July 31, 1923. 1,463,262

C. F. GRAY

STRAP FORMING DEVICE FOR SEWING MACHINES

Filed June 21, 1918 2 Sheets-Sheet 1

Fig. 1

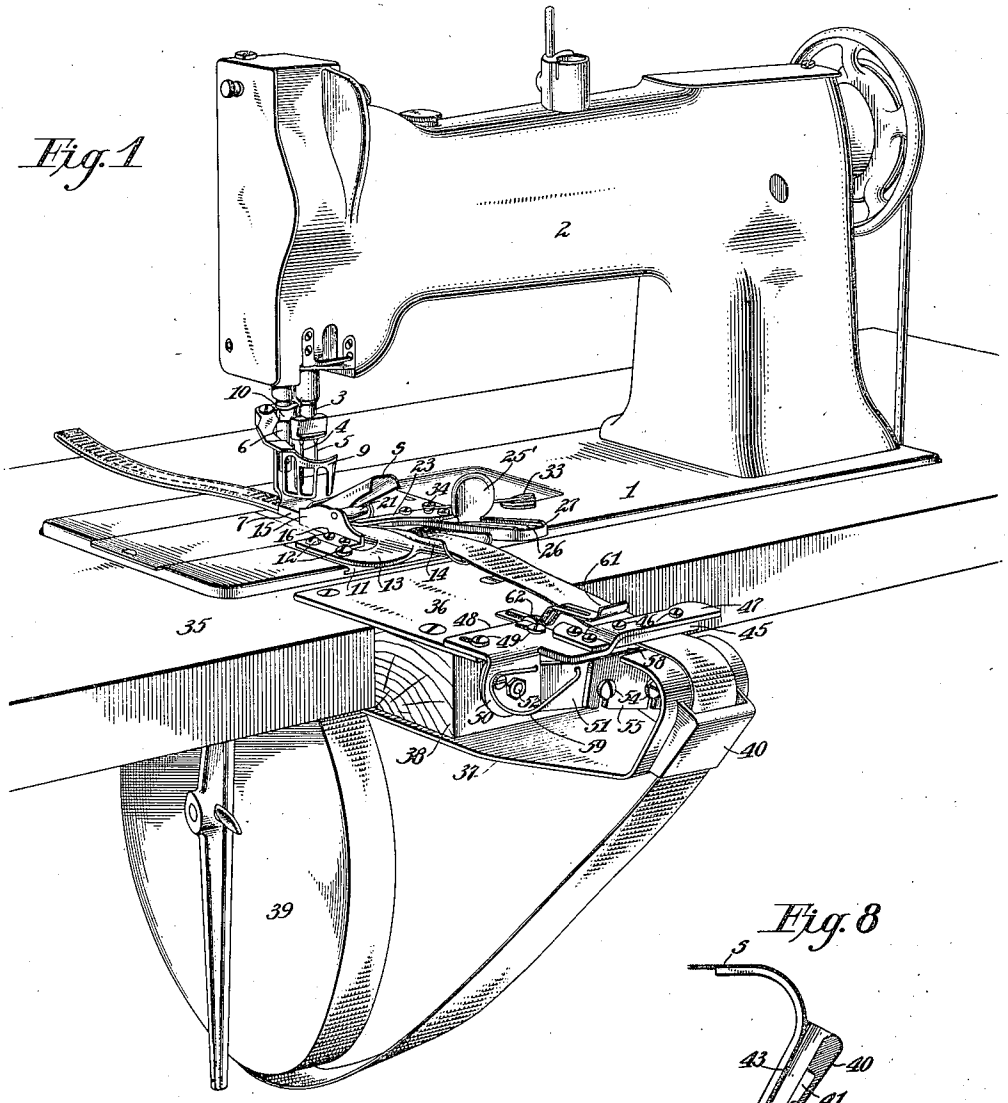
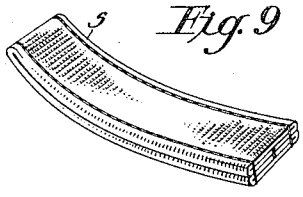


Fig. 8

Fig. 9



WITNESS

Adrian De Man.

INVENTOR

CHARLES F. GRAY

BY

ATTORNEY

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STRAP FORMING DEVICE FOR SEWING MACHINES

Filed June 21, 1918 2 Sheets-Sheet 2

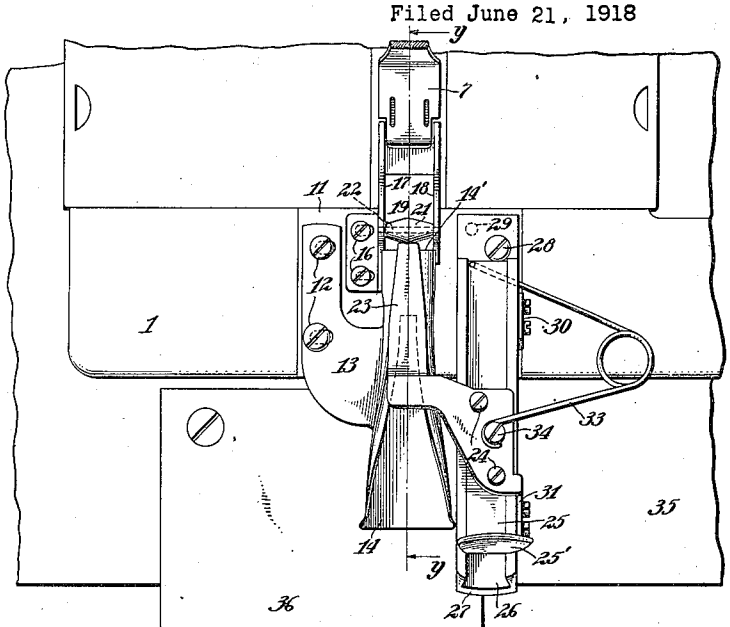
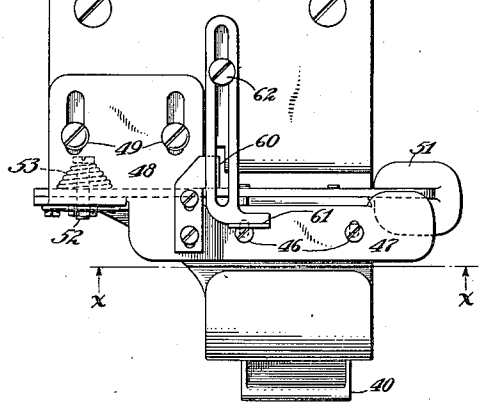


Fig. 2



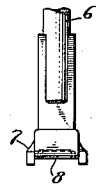


Fig. 7

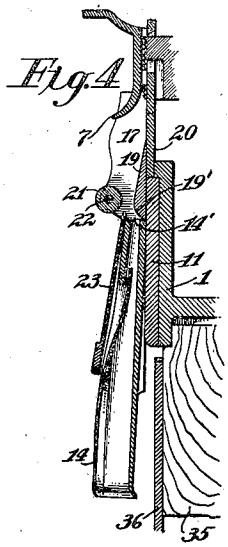


Fig. 4

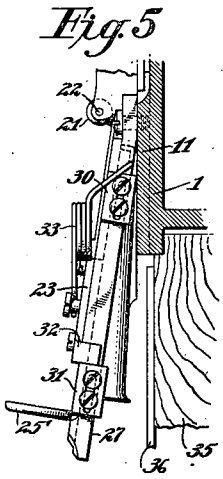


Fig. 5

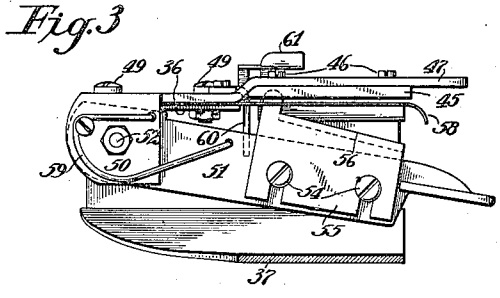


Fig. 3

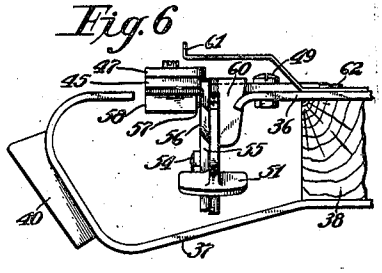


Fig. 6

WITNESS

Adrian DeMan

INVENTOR

CHARLES F. GRAY.

BY A. F. Ostrom

ATTORNEY

Patented July 31, 1923. 1,463,262

UNITED STATES PATENT OFFICE.

CHARLES F. GRAY, OF SIERRA MADRE, CALIFORNIA, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

STRAP-FORMING DEVICE FOR SEWING MACHINES.

Application filed June 21, 1918. Serial No. 241,149.

To all whom it may concern:

Be it known that I, CHARLES F. GRAY, a citizen of the United States, residing at Sierra Madre, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Strap-Forming Devices for Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in strip-guiding and folding devices for use in connection with sewing machines and has for its primary object to provide an improved construction for forming folded and stitched straps suitable for suspenders, leggings, belt-loops and the like.

More specifically, one of the objects of this invention is to provide means for the doubling back upon itself of a strip of fabric passed through a strip guide or folder, together with means for presenting the doubled strip to the action of the stitch-forming mechanism of the sewing machine.

Another object of this invention is to provide means for gauging the length of the doubled strip, severing said strip and for holding the severed end of the strip leading to the supply within convenient reach of an operator to facilitate the initiation of a succeeding strap-forming operation.

A further object of this invention is to provide means for properly guiding the doubled and severed strip of fabric to and past the stitch-forming mechanism.

Other objects of the invention will be apparent from the following description and claims—

In its preferred embodiment the present invention comprises a multiple needle sewing machine upon the cloth-plate of which is secured a strip-folder adapted to fold the longitudinal edge of a strip and having its delivery end positioned in advance of and spaced from the needles. A strip of fabric is guided to the strip-folder from a supply reel located below the sewing machine table, being led around the edge of the table by a strip-guiding element projecting therefrom and including a back-stop device constructed to permit the strip to pass therethrough in only the direction of the strip-folder.

As the strip of fabric is passed manually through the strip-folder, the end thereof is automatically directed upwardly by means of a strip-diverting element located at the delivery end of the folder to permit an operator to conveniently grasp the end of the strip and double said strip back upon itself for any desired distance preferably determined by an adjustable gauge provided for the purpose. A strip severing element is provided intermediate the strip-folder and the back-stop device and is adapted to be manually operated to sever the strip. Means are provided for presenting the folded, doubled and severed strip to the action of the stitch-forming mechanism, comprising a strip-positioning finger manually operable to engage the doubled end of the strip and advance it to the action of the usual feeding mechanism of the swing machine.

Suitable edge-guiding means for the strip are located intermediate the delivery end of the strip-folder and the presser-foot, the latter of which is grooved to properly guide the doubled strip past the stitch-forming mechanism. Inasmuch as the back-stop device permits the passing therethrough of the strip in only one direction, the severed end of the strip leading to the supply is held within convenient reach of an operator to initiate a succeeding strap-forming operation.

In the accompanying drawings, Fig. 1 is a perspective view of a sewing machine embodying the present improvement and showing a completed strap projecting beyond the stitch-forming mechanism. Fig. 2 is a top plan view of a portion of the cloth-plate of the sewing machine. Fig. 3 is a sectional view on the line *x*—*x*, Fig. 2. Fig. 4 is a sectional view on the line *y*—*y*, Fig. 2. Fig. 5 is an end elevation of the strip-positioning supporting member as viewed from the right in Fig. 2. Fig. 6 is an end elevation of the strip-severing elements as viewed from the right in Fig. 2. Fig. 7 is a front elevation of the presser-foot. Fig. 8 is a sectional view of the back-stop device. Fig. 9 is a perspective view of a portion of a strap formed by means of the present improvement.

Referring to the drawings the present improvement is shown in connection with a sewing machine comprising a cloth-plate 1, supporting the overhanging bracket-arm 2 in which is mounted for vertical reciproca-

tion in the usual manner the needle-bar 3, carrying two needles as 4 and 5. Any suitable complemental stitch-forming mechanism may be employed to cooperate with the needles beneath the cloth-plate, the particular construction of stitch-forming and fabric feeding mechanisms employed not entering into the present invention. Also mounted for vertical reciprocation in the overhanging bracket-arm is the presser-bar 6, to which is suitably secured the shank of a presser-foot 7 provided with an under-cut groove 8. A finger-guard 9 is pivotally supported to swing out of operative position for access to the needles upon a collar 10 suitably secured upon the presser-bar.

The cloth-plate of the sewing machine is provided with a front slide-plate 11 upon which is secured by screws, as 12, the supporting base 13 of a strip-guide or folder 14 adapted to fold the longitudinal edges of a strip of fabric *s* passed therethrough. The delivery end 14′ of the folder is positioned in advance of and spaced from the needles. Intermediate the delivery end of the folder and the needles is positioned a U-shaped edge-guiding element 15, secured by screws, as 16, to the front slide-plate and comprising spaced vertical edge-guiding walls 17 and 18 projecting upwardly from a common base 19. The base 19 overlies the throat-plate 20 of the sewing machine and for a portion of its length is formed with a strip diverting incline 19′ comprising means for directing the strip initially emerging from the folder in an upward direction and within convenient reach of an operator.

In order to permit the folded strip of fabric to be readily doubled back upon itself, there is provided a guide-roller 21 positioned slightly in advance of the delivery end 14′ of the strip-folder and mounted upon a pin 22 supported at its opposite ends by the walls 17 and 18. It is of course understood that a rigid bar could be employed instead of a roller for this purpose. The strip of fabric as it is drawn backwardly by the operator rides over the roller 21 and frees the delivery end of the folder from strain incident to the doubling of the strip. It will be observed that the roller is inclined toward the opposite ends thereof, thereby tending to maintain the edges of the strip in their folded condition.

A strip-positioning device is provided to present the doubled end of the strip to the action of the feeding mechanism of the sewing machine and comprises a manually operable strip-positioning blade 23 secured by screws, as 24, upon a slide-plate 25 formed with an upstanding thumb-piece 25′. The slide-plate 25 is fitted into a slideway 26 formed in a supporting member 27 secured by means of a screw 28 and steady pin 29 upon the front slide-plate 11. The limits of movement of the slide-plate 25 in the slideway 26 are determined by two adjustable stop-members 30 and 31 suitably secured upon the guide-member 27 and in the path of a finger 32 depending from the base of the positioning blade. Normally the positioning blade 23 is held retracted, as shown in Fig. 2 of the drawings, by a spring 33 of which one end enters a groove in the under side of the guide-member 27 and the other end bears against a stud-screw 34 upon the positioning blade base. By manually advancing the positioning blade, the doubled strip is presented to the action of the feeding mechanism and united by two lines of stitching.

The sewing machine is mounted upon a table 35 upon which are bolted spaced supporting plates 36 and 37 projecting beyond the edge of the table and reinforced by a block 38. The plate 37 projects forwardly beyond the plate 36, the free end thereof curving upwardly and rearwardly and forming a strip-guiding element adapted to lead the fabric-strip from the supply reel 39 to the strip-folder. The upwardly curved portion of the plate 37 carries a fabric-strip back-stop device 40 forming a guide for said strip and adapted to prevent reverse movement of said strip in a direction away from the strip-folder for a purpose hereinafter referred to. The back-stop device is looped to form a passageway for the strip *s* and its inner wall is formed with a groove 41 of which the wall 42 is inclined with respect to the guiding portion 43 of the plate 37 opposite thereto. A resistance member in the form of a ball 44 is placed in the groove 41. Movement of the fabric-strip *s* in a direction toward the strip-folder is permitted by the tendency of the ball during such movement to occupy the upper and wider portion of the passage-way, while movement of the fabric-strip in a reverse direction is prevented by the jamming of the ball in the lower portion of the passage-way.

A manually operable strip-severing device is provided and comprises a stationary blade 45 adjustably secured by screws, as 46, to the under side of a projecting portion 47 of a supporting plate 48 adjustably secured by screws, as 49, upon the plate 36. The plate 48 is formed with a depending ear 50 pivotally supporting a hand-operated lever 51, fulcrumed upon a bolt 52 and yieldingly held against the ear 50 by means of a spring 53 interposed between the head of the bolt 52 and the lever 51. Adjustably secured to the lever 51 by screws, as 54, is a strip-severing blade 55 of which the cutting edge 56 is adapted to cooperate with the edge 57 of the stationary blade in severing the strip *s* led between the under surface of the blade 45 and the upper surface of a

spring tongue 58 soldered or otherwise secured in any suitable manner to the supporting plate 48. The movable blade 55 is held retracted by the action of a spring 59 and is retained in operative relationship with the stationary blade by means, in addition to the action of the spring 53, of a depending guide-finger 60 adjustably secured in a suitable manner to the supporting plate 48. An adjustable gauge 61 is secured by means of a screw 62 upon the plate 36 for a purpose later referred to.

In operation, the strip of material is led from its supply 39 through the back-stop device 40, around the extremity of the plate 37, intermediate the lower surface of the stationary blade 45 and the upper surface of the spring tongue 58 and thence to the strip-guide or folder 14, which folds the longitudinal edges of the strip. As the strip emerges from the delivery end 14′ of the strip-guide, it is directed upwardly by means of the strip diverting incline 19′ within convenient reach of an operator who doubles the strip back upon itself for a distance preferably determined by the adjustable gauge 61. The doubling back of the strip is readily permitted by the provision of the guide-roller 21. The movable strip severing blade 55 is now operated to sever the strip, after which the strip-positioning finger 23 is advanced to present the doubled strip to the action of the stitch-forming mechanism. As the upper portion of the doubled strip passes to the stitch-forming mechanism, it contacts with the guiding roller 21, which serves the additional function of maintaining the longitudinal edges of the strip in their folded condition.

The grooved presser-foot 7 maintains the double portions of the strip in properly superposed relation. After severing the strip, the end of the strip leading to the supply is held by the back-stop device and therefore is within convenient reach to initiate a succeeding strap-forming operation.

Having thus set forth the nature of the invention, what I claim herein is—

1. In a sewing machine, in combination, stitch-forming mechanism including a reciprocatory needle, a strip-guide positioned in advance of said needle, and a strip-diverting element disposed in fixed position at the delivery end of said strip-guide and intersecting the path of movement of a strip of fabric emerging from said strip-guide to divert the initially emerging end of said strip in a direction substantially transverse to the direction of its lead through the strip-guide.

2. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide positioned in advance of and in alinement with said stitch-forming mechanism, means disposed at the delivery end of said strip-guide for diverting the initially emerging end of a strip in a direction substantially transverse to the direction of its lead through the strip-guide, and strip-severing means disposed in advance of the strip-receiving end of the strip-guide.

3. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide positioned in advance of and in alinement with said stitch-forming mechanism, means disposed at the delivery end of the strip-guide to divert the initially emerging end of a strip of material in a direction substantially transverse to the direction of its lead through the strip-guide, and a strip-supporting element positioned between the delivery end of the strip-guide and the stitch-forming mechanism around which element the strip is doubled on a line substantially transverse to its length.

4. A sewing machine including, in combination, stitch-forming mechanism, a strip-guide, means permitting doubling upon itself on a line substantially transverse to its length of a strip of fabric passing through said strip-guide, a strip-severing element disposed in advance of the strip-receiving end of said strip-guide adapted to be operated to sever the doubled strip, and means for engaging the doubled end of the strip to initially present said doubled end from doubling position to the action of the stitch-forming mechanism.

5. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide adapted to fold the longitudinal edges of a strip, means permitting doubling upon itself on a line substantially transverse to its length of a strip of fabric passed through said strip-guide, a strip severing element, and means for engaging the doubled end of said strip to initially present said doubled end from doubling position to the action of the stitch-forming mechanism to unite the doubled portions of the strip longitudinally of the latter.

6. A sewing machine including, in combination, stitch-forming mechanism, a strip-guide disposed in advance of and in alinement with said stitch-forming mechanism, means permitting doubling upon itself on a line substantially transverse to its length of a strip of fabric passing through said strip-guide, a strip severing element disposed in advance of the strip-receiving end of said strip-guide, and edge-guiding means intermediate the delivery end of the strip-guide and the stitch-forming mechanism for guiding the doubled strip of fabric to the latter to longitudinally unite the doubled portions of the strip.

7. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide having its delivery end positioned in advance of the stitch-forming mechanism, means permitting doubling upon itself on a

line substantially transverse to its length of a strip of fabric passing through said strip-guide, and means movable relatively to said strip-guide for engaging the doubled end of the strip to initially present said doubled end from doubling position to the action of the stitch-forming mechanism to longitudinally unite the doubled portions of the strip.

8. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide disposed in advance of said stitch-forming mechanism, means permitting doubling upon itself on a line substantially transverse to its length of a strip of fabric passed through said strip-guide, an adjustable gauge whereby the length of the strip drawn through said strip-guide is determined, and a strip severing element positioned in advance of the strip-receiving end of said strip-guide.

9. In a sewing machine, in combination, a strip-guide, means in advance of said strip-guide for leading a strip of fabric thereto, means intermediate the strip-guide and the strip-leading means for severing the strip, and means associated with said strip-leading means including a bodily movable resistance member and coacting devices constructed and arranged to prevent retrograde movement of said strip of fabric.

10. In a sewing machine, in combination, stitch-forming mechanism, a strip-guide adapted to fold the longitudinal edges of a strip of fabric, means permitting said strip to be doubled upon itself, means for initially presenting the doubled end of said strip into operative relation with said stitch-forming mechanism, a strip-severing element positioned in advance of said strip-guide, and means for holding a severed end of said strip against reverse movement.

11. In a sewing machine, in combination, stitch-forming mechanism, a supply-holder for a strip of fabric, a strip-guide having its delivery end positioned in advance of the stitch-forming mechanism, means for leading the strip of fabric from the supply-holder to said strip-guide and including a strip-back-stop device comprising a rolling resistance member coacting with relatively inclined walls to prevent movement of the strip in the opposite direction, and a strip-severing element.

12. A strap-forming device for sewing machines comprising, in combination, a strip-guide, means for diverting the initially emerging end of a strip in a direction substantially transverse to the direction of its lead through the strip-guide, a strip-supporting element disposed at the delivery end of said strip-guide in spaced relation with respect to the strip-diverting means around which element the strip may be doubled on a line substantially transverse to its length, means for gauging the length of the doubled strip, cooperating strip-severing elements disposed in advance of the receiving-end of said strip-guide, means for holding a severed end of said strip against retrograde movement, and means for engaging the doubled end of said strip to initially present the same to the action of the stitch-forming mechanism.

In testimony whereof, I have signed my name to this specification.

CHARLES F. GRAY.