United States Patent [19]

Shuffield

[11] **3,780,680**

[45] **Dec. 25, 1973**

[54] **BELT-LOOP FEEDER, AND STRIP CUTTER**

[75] Inventor: **Jack E. Shuffield,** Norwood, N.J.

[73] Assignee: **C & W Sewing Machine,** New York, N.Y.

[22] Filed: **Oct. 2, 1972**

[21] Appl. No.: **294,223**

[52] **U.S. Cl.** **112/121.27,** 112/130

[51] **Int. Cl.** **D05b 23/00**

[58] **Field of Search** ..... 112/121.27, 104, 112/130; 270/61 R

[56] **References Cited**

UNITED STATES PATENTS

3,726,242	4/1973	Eskin et al.	112/121.27
2,700,946	2/1955	Stanley et al.	112/121.27
2,821,385	1/1958	Hoffee	112/121.27 X

FOREIGN PATENTS OR APPLICATIONS

613,447	12/1960	Italy	112/121.27

Primary Examiner—James R. Boler
Attorney—William T. Hough et al.

[57] **ABSTRACT**

In a preferred embodiment, a belt loop strip receiving, advancing, cutting, and feeding apparatus automatic in operation at least per cycle upon manual initiation of a timer control, the functional parts thereof being pneumatically operated in the predetermined sequence of intermittent actuation of respective parts, the feed strip typically being fed from a source such as a spool or reel, into a feed guide between opposingly pressed feed rollers for advancing intermittently the strip between and past open cutter opposing scissor blades onto a planar plate slide surface along a rearwardly disposed guide rail for aligning advancing strip axially laterally across the plate surface, the scissor blades being actuateable after advancement and alignment, the actuation-closing of the blade simultaneously causing a holder to press downwardly from above the plate surface securingly of the belt loop strip severed from the feed strip, and thereafter the holder being pneumatically advanced forwardly to slideably push the belt loop strip into a sewing machine belt-loop receiver at a point angularly to the plate slide surface at which point holding pressure of the holder is insufficient to secure the belt loop severed strip, whereupon the advanced holder withdraws without the severed strip left forwardly at the sewing machine belt-loop receiver, after the return of which, or immediately before the return of which, the scissor blade opens, the opening of the scissor blade simultaneously causing the holder to lift from its holding down position.

7 Claims, 4 Drawing Figures

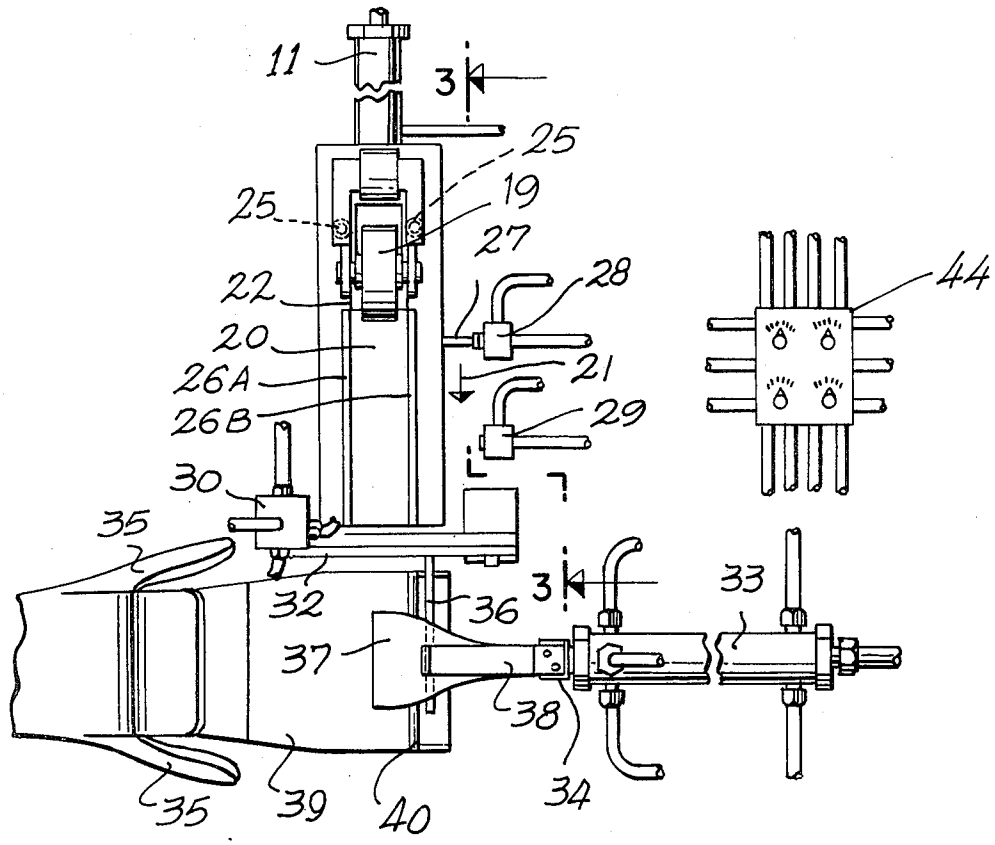
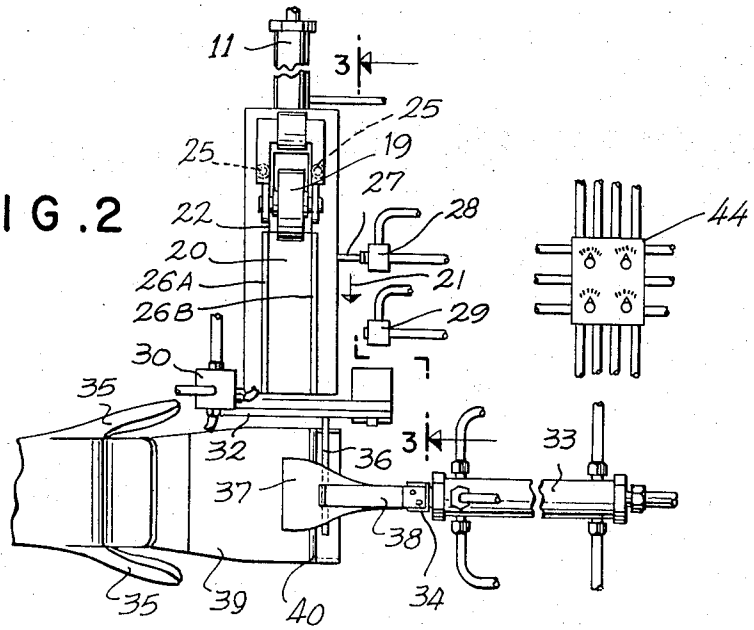


FIG. 2



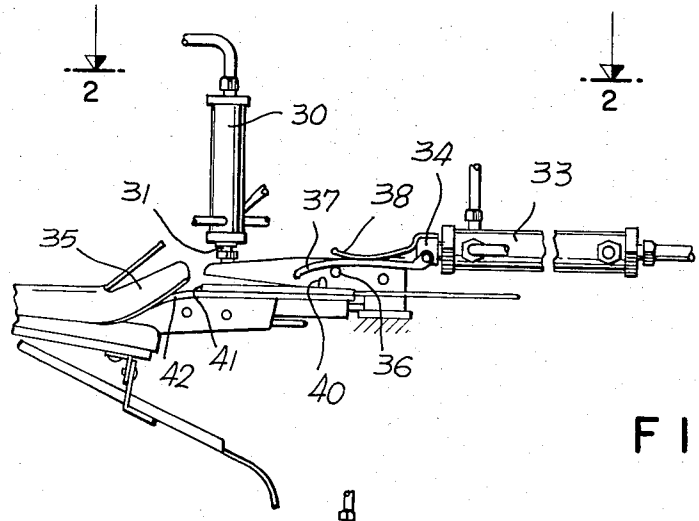
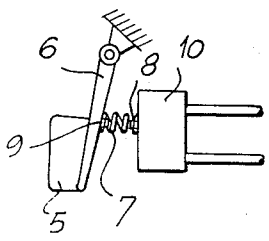


FIG. 1

FIG. 4



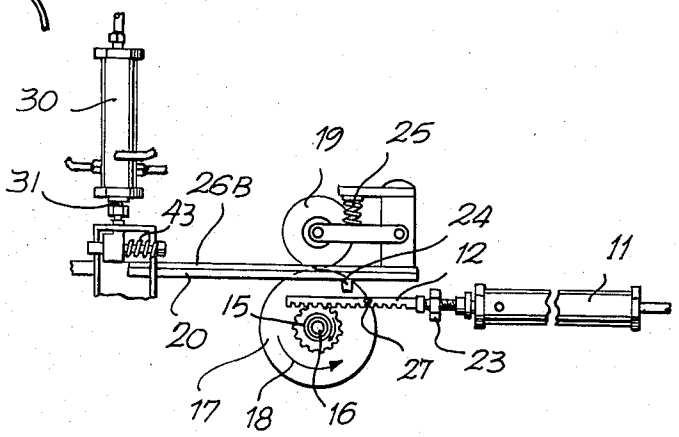


FIG. 3

BELT-LOOP FEEDER, AND STRIP CUTTER

This invention relates to an apparatus automatically cutting and feeding belt loops to a sewing machine for applying belt loops to pants' belt-line fabric.

BACKGROUND TO THE INVENTION

The feeding of belt loops to a sewing machine heretofore has been a manual operation, together with the advantageous utilization of a feed guide-receiver at the sewing machine for separately receiving each of two belt fabrics and for the cut belt loop for sewing the three as a unit onto sheet pants fabric. The present invention continues to utilize the receiver-guide for separate three pieces — as noted above — at the sewing machine, but does away with the time-consuming manual aligning and pushing-insertion of each belt loop cut strip intermittently after in a separate operation the belt strip material has been previous cut into a plurality of pieces in the prior art practice and method of operation. The separate cutting operations together with the individual placing of the severed loop strip onto the sewing machine feed guide-receiver is time consuming and therefor costly in the production of belt-loop mounted fabrics.

SUMMARY OF THE INVENTION

An object of the present invention is therefor to obtain an apparatus intermittently automatically feedable of a belt loop into a sewing machine guide receiver therefor.

Another object is to obtain a device which achieves cutting of the loops and positioning of the severed loop strip for automatic feeding thereafter to a sewing machine guide-receiver.

Another object is to obtain an automatic intermittent advancer of feed strip material from a feed source such as a roll thereof to a cutter functional with the achieving of the above noted objects.

Objects become apparent from the preceeding and following disclosure.

One or more objects of the present invention are obtained by the invention as defined herein.

Broadly the invention includes a belt-loop elongated strip-receiver guide and andvancer therefor, a cutter, a belt-loop cut-strip receiver plate, and a cut-loop strip holder and advancer, each of these functional elements means being intermittently actuateable in sequence by a timer preprogramed for a predetermined cyclic operation of the intermittent actuation of the several elements means and the timer being either manually intermittently actuateable or initiateable by mechanism responsive to measuring feed belt fabric strip and actuateable at predetermined intervals of fed belt fabric strip onto which the belt loop is sewable.

In a preferred embodiment, loop feed elongated strip is fed from a feed roll and is directed between oppositely pressing wheel-like rollers, at least one of the rollers being intermittently actuateable such that both rollers revolve for a predetermined number of revolutions (or part revolutions) to thereby force along the belt-loop strip, forcing the strip along axially a guide rail to, between and past scissor blades onto a cut-loop strip receiver about planar plate surface, after which the blades cut the strip. After the cutting of the belt loop to produce a severed loop strip, a clamp holder presses downwardly onto the cut loop strip and thereafter

forces the severed strip to slide across the planar plate surface into the sewing machine feed guide-receiver which at that receiving point retains the fed severed loop strip while the clamp holder retracts. A preferred mechanism for the clamp holder pressure to be reduced whereby the retracting clamp holder does not drag-back the severed loop strip, is a step-down from the planar plate, or alternatively at the sewing machine feed guide-receiver the planar plate curving downwardly to relieve grasping pressure of the clamp holder.

Preferably the belt-loop cut-strip receiver plate has a linially extending edge adjacent a scissors blade, a lower blade being recessed below the level of the plate with the blade axis (longitudinal) being parallel and snugly adjacent to the linially extending edge, with the upper scissor blade being pivotably mounted with the blade biased to an open state above the lower blade and above the level of the plate, by a biasing spring as well as by preferably a piston lever of a reciprocating type which when actuated in one direction closes downwardly the pivoted blade, but when actuated in a reverse direction opens the blade; when the blade is in the open state, there is provided sufficient room between the blades for the pushing slideably of belt-loop elongated strip along a ramp beside a guide rail for the passing of the strip between the blades in a direction across the blades such that the strip slips above the lower blade and beneath the upper blade onto the adjacent plate as aligned (the strip as aligned) by the plate rearwardly placed guide which plate guide is about aligned linially with the ramp guide rail.

The above-noted ramp and guide rail thereof has in combination therewith the feed rollers (wheel-like rollers) one of which either at the beginning of or extending through a hole in the ramp forces the elongated strip along the ramp by virtue of the lower roller acting against an opposing roller above the ramp level, with the elongated strip being fed between the opposing rollers. Typically, the powered lower roller is mounted on a drive shaft fixedly, which drive shaft is driven by a clutch-bearing wheel mounted thereon which clutch bearing wheel revolves freely around the shaft in one direction, but when the clutch bearing wheel is forcibly revolved in an opposite direction, the clutch bearing wheel grips the shaft and drives the shaft; thus, the clutch bearing wheel is toothed and meshes with a reciprocatable shaft having meshable teeth; an adjustable stop limits the amount of or the length of the travel stroke, and thereby is adjustable to determine the length of elongated strip material advanced past the scissor blades at any one stroke — whereby the length of the subsequently severed belt-loop strip is adjustably determined.

In a preferred embodiment of the present invention, the entire coordinated actions of the several functional parts as described above are operated in to and fro actions by air-pistons, with one end of each piston receiving air to actuate the piston and the element lever connected thereto, and with the opposite end of each piston receiving air to actuate the piston return itself and the element lever connected thereto the original starting position. Normally a third tube receives air being bled from the non-actuated end.

Preferably the bled air in certain instances is utilized as actuation air for another piston which is programed to be actuated simultaneous with the return and/or ac-

tuation of another piston and its respective lever. Also, lever(s) may actuate switch(es).

The invention can be better understood by reference to the following Figures.

THE FIGURES

FIG. 1 illustrates a side in-part view of the device of the present invention as viewed looking toward the direction from which the elongated uncut belt-loop strip is advanced, and looking at the side of the flat plate on which the cut loop strip is advanced from right to left when the clamp holder is lowered onto the severed belt-loop strip and the clamp holder is driven by the air piston shown herein, the scissor blade piston actuator also being shown above the scissor blade.

FIG. 2 is an elevation plan view of the device of FIG. 1 as viewed along lines 2—2 of FIG. 1, in addition to the elements recited above for FIG. 1, illustrating a slide ramp on which uncut strip is advanced slideably toward the scissor blade by action of opposing vise rollers between which a strip is feedable and by which the strip is driven by driven rotation of one or more of the rollers. Also partially viewable is the piston cylinder which indirectly drives the vise rollers, as well as two air switches and an actuating lever carried on the shaft indirectly of the vise roller actuation piston cylinder.

FIG. 3 represents a view as taken along lines 3—3 of FIG. 2, and is a side view representation of a typical embodiment of the slide ramp, the parallel guide rails thereon, the opposing vise rollers, the drive shaft therefor, the driving clutch bearing toothed wheel and the toothed piston shaft and its cylinder and the lever arm mounted on the toothed shaft, and the cutting spring-biased blade and in the background the blade actuating piston cylinder.

FIG. 4 is an in-part side view of a typical knee actuateable pivoted lever with a knee pad and actuateable of an air switch which typically puts into operation the sequence cycle of consecutive functions of the device of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

With reference to a more detailed description of the typical embodiment of FIGS. 1 through 4 and the process of operation thereof, as noted above the cycle of several consecutive actions of the different functional elements may be initiated by any convenient, conventional or desired manner and there may be a required reactivation after each cycle, or alternatively the system may be such that it is programed to repeat as dependent upon the amount of a fabric fed to which the belt loops will be sewn, with the distance between consecutive loops sewn onto the fabric being adjustable by the timer regularion; however, the present embodiment typically is for reactivation by the operators knee against the knee pad 5 of FIG. 4, which pad is mounted on lever pivoted arm 6 and which lever 6 is spring-biased by spring 7 away from actuation button 8 against which "go" abutment 9 is pressible by virtue of the operators knee pressing on the cusion 5, whereby the air switch 10 initiates an entire cycle, using air-source programmer-timer 44.

Upon actuation of the air switch 10, piston cylinder 11 is first actuated to eject shaft 12 which has teeth 13 which act on teeth 14 of bearing clutch gear wheel 15 which is thereby turned counter-clockwise and in that direction locks onto the shaft 16 to thereby turn the shaft 16 in the same counterclockwise direction, whereby the wheel-roller 17 — which is fixedly mounted onto the shaft 16 — also turns in the counterclockwise direction causing the contacting wheel-roller 19 to turn in a clockwise direction, the counterclockwise direction of wheel-roller 17 being represented by direction 18. Thereby a feed uncut elongated belt-loop strip (not shown) fed between the rollers 17 and 19 caused the strip to be advance along ramp 20 in direction 21. The lower roller 17 extends through ramp 20 opening 22. The extent to which the strip between rollers 17 and 19 is advanced is dependent upon the length of the stroke of shaft 12, which in turn is dependent upon the adjustable location of the adjusting nut (or its equivalent) which is stopped by the stop 24 during the stroke thereof. The wheel-roller 19 is spring biased against wheel-roller 17 by downwardly pressing spring 25. The belt-loop uncut strip is advanced on ramp 20 between the parallel rail-guides 26A and 26B. Lever arm 27 is fixedly mounted on the toothed shaft 12 whereby the forward stroke moves the arm 27 from its pressing position against bearing switch 28 (an air switch) to a position at which the arm 27 presses the bearing of bearing switch 29 to actuate that switch. The interconnecting of the various switches and cylinders is a matter of choice readily conventionally within ordinary mechanical engineering skill; however, the actuation of switch 29 typically actuates the cylinder 30 for the ejection of shaft 31 which mechanicall pushes downwardly the pivoted scissor blade 32 to thereby cut the strip at the end of the lever stroke of lever 12. The air exhausted from the cylinder 30 upon the pressurized air-ejection of shaft 31, is bled to an input typically of the clamp holder shaft cylinder 33 to eject outwardly the shaft 34 which thereby pushes cut belt-loop strip toward the sewing machine receiver prongs 35. Upon the downward movement of the blade 32, the rigid arm 36 which normally supports (retains) the clamp holder 37 in the upward state, moves downwardly with the downward movement of the blade 32 whereby the biasing spring 38 forces downwardly the clamp holder 37. As the clamp holder 37 moves to the left (in FIG. 1) along plate 39 slideably, the severed belt-loop strip slips typically off of a step 41 and/or is moved down a curved portion 42 by which movement the holding pressure of the clamp holder 37 is lessened whereby upon retraction of the shaft 34 the severed belt-loop strip is not drug backwardly. Release of the pressure of the operator's knee against the knee pad 5 permits a release of the button switch 8 and 10 which typically reverses air flow into the return-of-shaft end of the cylinder 11 whereby the lever arm 21 returns to press the bearing of bearing air-switch 28 to cause retraction-activation of air cylinder 33, the return of which activates (such as by use of the cylinder 33 exhaust air) retraction -motion of cylinder 30 which causes the blade to lift, with the assistance of the biasing spring 43, whereby the arm 36 lifts the spring-biased clamp holder 37. When the blade 32 is upwardly open, the stroke of lever 12 forwardly slides the strip between upper and lower scissor blades onto the plate 39, as guided by the guide 40 located in linear alignment with guide rail 26A.

Variations, substitution of equivalents, and modifications are within the scope of the invention within ordinary skill.

I claim:

1. A belt loop cutter and feeder device, comprising in combination: a feeder platform means including an upper substantially smooth surface with a rearward guide structure extending substantially linearly across and on top of a rearward portion of said surface from a loop material-receiving side of the feeder platform; a loop feeder means for receiving a cut loop and advancing it to a loop-securing position; aligned with said feeder means for permitting movement of linearly-extending elongated belt loop strip material to move past said blade means, for thereafter advancing a blade of said blade means to a material strip-cutting contact position, and for thereafter effecting the cutting through the contact position to sever that portion of the strip material already moved past said blade means; strip material advancer means for advancing belt loop strip material to and past said blade means and onto said feeder platform and into a position for action of said loop feeder means on severed loop strip material; said feeder means, said blade means, and said advancer means being mounted each relative to the other such that the strip material is advanceable one to the other in sequence without any necessity for operator handling thereof, said feeder means including a downwardly spring-biased pressure clamp element over said platform means and a reciprocatably mounted shaft attached supportingly to said clamp element and said shaft being reciprocatable of said clamp element between said guide structure and a forward feeding position portion of said platform including a belt loop retainer means for receiving and preventing retraction-withdrawal of severed loop strip material advanced by the loop feeder means, said feeder means further including reciprocating means for reciprocating said shaft, in which said blade means is adjacent to and aligned with a side edge of said smooth surface of said feeder platform, and including actuating means; said advancer means being advanceable of said strip material onto said smooth surface along said rearward guide structure, and at least one advancing by said advancer means, at least one cutting by said blade means, and at least one feeding by said feeder means being operative automatically upon an operator actuation of the sequence by actuation of said actuating means.

2. A belt loop cutter and feeder device of claim 1, in which said advancer means includes an elongated slide-surface having an axially-extending guide rail means on top thereof guidable of elongated strip material for axial movement of the strip material, and opposingly mounted pincher rotatable wheel-rolls at least one of which is intermittently actuable by said actuation means to rotate in contact with said strip material extending between and in contact with each of the pincher wheels whereby strip material is advanceable slidably along said slide-surface.

3. A belt loop cutter and feeder device of claim 2, in which said blade means includes two opposing scissor blades, one fixedly mounted and the other intermittently reciprocatably mounted.

4. A belt loop cutter and feeder device of claim 4, in which said reciprocatably mounted scissor blade is spring biased to an open non-cutting state prior to and subsequent to a cutting movement upon actuation by said actuating means, said actuation means including a plurality of fluid valve and conduit means in combination operatively with a programed timer means actuateable by an operator.

5. A belt loop cutter and feeder device of claim 4, in which said blade means includes a laterally extending shaft fixedly and rigidly extending from a side of the reciprocatably mounted scissor blade, said laterally extending shaft extending restrainingly beneath the clamp element when the blade is in an open state.

6. A process comprising in combination: placing an elongated strip of belt-loop strip across a cutting means for cutting-off a predetermined length of said strip, said placing including having the predetermined length lying on a substantially supporting surface about adjacent to said cutting means, and after said placing thereafter cutting-off said predetermined length, and thereafter causing said cut-off predetermined length to move laterally along said surface in a direction about transverse to said cut-off length's longitudinal axis until the length becomes receivably anchored within a sewing machine belt-loop receiving means, said surface being substantially planar whereby said causing includes sliding said length across said surface and then downwardly into a recess of the surface.

7. A process of claim 1, including manually initiating said placing, and in which after said initiating thereafter said cutting and said causing automatically occur in preprogramed sequence responsive to said initial initiating.

* * * * *