July 31, 1962 R. M. TORRENCE 3,046,765

YARN GUIDE UNIT

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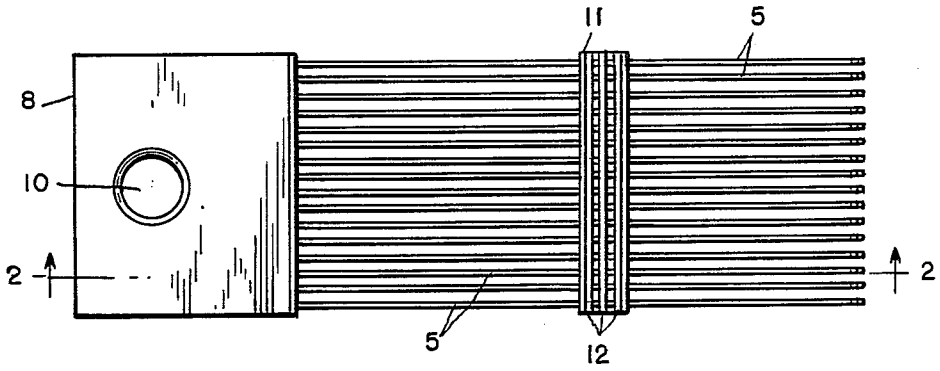


FIG. 1.

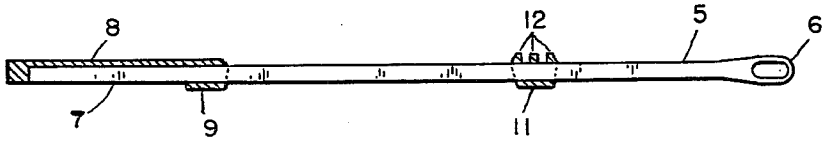


FIG. 2.

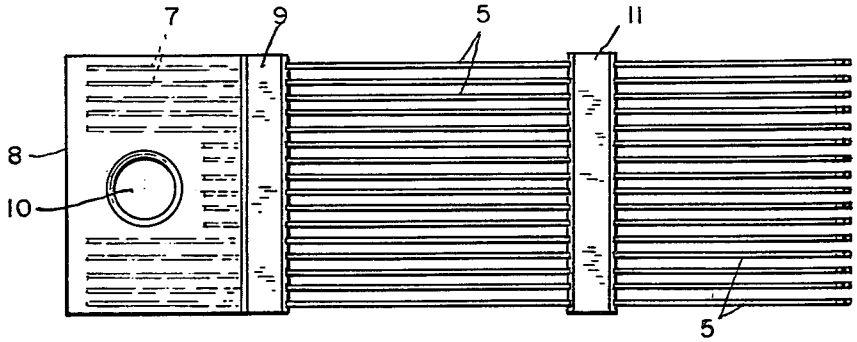


FIG. 3.

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YARN GUIDE UNIT

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The following specification relates to an improved yarn guide unit for use in warp knitting machines. More specifically, the novel guide unit forms part of a straight bar knitting machine.

A large number of yarn guide units is maintained on each guide bar of a knitting machine. This adds considerably to the mass of the moving guide bar. The power required for the movement of the guide bar adds considerably to the power demands of the machine. An incidental consequence is that enough heat is generated to raise the temperature surrounding the machine considerably. The present invention is addressed to effecting a material reduction in the aggregate weight of the guide units, thus reducing the power consumption of the machine, prolonging its useful life and reducing the operating temperature.

Some advantage has been previously obtained by replacing the lead from which the guide units are cast, with a lighter metal alloy, plastic or the like. By further redesign of the guide unit itself, the present invention provides an even greater reduction in weight, reaching as much as 44%. This has obvious advantages in the operation of the knitting machine.

In the usual practice it is customary for the free ends of the guide units to project beyond the lead or other holder only a short distance, in the majority of instances never more than one inch. Thus the free ends extending such a short distance from the front of the holder are fairly rigid and will maintain their proper spacing.

There is a problem however where, as in a lace making machine, the yarn guide units have free ends extending almost two and one-fourth inches beyond the front of the holder. With such a necessarily small cross-section, there must be some means provided for maintaining parallelism between the guides. The longer the distance from the lead holder, the less stable are the free ends when subjected to machine movements and knitting operations.

It is of course possible to cast the metal holder longer to bring it close enough to the free ends of the units to maintain their rigidity and parallelism. This however would greatly increase the dead weight of the holders. It would tend to slow down the knitting operations. It would also greatly diminish the visibility through the front holders, of the other holders on the bars in the rear.

One of the objects of the invention is to obtain a reduction in the weight of the yarn guide unit even beyond that which can be reached by the substitution of light alloys, plastic and the like for lead.

A further object of the invention is to reinforce the free ends of the guides by a crossbar which will maintain these guides in parallelism throughout their useful life.

Among the objects of the invention is to permit greatly lengthening the yarn guide units without reducing their rigidity to less than that of short units.

By reason of the improved design, a further object of the invention is obtained in that an open structure is provided. This permits ready inspection through the open spaces of the front guide bar units into the back rows of guide units. This feature of increased visibility is an aid to the operator in spotting machine difficulties such as malfunctions of guide units maintained at the rear, rethreading broken ends of yarns, adjusting clearance between guides and needles and the like.

In like manner the crossbar is designed with beveled or sloping longitudinal edges which will minimize fraying or damage to the yarn being fed.

The above and other objects of the invention will be readily understood from the following description as illustrated in the accompanying drawings in which:

FIG. 1 is a front view of the improved yarn guide unit;

FIG. 2 is a longitudinal cross-section on line 2—2 in FIG. 1 and

FIG. 3 is a rear view of the improved unit.

In order to improve the design and utility of the yarn guide unit, it has been formed by providing advantageous holding means for the customary yarn guides 5. These guides are each provided with an eye 6 at the free end. The rear ends 7 of the shanks of the guides 5 are held in spaced position in a holder 8. This holder may be of lead, or preferably a light metal or suitable plastic material. The holder 8 is cast or molded of this suitable material around the shank ends 7. The outer face of the holder 8 projects upwardly from the adjacent edge of the shanks 7 as indicated in FIGS. 1 and 2.

The opposite or inner surface of the holder 8, is cast flush with the inner edges of the shank ends 7. This is shown in FIG. 3.

An upstanding integral rib 9 forms part of the holder 8 and projects beyond the surface which is flush with the edges of the shanks.

The holder 8 thus designed, is held against the customary guide bar, not shown, by a bolt passing through the bolt hole 10. The flush surface of the holder 8 is against the side wall of the guide bar, while the rib 9 establishes the proper angular position by engagement with the front edge of the guide bar.

A crossbar 11 is cast over the guides 5 at an intermediate point. This bar projects to form a continuous surface on the same side as the rib 9.

On the opposite side, the crossbar 11 projects in the form of three or more upstanding ribs 12 opposite the similar projecting part of the holder 8. In this manner the guides are held in fixed parallelism with a minimum of the material used for the bar 11, whether it be light metal alloy or analogous material.

The yarn guide unit thus described is fitted on the usual guide bar of the straight bar knitting machine. It is held in proper extending position by reason of the projecting rib 9. However, except for this rib, the holder on that side is limited to a surface flush with the edge of the ends 7 of the guides. This flush surface cooperates with the guide bar proper to maintain adequate rigidity of the guides 5.

The holders 8 and the ribs 9 project only slightly beyond the front edge of the guide bar. As a consequence there is good visibility between the guides 5 to permit the operator to observe the operation of the guide units in the rows on the back guide bars.

The crossbar 11 spaced at an intermediate point does not interfere with this visibility or access. It will, however, reinforce the free ends of the guides 5 and hold them in true parallelism with a minimum of added weight. The cross-bar also offers the least surface for frictional wear upon the yarn as fed to the eyes 6.

The essential features of the invention have been described and illustrated by way of example, but numerous minor changes in design, proportion and materials are possible without departing from the scope of the invention as defined in the following claims.

What I claim is:

1. A yarn guide unit comprising a plurality of parallel yarn guides having eyes at their free ends, a holder of light metal alloy or the like cast around the rear ends of the shanks of the guides flush with the edges of the guides on one side and a spacing bar cast around the

guides at an intermediate point spaced between the free ends of the guides and the front edge of the holder.

2. A yarn guide unit comprising a plurality of parallel yarn guides having eyes at their free ends, a holder of light metal alloy or the like cast around the rear ends of the shanks of the guides flush with the edges of the guides on one side, an integral crossbar on the front edge of the holder over the shanks of the guides and a spacing bar cast around the guides at an intermediate point spaced between the free ends of the guides and the front edge of the holder.

3. A yarn guide unit comprising a plurality of parallel yarn guides having eyes at their free ends, a holder of light metal alloy or the like cast around the rear ends of the shanks of the guides flush with the edges of the guides on one side and projecting outwardly therefrom on the opposite side, a spacing bar cast around the guides

at an intermediate point spaced between the free ends of the guides and the front edge of the holder, and having spaced ribs covering the guides on the same side on which the holder projects.

4. A yarn guide unit comprising a plurality of parallel yarn guides having eyes at their free ends, a holder of light metal alloy or the like cast around the rear ends of the shanks of the guides flush with the edges of the guides on one side and a spacing bar cast around the guides at an intermediate point spaced between the free ends of the guides and the front edge of the holder, and having sloping longitudinal edges.

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