United States Patent

[11] **3,596,683**

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[33] **Japan**
[31] **43/68383 and 43/82388**

[54] WEFT YARN MEASURING AND DETAINING DEVICE FOR SHUTTLELESS LOOM

10 Claims, 5 Drawing Figs.

[52] U.S. Cl. ..... **139/122 R,** 139/127 P
[51] Int. Cl. **D03d 47/34**
[50] Field of Search 66/132; 139/122, 1, 127

[56] **References Cited**

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ABSTRACT: A device for continuously measuring and detaining unit lengths of weft yarn in a shuttleless loom. The device has two conveying belts set at an angle formed by the belt surfaces facing each other and diverging from the common tangential contact line in the drive end where the unit lengths are continuously measured and then detained in the angular space formed between the belt surfaces facing each other.

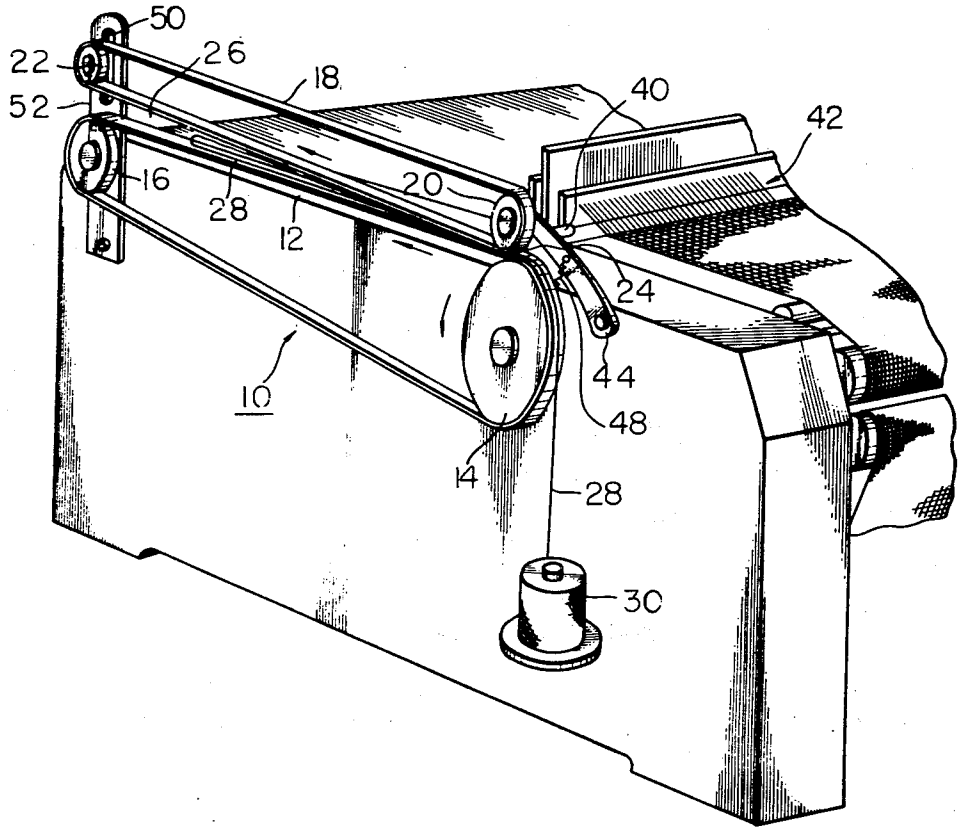

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Fig. 1

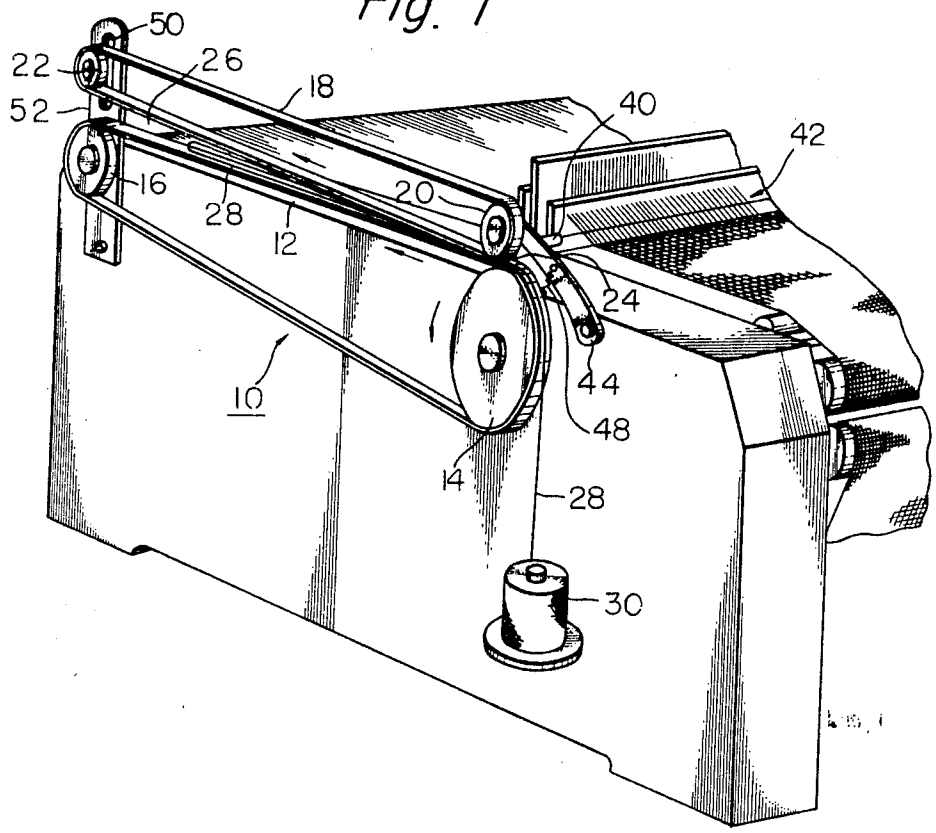

Fig. 2

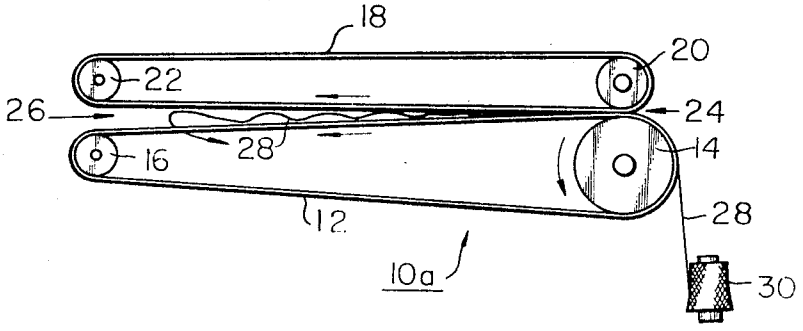

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Fig. 3

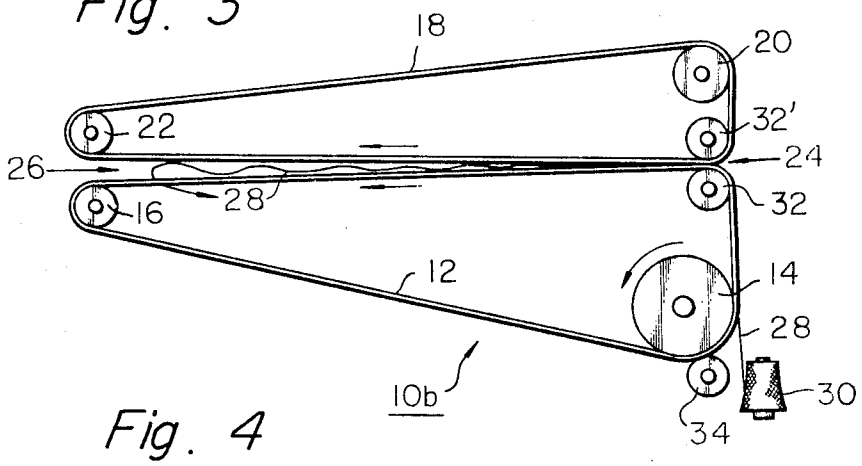


Fig. 4

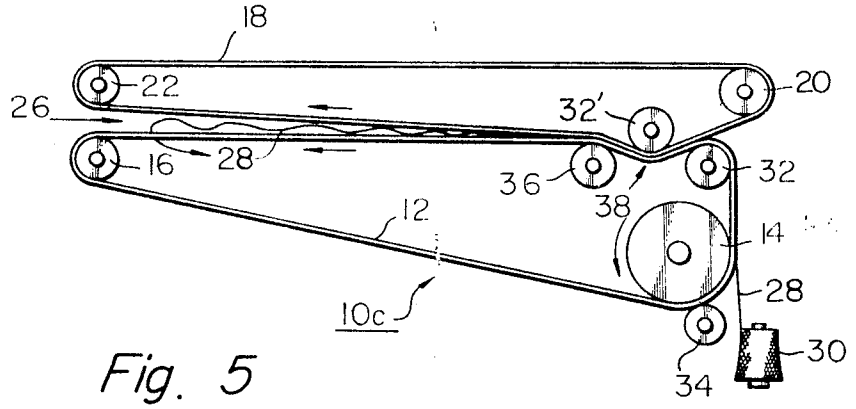
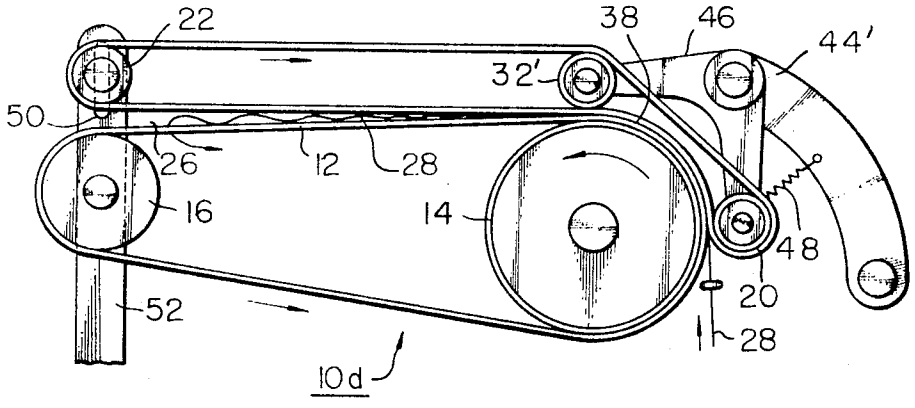


Fig. 5



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WEFT YARN MEASURING AND DETAINING DEVICE FOR SHUTTLELESS LOOM

This invention relates to a fluid jet shuttleless loom and more particularly to a device for continuously measuring unit lengths of weft yarn and then detaining the unit lengths in the angular space formed by two conveying belt surfaces facing each other.

In a conventional weft yarn measuring and detaining device the weft yarn is fed and measured from the supply package onto a moving conveyor belt from between the belt and a grip securing weft feed roller. The linear velocity of the belt is adjusted to conform with the intermittent projections by the fluid jet so that one unit length of weft yarn is measured and fed onto the conveyor belt. The measured yarn lays on the belt unprotected and, since wide belts cannot be used for practical reasons, even slight air movements often cause the yarn to fall off the rather narrow commonly used belt or to become entangled, resulting in interruptions of operation. Moreover, when the production rate is speeded up by increasing the number of measurements and projections per time unit, the presence of static electricity also increases with the higher yarn and weft feed roller speed. The static causes the weft yarn, especially fluffy spun yarn, to stick to the roller and wind around it resulting in irregular measurements of unit lengths.

The object of this invention is therefore to eliminate such drawbacks as dislocation and entanglement of weft yarn as well as fluffy yarn winding around the weft feed roller on a fluid jet shuttleless loom, as has heretofore been experienced.

The aforesaid object is accomplished by a device which is so constructed as to measure, detain, protect and guide unit lengths of weft yarn ensuring accurate length measurements and uninterrupted operations.

The features and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a fluid jet shuttleless loom with an improvement according to the present invention incorporated; and

FIGS. 2 through 5 are schematic views of different modifications of the improvement of FIG. 1.

Reference is first made to FIG. 1 which shows in perspective one preferred embodiment of the present invention as applied to a fluid jet shuttleless loom. The device indicated generally at **10** comprises a conveying detainer belt **12** driven by a drive roller **14**. The angular velocity of the belt **12** is adjustable to conform with the intermittent projections required by the production rate. The belt **12** is kept in position by an idler **16**. A protecting guide belt **18** is kept in such a position by a weft feed roller **20** and an idler **22** that a common tangential contact is established in the drive end for detainer belt to friction engage with the drive guide belt **18**. The surfaces of the belts **12** and **18** facing each other diverge from the common tangential contact line **24**, forming an angular space **26** in which a unit length of weft yarn **28** from supply package **30** is detained. Arrows (not identified by numerals) indicate the direction of movements of the drive wheel and the belts. The weft feed roller **20** may be, if preferred, mounted on a lever **44** urged by spring **48**. The angular space **26** between the two belts is adjustable by changing the position of the idler **22** as illustrated in FIGS. **1** and **5** showing idler **22** as mounted in the slot **50** of a support **52**. Indicated at **40** and **42** are a fluid jet nozzle and a shed of warp yarn array, respectively.

In FIG. **2** is shown the basic belt and roller arrangement **10***a* in accordance with the invention, the reference numerals being in correspondence with those in FIG. **1**.

If preferred, additional rollers **32** and **32'** may be provided downstream of the rollers **14** and **20**, respectively, to assist in holding the belts **12** and **18** in position, as illustrated in FIG. **3**. This modified form of the device **10***b* may be further provided with a pressure roller **34** to avoid slippage between the belt **12** and drive roller **14**. In addition to these additional rollers **32** and **32'**, there may be provided a further additional roller **36**, as in the device **10***c* shown in FIG. **4**. The additional rollers **32**, **32'** and **36** are mounted in a substantially triangular position in such a manner that the upper additional roller presses the belt **18** against the belt **12**, establishing a common contact area **38**. It will be appreciated that such arrangement of the rollers **32**, **32'** and **36** is advantageous not only to keep the belt **18** taut but to correctly guide the yarn with the increased contact area **38**.

A further modified form of the device according to the invention as shown by **10***d* in FIG. **5** includes a lever **44'** holding in position a bracket **46** onto which rollers **20** and **32'** are mounted to press the protecting guide belt **18** against the conveying detainer belt **12** for more positive frictional effect in the common contact area **38** through the action of a spring **48**.

From the foregoing it will be appreciated that, in contrast to prior art practice wherein weft yarn is measured and detained on an unprotected conveying belt subject to effects of even slight atmospheric environmental disturbances and jams caused by static the present invention provides a device for measuring continuously and detaining weft yarn under protection in the angular space formed by belts **12** and **18** thus substantially improving a fluid jet shuttleless loom.

I claim:

1. In a shuttleless loom of fluid jet type, a device for continuously measuring and detaining the weft yarn to be intermittently projected into the shed of the warp yarn array comprising a conveying detainer belt driven at an adjustable speed and a protecting guide belt positioned in a face-to-face angular relationship with said detainer belt and having its drive end portion in tangential friction driving contact with said detainer belt for drawing and measuring a unit length of weft yarn per time unit from a yarn supply package, the facing surfaces of said detainer belt and said guide belt diverging from said drive end portion to form an angular space therebetween whereby the weft yarn fed from between the two belts through said drive end portion is conveyed and detained on said detainer belt guided and protected by said protecting guide belt.

2. A device according to claim **1**, wherein said conveying detainer belt is held in position by a drive roller and a weft feed roller and said protecting guide belt being held by a pair of spaced apart idlers in tangential friction driving contact with said conveying detainer belt in said drive end.

3. A device according to claim **2**, wherein said conveying detainer belt is further held in position by at least one additional roller.

4. A device according to claim **2**, wherein said protecting guide belt is further held in position by at least one additional roller.

5. A device according to claim **2**, wherein said conveying detainer belt is held in position at said drive end portion by two additional rollers for increasing said friction driving contact to cover a substantial area between said conveying detainer belt and said protecting guide belt.

6. A device according to claim **2**, wherein said conveying detainer belt is held in position at said drive end portion by two additional rollers and said protecting guide belt is held in position by one additional roller pressing said protecting guide belt against said conveying detainer belt between said auxiliary idlers of said conveying detainer belt over a substantial area.

7. A device according to claim **2**, wherein at least one pressure roller is provided to avoid slippage between said belts.

8. A device according to claim **2**, wherein at least one additional roller is provided to maintain said protecting guide belt taut.

9. A device according to claim **8**, wherein said roller is mounted on a spring urged lever whereby pressure applied to said protecting guide belt is adjusted.

10. A device according to claim **1**, wherein said angular space is adjustable.