Dec. 9, 1969 B. G. LESLEY 3,482,390

THREAD COVERING MACHINE

Filed April 29, 1968 2 Sheets-Sheet 1

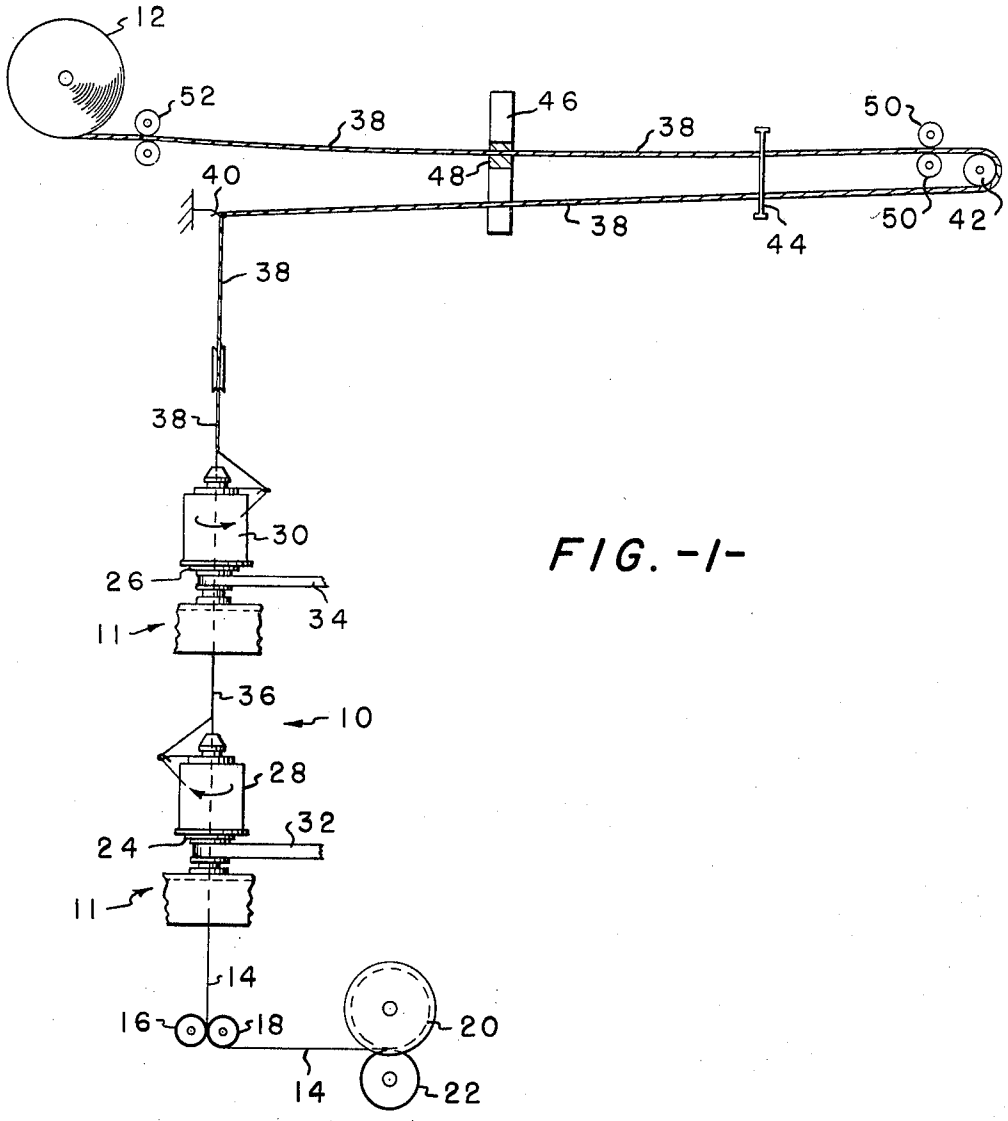

FIG. -1-

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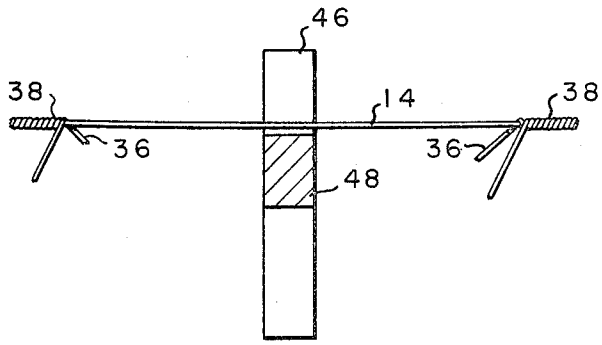

FIG. -2-

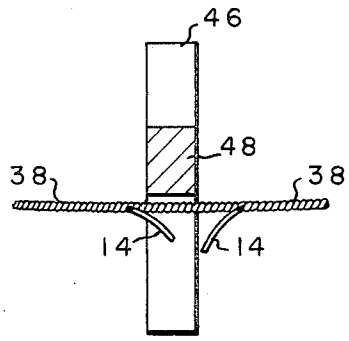

FIG. -3-

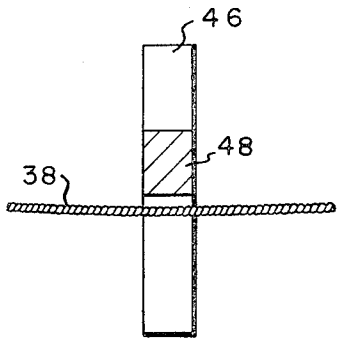

FIG. -4-

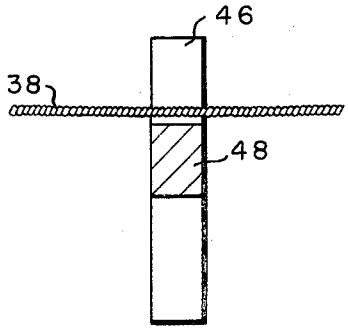

FIG. -5-

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THREAD COVERING MACHINE

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U.S. Cl. 57—163 1 Claim

ABSTRACT OF THE DISCLOSURE

This invention is directed to a method of detecting a change in tension in a covered yarn or thread by comparing the position of the yarn or thread to a standard.

Machines to produce covered yarns or threads are well known in the industry especially machines to produce covered elastic thread by winding one or more covering threads about a tensioned elastic thread. In production, the covered elastic thread produced is taken up on a take-up roll which is delivered to the machine producing the fabric. In a number of cases either the elastic core yarn will break or one of the covering yarns will break and will not be detected by the operator. The covered yarn with the broken thread will then be introduced into the fabric and will not be detected until the fabric is finished, resulting in a fabric which will be classified as seconds. Further, if Lycra or similar elastic yarn is used as a core yarn and one of the covering yarns break there is a decided loss of revenue because of the high cost of Lycra yarn relative to the overall production cost of the fabric.

It is therefore an object of the invention to provide a method of detecting a change in tension of a covered elastic yarn.

A second object of the invention is to provide a method of detecting a break in one or more yarns of a covered elastic yarn.

A still further object of the invention is to provide a method of comparing the tension of a covered elastic yarn against a standard to detect unusual variations in the tension of the covered yarn being produced.

Other objects and advantages of the invention will be clearly apparent as the specification proceeds to describe the invention with reference to the accompanying drawing in which:

FIGURE 1 is a schematic representation of one position of a thread covering machine;

FIGURE 2 shows the position of a covered yarn when one of the covering yarns breaks;

FIGURE 3 shows the position of a covered yarn when the core yarn breaks;

FIGURE 4 shows the position of the covered yarn when the overall tension is too low; and

FIGURE 5 shows the position of the covered yarn when the overall tension is too high.

Looking now to the drawing and especially FIGURE 1, one opposition **10** of a thread covering machine **11** is shown. It should be kept in mind that a multiplicity of positions **10** will supply covered yarn to a single take-up roll **12**. For the sake of illustration only one position has been shown, but in normal operation a plurality of identical positions will supply covered yarn to the take-up roll **12**.

In the preferred form of the invention the elastic core yarn **14** is Lycra but other elastic core yarns such as rubber, etc., can be used within the scope of the invention. The elastic core yarn **14** is supplied to the nip of rolls **16** and **18** from a package **20** in contact with surface drive roll **22**. Preferably the elastic core yarn **14** will be provided with a double wrap of yarn, which in the preferred

form of the invention is nylon. To provide this double wrap or cover for the elastic core there is provided two spindles **24** and **26** on which is mounted packages of nylon **28** and **30**, respectively. Each of the spindles has a tubular hollow center post for the passage of the core yarn centrally therethrough.

Spindles **28** and **30** are driven by conventional means, such as drive tapes **32** and **34**, in a direction opposite to each other as indicated by arrows so that as the elastic core yarn passes through the lower spindle **28** nylon is wrapped therearound in one direction. Then, the once wrapped thread **36** passes through the tubular center post of the spindle **30** and upon exit therefrom a second wrap or covering of nylon is wrapped therearound in a direction opposite to the first wrap providing an elastic yarn or thread **38** which has an elastic core with a double wrapping of yarn thereabout to provide good cover.

In prior art thread covering machines, such as that shown in U.S. Patent No. 2,276,797, the covered yarn or thread would be guided directly to the take-up roll **12** thereby leaving very little time for inspection of the yarn **38**. In my apparatus, to provide sufficient time for inspection of the covered yarn **38** from each of the positions **10**, the covered yarn **38** from the top spindle **30** is threaded through a pig tail guide **40** and guided in an elongated path across the length of the machine **11** to an idler roll **42** through a separator **44**. The separator **44** consists of an elongated member with a plurality of bars vertically mounted therein to form separate compartments for each covered yarn to maintain separation of each of the yarns.

Mounted on top of the thread covering machine is an upright post **46** which has an inspection area **48** marked thereon. From the idler roll **42** the covered yarn is delivered across the full length of the thread covering machine to the take-up roll **12** past the upright post **46**. In the preferred form of the invention two separated pairs of driven nip rolls **50** and **52** are used to control the tension of the covered yarn and deliver the yarn to the take-up roll **12** from the idler roll **42**. If desired only one set of driven nip rolls can be used but it is felt that two sets of rolls perform a more efficient operation. From the idler roll **42** to the take-up roll the covered yarns each pass through one compartment of the separator **44** to maintain separation between each covered yarn.

For each covered yarn there is a desired tension to be maintained. This tension is controlled by adjusting the speed of the nip rolls **50** and **52**. To ascertain whether proper tension is being maintained the speed of nip rolls **50** and **52** is correlated with the position of the upright post so that when the yarn **38** has the correct tension therein the position of the covered yarn **38** relative to the post **46** will be substantially in the center of the mark **48**. This position is considered the correct running position of the covered yarn.

As pointed out above the correct tension in the covered yarn **38** is indicated when the yarn is running substantially in the center of the mark **48** as indicated in FIGURE 1. Also, as previously discussed a plurality of yarn ends are running simultaneously and are being taken up on the same take-up **12** so that each of these yarns is substantially parallel between the nip rolls **50** and the take-up roll **12**.

The preferred disclosed system is a manual inspection by the operator. The operator will watch the upright post **46** to observe any change in position of the covered yarns relative to the mark **48**. If either or both of the covering yarns should break the tension of the elastic core yarn will pull the covered yarn up to the position indicated in FIGURE 2. The operator will observe this change and either stop the respective spindle position or mark the broken yarn on the take-up package. Similarly, if the elas-

tic core yarn should break the covered yarn **38** will drop below the mark **48**, as shown in FIGURE 3, since the elastic core yarn was under greater tension than the covering yarns. Again, this change will be noticed by the operator and the operator can take the necessary corrective measures.

FIGURES 4 and 5, respectively, indicate positions of the covered yarn when the tension therein is either too low or too high. When either of these conditions is noticed by the operator, the operator can adjust the speed of either or both sets of the nip rolls **50** and **52** to correct the tension in the covered yarn or yarns.

The preferred and simplest use of the device is in the form described above but it is obvious that the method disclosed could readily be automated by the use of automatic controls such as a photoelectric device to scan the covered yarns and initiate automatically corrective action when a change in the yarn position occurs. Such automatic controls and devices can readily be employed by a person versed in the art.

The herein disclosed method of detecting variations in the tension of covered yarns on a thread covering machine is simple, efficient and reliable in operation.

Although I have described in detail the preferred embodiment of my invention, it is contemplated that many changes may be made without departing from the scope or spirit of my invention.

That which is claimed is:

1. A method to produce covered elastic core yarns and to detect variations in the tension thereof comprising the steps of: supplying a plurality of elastic yarns, wrapping another yarn around each of said elastic yarns, directing the wrapped yarns over a first elongated path in one direction, reversing the path of said wrapped yarns, passing said wrapped yarns in said reversed path through the nips of two pairs of spaced rolls, maintaining said wrapped yarns spaced from one another between said pairs of rolls, adjusting the speed of said pairs of rolls to provide a predetermined tension in said wrapped yarns, comparing the position of said tensioned wrapped yarns to a standard to detect variations in the tension of any of said wrapped yarns and taking up said wrapped yarns after the inspection thereof.

References Cited

UNITED STATES PATENTS

1,748,119	2/1930	Firtion	57—18
2,566,848	9/1951	Morton	242—45
3,098,347	7/1963	Smith	57—163 XR
3,124,924	3/1964	Smith	57—163 XR
3,258,212	6/1966	La Tour	242—55
3,387,451	6/1968	Cape et al.	57—163
3,350,867	11/1967	Morrison et al.	57—163 XR
2,690,047	9/1954	Long	57—163

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