

Jan. 27, 1942.

L. LANG

2,270,881

WATERROLLER STRAP DEVICE

Filed Aug. 10, 1940

Fig. 1.

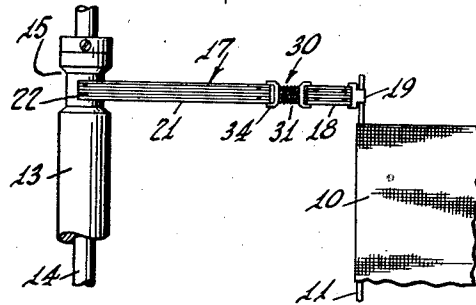


Fig. 2.

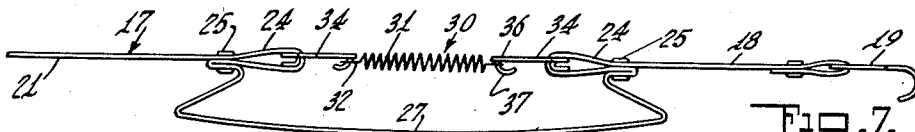
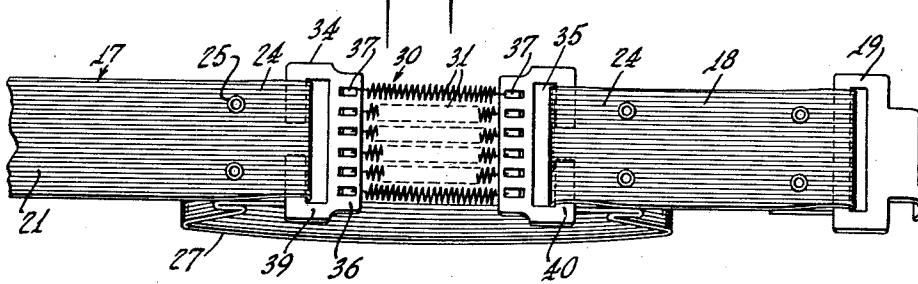


Fig. 4.

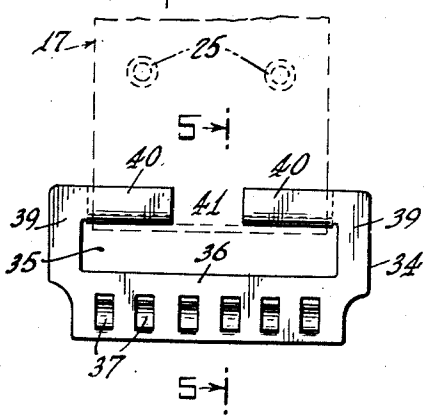


Fig. 5.

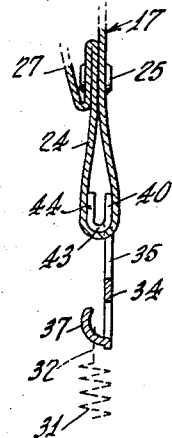


Fig. 6.

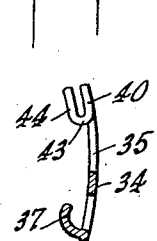


Fig. 7.

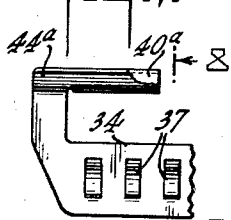
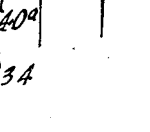


Fig. 8.



INVENTOR :

Lena Lang

BY

Morrison, Kennedy + Campbell
(ATTORNEYS.)

UNITED STATES PATENT OFFICE

2,270,881

WAREROLLER STRAP DEVICE

Lena Lang, New York, N. Y., assignor to Alfred Hofmann, Inc., West New York, N. J., a corporation of New Jersey

Application August 10, 1940, Serial No. 352,140

7 Claims. (Cl. 66—149)

This invention is a novel wareroller strap device, relating to the known class of device or fabric takeup assemblage employed in flat knitting machines, such as full fashioned hosiery machines. The invention is applicable for various uses, for example in a legger machine to draw off preliminarily the fabric by its doubled welt on to the wareroller or takeup cylinder, in which case there may be a pair of the devices arranged between the roller and the fabric, or rather to the opposite ends of a rod inserted through the stocking welt, so that the necessary tension may be applied to the advancing fabric through the operation of the roller and strap device until the fabric reaches and commences to be wound directly upon the roller. The device of this invention may also be used in footer machines, in which case there may be a single strap device extended from the wareroller for direct coupling to the fabric being knitted.

A typical instance of this class of device, and the nearest known prior art, is that shown in Patent No. 1,545,953, issued July 14, 1925, to E. A. Feustel, assignor to Alfred Hofmann, Inc. That patent shows a tension member or unit having an assemblage composed of rigid end pieces yieldably interconnected by tension springs, combined with an inelastic longitudinal strap member having attachers or hooks at its ends for coupling respectively to the wareroller and (directly or indirectly) to the fabric, and having also two intermediate closed strap loops, each of which before being closed was first passed through the slot of the tension member end piece, during original assembling, and then stitched or equivalently closed to produce a permanent loop engaged permanently with the slotted end piece or eyelet; the fabric between said loops constituting a loose depending section which is adapted to limit the extent of stretch and thereby protect the springs from over-extension.

Such prior construction was open to certain objections and defects. The strap member was apt to become worn or otherwise damaged by continued use. Also in time the tension member with its eyelets and springs was subject to impairment by wear or breakage. In either case the entire device or assemblage had to be discarded and replaced by a new one, or else reconstructed by reopening the strap loops, replacing defective elements and reassembling. Either of these operations, in a modern knitting machine, was often a matter of substantial delay and expense in view of the fact that as many as 56 of the strap de-

vices might be employed on one machine, and the occurrence of defects was not infrequent.

The principal object of the present invention then is to afford an improved wareroller strap device, free from the objections noted, and so reconstructed and arranged that the strap member or portion of the device and the tension member of the device may readily be disconnected and disassembled from each other, and reconnected at will, all without reconstruction, thereby facilitating the independent replacement of one or the other which may have become impaired in use. In the case of impairment of the metallic tension member or the spring elements thereof it is even possible with this invention to restore the proper conditions by a quick replacement of the tension member or unit, while the device as a whole remains on the machine, thus dispensing with the need of removing the entire device, strap and all, for the purpose of restoring proper conditions.

The device of the present invention has the advantage of simplicity, and low expense of construction and manufacture, as the preferred tension unit end pieces can be struck and shaped out of sheet metal in large quantities. Further objects and advantages of the present invention will be made clear in the hereinafter following description of an illustrative embodiment thereof.

To the attainment of such objects and advantages the present invention consists in the novel wareroller or takeup strap device for flat knitting machines, and the novel features of construction, arrangement and combination herein illustrated or described.

In the accompanying drawing Fig. 1 is a top plan view of a typical use of a wareroller strap device embodying the present invention, the ends of the strap portion being coupled or hooked respectively to a wareroller and to the fabric being knitted.

Fig. 2 on a much larger scale is a similar plan view, but at a slight slant or in perspective to show in detail the salient parts of the device.

Fig. 3 is a side elevation view of the device or assemblage of Figs 1 and 2.

Fig. 4 is a detached top view of one of the tension member end pieces shown on a further enlarged scale.

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 4, looking from the left.

Fig. 6 is a sectional view similar to Fig. 5 but showing only the end piece in a modified form.

Fig. 7 is a view similar to Fig. 4 of a further modification of the structure of the end piece,

and Fig. 8 is a sectional view thereof on the line 8-8 of Fig. 7.

In the drawing similar reference characters refer to corresponding parts.

In this embodiment illustrated in Figs. 1 to 5 the strap device is shown extended between the fabric 10 and a wareroller. The fabric is to be considered as in the process of being knitted in a flat knitting machine. It may for example be a stocking, and in the case of a legger it may have the usual welt, and there is shown a coupling rod 11 inserted through the welt for the purpose of coupling a strap device at each end of the rod and therefore at each side of the fabric.

The wareroller 13 may be of any conventional type, being shown of a usual type composed of wood, this roller being mounted upon a shaft 14 which may be yieldingly rotated for fabric take-up purposes. The strap device is intended for initial use, and the wareroller is shown formed with a circumferential recess or groove 15 at each end, in which the strap device may be coupled and which accommodates the winding up of the strap device until in due time the fabric itself reaches the roller.

As already explained the strap device comprises a strap member 17 assembled with a tension member 30, the entire assemblage to be applied and coupled up as shown in Fig. 1 between the fabric and the wareroller. The strap member 17 is generally in the form of a strap of web material which is inelastic, or substantially so, the only yield and stretch being provided by the tension member or unit 30.

Referring to the details of the strap member 17, this is shown as comprising a first or shorter end section 18, the terminal of which may be provided with a coupling, shown in the form of a hook 19 by which the device as a whole may be hooked or coupled to the inserted rod 11. The other or longer end 21 of the strap member is shown as suitably coupled to the wareroller, for example by tacks 22 driven through open eyelets of the strap and into the wareroller within its recess 15.

The strap member, between its end sections, is provided with a pair of opposed intermediate loops 24. These are shown as closed loops on the strap member, composed preferably of integral portions of the web, folded back upon itself and attached by cross attaching means such as stitching or staples, although for illustration a series of clinched eyelets or rivets 25 is shown. Thus is provided, for the inner end of each strap member end section, a permanent strap loop, these two loops cooperating in supporting between them the tension member or unit 30. In addition to the described strap member sections 18, 21 and 24 there is also preferably provided the conventional loose strap section 27, somewhat longer than the normal spacing between the loops 24, so that it may depend from the loops; this depending section 27 being of limited length so as to constitute a stop means, acting when the entire device is under tension, to prevent accidental overextension of the device and possible injury to the springs of the tension unit.

The strap or web material, as stated, is inelastic for all practical purposes, enabling it to serve as a guard against overextension. However it is flexible, as it needs to be longitudinally, to wind upon the wareroller. But for the present invention it must also be flexible transversely

as well, in other words universally flexible. The transverse flexibility performs a special function as will be explained.

Coming next to the characteristic tension member or unit 30, this is shown as built up of a system of elastic members or tension springs 31, shown as six coil springs having wire eyes 32 at their ends by which they are connected to the two opposite end pieces 34 into which the respective strap loops 24 are engaged.

The construction of the end pieces 34, in their preferred plate-like form shown, is best indicated in Figs. 4 and 5. Each end piece is formed with a transverse aperture 35 to be engaged by the strap loop, this preferably being a narrow aperture or slot extending from side to side, having about the same length as the width of the strap web. On one side of the aperture 35 the body or crossplate 36 of the end piece is shown provided with engagers in the form of hooks 37, struck out of the metal, to be engaged by the eyes 32 of the tension springs; and each hook 37 may be pressed closed if desired to prevent accidental detachment of its spring.

The construction of the end piece may be described by bounding the cross slot or aperture 35. It extends alongside the body 36 at one side, and the body is extended longitudinally as two edge bars 39, for the width of the aperture, and extended inwardly from the ends of these are two crossbars 40, the combined lengths of which are less than the total width of the end piece, thus leaving a gap or entrance way 41 between the free ends of the crossbars 40.

This entire end piece structure may be described as having substantially the form of a flattened letter C, the flattening being due to the fact that the opposed extensions or transverse bars 40 are both straight and are in alinement with each other, with the midway gap 41 between. When the strap loop 24 is in position, as indicated in Figs. 4 and 5, it therefore has a stable bearing or engagement upon the combined bars 40, for its pull, so that the connection of the strap member with the end piece of the tension member is safe against accidental disengagement. At the same time the strap loop 24, shown as being flexible in both longitudinal and transverse directions, is readily entered into the aperture 35 through the gap 41, since it may be threaded or worked through the gap, for example first one side of the loop, with sideways motion and then, by crowding the first side within the aperture, entering the other side, and thus completing the engagement between loop and end piece; or the engagement might be by doubling the fabric of the loop and pushing its edges through the gap while spreading them toward the sides of the end piece.

The construction of the disclosed end piece may be described somewhat differently as constituting a double-hook construction and engagement. Each transverse bar 40 forms with its edge bar 39 a hook or claw, and these two hooks are opposed to each other, with the gap 41 between, the two bars 40 being in alinement to act as the equivalent of a continuous bar so far as concerns its engagement with the strap loop.

It is by reason of the two-way, or the transverse, flexibility of the strap material, or at least of the loop sections thereof, that the loops can readily be worked into and out of engagement through the relatively narrow gap between the two bars on which the engaged loop bears.

In order to avoid abrasion, cutting or wear upon the strap loop 24 the crossbars 40 of the end piece are preferably thickened at 43, or rounded as shown, so that the loop rests smoothly in a somewhat open condition when under the tension of practical use. This thickened construction of bar may be afforded by employing a part of the metal 44 which originally extended into a portion of the aperture 35, this metal 44 being bent around, for example to U-shape for the purposes stated.

Various modifications of structure and design are possible within the principles of the invention. Thus, in Fig. 6 is shown a modified structure of end plate, having the same characteristics as that shown in Fig. 5, but with the entire plate additionally bent to a general curvature corresponding roughly with the circumference of the wareroller within or near the gap 15. By this arrangement when the taking up of fabric is nearly completed the tension member 30 enters and accommodates itself smoothly within the wareroller recess 15, the two curved end pieces lying snugly upon the wound strap section 21, without tendency to project, and the springs 31 likewise adapting themselves to the space in which they are accommodated.

The modification shown in Figs. 7 and 8 is a variation from that shown in Fig. 5 in that in sectional view the metal is forked or shaped like a letter Y. Thus, the metal forming the body of each bar 40 is bent away at an angle as shown at 40^a in Fig. 8, while the metal taken from the aperture is bent to a symmetrical position 44^a, these two portions therefore forming a wide V about which the strap loop may lie without danger of abrasion.

What is claimed is:

1. In a flat-knitting wareroller strap device of the kind having an inelastic longitudinal strap member with ends adapted to be coupled respectively to the wareroller and fabric and with two intermediate closed strap loops that are flexible both longitudinally and transversely, and having a tension member composed of two rigid loop-engaging end pieces yieldably interconnected by tension springs; the improvement characterized in that in said tension member each of said two end pieces is substantially of flattened C-shape formed with a transverse aperture which in use accommodates one of the two strap loops and with an entrance gap through which the strap loop by reason of its universal flexibility may be worked into engagement with or disengagement from the aperture; whereby the strap member and tension member of the device may be readily disassembled at will from each other for replacement of either thereof without opening said strap loops.

2. In a flat-knitting wareroller strap device of the kind having an inelastic longitudinal strap member with two end sections adapted to be coupled respectively to the wareroller and fabric and with two intermediate closed strap loop sections and with a loose connecting strap section between the end sections of limited length to prevent over-extension, all of said five sections being composed of the same inelastic strap material, and at least such loop sections thereof possessing universal flexibility, not only longitudinally but transversely thereof, and having a tension mem-

ber composed of two rigid loop-engaging end pieces yieldably interconnected by tension springs; the improvement characterized in that in said tension member each of said two end pieces is substantially of flattened C-shape formed with two opposite transverse crossbars projecting toward each other providing a transverse aperture which is of transverse extent to accommodate one of the two strap loops bearing against both of said crossbars and said crossbars being abridged to provide an entrance gap through which the strap loop by reason of its universal flexibility may be worked into engagement with or disengagement from the aperture; whereby the strap member and tension member of the device may be readily disassembled at will from each other for replacement of either thereof without opening said strap loops.

3. A wareroller strap device for flat knitting machines, comprising the following combination of strap member and tension member, namely: an inelastic longitudinal strap member having its two ends adapted to be coupled respectively to the wareroller and to the fabric being knitted and having two intermediate closed strap loops each being inelastic but having both longitudinal and transverse flexibility, and a cooperating tension member having two rigid loop-engaging end pieces yieldably interconnected by tension springs; said tension member end pieces being each substantially of flattened C-shape by reason of being formed with a transverse aperture that accommodates one of the two strap loops and with an entrance way through which the strap loop by reason of its two-way flexibility may be worked into engagement with or disengagement from the aperture; whereby the cooperating strap member and tension member of the device may at will be readily disassembled from each other without opening said strap loops, permitting repair or replacement and ready reassembling thereof.

4. A device as in claim 3 and wherein each of the C-shape tension member end pieces comprises straight transverse bars projecting toward each other with a midway gap between them and together affording a bearing for the full width of the pull of the strap loop.

5. A device as in claim 1 and wherein each C-shaped tension member end piece is of a structure of sheet metal stamped out and bent to provide that each transverse bar of the C-shape is of U-shape cross section by reason of the out-bending thereat of the metal from the end piece aperture.

6. A device as in claim 2 and wherein each C-shape tension member end piece is of a structure of sheet metal stamped out and bent to provide that each transverse bar of the C-shape is of U-shape cross section by reason of the out-bending thereat of the metal from the end piece aperture.

7. A device as in claim 3 and wherein each C-shape tension member end piece is of a structure of sheet metal stamped out and bent to provide that each transverse bar of the C-shape is of U-shape cross section by reason of the out-bending thereat of the metal from the end piece aperture.

LENA LANG.