Nov. 14, 1933. J. F. MADDEN 1,935,476

TWISTING GUIDE

Filed April 8, 1932 2 Sheets-Sheet 1

Fig. 1

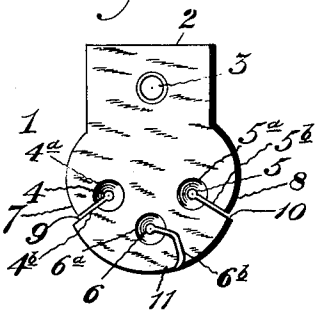


Fig. 2

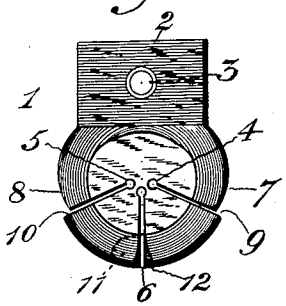


Fig. 3

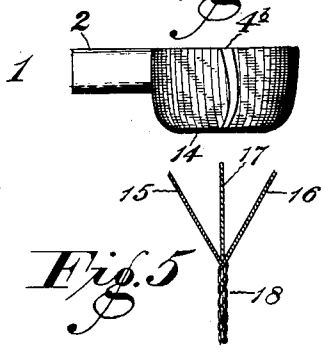


Fig. 4

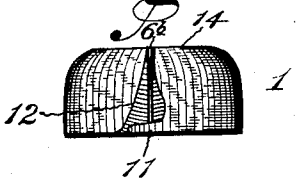


Fig. 5

Fig. 6

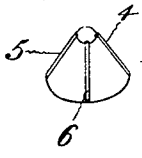


Fig. 7

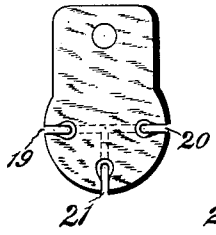


Fig. 8

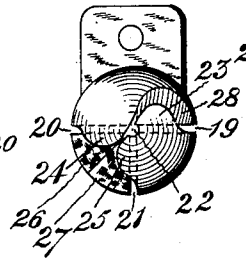


Fig. 9

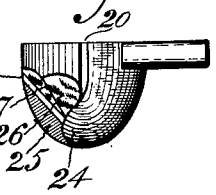
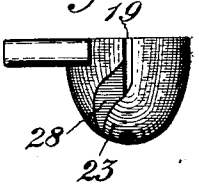


Fig. 10



Inventor

Jesse F. Madden,

By E. E. Overholt,

Attorney.

Nov. 14, 1933. J. F. MADDEN 1,935,476

TWISTING GUIDE

Filed April 8, 1932 2 Sheets-Sheet 2

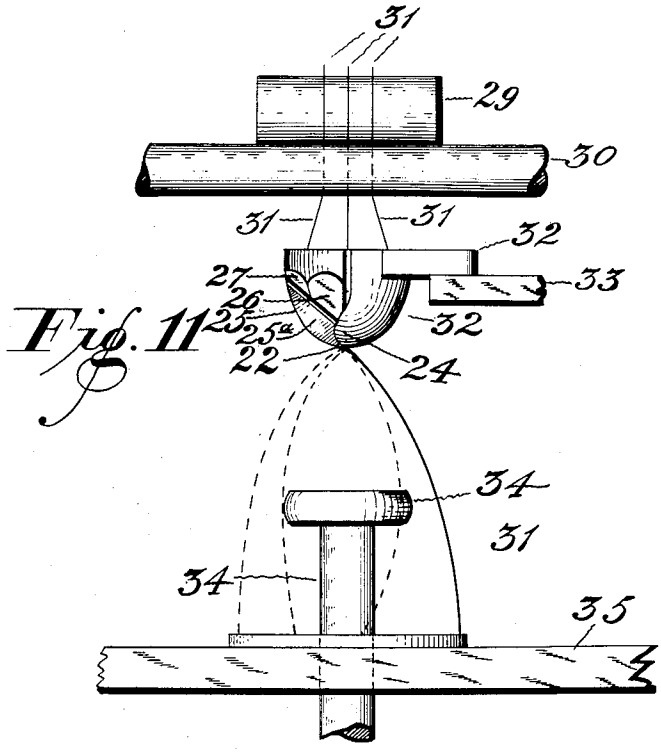


Fig. 11

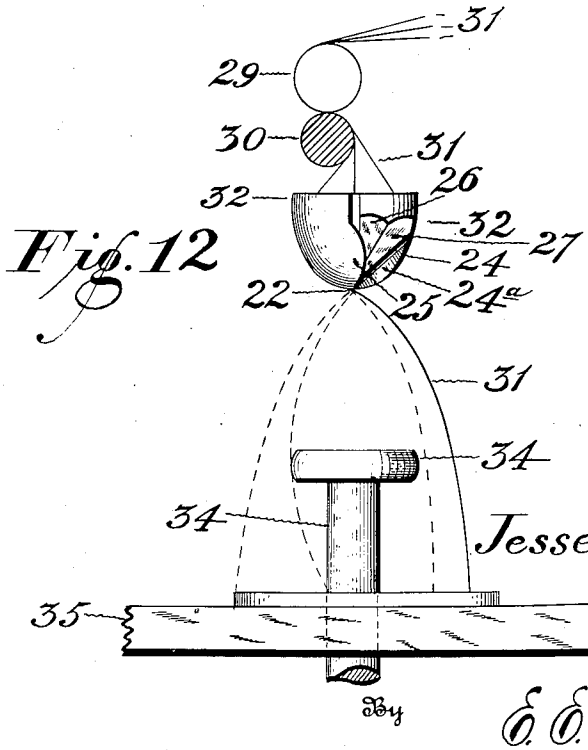


Fig. 12

Jesse F. Madden,
Inventor,

By E. E. Overholt
Attorney

Patented Nov. 14, 1933 1,935,476

UNITED STATES PATENT OFFICE

1,935,476

TWISTING GUIDE

Jesse F. Madden, Rockville Center, N. Y.

Application April 8, 1932. Serial No. 604,086

11 Claims. (Cl. 242—157)

My invention relates to thread guides, and more particularly to a guide for a plurality of threads or cords which are being twisted together to form a single cord.

The individual threads or cords from which the composite cord is to be formed, have already been formed by twisting, and hence as they pass from their respective bobbins to the point where they all unite and are twisted into a single cord, the additional twisting thus simultaneously imparted to the cords and added to the individual twist that is already in them, imparts to each of them a tendency to independently become kinked and knotted and snarled; and unless this is prevented or overcome, it ruins everything.

For years and years those types of mills in the textile trade known as braiders, yarn or novelty yarn mills, have experienced all sorts of inconvenience, trouble, delays, difficulties, loss of time, material and labor, in trying to hit upon some kind of an arrangement that would prevent these individual threads from becoming knotted and snarled and tangled before reaching the point where they all unite and are formed into a single cord. A mill may be manufacturing a novelty yarn that is composed of eight or ten different threads, each a different color. These threads must necessarily come from that many bobbins. In some cases there is a distance of from 36" to 42" between the various bobbins and the point of contact where the threads all meet and the composite twist begins. All kinds of contraptions and set-ups have been used to keep all of the threads individually unkinked and from becoming entangled with each other before the point of union is reached and the composite twist begins.

The object of the present invention is to provide a guide which will prevent the individual threads from becoming kinked or knotted or entangled with each other before they reach the point where they unite to be formed into a composite cord.

A leading feature of the invention consists of a guide formed of any suitable material and provided with a plurality of guideways passing through the guide from one side to the other, being separated from each other a material distance at their entrance ends and converging toward a common point as they pass through the guide, said guideways being open on their sides facing outwardly, and some of them at least preferably provided on said open sides with overlapping lips or projections, to prevent the threads when in motion from easily jumping out of the guideways laterally.

The invention consists in certain novel features of construction and arrangement of parts, as will be hereinafter described and claimed, reference being had to the accompanying drawings.

In a majority of cases these novelty braids or yarns are made up from three threads, each a different color. This is true of perhaps 90% of the mills; and hence in the drawings I have shown guides usually provided with three guideways, though of course, it is understood that each guide must have as many guideways as there are individual threads to be united in the composite cord to be formed.

Occasionally only two threads are to be united, in which case a guide having two guideways is all that will be required. However, in a case of that kind, a guide having three or more guideways may be employed, only two of the guideways being used.

In the drawings;—

Fig. 1 is a top plan view of one form of my device.

Fig. 2 is a bottom plan view of Fig. 1.

Fig. 3 is a side elevation of Fig. 1.

Fig. 4 is a front elevation of Fig. 2.

Fig. 5 illustrates the relative position in which the respective threads are held as they pass through the guide.

Fig. 6 shows the frustum of a cone as it would appear if cut from the centre of the main portion of the guide shown in Figs. 2 and 4 in a way to retain the bottoms of the guideways on the surface of the cone.

Fig. 7 is a top plan view of another form of my device.

Fig. 8 is a bottom plan view of Fig. 7.

Fig. 9 is a side elevation of Fig. 7 taken from the right side.

Fig. 10 is a side elevation of the same taken from the left side.

Fig. 11 is a fragmentary front elevation, partly diagrammatic, of twisting apparatus of ordinary construction, employing one of my improved guides; and,

Fig. 12 is a side elevation of Fig. 1.

Referring further to the drawings, the numeral 1 indicates the form of my device illustrated in Figs. 1 to 4.

The device has on one side a lug 2 with an opening 3 for securing the guide in position on the machine with which it is to be used. The main body of the guide illustrated in Figs. 1 to 4 is provided with a plurality of guideways 4, 5,

and 6, having their entrance ends spaced apart from each other a material distance, as indicated in Fig. 1, said guideways converging toward each other as they pass through the guide, so that they come out close together on the other side, as illustrated in Fig. 2. They are slightly flared at their entrance ends, as indicated by 4*a*, 5*a*, and 6*a*, and extend laterally outward through the outer walls of the guide, as indicated by the slots 4*b*, 5*b*, and 6*b*. These slots may occupy planes substantially at right angles to the top surface of the guide, or they may be disposed at any desired inclination to said surface.

The outer circumference of the guide is cut away on its two opposite sides, as indicated at 7 and 8, to form the shoulders 9 and 10 which constitute stops for the threads, making it easy to enter them laterally into the guideways.

The front guideway 6 is overlapped at its upper end with a thin horizontal flange 11 flush with the upper surface of the guide.

The front guide-slot 6*b* is slightly widened at its outer side as indicated at 12, to provide it with an open mouth for the lateral reception of the thread.

The reduced under-side 14 of the guide is flat and is disposed parallel to the upper side.

Fig. 5 shows three threads 15, 16, and 17, united to form a composite cord 18. Fig. 6 represents Fig. 4 as cut away till only a central cone is left, the same being large enough to include the inner edges of the guideways 4, 5, and 6, which emerge from the under face 14 of the guide very close together, as appears in Fig. 2.

Fig. 7 shows in top plan view a slightly modified form of guide in which the three guideways 19, 20, and 21, converge to a focal point slightly above a single opening 22 from which the composite cord emerges as it is formed from the three smaller cords, the axis of the guide passing through said focal point of the guideways and through said opening 22. These guideways 19, 20, and 21, are overlapped respectively by the lips 23, 24, and 25. And these lips are extended downwardly till they practically meet each other, there being only a narrow slit between them; and approximately midway of this slit is said opening 22, the slit being for the lateral passage of threads into said opening 22. Underneath the inner sides of the lips 24 and 25 the surface of the guide is cut away somewhat as indicated at 26 and 27 to form means for the easy introduction of the threads laterally underneath the lips into said respective guideways and into said opening 22. The surface of the guide is also cut away under the inner side of the lip 23, as indicated at 28, to similarly provide room underneath said lip for the introduction of the thread laterally into the guideway 19.

Both forms of the device herein shown have been put through various tests with the most gratifying results. They do the work as nearly perfect as is humanly possible, making a better yarn than has heretofore been found possible to produce, and avoiding all the inconvenience, annoyance, delay, vexation, and loss heretofore encountered in this kind of work.

When the device is in operation, the overlapping lips 23, 24, and 25 tend to lock the threads in their respective guideways against jumping out sidewise when the machines are doing rapid work and the threads are traveling fast, so that the reaction of every jerk they receive tends to make them jump sidewise.

Where the three guideways come together is the point where the twisting of the three cords into a single composite cord begins; and just underneath this point and slightly spaced therefrom is the opening 22 through which the composite cord projects and from which it seems to grow. This is a very decided advantage over anything now in use of which I have any knowledge; for while the threads can be very easily and conveniently entered underneath the overlapping lips into the guideways, the lips nevertheless tend, under all normal conditions, to lock the threads against laterally rebounding from the guideways; and it is apparent that the guide keeps the individual threads, however many there may be of them, all separated from each other till the point is reached where the twisting together begins, and they are all merged into the one finished cord.

The form of the device illustrated in Figs. 1 to 4 does not have an opening corresponding to the opening 22 shown in the other form illustrated in Figs. 7 to 10. Neither does it have any locking means for holding the threads in the guideways 4 and 5, but it does have a flange-lock 11 for the front guideway 6, and its guideways 4 and 5 have the shoulders 9 and 10 to facilitate the entrance of the threads laterally into said guideways. This form of the device is used for what is termed in the trade, loose yarns, and there is no danger of the side threads in the guideways 4 and 5 becoming unthreaded; and the functioning of the device is in all essential respects very similar to that of the other form of the device described.

The reason that the under side of the guide 1 has the flat surface 14, with the three guideways coming close together at the center thereof, but not merging into a single opening corresponding to the opening 22 in the other form of the device illustrated in Figs. 7 to 10, is briefly as follows;—Some yarns that have to be worked are light, and others are heavy. With the light yarns the form of the device illustrated in Figs. 7 to 10 works perfectly, but with the heavy yarns (where the threads would run up to as high as #20), this form of the device does not work so well, since the hole 22 would be too small an outlet for the composite cord. These coarse threads make a much larger composite cord, and are much more resistant in their bending operations, and are sluggish in uniting symmetrically together as the composite cord is progressively formed; and consequently much more space is required at the point where the twisting into the composite cord begins; and it has been found that this space can be best provided for by allowing each of the contributing threads to begin twisting immediately upon its emergence from its own individual opening in the flat face 14. And this flat face 14 is set right up against the machine that receives the finished cord to assist the cord in going in the proper kind of a twist. It slightly presses it all the time somewhat similar to the manner in which a cord must be pressed continually to keep it going through a small hole.

The small threads with which the other guide is used are more perfectly compacted and fitted to each other, so that they easily pass through the opening 22 and keep their twist as they move on.

Experiments have proved that for coarse yarn, the form of the device illustrated in Figs. 1 to 4, having the flat face 14, with the guideways emerging close together (but separated from each

other) at the centre is best; while for fine threads, the form illustrated in Figs. 7 to 10 is best.

It may be here explained that in many of the different novelty yarns and braids that are being manufactured today, the different threads do not all run at the same rate of speed through the guide. For instance; if a particular thread or yarn carries more red and blue than it does white, naturally the red and blue must be traveling at a higher rate of speed than does the white, and in this case, the two threads traveling at the high rate of speed are preferably threaded into the side slots 4 and 5, while the slow speed thread is placed in the centre slot 6, and is wrapped around the other two threads as the composite cord is formed. Now, with this slower speed there is more liability of the thread jumping out of the slot than is the case with the higher speed threads, and hence the slot that carries the slow-speed thread is provided with the locking flange 11, and the other two guideways 4 and 5 are not provided with any locking flanges or lips, because they generally do not need them, due, as just stated, to the kind of work this form of the device is used with.

The form of the device illustrated in Figs. 7 to 10 is made in different sizes for use with threads of varying degrees of fineness, while the form illustrated in Figs. 1 to 4 is also made in different sizes to accommodate threads or cords of different degrees of coarseness.

As illustrated in Figs. 9, 11, and 12, it will be seen that the edges 24*a* and 25*a* of the lips 24 and 25 respectively, form shoulders on the circumference of the guide at the outer sides of their respective guideways to facilitate the entrance of threads laterally into said guideways. The edge of the lip 23, which as illustrated in Figs. 8 and 10, overlaps the guideway 19, also forms a shoulder for this guideway just as the edges of the other lips form shoulders for their respective guideways.

From Figs. 8 to 12, it will also be seen that the circumference of the guide is cut away at 26, 27 and 28, adjacent the lips or shoulders 24, 25, and 23 respectively, which corresponds to the cut-away portions 7 and 8 adjacent the slits 9 and 10 on the circumference of the other form of the device illustrated in Figs. 1 to 4.

The twisting apparatus illustrated in Figs. 11 and 12, is of ordinary construction, and has front rollers 29 and 30, over which the strands 31 are fed from a suitable source of supply, and pass through the guide 32 which is carried by the supporting bar 33. The twist bobbin 34 upon which the composite cord is wound, projects above the lifter plate 35, with the axis of the bobbin in alinement with the opening 22 at the outlet of the guide. The separate strands 31 are fed by the front rollers to the guide 32 and pass through the respective guideways of the guide, there being as many guideways as there are separate strands to be united into one cord. When the operation is completed, the composite cord is formed and wound on the bobbin 34.

As the separate strands of thread are fed through the guideways they unite just after they have passed the focal point of the guideways, and at that point are twisted into a composite cord, and while the twist which unites the cords is taking place at that point it imparts to the individual strands an additional amount of twist which tends to make these strands flex and kink just at that point. But just there is where the opening 22, which is slightly spaced from the focal point of the guideways, holds the newly formed section of cord against appreciable lateral movement in any direction during the initial twisting operation which forms it; and therefore the cord is progressively formed on a line coinciding with the axis of the guide, and is therefore formed into a straight cord, and kept free from kinks, since it is apparent that if the cord is kept straight at the point where it is being progressively formed, it will be an evenly formed cord free from a tendency to kink.

Having described my invention and shown two practical embodiments thereof, what I claim as new and desire to protect by Letters Patent is;—

1. A circular thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of concentric guideways extending through the guide toward a common focal point and extending laterally outward through the circumference of the guide, certain of said guideways being located on opposite sides of the guide, the circumference of the guide being cut away on opposite sides of the guide at one side of each of said guideways, whereby to form shoulders on the diameters of the guideways at the outer sides of each of said side-guideways, to facilitate the entrance of threads laterally into said shouldered-guideways.

2. A circular thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of concentric guideways extending through the guide and emerging therefrom close together, and extending laterally outward through the circumference of the guide, certain of said guideways being located on opposite sides of the guide, the circumference of the guide being cut away on opposite sides of the guide at one side of each of said side-guideways, whereby to form shoulders on the diameter of the guide at the outer side of each of said side-guideways, to facilitate the entrance of threads laterally into said shouldered guideways, said guide being provided with a reduced flat surface at the point where the guideways emerge from the guide, said surface being in a plane at right angles to the axis of the guide.

3. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of guideways converging toward a common focal point, said guideways having lips overlapping their outer sides and also their focal point, said lips being provided with an opening at the point where they overlap the focal point of the guideways.

4. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of guideways converging toward a common focal point, said guideways having spaced lips overlapping their outer sides and meeting above their common focal point, said lips at their meeting point being provided with an opening for the passage therethrough of the threads emerging from the guideways.

5. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of concentric guideways converging toward a common focal point, said guideways having spaced lips overlapping their outer sides and also their focal

point, and provided opposite said focal point with an opening for the passage of the composite thread fed thereto from the focal point of the guideways.

6. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of concentric guideways converging toward a common focal point, said guideways having spaced lips overlapping their outer sides and also their focal point, and provided opposite said focal point with an opening for the passage of the composite thread fed thereto from the focal point of the guideways, said opening in the overlapping lips having, on diametrically opposite sides thereof, slots leading outwardly from said opening to the side edges of the lips.

7. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of guideways and an opening for cooperation therewith, said guideways being concentric to the axis of the guide and extending toward a common focal point on said axis, said opening being spaced from said focal point with the axis extending through said opening, said guideways being provided with spaced lips overlapping their outer sides, whereby to permit the lateral introduction of threads underneath said lips into said guideways, said guide also having slits leading into said opening from opposite sides thereof for introducing threads laterally thereinto.

8. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of covered guideways, with a central outlet-opening in the covering adjacent the outlet ends of the guide-ways, for receiving the separate cords as they emerge from the guideways and holding them in close proximity to each other at that point preparatory to being twisted into a single cord by the twisting machine.

9. A thread guide designed for use with a twisting machine in the formation of a composite cord, said guide having a plurality of covered concentric guideways extending toward a common focal point, and a central outlet opening in the covering slightly in advance of said focal point, for receiving the separate cords as they emerge from the guideways en route to the twisting machine during the twisting operation.

10. A thread guide for delivering a plurality of cords to a twisting machine to be twisted into a single cord, said guide having a plurality of covered guideways for the respective cords with a central opening adjacent the outlet ends of said guideways, said separate cords passing through said opening to bring them into close proximity to each other preparatory to being twisted into a single cord by the twisting machine.

11. A thread guide designed for use with a twisting machine in the formation of a composite cord from a plurality of smaller threads, said guide having a plurality of covered guideways for the respective threads; and means adjacent the outlet ends of said guideways for engaging said separate threads after they have emerged from said guideways and holding them in close proximity to each other at the point where the uniting of the separate threads into a single cord begins, whereby to prevent kinking of the threads at that point.

JESSE F. MADDEN.