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L. CETRAN ETAL

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TENSION TESTER FOR SEWING MACHINE THREAD

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FIG.1

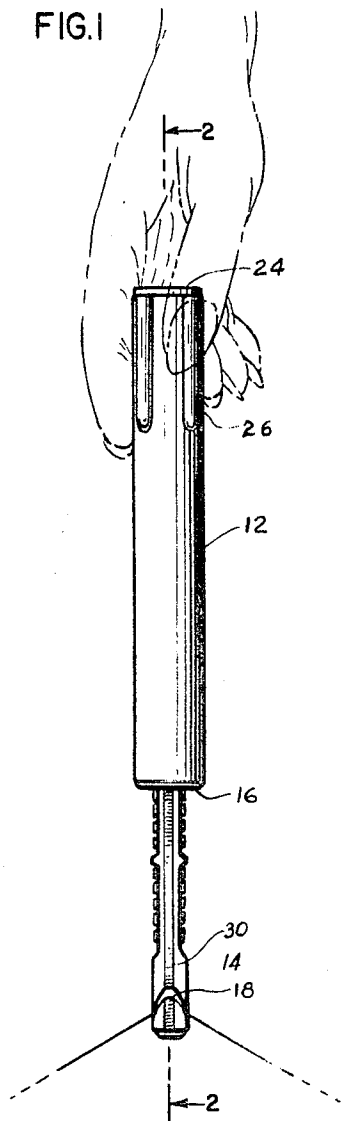


FIG.2

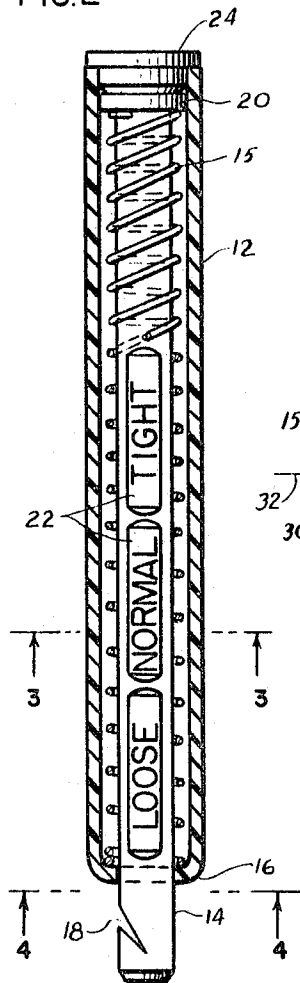


FIG.3

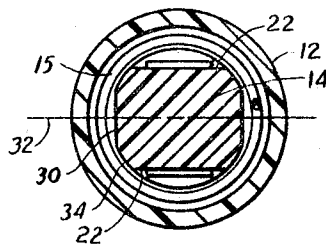


FIG.4

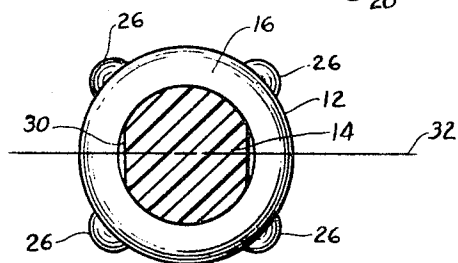
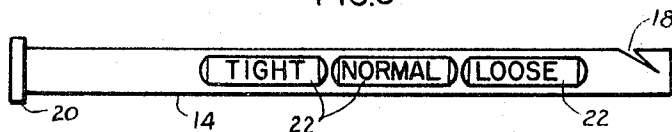


FIG.5



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1

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TENSION TESTER FOR SEWING MACHINE THREAD

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7 Claims

ABSTRACT OF THE DISCLOSURE

The tension tester comprises a relatively long tubular sleeve with a rod slidable therein and projecting from one end to receive the thread. A light compression spring is disposed in the space between the rod and sleeve, and is substantially as long as the sleeve, and therefore has a low spring rate and large deflection, thus providing ample room along the rod to carry markings which are appropriately exposed as the rod is pulled out of the sleeve.

BACKGROUND OF THE INVENTION

Low cost tension testers for sewing machine thread are already known, but employ a small pull spring with small deflection, thereby making it difficult to manufacture the device with close tension tolerance, and to maintain such tolerance in use, and to obtain room for large legible markings.

SUMMARY OF THE INVENTION

The improved tension tester comprises a tubular sleeve with a rod slidable therein and projecting through one end. The projecting end is notched to hook the thread, and the inner end has a flange. A low rate compression spring having a length almost as long as the sleeve is disposed in the space between the rod and sleeve. The rod is preferably molded out of a plastics material, and as molded includes a thread notch and the inner flange, and has flats with letters molded on the flats reading "LOOSE," "NORMAL," and "TIGHT," or equivalent words. Both sides of the rod have such flats, with the words reading from the notched end on the one side, and reading toward the notched end on the other side. The sleeve also is preferably molded out of a plastics material, with one end initially open but closed later by an end cap. The sleeve as molded may have ridges to inhibit rolling, and to facilitate handling the device when testing thread tension.

The foregoing and additional features are described in the following detailed specification, which is accompanied by drawings in which:

FIG. 1 is an elevation showing the tension tester in use;

FIG. 2 is a section taken on the line 2-2 of FIG. 1;

FIG. 3 is a transverse section taken approximately on the line 3-3 of FIGURE 2;

FIG. 4 is a section taken on the line 4-4 of FIG. 2; and

FIG. 5 is an elevation showing the side of the rod opposite to that shown in FIG. 2.

Referring to the drawing, the tension tester comprises a tubular sleeve 12, and a rod 14 of smaller diameter slidable in sleeve 12, and projecting through the end 16 of the sleeve. The projecting end of the rod has means to hook the thread, and this is preferably a notch 18 in the projecting end of the rod. A flange 20 (FIGS. 2 and 5) at the inner end of the rod is preferably molded integrally with the rod and is dimensioned to slidably fit the bore of the sleeve 12. The plastics material used is preferably a medium high impact polystyrene.

A compression spring 15 is disposed in the space be-

2

tween the rod 14 and the sleeve 12, with one end of the spring bearing against the flange 20, and the other end of the spring bearing against the end 16 of the sleeve. In this arrangement the spring has a length almost as long as the sleeve.

In the particular case here shown the spring is made of music wire and has a free length of $3\frac{3}{8}$ inch. A pull on the rod which exposes all of the word "LOOSE" corresponds to 6.3 ounces; a pull on the rod which exposes all of the word "NORMAL" corresponds to a pull of 10.8 ounces; and a pull on the rod which exposes all of the word "TIGHT" corresponds to a pull of 15.3 ounces. These values are approximate. The sleeve has a length of $3\frac{3}{8}$ inches, and thus substantially the full length of the sleeve is utilized for the spring. The dimensions are given as an example, and are not intended to be in limitation of the invention.

The long spring affords a long movement of the rod, which in turn makes it possible to use large, easily legible words on the rod, there being much more deflection for the same load than would be the case when working with a pull spring which would necessarily be short. There is also a manufacturing advantage in that it is relatively easy to make the device within desired tolerance, and to thereafter maintain the desired linearity and accuracy in use. A lower working stress makes possible a longer life without change in the deflection for any particular load put on the spring.

The rod, as molded, is molded with the flats 22, and the letters on the flats reading "LOOSE," "NORMAL," and "TIGHT," as is clearly shown in FIG. 2. In preferred form the two opposite sides of the rod are molded with such flats, and the letters are raised letters, as will be seen in FIGS. 1 and 3. The words on one side preferably read from the hook end toward the flange, as shown in FIG. 2, and on the opposite side the words preferably read in a direction from the flange 20 toward the notch 18, as shown in FIG. 5. This is convenient because a housewife using the tension tester can read the words on one side when pulling the sleeve toward the right, and can read the words on the other side when it is more convenient to pull the sleeve toward the left.

In the preferred form shown the sleeve also is molded out of a plastics material, with the end 16 having an aperture dimensioned to slidably receive the rod, while the other end is fully open to readily receive the spring and the flange 20. This open end then is closed by an end cap 24. The cap and sleeve are preferably molded out of medium high impact polystyrene, and the cap may be secured in the open end of the sleeve by means of cement, or by welding in accordance with any of several known welding techniques.

The tension tester comprises only four parts, one of which is the spring. The other three parts are molded in finished form, and the assembly requires only the attachment of the cap 24 to the sleeve 12.

The sleeve preferably has ridges 26 molded thereon. These inhibit undesired rolling of the device, and they also facilitate handling the same when testing thread tension as shown in FIG. 1.

The rod 14 is well guided in the sleeve, despite the flats with raised letters. At the inner end the flange 20 is circular and is guided by the sleeve 12 itself, and at the end 16 the hole corresponds to the diameter of the rod as shown in FIG. 4.

The two sides of the rod between the lettered flats may themselves be given a slight flat, as shown at 30 in FIGS. 3 and 4. The rod is molded in a die having its parting face on the center line 32. The flats 30 allow for a small amount of residual flash at the parting face. The flash is removed but need not be removed as thoroughly and accurately as would be the case if there were no flats. By reference

3

to FIG. 3 it will be seen that even when all four flats are used, the rod nevertheless is guided by four rounded corners 34 between the flats, these rounded corners conforming to the theoretical cylindrical shape of the rod.

We claim:

1. A tension tester for sewing machine thread, said tester comprising a hollow sleeve, a rod of smaller diameter slidable therein and projecting through one end thereof, the projecting end of said rod having means to hook the thread, the inner end of said rod having a flange, a compression spring disposed in the space between the rod and sleeve with one end of the spring bearing against the flange and the other end of the spring bearing against that end of the sleeve through which the rod projects, whereby the spring has a length almost as long as the sleeve, said rod carrying lettered markings appropriately exposed as the rod is pulled out of the sleeve against the force of the spring, said rod being molded out of a plastics material, said lettered markings being carried by flats on two opposite sides of the rod, said flange and said flats and said lettered markings being molded integrally with the rod, said sleeve also being molded out of a plastics material, with one end having a round aperture dimensioned to receive the rod, and with the other end initially open to receive the spring and the flange at the inner end of the rod, said open end being closed by an end cap, the rod being molded with a parting face and residual flash at the two remaining sides of the rod between two lettered flats, said two remaining sides of the rod having flats which provide clearance to receive residual flash without interfering with the sliding movement of the rod, the corners of the rod conforming to a round section which mates with the aforesaid round aperture in the sleeve.

2. A tension tester as defined in claim 1, in which the

4

lettered markings carried by the rod read "LOOSE," "NORMAL," and "TIGHT," or equivalent.

3. A tension tester as defined in claim 2, in which the means to hook the thread is a notch in the outer end of the rod, and in which the lettered markings are raised letters, and in which the words read from the notched end on one side of the rod, and read toward the notched end on the other side of the rod.

4. A tension tester as defined in claim 3, in which the sleeve as molded has ridges which inhibit rolling of the sleeve, and which facilitate handling the same when testing thread tension.

5. A tension tester as defined in claim 1, in which the lettered markings are raised letters, and in which the words read from the hook means of the rod on one side of the rod, and read toward the hook means of the rod on the other side of the rod.

6. A tension tester as defined in claim 1, in which the sleeve as molded has ridges which inhibit rolling of the sleeve, and which facilitate handling the same when testing thread tension.

7. A tension tester as defined in claim 1, in which the spring has a very low spring rate, and the sleeve and rod and spring are of the order of three inches long, and afford a correspondingly long travel of the rod.

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