Nov. 8, 1955 H. E. STOUT 2,722,728

HOSIERY TRIMMING DEVICE

Filed Oct. 4, 1954 3 Sheets-Sheet 1

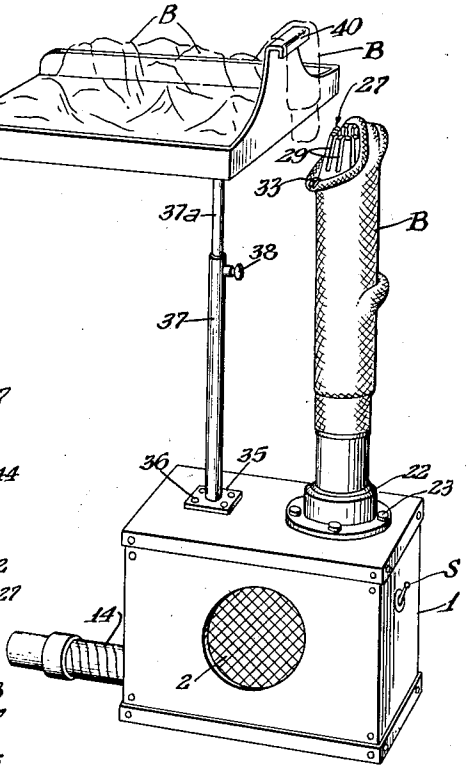


FIG. 1.

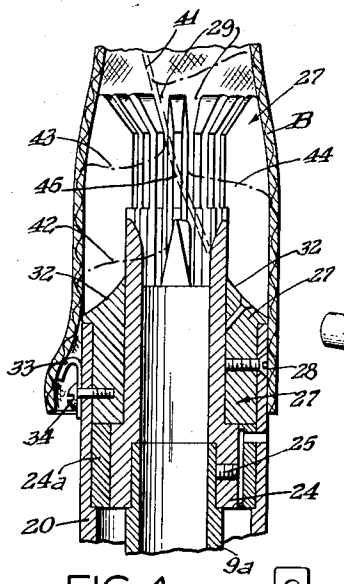


FIG. 4.

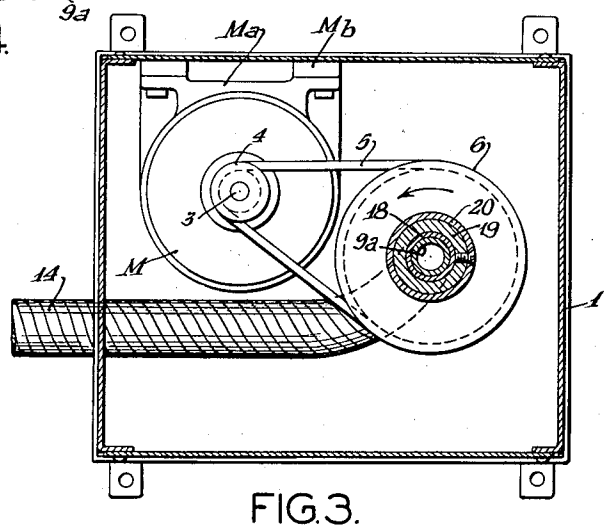


FIG. 3.

INVENTOR
HAROLD E. STOUT

BY Mock & Blum
ATTORNEYS

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HOSIERY TRIMMING DEVICE

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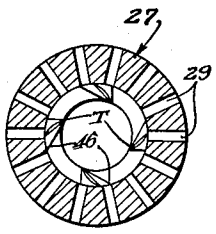


FIG. 5.

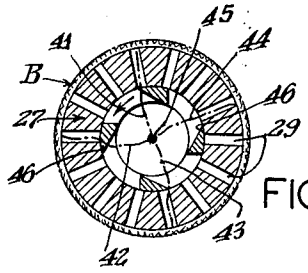


FIG. 6.

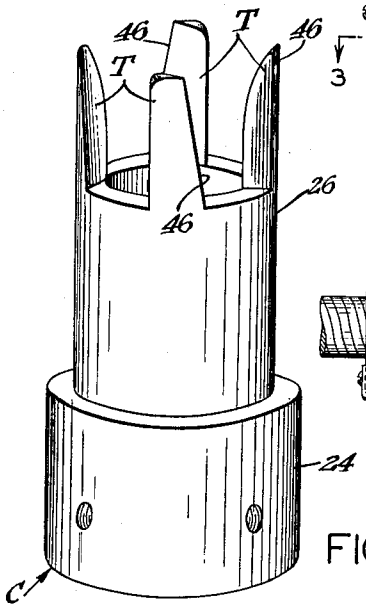


FIG. 7.

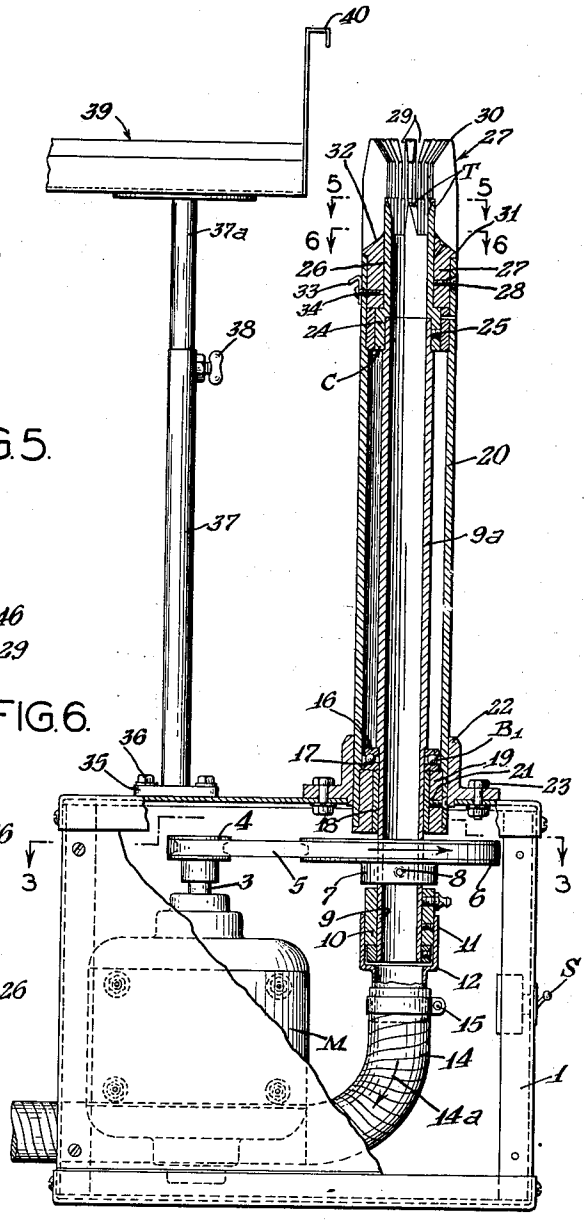


FIG. 2.

INVENTOR
HAROLD E. STOUT
BY Mock & Blum
ATTORNEYS

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HOSIERY TRIMMING DEVICE

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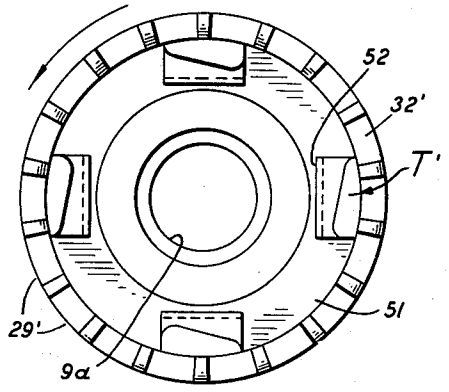


FIG.8.

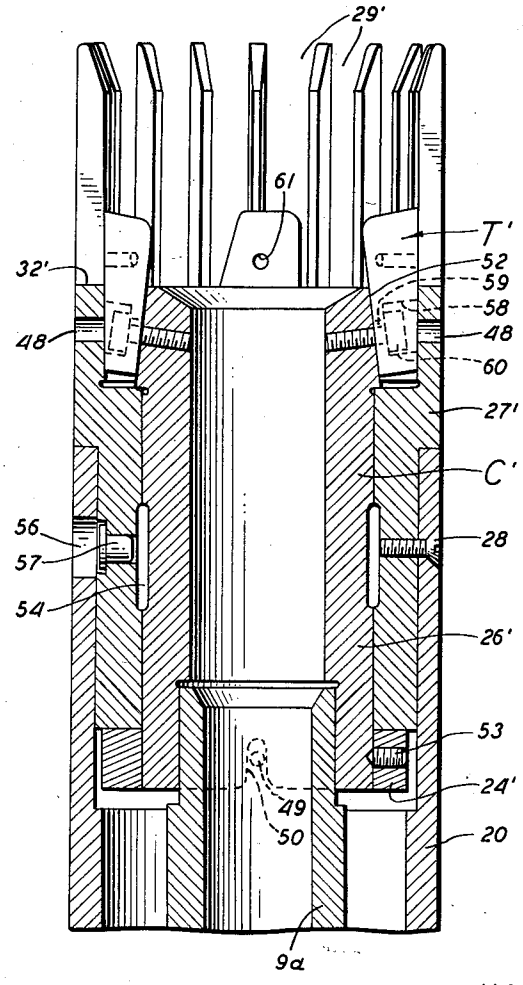


FIG.9.

INVENTOR.
HAROLD E. STOUT
BY Mock & Blum
Attorneys.

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HOSIERY TRIMMING DEVICE

Harold E. Stout, West Leesport, Pa., assignor to Textile Trimming & Boarding Machine Co., Inc., Reading, Pa., a corporation of Pennsylvania

Application October 4, 1954, Serial No. 460,128

4 Claims. (Cl. 26—11)

My invention relates to new and improved means for trimming articles of hosiery.

The invention relates particularly to the trimming of the interior threads of a knitted Argyle sock or other article of hosiery which is knitted by well-known and current machines.

When an Argyle sock is knitted upon the machines now used, an original knitted blank is made on the machines. This original blank is open at both ends. The pattern areas have yarns of different colors which are interknitted in order to form a single twisted or composite yarn or thread. It is necessary to cut out this composite or twisted yarn or thread, and also to cut the individual colored fibres of the respective pattern diamonds or areas, while leaving short lengths of such individual yarns uncut.

At the present time, this trimming operation is attended with serious difficulties and requires considerable time and labor and is expensive.

According to my invention, I provide a simple and efficient mechanism whereby this work can be done accurately and rapidly at low cost.

The invention is further explained in the annexed description and drawings which show a preferred embodiment.

Fig. 1 is a perspective view of the apparatus with a blank in position.

Fig. 2 is a longitudinal vertical section of the apparatus, partially in elevation.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged detail view of the upper part of Fig. 2, showing a blank in position.

Fig. 5 is a section on the line 5—5 of Fig. 2.

Fig. 6 is a section on the line 6—6 of Fig. 2.

Fig. 7 is an enlarged perspective view of the internal cutter.

Figs. 8 and 9 are respectively top plan and longitudinal vertical sections of a slightly modified form of the invention.

Referring to Figs. 1 to 7, the apparatus comprises a box or casing 1, which is provided with an opening which has a wire mesh or screen 2. As shown in Fig. 2, a motor M is located in the casing 1. This motor M may be an electric motor or of any type. In this embodiment, the shaft 3 of the motor is in the vertical position. A pulley 4 is fixed to the shaft 3. An endless belt 5 connects the pulley 4 to a companion pulley 6. The belt 5 may be a V-belt.

The pulley 6 is of larger diameter than the pulley 4, in order to provide a selected speed reduction. The pulley 6 has a hub 7. This hub 7 is fixed by means of a set screw 8 to a sleeve or tube 9. This sleeve 9 is integral with a tube 9*a*. The sleeve 9 provides the bearing portion of the tube 9*a*. The sleeve 9 fits rotatively in a bushing 10 which is fixed by screws 11 to a sleeve-socket 12. This sleeve-socket 12 is open at its top and bottom. At its bottom end, the sleeve-socket 12 is connected to an exhaust tube 14, which is connected to any suitable suction

blower or the like, for creating a suction in the tube 14, in the direction of the arrow 14*a*. The tube 14 is of the usual flexible type, and it is clamped to the lower part or neck of the sleeve-socket 12, by means of a clamp 15.

The hose 14 is held against rotation or shifting from its selected position, by any suitable means.

As shown in Fig. 2, the tube 9*a* has a shoulder which rests upon the upper race 16 of a thrust bearing of the anti-friction type. This thrust bearing is provided with balls B, and with a lower race 17. This lower race 17 rests upon the upper end of a bushing 18. This bushing 18, like the other bushings mentioned herein, is cylindrical. This bushing 18 fits within a bushing 19, which also provides part of the support for the lower race 17. The bushing 18 has a force fit in the bushing 19. The bushing 19 is fixed to the outer sleeve-casing 20, by one or more set screws 21. The lower part of the outer casing 20 fits within a sleeve 22, which has a base of annular shape which is fixed to the top wall of the casing 1 by releasable fixing members 23, which may be bolts or the like.

The outer casing 20 is thus fixed non-rotatively to the casing 1.

The tube 9*a* is held turnably in position by means of its thrust bearing and the bushings 18 and 19.

For convenience, the invention is explained in a position in which the tube 9*a* rotates about a vertical axis.

At its upper end, the sleeve 9*a* is fixed to the tubular hub 24 of the cutter C. As shown in Fig. 2, the upper end of the tube 9*a* is of reduced thickness, in order to provide a shoulder which abuts the lower end of the hub 24. One or more set screws 25 fix the hub 24 circumposed about the rotatable sleeve 9*a*.

The cutter has a tubular shank 26, which is provided with a selected number of circumferentially separated teeth T. In this embodiment, four teeth T are shown, but the number of teeth T may be varied.

The shank 26 is turnable within a casing 27, which is fixed to the casing 20 by one or more set screws 28.

As shown in Fig. 6, the casing 27 is provided with a selected number of radial slots 29. In this embodiment, there are 14 radial slots 29. Each of the slots 29 has vertical parallel walls, and each said slot 29 has a lateral axis which is disposed radially relative to the vertical axis of rotation.

Fig. 6 shows the counterclockwise direction of rotation of the cutter C. As shown in Fig. 6, each tooth T is wedge-shaped in horizontal cross-section, with an anterior sharp cutting edge in the direction of the counterclockwise rotation.

As also shown in Fig. 6, each tooth T has a part-cylindrical surface which fits closely against the interior wall of the casing 27, which is cylindrical, save where it is interrupted by the vertical slots 29.

As shown in Fig. 2, the casing 27 has an enlarged head at its upper end, thus forming a shoulder of the casing 27 which abuts the upper end of the casing 20. The slots 29 extend vertically between the points 30 and 31, namely, above the top of the casing 20. That is, the slots 29 are located wholly above the top of the casing 20. The shank of the casing 27 which is located within the casing 20, is unslotted.

At its upper end, the interior wall of the casing 27 is of frusto-conical shape.

Each slot 29 has a bottom wall 32.

A hook 33 is fixed to the casing 20 by means of a screw 34.

A column 37 has a flange 35 which is fixed to the top wall of the casing 1 by means of members 36. Said column 37 has an extension 37*a* which is slidable in the column 37. A clamping screw 38 holds the extension 37*a* at its desired height.

A platform 39 is fixed to the extension 37.

A pile of the blanks can be placed upon the top of the platform **39** and each top blank B can be moved over the lip **40** of the platform **39**, to be located upon and to fit snugly against the casing **20**.

The operation of the mechanism is as follows:

The motor M is controlled by any suitable switch S. The switch S is opened so that the tube **9***a* and the cutter C are stationary, while a blank B is moved into the position shown in Fig. 1. When this is done, the inner threads which are to be cut are guided so as to be located in the slots **29**.

As shown in Fig. 1, the upper end portion of the casing **27** is tapered, so that the blank B can be easily inserted in position.

Some of the threads **41**, **42**, **43**, **44** are shown in Fig. 4. Said Fig. 4 also shows the combined or twisted thread **45** of the individual pattern threads **41**, **42**, **43**, **44**. In this illustration, there are four pattern threads, **41**, **42**, **43** and **44**, of different respective colors.

When the motor M is started, the cutting edges **46** of the teeth T accurately cut the individual pattern threads and also cut off the combined or twisted thread **45**, while leaving short lengths of the individual pattern threads projecting or extending from the pattern areas, so that the Argyle sock does not unravel.

As an important feature of the invention, the forward or cutting edges **46** are inclined rearwardly or reversely, relative to the direction of rotation of the cutter C and of its teeth T. This provides the desired shearing action.

The portions of the pattern threads which are located within the slots **29** remain uncut.

The cut threads are removed from the interior of the rotating tube **9***a*, by means of the suction which is exerted through the hose **14**.

The hook or catch **33** provides convenient means for reversing the blank B after the cutting operation has been completed.

As shown in Fig. 1, the hook **33** extends over the edge of the top opening of the blank B, when the blank B is in the cutting or operating position. When the cutting operation has been completed, the operator rolls the blank B upwardly from its bottom end, thus conveniently reversing the blank B by means of hook **33**.

Fig. 3 shows that the motor has a flange M*a*, which is fixed to a bracket M*b*, of one of the side walls of the casing **1**.

It will now be understood that the hollow standard or casing **20** is fixedly supported in upstanding position on the box or base **1**, and has fixed on its upper end, in alignment therewith, the open ended, generally tubular casing **27**. Further, the inner suction sleeve or tube **9***a* is axially rotatably supported within the outer sleeve or standard **20**, and communicates through the axially alined tubular shank **26** of the cutter with the interior of the casing **27**, to thereby permit the suction in hose **14** to act on the internal sock threads and draw the latter inwards through the casing slots **29** into the path of the cutter teeth. That is, the cutter teeth or blades extend longitudinally from the shank **26**, and are rotatable with the latter transversely across the slots **29** for shearing engagement with the internal sock threads. Of course, the severed threads will then be withdrawn through the suction tube **9***a* and hose **14**.

In Figs. 8 and 9 are shown a slightly modified form of the present invention, wherein the casing **27′** is generally cylindrical in configuration and formed with a depending tubular shank extending snugly into and fixed within the upper end of the upstanding outer sleeve or casing **20**, as by the threaded fastener **28**. The casing **27′** is formed with a plurality of radially disposed, longitudinal slots extending inwards from the open upper casing end and terminating in upwardly facing end walls **32′**. In addition, the casing **27′** is formed with a plurality of circumferentially spaced, radial apertures **48**, for a purpose appearing presently.

Disposed spacedly within the outer sleeve **20**, below the upper end of the latter, is the rotary suction sleeve or tube **9***a*, which in the instant modification is formed with one or more laterally outwardly projecting lugs or pins **49**. The cutter C′ includes a tubular, open ended shank **26′** arranged within the casing **27′** in substantial alignment with the suction tube **9***a*, and having its lower end portion circumposed about the upper end portion of the suction tube. The suction tube portion received in the cutter shank need not be a close fit, as will appear presently; and, the lower end of the cutter shank is formed with a plurality of circumferentially spaced notches or cutouts **50**, each adapted to loosely receive one of the suction tube pins **49**. Formed on the upper end of the cutter shank **26′** is an enlarged annular head **51** which is provided with a plurality of circumferentially spaced, longitudinally extending outwardly opening slots or seats **52**. The rear wall of each slot **52**, as best seen in Fig. 9, is beveled or inclined inwards.

To retain the cutter shank **26′** in position within the casing **27′**, an annular collar or hub **24′** is releasably held, as by the set screw **53**, in fixed surrounding relation with respect to the lower end portion of the cutter shank. That is, upward movement of the cutter shank is limited by engagement of the hub **24′** with the lower end of the casing **27′**. Obviously, rotary movement of the suction sleeve **9***a* will, through the pin and notch connection **49**, **50**, effect axial rotation of the cutter shank **26′** within the casing **27′**. Further, the loose suction tube and cutter connection permits floating action of the latter within the casing **27′**. The facing surfaces of the cutter shank **26′** and casing **27′** are preferably recessed to define therebetween an annular chamber **54**, which communicates radially outwardly through the casings **20** and **27′** via the passageway **56** for receiving grease or other suitable lubricant between the cutter shank **26′** and casing **27′**. The passageway **56** is preferably normally closed or sealed, as by a removable plug **57** or other suitable means.

Seated in each of the slots **52** is a cutter blade or tooth T′ which extends longitudinally of the casing **27′** and upwards beyond the slot end walls **32′** so as to partially overlie the slots **29′**. The cutter teeth T′ have outer cylindrical surfaces conforming to the interior of the casing **27′** and have their inner surfaces inclined inwards and in bearing engagement with the inwardly inclined back walls of the slots **52**. Thus, vertical or longitudinal shifting movement of the cutter teeth T′ in the slots **52** will effect movement of the teeth radially inwards and outwards.

Formed in the outer face of each cutter tooth is an inwardly extending recess **58**; and, a longitudinally elongated slot **59** opens inwardly from each recess **58** through the inner face of the associated cutter tooth. Extending through the slot **59** of each cutter tooth T′ and threadedly into the adjacent portion of the cutter shank **26′** is a headed clamping screw **60**. That is, the head of each screw **60** is seated in the recess **58** of the respective cutter tooth T′ to clamp the tooth in any selected position of its longitudinal, and hence radial movement, as mentioned hereinbefore. As the cutter teeth wear in normal usage, adjustment may be had by loosening the screws **60**, access being provided through the casing holes **48**, and subsequently retightening the screws after the teeth have been shifted, as desired, along the back walls of the slots **52**. The tooth slots **59** obviously provide substantial adjustability, and, adjustment of the cutter teeth is further facilitated by the provision in each tooth of a through hole **60** for receiving an adjusting tool to be actuated from exteriorly of the casing **27′**.

The sock trimming operation of the modification of Figs. 8 and 9 is substantially the same as that described hereinbefore in connection with Figs. 1–7.

From the foregoing, it is seen that the present invention provides a hosiery trimming device which fully

accomplishes its intended objects, and which is well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A device for trimming internal threads from an article of hosiery, said device comprising a fixedly positioned open ended casing shaped to receive an article of hosiery engaged over one casing end, said casing being formed with a plurality of longitudinally disposed slots opening outwards through said one end for receiving the internal threads of said article when the latter is engaged in said casing, an axially rotatable suction tube arranged in longitudinal alignment with said casing, one end of said suction tube being disposed adjacent to the other end of said casing and the other end of said suction tube communicating with a source of suction, an open ended tubular cutter shank disposed longitudinally within said casing and secured in axial alignment with said one end of said suction tube for rotation with the latter, said cutter shank having its external surface in rotatable engagement with the internal surface of said casing, and a plurality of spaced cutting blades extending longitudinally from said shank in close proximity to the internal surface of said casing and movable with said shank transversely across the interior of said slots, whereby the portions of said threads disposed interiorly of said casing are severed by said cutter blades and pneumatically removed through said cutter blade shank and said suction tube.

2. A device for trimming internal threads from an article of hosiery comprising a base, a hollow open standard on said base, an open ended casing fixed in upstanding relation on the upper end of said standard and shaped to receive an article of hosiery engaged over said casing, said casing being provided with a plurality of spaced slots for receiving the internal threads of said article when the latter is engaged over said casing, an axially rotatable suction tube disposed longitudinally within said

standard having its upper end adjacent to said casing and having its lower end connected to a source of suction, an open ended tubular cutter shank disposed longitudinally within said casing and secured in axial alignment on the upper end of said suction tube for rotation with the latter, said cutter shank having its external surface in rotatable engagement with the internal surface of said casing, and a plurality of spaced cutting blades extending longitudinally upwards from said cutter shank in close proximity to the internal surface of said casing and movable with said shank transversely across the interior of said slots, whereby the portions of said threads disposed interiorly of said casing are severed by said cutting blades and pneumatically removed through said cutter shank and suction tube.

3. A device according to claim 2, wherein the lower end of said suction tube extends downwards through and out of the lower end of said standard to insure unobstructed removal of the severed threads.

4. In a hosiery thread trimming device, a fixed open ended casing shaped to receive an article of hosiery engaged over said casing, said casing being provided with a plurality of spaced longitudinally extending slots for receiving internal threads of an article of hosiery when the latter is engaged over said casing, an open ended tubular cutter shank rotatably supported longitudinally within said casing with its external surface in rotatable engagement with the internal surface of said casing, said shank being formed with a plurality of circumferentially spaced, outwardly opening recesses each having its bottom wall inclined at an angle with respect to the shank axis, a plurality of cutter blades each seated in one of said recesses and shiftable along the respective recess bottom wall to adjust said blade radially into close proximity with the interior surface of said casing, and means for releasably fixing each of said blades in any selected position of its adjustment.

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