

May 19, 1959

P. GUMMI

2,886,879

WARP GUIDE

Filed March 29, 1956

*Fig. 1.*

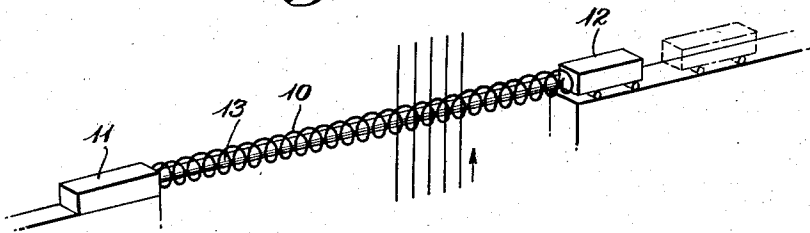


*Fig. 2.*

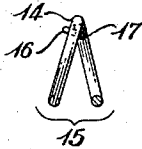


*Fig. 3.*



*Fig. 4.*

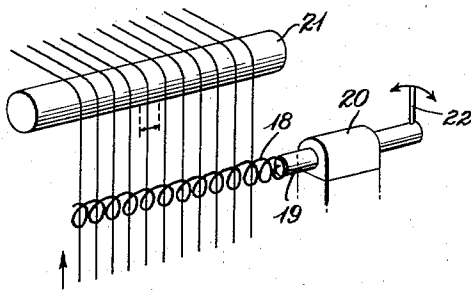
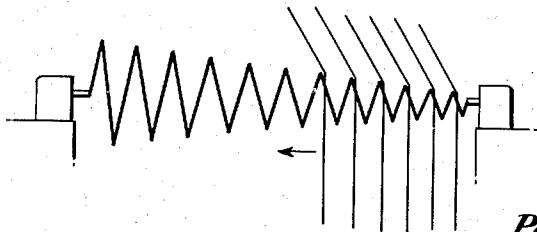


*Fig. 5.*



INVENTOR

*Peter Gummi*

BY

*Met R. Poston*

ATTORNEY

1

2,886,879

## WARP GUIDE

Peter Gummi, Obernburg (Main), Germany, assignor to American Enka Corporation, Enka, N.C., a corporation of Delaware

Application March 29, 1956, Serial No. 574,659

Claims priority, application Germany April 6, 1955

5 Claims. (Cl. 28—55)

This invention relates to thread or yarn guides and more particularly to guides of the type that are employed in orienting a warp of running yarns or threads such as is established in beaming and slashing operations as well as in some forms of continuous spinning.

In the textile arts, combs, notched bars, grooved rollers and the like are commonly used to guide yarns and threads in mutual parallelism as, for example, through sizing materials, in beaming or, as in the Heim system of continuous spinning (see U.S. Patent No. 2,334,325, dated November 16, 1943), for guiding the yarns in mutual parallelism through after-treating baths. Sometimes the combs are used not only for thread orientation but, as well, for stripping excess liquid from the yarns; the contact of the yarn with the comb between the teeth permitting the comb to exercise a wiping action which is desirable in the interest of solution economy. Sometimes combs and the like are used for guiding yarns around corners and to impart drag to the yarns to create a higher thread tension.

While combs and the like have enjoyed very wide use in the textile industry, in general they are not very adaptable from one specific use to another and there has not been much standardization in comb design. In other words, each comb is designed for its own particular job and this is all it can perform. If a different operation is required, or even different thread spacing in the same operation, another comb is substituted. This requires a considerable inventory in combs, some of which are fairly expensive to produce. It will be appreciated that the condition of the surface of a comb is very important because a rough or abraded surface can do great damage to the yarn or thread being guided thereby. Accordingly, another serious problem with combs is that there cannot be adequate distribution of wear and worn combs must be replaced.

It is an object of the present invention to overcome the disadvantages of combs and the like as known in the prior art and to provide a comb characterized by low initial cost, easy adjustability as to tooth spacing, easy adjustability as to wear distribution and excellent adaptability to specialized secondary operations such as stripping and causing lateral oscillation of a warp sheet in order to distribute wear evenly on subsequent processing apparatus such as squeeze rollers.

Other objects and advantages of the present invention will be apparent upon consideration of the following detailed description of several embodiments thereof in conjunction with the annexed drawings wherein:

Figure 1 is a schematic view of a coil spring thread guide constructed in accordance with the principles of the present invention; the broken lines indicating an alternate extension of the spring;

Figures 2 and 3 are fragmentary views to the enlarged scale depicting the thread-to-coil spring relationship in two possible ways of running the threads through the coil of Figure 1;

2

Figure 4 discloses a coil similar to Figure 1, but mounted for oscillation; and

Figure 5 discloses a coil which is externally conical to render the resistance to lateral shifting of the coils variable along the length of the spring.

Referring first to Figure 1, the numeral 10 represents a coil spring which may be made of corrosion resistant steel of good surface quality. This coil is stretched between two blocks 11 and 12. The block 11 is fixed in any convenient manner and the block 12 is arranged to be shifted laterally, for example, from the position shown in full lines to the broken line position thereby to alter the helix angle of the spring. It will be appreciated that as the spring 10 is extended its helix angle will increase and this will, in turn, increase the pitch or space between adjacent coils. The pitch of the spring, of course, predetermines the spacing between adjacent yarns of a warp sheet being guided thereby. It is to be understood that the block 12 will be guided in its movement of adjustment by conventional means and will likewise be provided with some sort of locking means to hold it in the desired position of adjustment. To the rear of the coil spring 10 there is located a bearer bar 13 which is resistant to bending and which reinforces the spring against the forces generated by altering the planes of travel of the threads as, for example, in the case of Figure 1 where the threads approach the coil spring by ascending from below in the direction of the arrow and then bend through a slight angle while guided by the spring passing on toward the rear of the device as it is shown in the drawing. In other words, the bearer 13 lies more or less in the position of the component of force tending bodily to displace the spring 10. The bearer 13 may be secured either to the block 11 or to the support for blocks 11 and 12 and remains fixed upon adjustment of block 12 to the broken line position shown.

It will be appreciated that the degree of deflection of the threads and the tension thereon determines the magnitude of their entry into the respective convolutions of the coil spring and accordingly the amount of stripping action which can be expected and the amount of tension which the coil will impart to the yarns. While only five threads are shown in the warp of Figure 1, it is to be understood that the warp may equal the number of coils of the spring 10.

In Figure 2 there is shown a single thread bearing on the base 14 of a single convolution 15 of the spring 10. The thread running from below at right angles to the plane of the drawing initially contacts with one of its sides at point 16 of the coil 15. It remains in intimate contact as it travels forward to the other side 17, thereby losing the major part of its entrained liquid and it is tensioned by its friction along the curved path of contact with the base 14 at the convolution 15.

In Figure 3 there is shown a thread which is only guided between the convolutions passing therethrough without being deflected from its direction of axial movement. It is held in the path of travel by light lateral contact with the convolution. Various intermediate thread positions, not illustrated, are of course possible depending upon the angle of attack and of departure of the yarns to and from the respective guiding coil.

In Figure 4 there is shown a coil spring 18 which is similar to the coil spring 10 of Figure 1 except that it is mounted on a tube 19, which, in turn, is mounted in a bearing 20 for oscillation through about 360° as is indicated by the arrows in the drawing. The rotation of the spring 18 through 360° will of course laterally displace the yarns a distance equal to the pitch of the spring. This is depicted in broken lines in the drawing where the yarns are indicated as passing over a roller 21 which may be one of a pair of squeeze rollers or something of

3

the sort. Rotation of spring 18 may be effected through lever 22 either manually or by suitable automatic indexing mechanism not forming a part of this invention and therefore not illustrated. This lateral displacement of the yarns, of course, evenly distributes the wear on the roller. Particularly is this true when the oscillation is 360° which means, in effect, that every bit of the surface of the roller 21 is used, the warp contacting a portion of the surface of the roller equal to its width plus the pitch of the helix. The support for the coil 18 at the left side of Figure 4 is not shown but this is a mere matter of drawing convenience, since it will correspond to that indicated at 20. It is obvious that the coil spring mounting or tube 19 at one end of spring 18 must be coupled for turning movement with the other end so that the spring will rotate without change in the pitch.

It will be appreciated that the coil 10 or 18 may be closed or partially opened in its condition of repose. If a normally closed coil is used, some tension must be applied to it before it will open up to receive yarns. It is likewise possible and considered to be a part of this invention to have the coil possessed of a progressively varying helix angle from one end to the other. This is in order to offer substantially uniform resistance to threads which are bent around a corner while being guided by such a spring. Another expedient is to use a uniform helix angle but to increase the coil diameter progressively of the length of the spring. This type of arrangement is shown in Figure 5, where the warp is being bent toward the left of the drawing so that the thrust assumed by the spring from the yarns is exerted in the line of the arrow. The cumulative effect of this thrust is of course felt at the right hand side of the spring and if the spring were uniform in pitch and coil diameter the spacing to the right of Figure 5 would be greater than that to the left. However, the coils at the left are made stronger so that they do not transmit load to the right, whereby substantially uniform spacing is maintainable.

The coil springs to be used in the manner disclosed

4

herein should be manufactured from a quality material, such as corrosion-resistant steel, and should have smooth yarn-contacting surfaces. In view of the fact that they can be rotated and adjusted in length, these springs permit a versatile use as guiding, stripping, tensioning and deflecting means, have a long effective life and can be easily adapted to all operating conditions.

What is claimed is:

1. A guide for a warp sheet or the like, comprising a helical spring with sufficient pitch to accommodate a yarn in each coil thereof and means to rotate said helical spring about its axis.
2. A guide for a warp sheet or the like comprising a helical spring with sufficient pitch to accommodate a yarn in each coil thereof and means to oscillate said helical spring about its axis.
3. A guide for a warp sheet or the like comprising a helical spring with sufficient pitch to accommodate a yarn in each coil thereof and means to oscillate said helical spring about its axis in alternations of 360° thereby to shift said warp sheet laterally.
4. A guide for a warp sheet or the like comprising a helical spring supported by the ends thereof and having sufficient pitch to accommodate a yarn in each coil, a roller mounted adjacent to said spring and having a surface for receiving said warp sheet and means to oscillate said spring about its axis in order to distribute wear of the warp sheet on said roller.
5. A guide as set forth in claim 4 wherein said means permits oscillation of said spring through an angle of 360°.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

|           |              |               |
|-----------|--------------|---------------|
| 343,801   | Entwistle    | June 15, 1886 |
| 686,565   | White et al. | Nov. 12, 1901 |
| 1,507,251 | Perrin       | Sept. 2, 1924 |
| 1,987,777 | Jewett       | Jan. 15, 1935 |