Nov. 27, 1934. C. G. BROSTROM 1,981,944

TRIMMING MACHINE

Filed Jan. 18, 1934 2 Sheets-Sheet 1

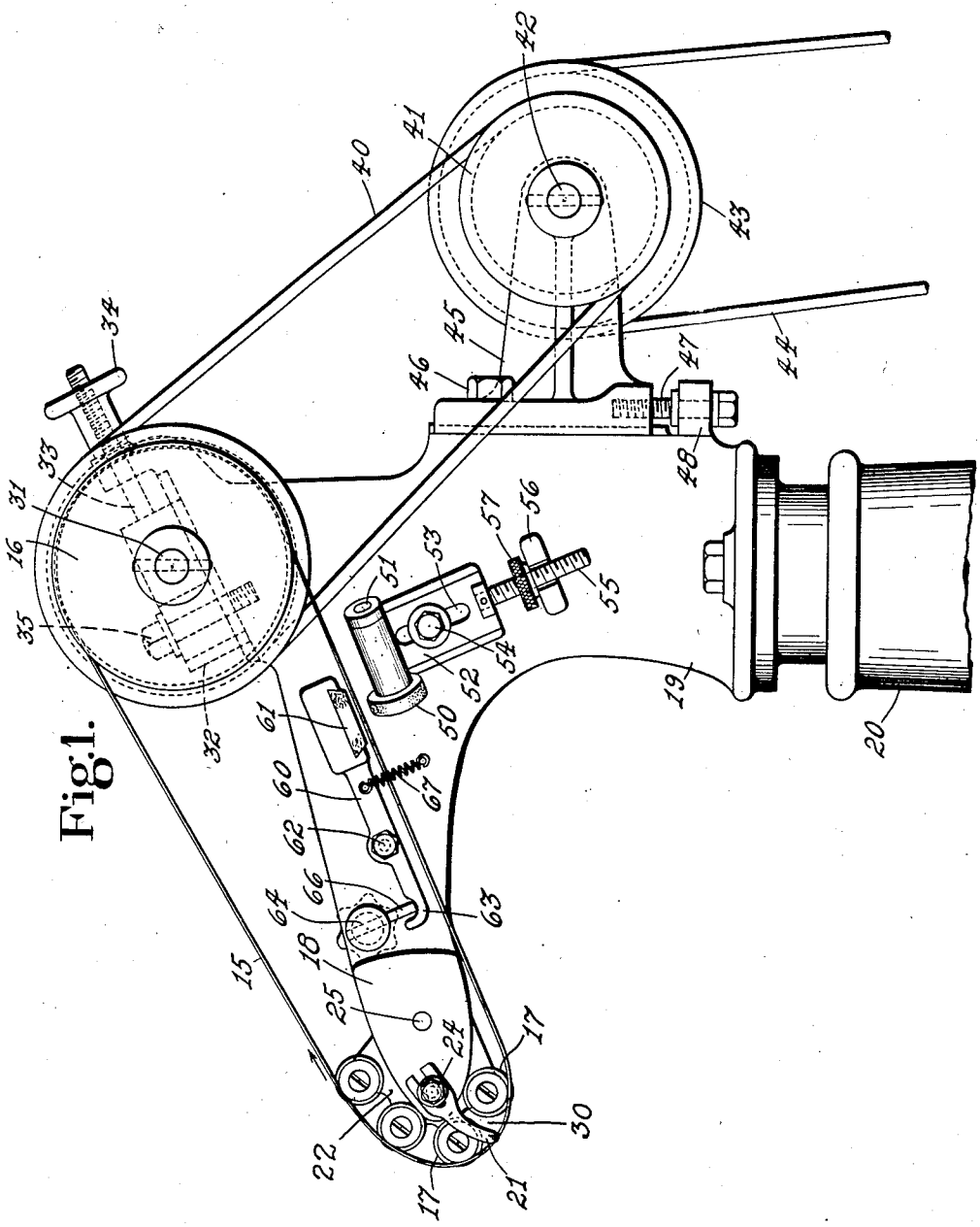


Fig.1.

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Fig.2.

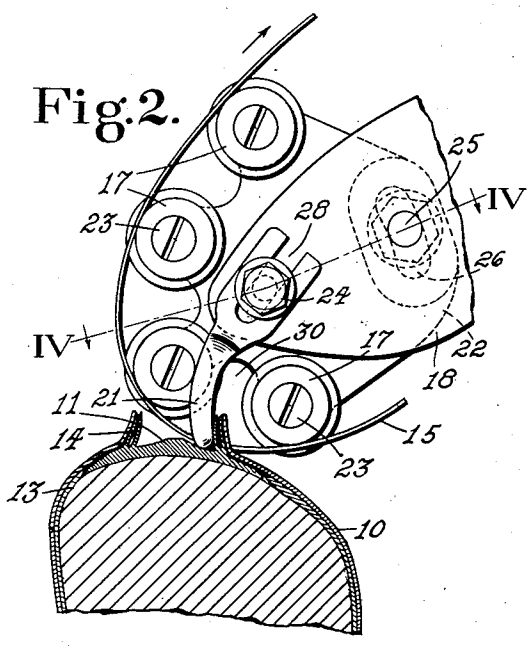


Fig.4.

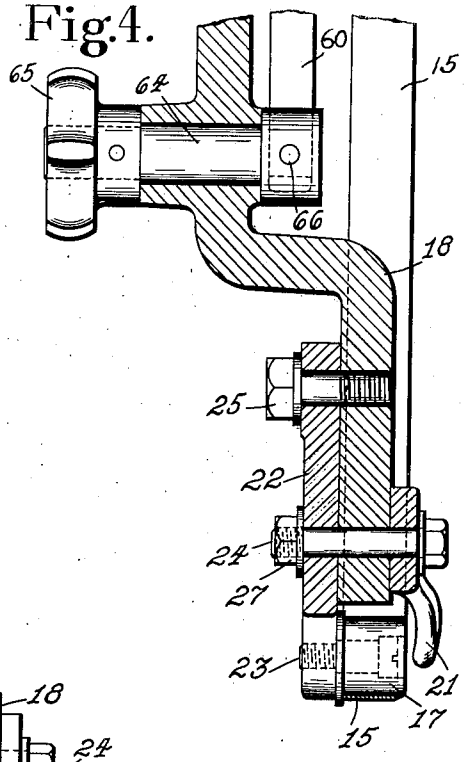
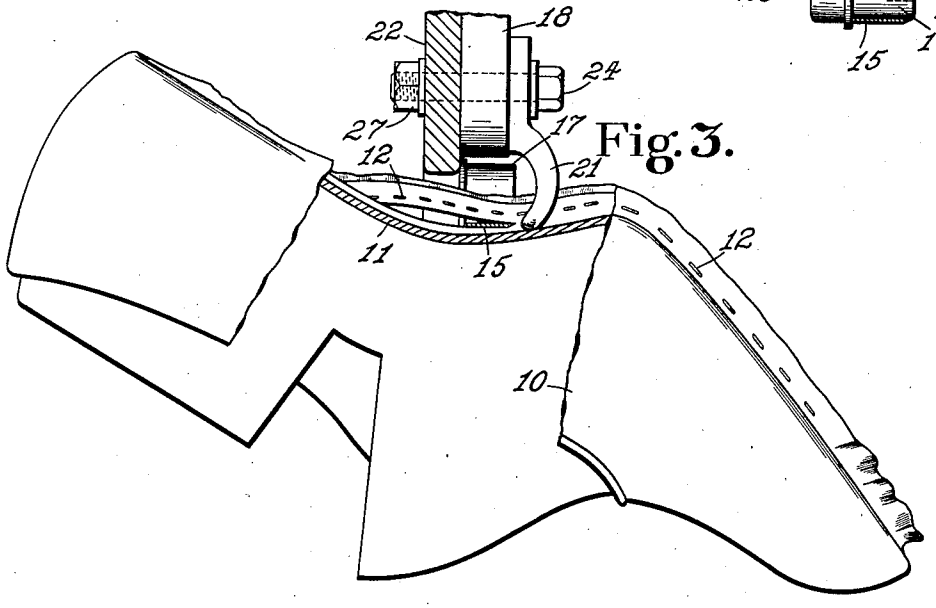


Fig.3.



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Patented Nov. 27, 1934

1,981,944

UNITED STATES PATENT OFFICE

1,981,944

TRIMMING MACHINE

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Application January 18, 1934, Serial No. 707,169

9 Claims. (Cl. 12—83.5)

This invention relates to trimming machines and is herein illustrated as embodied in a machine comprising a flexible band-knife and other elements organized to sever a flange of surplus material projecting from the bottom of a lasted shoe.

Although it has heretofore been proposed to utilize trimming machines of the band-knife type for severing flanges of surplus materials projecting from the bottoms of lasted shoes, such machines have not heretofore been entirely satisfactory and have never been used extensively for such work as trimming inseams of shoes, because they do not provide sufficient clearance for the untrimmed materials at certain portions of the shoes. For example, in many women's shoes the surplus materials at one side of the shank are not more than 5/8 of an inch from those at the opposite side of the narrowest portion. Consequently, when trimming the first side the band-knife constitutes an obstruction to the untrimmed materials at the other side. This obstruction can be avoided only by tipping or rocking the shoe in such a way as to leave some of the surplus materials unsevered. Again, similar obstruction is encountered when the trimming approaches the toe of a shoe, particularly if the toe is narrow, and here also it can be avoided only by rocking the shoe and leaving an undesirable quantity of surplus material unsevered.

Regarding the conditions above set forth as a problem to be overcome, an object of the present invention is to provide an improved band-knife machine with which inseams and similar formations of lasted shoes may be trimmed closely without encountering obstruction.

Accordingly, a feature of the invention as embodied in the trimming machine herein illustrated, consists in an organization comprising two small stationary rolls (there may be more than two) in tandem relation and arranged to provide between them a narrow gap through which a flange of surplus materials may pass without obstruction, a flexible band-knife arranged to run on the rolls and tensioned against them in a direction such as to bulge the intermediate portion extending across the gap, means for operating the knife with movement lengthwise thereof, and means arranged to guide the flange of surplus material to the gap.

Preferably, and as herein shown, the band-knife is endless and is mounted to run also on a driving wheel so related to the small rolls as to give it an oblong shape with U-shaped bends or curves, of which one runs on the rolls. The latter, though enclosed by the band-knife, are so small and so closely related that when the knife is tensioned against them the radius of curvature of the U-shaped bend thus formed is short enough to provide the aforesaid clearance for the surplus materials of a lasted shoe that run past but not through the point of operation. Moreover, although the band-knife is flexible and not directly supported or braced at the cutting point, it is rendered sufficiently firm and stiff at that point by its inherent resistance to being flexed to a curvature of short radius.

Another object of the invention is to provide, in a machine of the type above mentioned, improved means for sharpening the cutting edge of the band-knife. It has been common heretofore to provide for this purpose an abrading member arranged to be moved manually or through the medium of an adjusting screw toward and from the edge to be sharpened. Although devices so controlled may fulfill their sharpening duties, the pressure of the abrading element against the cutter may be, and frequently is, developed more than is desirable or necessary, and as a result the cutter is worn away more rapidly than need be by the abrading element. To avoid excessive or unnecessary abrasion of the cutter, and to insure uniform pressure whenever the abrading relation is established the present invention provides an improved combination comprising an abrading member arranged adjacent to but normally out of contact with a tensioned stretch of a band-knife, a movable presser arranged normally to deflect that stretch of the band-knife against the abrading member with limited predetermined force, and a manually operable controller arranged to restrain the presser from functioning but movable to release it. In such a combination the force with which the band-knife is held against the abrading member is limited by the force with which the presser may deflect the band-knife, and since this pressure is limited and predetermined to suit the established conditions, the user may control only the length of time during which the band-knife and the abrading member are in contact with each other. Preferably, the abrading member is adjustably mounted so that it may be supported at various distances from the normal path of travel of the band-knife. This adjustability provides for regulating the pressure with which the band-knife may be pressed against the abrading member by the presser and also provides for counteracting various degrees of tension to which the band-knife is subjected and by which the magnitude of its deflection from its normal path of travel is affected.

Referring to the drawings,

Fig. 1 is a right-side elevation of a trimming machine embodying the several features of the invention;

Fig. 2 is a similar elevation on a larger scale of the elements adjacent to the trimming locality, the figure also including a cross-sectional view of the shank-portion of a lasted shoe in process of being trimmed;

Fig. 3 is a front elevation, partly in section of the elements included in Fig. 2; and

Fig. 4 is a sectional view through the structure intersected by line IV—IV of Fig. 2.

The shoe illustrated in Figs. 2 and 3 is of the type more fully illustrated and described in Letters Patent of the United States No. 1,932,545, granted October 31, 1933 on an application of George Goddu. In a shoe of this type, the overdrawn margins of the upper 10 are secured to a leather insole 11 both by lasting staples 12 and quick-drying cement of the pyroxylin type, the margins of the lining 13 being cut away prior to the lasting operation so that the margins of the upper will lie in contact with the insole. Before the parts of the shoe are assembled on a last the insole is prepared by a channeling operation that forms two oppositely extending flaps which, when turned up into confronting relation, form a two-ply lip or flange 14 to which the overdrawn marginal portion of the upper may be secured at close intervals by lasting staples 12, but immediately before the lasting operation is performed the margin of the upper and the surface of the insole against which it is to lie are coated with cement of the type above mentioned to provide a permanent bond when the cement hardens. The duty of the staples 12 is to maintain the cement-coated portions of the upper and the insole in their lasted relation until the bond of adhesion afforded by the cement acquires a permanent condition. When the cement has hardened the surplus materials comprising the upstanding margin of the upper and the lip of the insole must be severed substantially flush with the general plane of the shoe bottom, that is at the root of the flange 14, to the end that no surplus material will project to form a lump or to interfere with forming a close and satisfactory bond with an outsole which is to be subsequently attached with cement. When the surplus materials are severed as above pointed out, the line of cutting is below the lasting staples which therefore remain in the severed scraps. So far as the above-described trimming operation is concerned, the conditions encountered in a shoe of this type are substantially identical with those encountered in a welt-shoe, with this exception, that the shoe herein illustrated does not include a welt.

The machine herein disclosed for severing the flange of surplus materials that project from the bottom of a lasted shoe comprises an endless, flexible band-knife 15 of oblong shape having an upper U-shaped bend arranged to run on a driving wheel or pulley 16, and a drooping U-shaped bend of short radius arranged to enclose and run on a series of small, stationary rolls 17 in tandem relation and below the level of the driving wheel 16. Preferably, these small rolls are so arranged that the lower portion of the drooping bend between two of them will be conveniently situated and curved to perform the trimming operation on the upturned bottom of an inverted shoe in the hands of an operator. The band-knife is tensioned against the two lower rolls 17 in lines angularly related to a line tangent to their peripheries, whereby these rolls maintain a bend or bulging formation of short radius in that portion of the band-knife that lies between them. To provide a space in which a shoe may be manipulated without obstruction, the rolls 17 are mounted at the forward end of an overhanging arm 18 that projects forwardly from a frame or head 19. As shown in Fig. 1, this frame is mounted at the upper end of a floor-pedestal 20. The two lower rolls of the series, though closely related, are nevertheless spaced one from the other far enough to provide a narrow gap through which the surplus materials in process of being severed may pass without obstruction.

The surplus materials are guided to this gap by a stationary work-guide or gage 21 secured to the forward end of the arm 18. The tip of the work-guide is arranged to run in the angle formed by the body of an insole and the inner lip or flap projecting upwardly therefrom, and is effective not only to control the closeness of the trimming but also to brace the surplus materials against the frictional drag of the band-knife which should be driven in the direction indicated by an arrow in Figs. 1 and 2.

The right-hand edge of the band-knife (Fig. 3) is sharpened to provide a cutting edge. Consequently, the operator will feed the shoe from right to left. The band-knife is braced against lateral displacement by flanges projecting from the left-hand ends of the rolls 17. As the surplus materials are severed in the form of a strip they pass between and beyond the two lower rolls 17 without obstruction, and when finally detached from the shoe they may fall from the left-hand side of the knife.

As herein shown, provision is made for adjusting the small rolls 17 about an axis approximately at the center of curvature of the lower U-shaped bend of the band-knife, to the end that the operator may use whichever segment of the bend may be situated most conveniently, with regard to its pitch or slant, to suit his view of the work or his mode of manipulation. For this purpose, the rolls 17 are mounted on a plate 22 by means of studs 23 about which they rotate. To avoid obstructing the gap through which the severed materials must pass, the plate 22 is provided with a notch 30. The plate 22 is clamped against the left-hand face of the arm 18 by two clamping bolts 24 and 25 of which the first is located approximately at the center of curvature of the U-shaped bend. The bolt 25 extends through a segmental slot 26 formed in the plate 22 and has screw-threaded engagement with the arm 18, but the clamping effect of the bolt 24 is derived from a nut 27. When both bolts are loosened the plate and the rolls 17 may be adjusted angularly about the axis of the bolt 24 within the range of adjustment afforded by the slot 26, and in this way the gap between the two lower rolls 17 may be placed in register with the desired segment of the band-knife.

As shown, the clamping bolt 24 is also utilized to secure the trimming guide 21 to the right-hand face of the arm 18. A notch or slot 28 formed in the shank of the trimming guide for the reception of the bolt 24 provides for adjusting the trimming guide up and down as may be necessary or desirable to determine the closeness of the trimming cut to the body of an insole. The trimming guide may also be adjusted angularly about the bolt 24. For a shoe of the type herein illus-

trated, it is preferable to set the tip of the trimming gage at a level that will result in severing the surplus materials flush with that portion of the upper that lies on the margin of the insole, but for the purpose of trimming a welt-shoe it would be necessary to adjust the trimming gage to a lower level, since the inseam of a welt-shoe must be trimmed slightly above the inseam stitches. As clearly shown in Fig. 2, the radius of curvature of the drooping bend at the trimming locality is so short that ample clearance is provided for the unsevered surplus materials at the front side of the shoe even when the narrowest parts thereof, namely the shank and the toe, are in process of being trimmed as closely as could be desired.

For the purpose of tensioning the band-knife 15 against the small rolls 17 the wheel 16 is adjustably mounted. Its supporting stud 31 is affixed to a block 32 having tongue-and-groove connection with the frame 19. A screw-threaded stem 33 of the block is provided with an adjusting nut 34 that operates by engagement with a boss on the frame 19. A clamping bolt 35 extends through a slot in the block 32 and is screwed into a tapped hole in the frame. The wheel or pulley 16, in addition to having a surface on which the band-knife runs, is also provided with a groove in which a driving belt 40 may run. This belt is driven by a pulley 41 affixed to a countershaft 42 that also carries a pulley 43. A belt 44 is arranged to run on the pulley 43 and on a driving pulley (not shown) at a source of rotation. The countershaft 42 is journaled in a bracket 45 clamped against the rear face of the frame 19 by bolts 46 with provision for vertical adjustment to regulate the tension of the belt 40. For the purpose of effecting such adjustment, the bracket 45 is bored and tapped to receive an adjusting screw 47 sustained by a boss 48 formed on the frame.

The invention also provides improved means for sharpening the cutting edge of the band-knife 15 under conditions that will guard against wearing away the band-knife too rapidly by excessive abrasion. As shown in Fig. 1, a small abrading wheel or roll 50 is arranged under but adjacent to the lower stretch of the band-knife. This abrading member is affixed to a freely rotatable stem 51 journaled in a block 52. The axis of the stem 51 is preferably skewed relatively to the path of travel of the band-knife, to the end that when the latter is running in contact with the periphery of the abrading member the latter will be rotated slowly thereby. The supporting block 52 is provided with a slot 53 to receive a clamping bolt 54 that projects into a hole bored and tapped into the frame 19. The block is also provided with a screw-threaded stem 55 that extends through a notch or hole in a boss 56 projecting from the frame. A nut 57 carried by the stem 55 is arranged to be seated against the boss 56 and thus to adjust the abrading wheel 50 so that it will stand at the desired distance from the normal path of travel of the adjacent stretch of the band-knife.

A presser 60 preferably provided with a pad 61 of soft material, such as felt, is arranged above the lower stretch of the band-knife at a point in register with the abrading wheel 50, its purpose being to deflect this stretch of the band-knife from its normal path of travel so that it may, whenever desired, run in contact with the abrading wheel. In the illustrated embodiment, this presser is so weighted as to be operated by the force of gravity for the purpose above explained, but if desired a light spring 67 may be provided to supplement such deflecting force. The presser is arranged to rock on a horizontal pivot 62 projecting from the arm 18 and is provided with a tail-piece or extension 63 by which it may be restrained in a retracted position out of contact with the band-knife. A manually operative controller is provided for restraining the presser and for releasing it whenever it is desired to sharpen the band-knife. The controller comprises a freely rotatable stud 64 (Fig. 4) journaled in the arm 18 and provided with a knob or hand-wheel 65 at its left-hand end. The right-hand end is provided with a radially extending pin or finger 66 arranged to depress the tail-piece 63 and thus to retract the presser from contact with the band-knife. As shown in Fig. 1, the tail-piece 63 is provided with a lip or projection to arrest clockwise rotation of the controller when it has been turned to the position shown, and is also provided with a notch or groove to receive the outer end of the pin 66 and thus to utilize the presser 60 for the purpose of preventing accidental turning of the controller in a counterclockwise direction. Nevertheless, when it is desired to depress the band-knife into engagement with the abrading wheel 50, it is necessary merely to turn the controller in a counterclockwise direction far enough to disengage the pin 66 from the tail-piece 63.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A trimming machine comprising two small stationary rolls in tandem relation and arranged to provide between them a narrow gap through which a flange of surplus materials projecting from the bottom of a lasted shoe may pass without obstruction, a flexible band-knife arranged to run on said rolls and tensioned against them in a direction such as to bulge the intermediate portion extending across said gap, means arranged to operate said band-knife with movement lengthwise thereof, and means arranged to guide the flange of surplus materials to said gap.

2. A trimming machine comprising a flexible band-knife having a U-shaped bend of short radius, two small stationary rolls in tandem relation on which the inner surface of said bend is arranged to run and against which the knife is tensioned in a direction such as to bulge the intermediate portion, said rolls being arranged to provide between them a narrow gap through which a flange of surplus materials projecting from the bottom of a lasted shoe may pass without obstruction, means arranged to guide such a flange to said gap, and means arranged to operate the band-knife with movement lengthwise thereof.

3. A trimming machine comprising a flexible band-knife having a drooping bend the inner surface of which is tensioned upwardly against two small rolls in tandem relation to stiffen the bend and to maintain a short radius of curvature thereof, said rolls being arranged to provide between them a narrow gap through which a flange of surplus materials projecting from the bottom of a lasted shoe may pass without obstruction, means arranged to guide such a flange to said gap, and means arranged to operate the band-knife with movement lengthwise thereof.

4. A trimming machine comprising a flexible band-knife, means including two small stationary rolls in tandem relation on which the band-knife is arranged to run and by which it is tensioned

in lines angularly related to a line tangent to the peripheries of said rolls whereby said rolls maintain a bend of short radius in that portion of the band-knife that lies between them, means arranged to guide a flange of surplus materials projecting from the bottom of a lasted shoe to said bend of the band-knife, and means arranged to operate the band-knife with movement lengthwise thereof.

5. A trimming machine comprising a flexible band-knife having a U-shaped bend of short radius, means on which said band-knife is arranged to run, said means including two small stationary rolls in tandem relation against both of which the inner surface of said bend is tensioned, means by which said rolls are supported with provision for adjustment about an axis approximately at the center of curvature of said bend, means arranged to guide a flange of surplus materials projecting from the bottom of a lasted shoe to said knife between said rolls, and means arranged to operate the knife with motion lengthwise thereof.

6. A trimming machine comprising a flexible band-knife having a U-shaped bend of short radius, means on which said band-knife is arranged to run, said means including two small stationary rolls in tandem relation against both of which the inner surface of said bend is tensioned, a supporting member on which both of said rolls are mounted, said member being angularly adjustable about an axis approximately at the center of curvature of said bend, means arranged to guide a flange of surplus materials projecting from the bottom of a lasted shoe to the band-knife between said rolls, and means arranged to operate the band-knife with movement lengthwise thereof.

7. A trimming machine comprising a forwardly projecting arm, a curved series of small rolls in tandem relation mounted at the forward end of said arm, a driving wheel behind said rolls and at a substantially higher level, a flexible band-knife of oblong shape having two U-shaped bends arranged to run respectively on said rolls and on said wheel, and a trimming gage secured to the forward end of said arm to guide surplus material on the bottom of an inverted lasted shoe to the lower part of the forward U-shaped bend at a point between two of said rolls.

8. A trimming machine comprising a frame, an angularly adjustable member, a trimming guide, a clamping bolt by which said adjustable member and said trimming guide are both adjustably secured to said frame, a driving wheel mounted on said frame, a series of small rolls mounted in tandem relation on said angularly adjustable member, and a flexible oblong band-knife one bend of which is arranged to run on said wheel and the other on said small rolls, the axis of said bolt being near the center of curvature of said other bend.

9. In a trimming machine of the type in which a stretch of a band-knife is normally constrained by tension to travel in a straight path, an abrading member arranged adjacent to but normally out of contact with a face of said stretch, a movable presser under the influence of a limited and predetermined yielding force arranged to deflect said stretch against said abrading member, and a manually operative controller arranged to restrain said presser from functioning but movable to release it.

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