This invention relates to knitting machines and, particularly, to slotted beds of circular knitting machines adapted to mount needles or other movable stitch handling elements. Beds of this type are well exemplified in the application of Lindsay H. Browne, Serial No. 220,755, filed on August 31, 1962, now abandoned, which discloses a large diameter machine to which the invention is particularly applicable. Due to the fact that the beds and cylinders of the large type disclosed in said application may have diameters of the order of 70 inches or more, with each bed and cylinder possibly having, for example, 850 slots, the usual methods of milling individual slots either for the movable elements or for insertion of walls to provide slots may become excessively costly and time consuming.

It is therefore a principal object of the present invention to provide an improved type of beds and cylinders together with an improved method for fabricating such elements wherein the cost and time factors of fabrication are substantially reduced.

It is a further object of the present invention to provide a method of forming such slotted members wherein the dimensions of the individual slots may be of equal or increased accuracy and uniformity without requiring precision milling. Since the problems of such precision machining are much greater in the case of smaller diameter members wherein each individual slot may be ten times smaller than the slots in the large type of machine referred to above, it will be apparent that the objects of the present invention particularly relate to large machines, through the invention is applicable to small machines as well.

The foregoing objects as well as others relating to structural details and to the method of fabrication will become more readily apparent from the following description taken with the accompanying drawings in which:

FIGURE 1 is a sectional view of a jack bed and cylinder of the type employed in circular knitting machines and incorporating the subject matter of the invention;

FIGURE 2 is an enlarged sectional view of the needle cylinder taken on the plane indicated at 2-2 in FIGURE 1;

FIGURE 3 is an enlarged sectional view of the jack bed taken on the plane indicated at 3-3 in FIGURE 1; and

FIGURE 4 is an enlarged sectional view of a section of the jack bed during an intermediate step in the fabrication process.

As will become evident, the invention is applicable generally to the formation of slotted beds for reception of slidable tiltable, or otherwise movable knitting machine elements such as needles, sinkers, jacks, web holders or the like; but for uniformity of description reference will be made to a machine comprising a needle cylinder and a dial bed for mounting individual jacks.

The structural form of the needle cylinder and the dial will first be described with reference to FIGURES 1 through 3 and, thereafter, the details of the method of fabricating each of these elements will be set forth with particular reference to FIGURE 4.

A needle cylinder 10 is composed of a one-piece, annular ring 12 to which a plurality of individual segments 14 are secured by means of bolts 16, one of such segments being shown in FIGURE 2. Each of segments 14 is identical in construction and includes a plurality of individual slot elements or assemblies 20 together with an arcurate member 18 having an L-shaped cross-section as shown in FIGURE 1. Member 18 is provided with threaded bores 17 for receiving bolts 16 and is also provided with passages 19 adapted to be filled with a bonding material as will be described hereinafter in more detail.

Each one of assemblies 20 is composed of a pair of side plates 22, 23 of sheet metal accurate as to thickness secured to opposite sides of an accurately dimensioned spacer plate 24 by means of a plurality of hollow rivets 26 passing through holes or passages 28. It will be noted that opposite ends of holes 28 have countersunk edges so as to accommodate the enlarged head portions of the rivets and make them flush with the outer surfaces of plates 22, 23. Such countersinking of the rivet heads is of particular importance in the case of small diameter machines wherein there is very little space between adjacent assemblies. On the other hand, where the assemblies may be circumferentially spaced a greater distance apart, as in the case of coarse gauge machines, the countersinking obviously may be omitted.

From the foregoing description it will be apparent that each one of assemblies 20 forms a single slot 30 the sides of which are defined by the mutually facing inner surfaces of plates 22 and 23, the bottom of the slot being defined by the edge 32 and spacer 24. Each arcurate segment 14 is composed of a plurality of assemblies 20 which are secured to each other and to a common member 18 by means of a bonding material 34, the method of producing such bonding being deferred at this point.

Reference is now made to FIGURES 1 and 3 wherein primed numerals indicate those components of the jack bed which are similar to the needle cylinder elements just described.

Bed 10 includes a one-piece annular ring 12 to which a plurality of segments 14 is secured by means of bolts 16. Each of segments 14 is identical in structure and includes a plurality of slot elements 20' together with a single backing member 18' having an L-shaped cross-section as shown in FIGURE 1. Member 18' is provided with threaded bores 17' and passages 19' which are adapted to receive bolts 16' and bonding material 34', respectively.

Each one of the slot elements 20' is formed as an integral unit having a pair of walls 22', 23' extending outwardly from a base portion 36. Thus, each assembly 20' forms a single slot 30' which is defined by the inner facing surfaces of portions 22', 23' and the surface 32' of base portion 36. Each slot element includes a bore or passage 28' extending transversely through base portion 36 although this bore does not contain a rivet since the elements are individually formed as integral units; for example as extrusions.

From the foregoing description it will be apparent that the two forms of slot elements 20 and 20' are fully interchangeable so that both the bed and cylinder may be formed of assemblies having either form. Alternatively, the needle cylinder may be composed of riveted elements and the needle bed may be composed of integral elements as illustrated or the two forms of slot elements may be reversed in the bed and cylinder, respectively.

The method of fabrication is as follows. First, the individual slot elements 20 or 20' are individually formed. In the case of assemblies 20, the individual plates 22, 23 and 24 may be stamped out of forming die gauge metal, being perforated in the stamping operation, so that each plate is preshaped and merely requires riveting to form each assembly. Alternatively, the plates may be riveted together in strip form to provide long assemblies which are then cut into individual lengths, final shaping being...
accomplished after the complete ring is assembled as will be described hereinafter.

In the case of slot elements 20', each element may be individually extruded and shaped or, alternatively, a long strip of U-shaped cross-section may be extruded followed by cutting into individual pieces. In either event, bores 28' may be drilled subsequent to the extrusion process.

Rings 12 and 12', as well as the arcuate members 18 and 18', may be suitably fashioned, for example, by casting and/or conventional machining methods.

Upon completion of the individual members and slot elements, one arcuate member and a plurality of slot elements are inserted in a jig such as that shown in FIGURE 4. This jig may comprise a simple frame structure 48 having a plurality of projections 42 adapted to enter and fill slots 30 and thereby hold the plurality of slot elements separated by spaces 21. The jig is further provided with a plurality of injection ports 44 through which the bonding material 34 may be injected so as to fill passages 19, spaces 21 and bores 28. For example, the bonding material may be a molten hard solder or other known matrix-forming metal which is preferably injected under pressure so as to completely fill the above spaces, and then allowed to cool to form the desired assembly of the ring as specifically set forth in the following claims.

What is claimed is:

1. A slotted member for supporting and guiding movable stitch handling elements in a knitting machine comprising, means forming individual slot elements, means defining a passage through each said slot element, means defining spaces between said slot elements, said spaces and passages being interconnected, and means forming a matrix of bonding material filling said spaces and passages, to secure said slot elements to one another and to maintain said slot elements in a fixed space relationship with one another.

2. The slotted member as claimed in claim 1 wherein each one of said individual slot elements comprises a plurality of plates secured together to form a single slot.

3. The slotted member as claimed in claim 2 wherein said plurality of plates are riveted together to form each of said slot elements.

4. The slotted member as claimed in claim 1 wherein each one of said individual slot elements comprises a one-piece unit having a single slot therein.

5. A slotted member for supporting and guiding movable stitch handling elements in a knitting machine comprising, means forming individual slot elements, means defining a passage through each said slot element, means defining spaces between said slot elements, said spaces and passages being interconnected, a plurality of backing members, each of said backing members supporting a group of individual slot elements forming an individual section of said slotted member, said each backing member having at least one passage connected with said spaces and passages between and through said slot elements, and means forming a matrix of bonding material filling said said spaces and passages, to secure said slot elements to one another and to said backing member and to maintain said slot elements in a fixed space relationship with one another.

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