Sept. 10, 1935. E. M. MÜLLER 2,014,114

FABRIC DRAW-OFF MEANS FOR STRAIGHT KNITTING MACHINES

Filed April 11, 1933 2 Sheets-Sheet 1

FIG. 1.

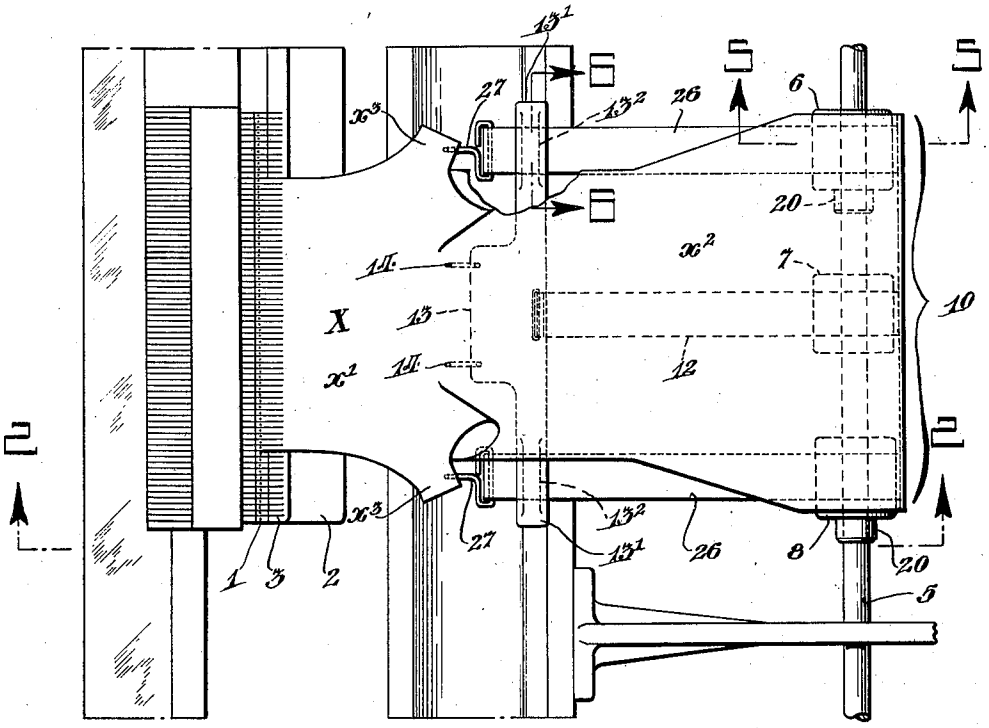


FIG. 2.

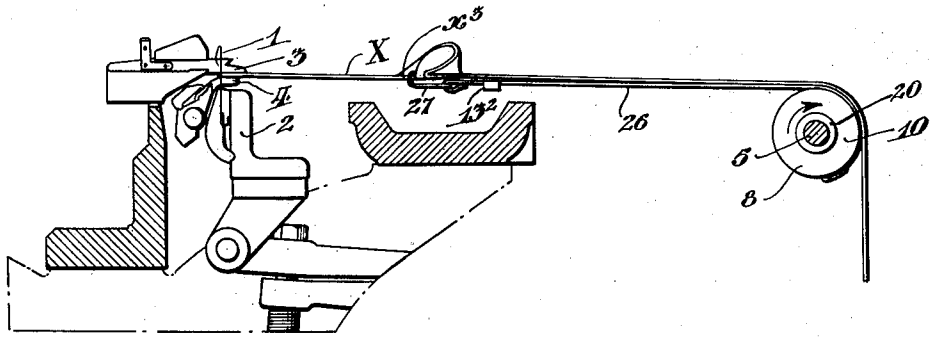
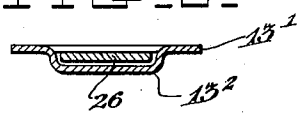


FIG. 6.



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FIG. 3.

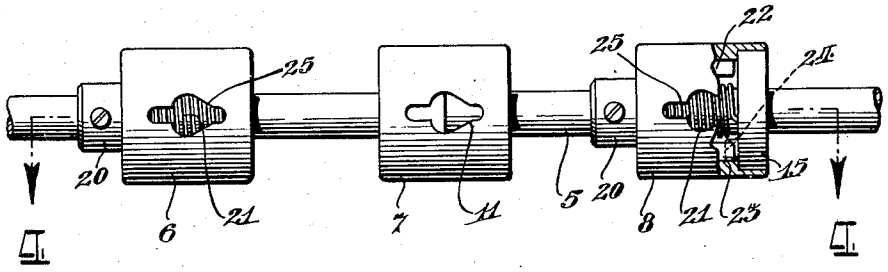


FIG. 4.

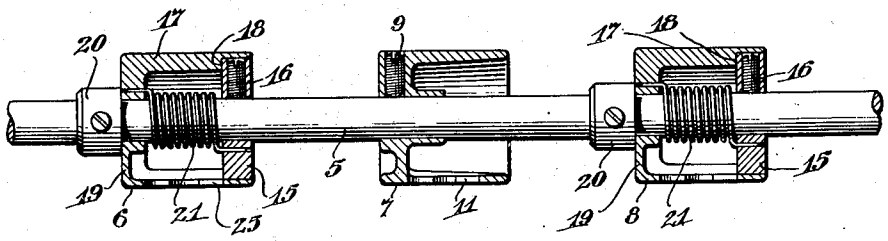
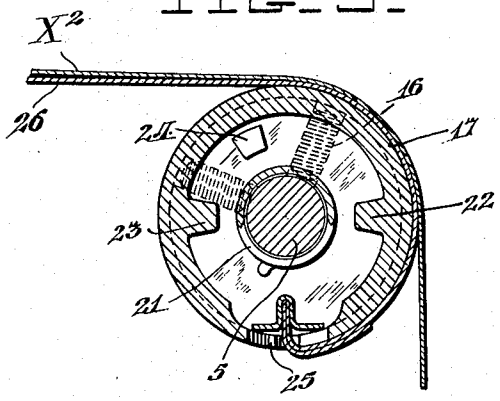


FIG. 5.



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UNITED STATES PATENT OFFICE

2,014,114

FABRIC DRAW-OFF MEANS FOR STRAIGHT KNITTING MACHINES

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Application April 11, 1933, Serial No. 665,479

25 Claims. (Cl. 66—149)

This invention relates to the "draw-off" or "take-up" motions of flat full fashioned hosiery knitting machines of conventional types, wherein the machine comprises a plurality of separate knitting heads or sections each including a separate bank of needles and an individual take-up roll or reel for drawing the finished fabric away from the needles of the section, as the fabric is produced course by course by the needles.

The take-up motion of the machine, through the individual take-up reels of the several sections places the fabrics respectively produced by the several banks of needles under tension, between the needles and the reels, or between the needles and draw bars which are respectively connected to the fabrics and the reels through suitable straps.

Each take-up reel is substantially as long as the width of the full complement of needles in the section, and is formed in one piece throughout its length, for the purpose of winding the strap and the full width of fabric on the reel, in some instances, and for merely supporting the full width of the fabric and winding the strap without winding the fabric on the reel in other instances.

All the reels in the machine are mounted on a common take-up shaft which extends the full width of the machine and which tends to rotate the entire number of reels simultaneously in a direction to draw the fabrics away from the needles of all the sections simultaneously.

The rotary tendency of the take-up shaft is produced by means of weight and pulley tackle, hence the rate of take-up of the fabrics by the reels depends upon the knitting of the successive courses of stitches in the several sections of the machine, consequently, the fabrics of the several sections are theoretically maintained under substantially uniform tension at all times.

The amount of tension applied to the fabrics is varied at predetermined times by adding additional weights to the take-up tackle or by removing weights from the tackle as the fabrics being produced by the several sections of the machine are widened or narrowed, as the case may be.

In order to maintain substantially uniform tension on all the fabrics in the various sections of the machine by a single take-up tackle, or by corresponding tackles at opposite ends of the take-up shaft, two outstanding methods have been employed.

In one instance the take-up reels are all rigidly secured to the take-up shaft and resilient straps are provided for connecting the several reels to the draw bars which are respectively atttached to the fabrics of the several sections, consequently, any variations in the knitting of the fabrics in any of the sections relative to the knitting of the fabrics in the remaining sections will be compensated for by the elastic straps of the several sections, whereby the tension on all the pieces of fabric being simultaneously produced on the machine by the various sections thereof will be substantially constant and uniform.

In other instances, the reels are each loosely mounted on the take-up shaft for independent partial rotation relative thereto, and suitable spring units are provided to form a resilient driving connection between the shaft and each reel, in which case nonelastic straps are used between the reels and the draw bars, and any variation occurring in the knitting of the fabrics in the various sections will be compensated for by the resilient driving units of the several take-up rolls respectively.

In no instance, however, has any satisfactory provision been made for maintaining equal uniform tension on all parts of each piece of fabric in and being produced by each of the individual knitting sections, across the full complement of needles of the section employed in producing the piece of fabric thereon. The piece of fabric being produced by each individual section is subject to variations in the knitting at various points across the bank of needles of the section. For example, one portion of the fabric may knit tighter than adjacent portions, thus, with the prevailing methods of applying and maintaining tension on the fabric such tension is applied only to the tighter knit portions of the fabric while the adjacent looser knit portions are practically devoid of tension, as a result of which the newly formed stitches of successively formed courses within the looser areas of the fabric are not drawn away from the needles properly, consequently, the thread or stitches formed by the thread tend to bunch at the needles in these looser knit areas of the fabric.

The object of the present invention is to provide means in each of the individual sections of the machine which will maintain practically equal tension on all parts of each individual piece of fabric, across the entire width of the full complement of needles employed in producing the piece of fabric, whereby bunching of the thread or stitches at any and all parts of the fabric across the bank of needles is effectively prevented.

The present invention contemplates the making of the take-up reel of each section of the machine in the form of a unit comprising a plurality of independent sections; and the provision of resilient means coupled in tandem with each reel section and with one of a plurality of laterally spaced portions of the piece of fabric being knit by the needles of the machine section with which the reel unit is associated, for operatively connecting the take-up shaft differentially to the several fabrics and to the said laterally spaced portions of each piece of fabric, whereby the tension applied to each piece of fabric will be equally distributed between the relatively looser and tighter portions of the fabric during the knitting thereof.

More specifically, the invention contemplates the provision of a resilient element operatively connecting each section of the reel unit to the take-up shaft independently of the other reel sections to allow for relative rotary movement between the sections of the reel unit in each knitting head and with respect to the take-up shaft; and the provision of a separate non-elastic strap for each of the sections of the reel unit for connecting the above noted laterally spaced portions of the fabric independently to the reel.

It is within the scope of the invention to provide the continuous full width reel of the prior art, which is rigidly secured to the take-up shaft, with a plurality of elastic take-up straps respectively and independently connected to relatively laterally spaced portions of the fabric.

A further modification within the scope of the invention resides in the provision of the multi-sectional reel in each knitting head of the machine, with, for example, a centrally disposed section of the reel rigidly secured to the take-up shaft and an elastic take-up strap provided to connect the central rigidly mounted section of the reel with the central portion of the fabric, and at either side of and in laterally spaced relation to the central rigidly mounted section of the reel to provide resiliently mounted sections of the reel, which latter will be connected to laterally spaced side portions of the fabric by non-elastic take-up straps, respectively. Obviously, this order may be reversed by providing laterally spaced rigidly mounted reel sections respectively connected to the side edges of the fabric by elastic straps with an intermediate section of the reel resiliently coupled to the take-up shaft and connected to the central portion of the fabric by a nonelastic take-up strap.

Regardless of the particular order of the elastic or inelastic straps connected to rigid or resiliently mounted reel sections respectively, or vice versa, each strap may ordinarily have to be manually engaged individually with its respective fabric portion. This would result in some inconvenience to the operator, as well as loss of time, in properly relocating each strap upon the fabric after disengagement therefrom; because the straps would be likely to assume various inactive positions beneath the reel when not engaged upon the fabric.

As a still further object, therefore, the invention aims to facilitate the engagement of the straps with the fabric to thereby increase the speed of production by enabling the straps, with their engaging hooks or other fastening devices, to be simultaneously presented and automatically positioned in spaced relation at their proper locations beneath the fabric. At the same time the invention has for an object to retain the draw bars, with cooperating elastic and inelastic straps, in safe and convenient position for a following reengagement with the fabric after having been disengaged therefrom. To this end the draw bar may be constructed so that it extends across the knitting field of a section of the machine and, while connected to one strap or set of straps, elastic or inelastic, includes means for retaining and guiding another strap or set of straps. Desirably the draw bar is constructed with coextensive outspread portions, is connected to a single strap, and includes a plurality of hooks or other fastenings to engage the stocking blank or other fabric at substantially the central part of the latter, while the opposite outer or wing portions of the bar include guideways to afford free movement for the other straps while retaining them in properly spaced relation at all times.

With these and other objects in view, which will become apparent form the following detailed description of the illustrative embodiments of the invention shown in the accompanying drawings, my invention resides in the novel elements of construction, mechanisms and combination of parts in cooperative relationship as hereinafter more particularly pointed out in the claims.

In the accompanying drawings:

Fig. 1 is a plan view of sufficient of one of the sections or knitting heads of a flat full fashioned hosiery knitting machine to illustrate the principles of the present invention as applied thereto;

Fig. 2 is a sectional elevation taken on the line 2—2, Fig. 1;

Fig. 3 is a detail view of one of the sectional take-up reel units for one of the knitting heads of the machine;

Fig. 4 is a longitudinal sectional view taken on the line 4—4, of Fig. 3;

Fig. 5 is a transverse sectional elevation taken on the line 5—5, Fig. 1; and

Fig. 6 is a cross-sectional view taken on the line 6—6, Fig. 1.

Figs. 1 and 2 illustrate the bank of needles 1 of a single knitting head of a multi-section knitting machine of the type above noted. The needles 1 are secured to the usual needle bar 2 and are operated in the usual manner in conjunction with the sinkers and dividers 3 and knocking over bits 4, to produce course after course of stitches of which the fabric X is composed.

The usual take-up shaft, illustrated at 5, which is common to all knitting heads or sections in machines of the type noted, tends to rotate in the direction of the arrow, Fig. 2, under the influence of a pulley or drum (not shown) which is secured to the shaft 5 and about which a flexible element is wound and secured thereto at one end, while suitable removable weights are suspended from the opposite end of the flexible element which tend to unwind the flexible element from the drum and in so doing rotate the shaft in the direction indicated.

Mounted on the shaft 5 is a plurality of reel sections 6, 7 and 8 respectively which form and are included in a single take-up reel unit 10 having an overall length substantially equal to width of the bank of needles 1, whereby the maximum width of the fabric produced by the needles 1 may be wound on or supported by the reel unit 10.

The central section 7 of the reel unit 10, as shown in Figs. 1, 3 and 4, is shown as being rigidly

connected to the shaft 5, by means of a set screw 9, and is provided with a slot 11 adapted to receive and anchor one end of an elastic take-up strap 12, the opposite end of which is provided with a draw bar 13 which extends transversely across the knitting field and carries a plurality of fabric hooks 14, 14, arranged to be hooked into the central portion of the fabric X.

The outer sections 6 and 8 respectively of the reel unit 10 each comprises a collar 15 which is rigidly secured to the shaft 5 by a set screw 16. Each of the sections 6 and 8 also comprises a hollow cylindrical body portion 17 which is counterbored at 18 to rotatably receive the collar 15 which forms one end closure for the hollow body 17, the opposite end of which is closed by a head 19 formed integral with the body 17 and bored to receive and rotate about the shaft 5. A collar 20 is rigidly secured to the shaft 5 adjacent the head 19 to prevent lateral movement of the cylindrical body 17 relative to the collar 15 and longitudinally of the shaft 5.

Encircling the shaft 5 between the fixed head or collar 15 and the relatively rotatable head 19 is a spring 21, one end of which is secured in the fixed head 15 while the opposite end is secured in the relatively rotatable head 19, said spring tending to rotate the body portion 17 about and relative to the shaft 5, in the direction of the arrow in Fig. 2.

Rotation of the body 17 relative to the shaft 5 is limited by engagement of a pair of oppositely disposed lugs or ribs 22 and 23 respectively, which are formed on the body portion 17, and a lug 24 which is formed on the head 15 and projects into the interior of the hollow body 17 between said lugs 22 and 23.

Each of the sections 6 and 8 of the reel unit 10 is slotted at 25 to receive and anchor one end of a nonelastic take-up strap 26 thereto, the opposite end of each strap 26 being provided with a short draw bar or, as illustrated in Fig. 1, with a single hook 27 adapted to be connected to the fabric adjacent the opposite edges thereof and in laterally spaced relation to the hooks 14, 14 carried by the bar 13 of the elastic strap 12.

The draw bar 13 may be of any desired length, so as to accommodate any desired number of hooks 14. As shown in Figs. 1 and 6, however, the bar 13 extends across the field of the knitting section, and includes opposite coextensive outspread wing portions 13^1, each of which is suitably formed to provide a slotted guide portion 13^2 through which the take-up straps 26 are permitted to freely move, while being retained in lateral spaced relationship against separation from the draw-bar by engagement of the hook portions 27 with the outer ends of the slotted guide portions 13^2. If desired the straps 26 may be fastened to the draw bar and guide means may be provided for the strap 12. In either case the fabric engaging hooks will be retained in properly spaced order on the draw bar so that they may be simultaneously presented to the fabric for reengagement after having been disengaged from a preceding fabric.

With the combination shown in Fig. 1, assuming that each of the independent knitting heads or sections of the machine are similarly equipped with an individual take-up unit 10 of the type and arrangement shown in Figs. 3, 4 and 5, the constant tendency of the shaft 5 to rotate in the direction of the arrow, Fig. 2, will be transmitted directly to the central units or sections 7 of each of the take-up reel units 10 throughout the full width of the machine. Such rotation of the central units 7 applies tension to each of the straps 12 and as each strap 12 is connected to the central portion of the fabric X in each of the sections of the machine all of the fabric units X, X theoretically would be placed under the same tension, provided that the straps 12 were of a nonelastic nature, but under such circumstances any variation in the knitting of any one of the sections of the machine which would tend to shorten the fabric of that section with respect to the fabrics being produced by the adjacent sections, would cause the relatively shorter section to receive practically the full force of the tension applied by the shaft 5, while the adjacent sections would be practically loose and without tension, but, by the provision of the elastic straps 12 in all the sections any variations in the fabrics X, X will be compensated for by the elasticity of the straps 12 throughout the full width of the machine.

By the provision of a plurality of elastic straps in each section of the machine and by independently connecting the several straps in each section to relatively laterally spaced portions of the fabric X, in the particular section, and by rigidly securing the sections 6 and 8 of the reel unit 10 to the shaft 5 in the same manner as the central section 7 of the unit, any variations occurring in the knitting of any parts of the particular fabric X will be compensated for by relative stretching between the elastic straps, thus, the fabric X in each instance will be maintained under constant substantially equal and uniform tension throughout its width, at all the needles of the bank 1 employed in knitting that particular piece of fabric X.

With the construction and arrangement shown in Figs. 1, 3 and 4, wherein the straps 26, 26 are of a nonelastic nature and connect the resiliently mounted reel sections 6 and 8 respectively with the laterally spaced portions of the fabric, variations in the knitting of the fabric are directly transmitted by the nonelastic straps 26, 26 to the resiliently coupled body portions 17, 17 of the reel sections 6 and 8 respectively, and the springs 21 will compensate for the variations by permitting relative rotation between the body portion 17 and the shaft 5, at the same time maintaining the outer portions of the fabric under substantially equal tension with that applied to the central portion of the fabric by the elastic strap 12 which connects the rigidly mounted section 7 of the unit 10 to the snaft 5.

If desired, the central section 7 of the reel unit 10 may be of the same character, and mounted in the same manner as the outer sections 6 and 8, in which case the elastic strap 12 would be supplanted by a nonelastic strap 26, in which case the springs 21 of all three sections 6, 7 and 8 would compensate for any variations occurring in the knitting across the width of the piece of fabric X.

As shown in Fig. 1, piece of fabric X is in the form of a full fashioned stocking blank having a foot portion x^1 knit on to the leg portion x^2 and to the heel tabs x^3, x^3, in the usual manner. The hooks 27, 27 are shown as being connected to the heel tabs x^3, x^3 while the hooks 14 are shown as being connected to the intermediate instep portion of the foot structure x^1.

It is generally known in the art that when all the hooks are secured to one draw bar which is connected by a single strap to a single reel on the take-up shaft, that a certain amount of loose-

ness invariably develops in the fabric of the foot being knit onto the inner wale edges of the heel tabs and the intermediate instep portion of the foot structure because of the outermost hooks pulling coursewise of the heel tab fabric while the intermediate hooks pull walewise on the instep fabric and such different pullings are responsible for variations occurring in the knitting of the foot portion x^1. In connecting the heel tabs independently of the instep to relatively movable tension elements the dierential pull is completely taken care of and equal tension is applied to all parts of the fabric across the full complement of operating needles.

Of course, the improvement specifically shown and described, by which I obtain the above results, can be changed and modified in various ways without departing from the scope of the invention herein disclosed and hereinafter claimed.

I claim:

1. Draw-off mechanism for a single piece of fabric comprising a rotatable take-up device having a plurality of relatively movable pulling elements, a plurality of fabric engaging elements, and independent means connecting said engaging elements to said pulling elements.

2. Draw-off mechanism for a single piece of fabric comprising a plurality of fabric connection elements, a rotatable take-up device having a plurality of reel elements rotatable relative to each other, and means independently connecting said fabric connection elements to said reel elements.

3. A take-up motion device, for drawing fabric from a bank of needles in a knitting machine, comprising a take-off reel member extending parallel to the bank, and a plurality of means for independent resilient connection between laterally-spaced positions on the fabric and laterally-spaced positions on said reel member.

4. A take-up motion device, for drawing fabric from a bank of needles in a knitting machine, comprising a plurality of resilient means for independent connection to laterally spaced portions of the fabric, and means common to said independent means for applying tension thereto including portions relatively movable for differentially affecting the tension on the fabric as the knitting of the fabric progresses.

5. A take-up motion device for drawing fabric from a bank of needles in a knitting machine, comprising a composite take-up reel unit including a plurality of component longitudinal sections for independent connection to laterally-spaced portions of the fabric, and means operatively and resiliently interconnecting said longitudinal component sections providing for relative rotative movement therebetween about the axis of the reel.

6. A take-up motion device for drawing fabric from a bank of needles in a knitting machine, comprising a composite take-up reel unit including a plurality of component longitudinal sections for independent connection to laterally-spaced portions of the fabric, a common supporting means for said sections, and means operatively and resiliently connecting said longitudinal component sections to said common supporting means providing for relative rotative movement between the sections about the axis of the reel on said common supporting means.

7. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent connection to laterally spaced portions of the piece of fabric, and means resiliently interconnecting said sections one to another through said shaft to permit relative rotation between the sections.

8. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a take-up reel unit including a shaft, a plurality of sections relatively movable on the shaft for independent connection to laterally spaced portions of the piece of fabric, and resilient means providing a differential pull on said fabric under equal tension at said relatively spaced portions thereof through said sections upon rotation of the shaft.

9. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent connection to laterally spaced portions of the piece of fabric, means for rigidly securing one of said sections to said shaft, means for resiliently connecting another of said sections to said shaft, resilient means for connecting the rigidly mounted section to its elected portion of the fabric, and non-resilient means for connecting the said resiliently mounted section to its elected portion of the fabric.

10. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent rotation about the shaft axis relative to each other, said sections also being for independent connection to laterally spaced portions of the piece of fabric, and resilient means operatively connecting one of said sections to said shaft.

11. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent connection to laterally spaced portions of the piece of fabric, at least one of said sections comprising a collar portion rigidly secured to said shaft, a body portion rotatably mounted on said shaft, and a spring connection between said collar portion and said body portion.

12. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent connection to laterally spaced portions of the piece of fabric, at least one of said sections comprising a collar portion rigidly secured to said shaft, a body portion rotatably mounted on said shaft, a spring connection between said collar portion and said body portion, and means on said one portion of a section cooperating with the other of said portions of a section to limit the relative rotation between said portions about said shaft.

13. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, and a plurality of take-up reel units, one of which is fixed to the shaft and one of which comprises a collar fixed to said shaft, a hollow body portion having a head at one end rotatably mounted on said shaft and a recess at the opposite end for rotatably receiving said collar which latter constitutes the second head for said body por-

tion, and a spring encircling said shaft within said hollow body portion and having its opposite ends rigidly secured to said fixed and relatively rotatable heads, respectively.

14. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a collar fixed to said shaft, a hollow body portion having a head at one end rotatably mounted on said shaft and a recess at the opposite end for rotatably receiving said collar which latter constitutes the second head for said body portion, a spring encircling said shaft within said hollow body portion and having its opposite ends rigidly secured to said fixed and relatively rotatable heads respectively, and a second collar rigidly secured to the shaft adjacent to the rotatably mounted head of the body portion for preventing axial movement of the body portion relative to the shaft and the first said collar.

15. A take-up motion for drawing a single piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a collar fixed to said shaft, a hollow body portion having a head at one end rotatably mounted on said shaft and a recess at the opposite end for rotatably receiving said collar which latter constitutes the second head for said body portion, a spring encircling said shaft within said hollow body portion and having its opposite ends rigidly secured to said fixed and relatively rotatable heads respectively, a second collar rigidly secured to the shaft adjacent to the rotatably mounted head of the body portion for preventing axial movement of the body portion relative to the shaft and the first said collar, a lug on the first said collar, and a pair of ribs on said body portion and cooperating with the said lug to limit rotation of the body portion relative to the shaft.

16. A take-up motion for multi-section flat knitting machines having a bank of needles in each section for knitting a separate piece of fabric, a take-up shaft common to all said machine sections for simultaneously drawing said fabric pieces away from the respective banks of needles, and means for differentially connecting said pieces of fabric and laterally spaced portions of each piece of fabric to said shaft comprising a take-up reel unit for each piece of fabric including a plurality of longitudinal reel sections and resilient elements respectively for coupling in tandem and forming independent resilient connections between said shaft and the said laterally spaced portions of the said pieces of fabric respectively.

17. In a straight knitting machine including a bank of needles for producing a knitted fabric, take-off means for drawing a piece of fabric away from said needles, said take-off means including a shaft and means for equalizing the tension of said take-off means in different parts of the fabric, said equalizing means including a plurality of differently tensioned flexible members connected to said shaft, a draw bar secured to at least one of said flexible members, said draw bar having at different positions along its length guiding means for at least another of said flexible members and fabric engaging means, said last mentioned flexible member extending through said guiding means and including fabric engaging means at its free end.

18. In a straight knitting machine including a bank of needles for producing a knitted fabric, take-off means for drawing a piece of fabric away from said needles, said take-off means including a shaft and means for equalizing the tension of said take-off means in different parts of the fabric, said equalizing means including a plurality of differently tensioned flexible members connected to said shaft, a draw bar secured to one of said flexible members, said draw bar having at opposite ends guiding means for other flexible members and intermediate thereof, fabric engaging means, said last mentioned flexible members extending through said guiding means and including fabric engaging means at their free ends.

19. In a straight knitting machine including a bank of needles for producing a knitted fabric, take-off means for drawing a piece of fabric away from said needles, and means for equalizing the tension of said take-off means in different parts of the fabric, said equalizing means including a plurality of flexible members at least one of which is a resiliently mounted inelastic member and at least another of which is a rigidly mounted elastic member, a draw bar secured to one of said flexible members, said draw bar having guiding means at opposite ends and fabric engaging means at its centeral portion, certain of said flexible members extending through said guiding means and including fabric engaging means at their free ends.

20. A take-up device for drawing a piece of fabric away from a bank of needles in a flat knitting machine, comprising a shaft, a take-up reel unit comprising a plurality of sections mounted on said shaft for independent attachment to laterally spaced portions of the piece of fabric, means for rigidly securing one of said sections to said shaft, means for resiliently coupling another of said sections to said shaft, resilient means for connecting the rigidly mounted section to its elected portion of the fabric, and non-resilient means for connecting the resiliently mounted section to its elected portion of the fabric, one of said connecting means including a strap and a tension draw bar including fastening means to engage a certain part of the fabric and having opposite wing portions, each wing portion including guiding means and the other of said connecting means including straps extending through said guiding means and fastening means to engage a different part of the fabric.

21. In combination, in a straight knitting machine, a fabric draw bar, and a take-up device including a reel having a support and relatively rotative portions thereon, one of which is resiliently biased relative to said support, and means connected between positions spaced along the draw bar and said relatively rotative portions, respectively.

22. A knitting machine fabric draw-off device comprising a take-up reel, a draw-off bar having securing means and guiding means thereon, a band connected between the reel and said draw-off bar, and a band extending from the reel through said guiding means for connecting the reel to the fabric.

23. A take-up motion device, for drawing fabric from a bank of needles in a knitting machine, comprising a take-off reel member extending parallel to the bank, a member mounted to rotate with said reel member and to turn relative thereto, a spring for opposing said relative turning, an elastic flexible element connected between the fabric and a rigid portion of said reel member and an inelastic flexible element connected

between the fabric and said turnable member at a position laterally spaced from said elastic flexible element.

24. A take-up motion device, for drawing fabric from a bank of needles in a knitting machine, comprising a take-off reel member extending parallel to the bank, a pair of members disposed one adjacent to each end of said take-off reel member mounted to rotate therewith and to turn relative thereto, springs for opposing said relative turning of said pair of members, an elastic flexible element between the members of said pair connected between the fabric and a rigid portion of said reel member, and inelastic flexible elements connected between the fabric and said turnable member at positions laterally spaced from said elastic flexible element.

25. In a take-up mechanism for a knitting machine, the combination of a plurality of relatively movable pulling elements arranged to grip at laterally spaced points respectively a piece of fabric being knit by the needles of said machine, and means connected to said pulling elements to permit relative shifting therebetween while retaining said grip for applying substantially equal tension to and across the width of the fabric as the knitting progresses.

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