It is frequently important in winding yarn or thread on a core, particularly if that core has upper and lower shoulders, as in a spool, to be able to adjust the thread guiding operations so that the yarn will be laid accurately against both shoulders. This situation arises in spinning, twisting and winding operations. In order to produce the desired results it is often necessary to be able to make some adjustment of the spindle relatively to the spinning or twister ring with which it cooperates in addition to the adjustment that customarily is made in the builder motion for this purpose.

The present invention deals particularly with this problem and it aims to devise means where-by a spindle can be adjusted quickly and easily through those gradations of height necessary to bring it into the desired relationship to the ring or other yarn guiding device with which it is associated. For convenience the various machines in which this problem occurs will be included generically in the term “twister frame” since this is the most common machine in which the necessity for the present invention arises.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawing, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Fig. 1 is a vertical, sectional view of a twister spindle mounted on a spindle rail and operatively associated with adjusting means embodying this invention;

Fig. 2 is a top view of a height adjusting washer provided by this invention; and

Fig. 3 is a side view of a pair of washers illustrating the manner in which they cooperate with each other.

Referring first to Fig. 1, a spindle of an ordinary commercial form is there illustrated, including a rotary blade 2, a whirl 3, and a spindle base 4 clamped on a spindle rail 5 by means of the usual clamping nut 6.

According to this invention an adjusting device is interposed between the rail 5 and the base 4, this device comprising upper and lower washers 7 and 8, respectively, which are identical in construction. As best shown in Figs. 2 and 3, the washer 8 has a flat bottom surface and an upper surface which is composed of three lobes. Each lobe may be regarded as having an inclined section a and an oppositely inclined section b, the former being of approximately 110° in angular extent, while the latter is of about 10° extent.

Between the high and low points of each inclined section a, the surface rises at a uniform rate but is divided by radial teeth into equal steps. For example, a typical spindle base has a diameter of approximately two and one-half inches. In other words, the meeting inclined surfaces of the washers are non-slippering. The washer may have about the same diameter, and each lobe may be made with, say, forty teeth, or some other convenient number. Also, the bases of these teeth are spaced vertically by equal increments of height of some convenient value, as for example, three one-thousandths of an inch.

The upper washer 7 is a duplicate of that shown at 8, so that when one is superposed on the other, as shown in Fig. 3, the assembly forms a seat or support for the spindle base 4 which may be adjusted to raise or lower the spindle through a distance of, say, one-quarter of an inch, merely by rotating one washer relatively to the other. In order to facilitate this adjusting operation several holes 9 are drilled into the edge of each washer at uniformly spaced distances to receive a spanner wrench, or some other suitable tool, with which to produce the relative adjusting movement of the two parts 7 and 8. If the spindle has been clamped to the spindle rail, it is necessary, of course, to loosen the nut 6 sufficiently to permit making the desired adjustment, the nut being tightened up again after the adjusting operation has been completed. In new installations the spool or bobbin is adjusted into the desired relationship to the ring by turning one, or both, of the washers 7 or 8, this adjustment being made before the nut 6 is tightened up.

The internal diameter of the washers is made slightly greater, say, for example, ten one-thousandths of an inch, than the maximum diameter of the part of the base extending through the washers. Partly due to this construction and partly, also, to the tendency of the upper washer to center itself on its companion because of the action of the radial teeth, the two register accurately without any particular attention, and take a proper position under the base. It should be observed that the upper washer always bears on the lower one at three points or areas, each of substantial extent, and that the three are separated by equal angular distances, so that they provide a firm support for the spindle base. The teeth automatically lock the washers in any relationship to which they are adjusted. In other words, the meeting inclined surfaces of those washers are non-slippering.

With this construction, therefore, it is a very...
simple matter to adjust the spindle height relatively to the ring so that the thread or yarn will be laid snugly against the shoulder at one end of the spool or other core on which it is being wound. The adjustment at the other end can always be made in the builder motion.

Having thus described my invention, what I desire to claim as new is:

1. In a twister frame, the combination with a spindle rail and a spindle mounted thereon, of means interposed between said rail and the spindle base, operable by rotative movement around the axis of the spindle, for adjusting the height of said spindle.

2. In a twister frame, the combination with a spindle rail and a spindle mounted thereon, of two annular adjusting washers superposed, one on the other, and interposed between said spindle rail and the base of said spindle, said washers having flat faces to bear, respectively, on said rail and against said base, the contacting faces of said washers each being provided with three segmental lobes having helically inclined surfaces, whereby said spindle base may be adjusted vertically with reference to the spindle rail by rotatively rotating the washers, said washers supporting said base with a three-point bearing in their various adjusted relationships, the contacting inclined faces of said washers being shaped to provide radial teeth spaced by intervening radial grooves, said faces of the two washers interlocking with each other to hold said washers in different angular positions of adjustment.

3. In a twister frame, the combination with a spindle rail and a spindle mounted thereon, of two annular adjusting washers superposed, one on the other, and interposed between said spindle rail and the base of said spindle, the contacting faces of said washers each being provided with three segmental lobes having helically inclined surfaces, the two washers being essentially alike and each lobe being approximately like another, said lobes being radially toothed whereby the rotative adjustment of one relatively to the other will change the height of said spindle base above said spindle rail and will lock the two in their different positions of adjustment.

4. In a twister frame, the combination with a spindle rail and a spindle mounted thereon, of two annular adjusting washers superposed, one on the other, and located between the spindle base and said rail, said washers having flat surfaces to bear, respectively, on said rail and against the bottom surface of the spindle base, and each washer also being provided with helical surfaces arranged in three segmental lobes angularly disposed about the axis of said spindle, the segmental surfaces of one washer being in face to face contact, respectively, with like surfaces of the other washer and said segmental surfaces being so inclined with reference to said flat surfaces that the latter are parallel to each other, said segmental inclined surfaces also being radially toothed with V-shaped grooves and ribs so that the two washers interlock with each other and thereby to secure the washers in different angular positions of adjustment, whereby said spindle may be adjusted vertically relatively to its spindle rail by turning one washer around the axis of the spindle relatively to the other washer.

5. A device for adjusting a twister spindle relatively to the spindle rail on which it is mounted, comprising two annular washers, each having a flat face, one to rest on the spindle rail and the other for contact with the lower face of a spindle base, the opposite faces of said washers each being provided with three approximately equal segmental lobes which, together, form the greater part of the surface of each washer opposite to said flat surface, each of said lobes being inclined helically and being provided with radially extended V-shaped grooves, the walls of which form V-shaped radial ribs adapted to mesh with the grooves of the opposite washer, whereby when one of said washers is superposed on the other with said grooved faces of one in contact with corresponding faces of the other, they interlock, one with the other, but they may be adjusted to change the height of the spindle supported on them relatively to the spindle rail by rotating one washer relatively to the other, and the grooved surfaces of the washers will lock them in their different adjusted positions, adjacent grooves in said inclined surfaces being spaced apart vertically by equal increments of height, each such increment being equal to a few thousandths of an inch.

6. In a twister frame, the combination with a spindle rail and a spindle mounted thereon, of two superposed washers interposed between said rail and the spindle base, said washers having inclined non-slipping surfaces in contact with each other so that by relatively rotating them around the axis of the spindle they can be adjusted to support said spindle at different elevations above the spindle rail.

JOHN A. KENNEDY.