L-shaped grooves at the inner surfaces thereof, having a rib on the outer surface of one of said arms, and having an outwardly extending projection at the junction of said arms; and an L-shaped needle for each groove having a shank and a butt, said needles having a portion of their shanks removably embedded in the portion of the grooves formed in said arm having the rib thereon and having their butts removably embedded in the portion of the grooves formed in said other arm.

11. An assembly according to claim 10, wherein one of said arms is substantially longer than said other arm, said longer arm being formed with the groove portions for receiving said shank portions and said shorter arm being formed with the groove portions for receiving said butts, and wherein said member is formed of moldable material surrounding all but one side of said needles to expose one side of said needle at the surface in which said grooves are formed for engagement with the needle bed element.

12. A needle bed assembly for knitting machines comprising a needle bed element having a shoulder and a needle holder supporting surface, a needle holding member having a surface superimposed on said first mentioned surface and formed with a plurality of substantially parallel grooves, butted needles each having a shank portion removably embedded in one of said grooves and having a butt portion engaging said shoulder, and clamping means for engaging said needle holding member to mount the same on said needle bed element.

13. A needle bed assembly for knitting machines comprising a needle bar having a flat surface and a shoulder at one end of said surface, a needle holding member of L-shaped cross-section having a flat surface superimposed on said first mentioned surface and being formed with L-shaped parallel grooves, butted needles each having a shank portion and a butt portion removably embedded in one of said grooves with one side of said shank portions contacting said first mentioned surface and one side of said butts engaging said shoulder, and clamping means for engaging said needle holding member to secure the same on said needle bar.

14. A needle bed assembly for knitting machines comprising a needle bed element having a recess therein, an adaptor member adjacent said element having a projection on one side thereof

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extending into said recess and having on the opposite side thereof a needle holder supporting surface and a shoulder, a needle holding member having a surface superimposed on said first mentioned surface and formed with a plurality of substantially parallel grooves, butted needles each having a shank portion removably embedded in one of said grooves and having a butt portion engaging said shoulder, and clamping means for engaging said needle holding member to secure the same and said adaptor member on said needle bed element.

15. A needle bed assembly for knitting machines comprising a needle bar having a lengthwise extending recess therein, an adaptor bar adjacent said needle bar having a projection at one side thereof extending into said recess and having on the opposite side thereof a needle holder supporting surface formed with a lengthwise extending recess providing a shoulder, a needle holding member of L-shaped cross-section having a pair of arms one of which extends into said recess of said adaptor bar and the other of which is superimposed on said surface of said adaptor bar, said arms having portions of L-shaped parallel grooves formed on the inner surfaces thereof, an

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L-shaped needle for each groove having a shank and a butt, said needles having their butts removably embedded in the portion of said grooves formed on the surface of said arm which extends into said adaptor bar recess and engaging said shoulder and having a portion of their shanks removably embedded in the portion of said grooves formed on the surface of said other arm and contacting said adaptor bar surface, and clamping means for engaging said needle holding member to secure the same and said adaptor bar on said needle bar.

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References Cited in the file of this patent

UNITED STATES PATENTS

| Number    | Name           | Date          |
|-----------|----------------|---------------|
| 1,326,555 | Wilkins -----  | Dec. 30, 1919 |
| 1,916,676 | Lange -----    | July 14, 1933 |
| 2,005,674 | Gastrich ----- | June 18, 1935 |

FOREIGN PATENTS

| Number  | Country      | Date          |
|---------|--------------|---------------|
| 606,837 | France ----- | Mar. 15, 1926 |