Aug. 27, 1963 M. H. ROSKE 3,101,494

INSEAM TRIMMING MACHINES

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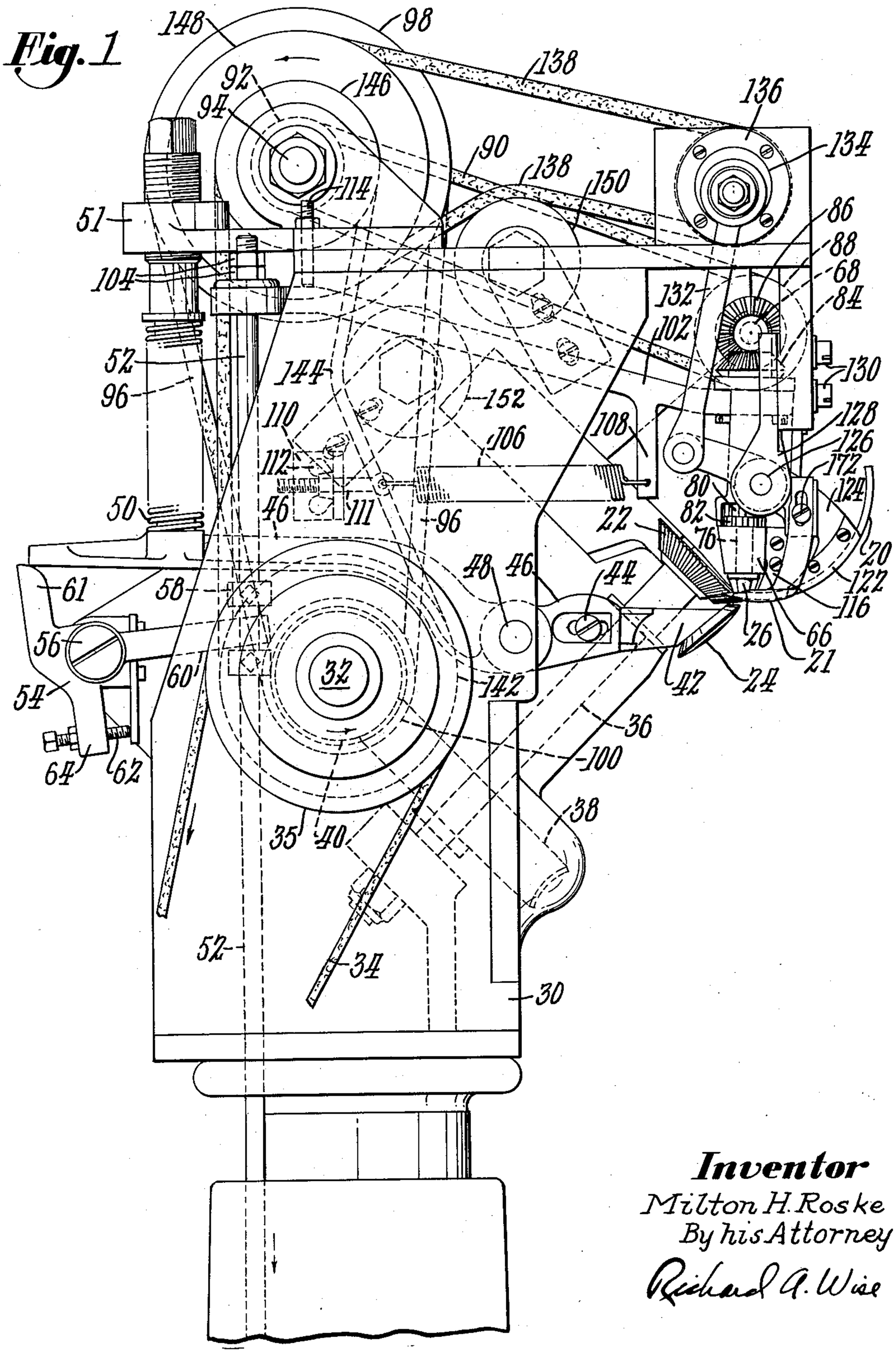
Fig. 1



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By his Attorney

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INSEAM TRIMMING MACHINES

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Fig. 2

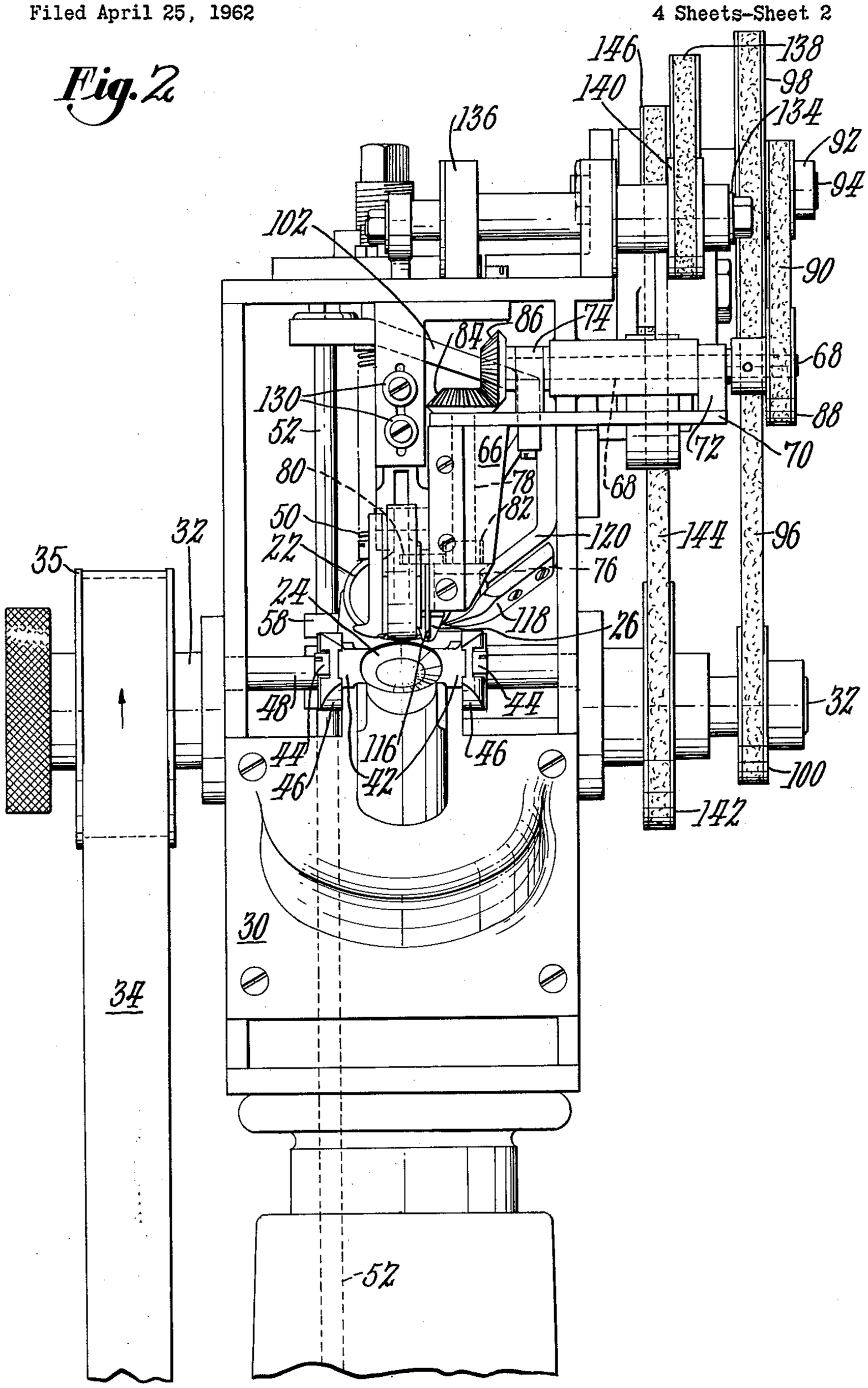

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Fig. 3

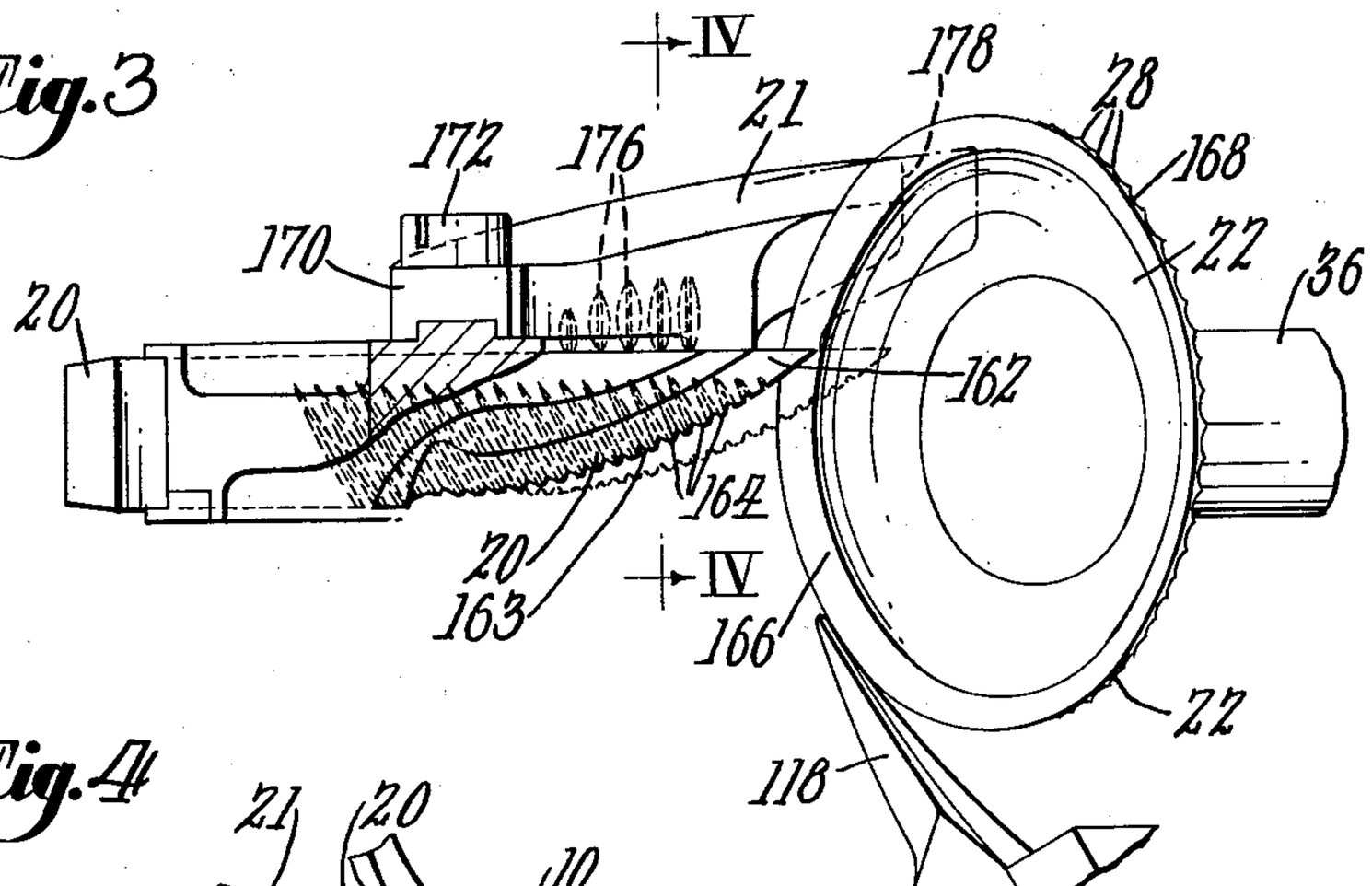


Fig. 4

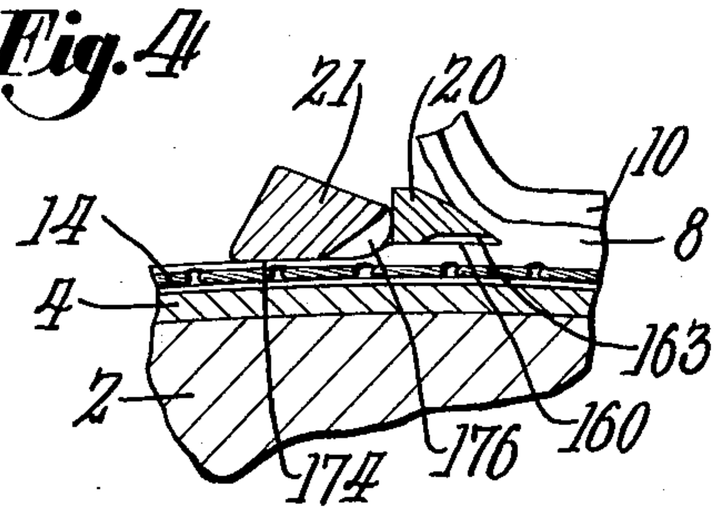
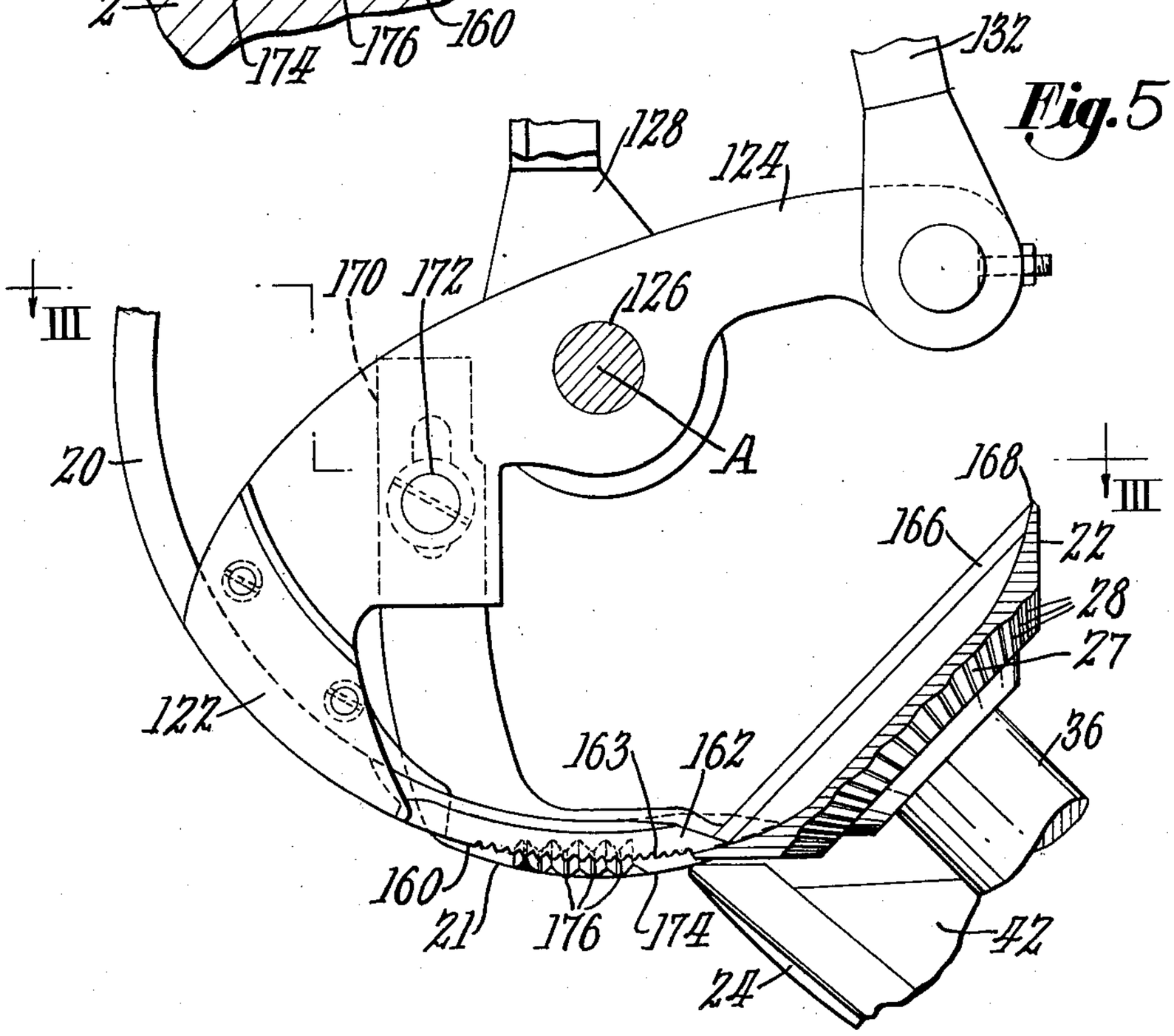


Fig. 5



INSEAM TRIMMING MACHINES

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Fig. 6

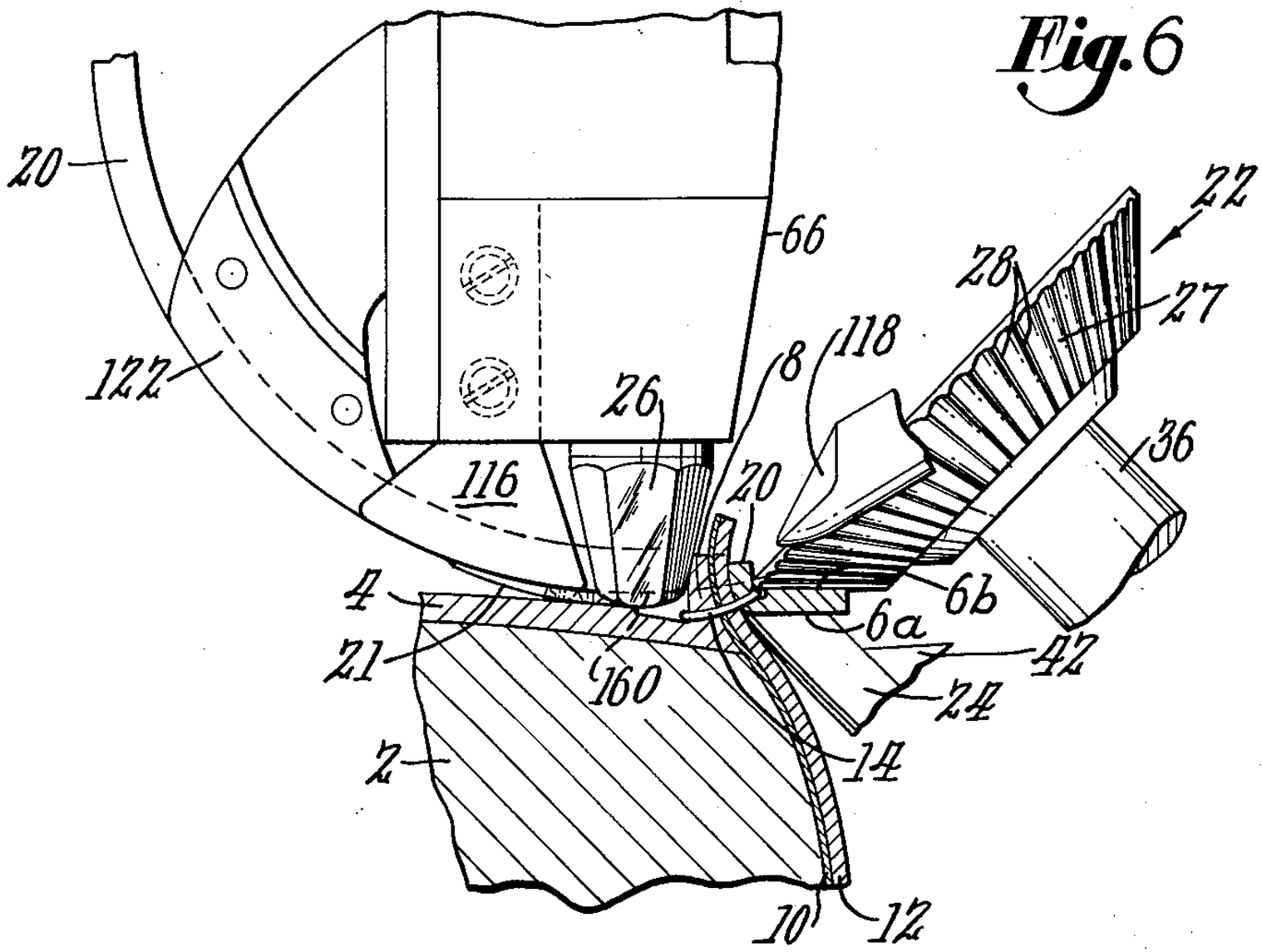


Fig. 7

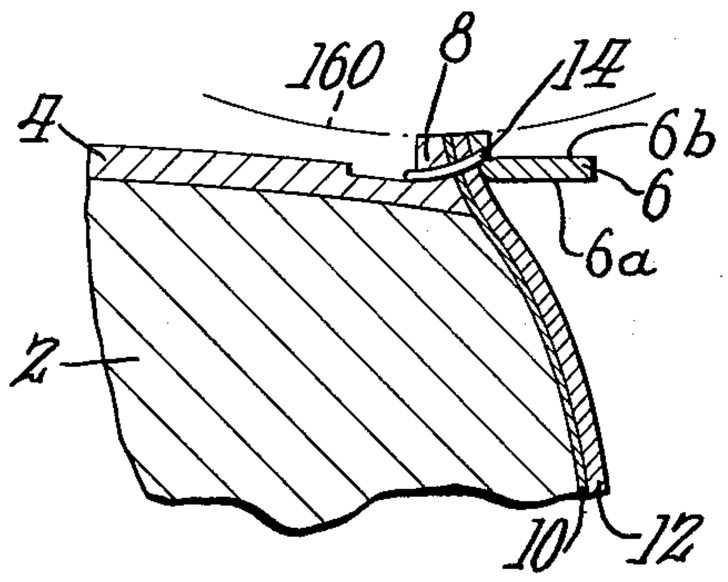
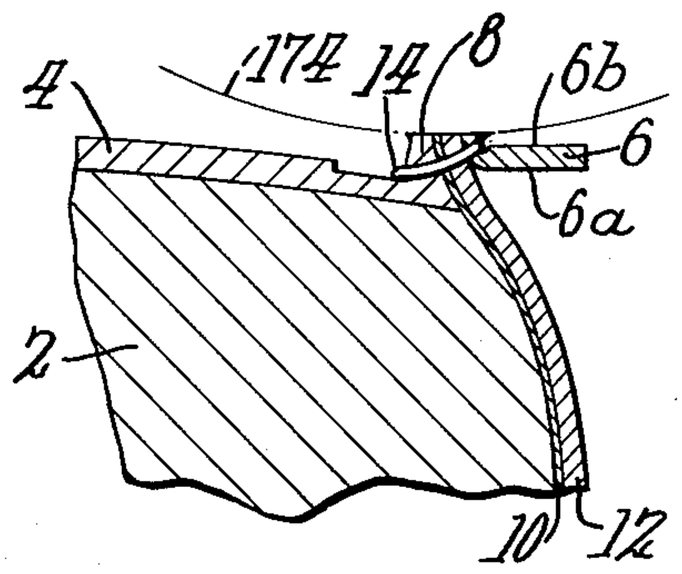


Fig. 8



United States Patent Office

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3,101,494
INSEAM TRIMMING MACHINES

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Filed Apr. 25, 1962, Ser. No. 190,155
12 Claims. (Cl. 12—4.4)

This invention relates to shoe machinery and more particularly to machines for trimming the inseams of partially fabricated welt shoes.

In the manufacture of a Goodyear welt shoe the upper leather, lining and the welt are stitched to a reinforced rib preformed from or secured to the bottom of the insole near its edge. Around the toe end of the shoe there may be additional layers of material including a box toe and/or a doubler sandwiched between the upper layer and the lining, which layers are also secured to the rib by stitching. The reinforced rib plus the marginal portions of the upper materials and welt which are joined to the rib, together with the stitches that form the joint are, in the art, generally referred to collectively as the "inseam" of the shoe, although, technically the inseam is the only seam or junction formed by the line of stitches.

One criterion of the modern shoemaking requires that the forepart of a Goodyear welt shoe, particularly at the ball of the foot, be made as flexible as possible without sacrificing durability, for which this type of shoe is well known. Because the inseam is formed as a projection on the insole it acts similar to the web of an "I beam" and tends to resist bending. It is, therefore, necessary to restrict the height of the inseam to a minimum to maintain flexibility. Consequently, the surplus portion of the inseam must be removed to a level as close as possible to the flesh side of the welt not only to reduce the height of the web to gain flexibility but also to provide as flat and continuous a surface between the welt and the inseam as is possible in order that an outsole may be stitched to the shoes without bulging.

It is obvious that all of the surplus inseam material may be removed by trimming but the risk is always present, where a close trim is desired, of severing the stitches that form the joint. A second method of reducing the height of the inseam is to trim the inseam to a level higher than is ultimately desired in order to avoid cutting the stitches and then to rub or beat the inseam to the desired level. This second operation is known in the art as inseam rubbing, beating or pounding and is currently performed in a separate machine from an inseam trimmer.

Attempts have been made to build a single machine that would combine the processes of inseam trimming, rubbing and/or beating but to date no successful commercial machine has been produced. This failure has been due primarily to the fact that the additional instrumentalities required to carry out the rubbing and beating processes have resulted in machines which are too expensive and furthermore impair the operator's vision of the trimming area whereby considerable loss of speed results, nullifying the gain of combining the processes.

It is an object of this invention to provide a single inexpensive machine for combining the operations of inseam trimming, rubbing and beating, which machine is as easily and quickly operated as machines for carrying out these processes separately.

It is another object of this invention to produce a combined inseam trimming, rubbing and beating machine which permits maximum visibility of the shoe at the trimming-rubbing area.

Still another object of this invention is to produce a combined inseam trimming, rubbing and beating machine

which is operated in a manner similar to familiar and successful types of inseam trimmers whereby an experienced operator can adapt himself readily to the operation of the combined machine.

In a prior copending applictaion, United States Serial No. 173,577, filed February 15, 1962, now Patent No. 3,069,705, granted December 25, 1962 I have disclosed a machine for trimming shoe parts including inseams which machine comprises an arcuate shearing knife which is oscillated at high frequency with a relatively low amplitude. The knife is maintained in substantial shearing engagement with a concave shearing surface formed in a conical feed wheel of the type used in conventional inseam trimmers. While the oscillating knife and shearing wheel combination is capable of producing an extremely close trim numerous other advantages enure from this mechanism and include, among others, economy of construction, good visibility of the trimming area, ease of operation and higher than usual speed of trimming. I have found that by the addition of relatively little mechanism this type of machine can be made to produce a most satisfactory trimmed, rubbed and beat inseam and still operate at a high speed with maximum visibility of the trimming area afforded the operator.

In accordance with these objects and as a feature of this invention there is provided a machine for trimming the inseam of a partially fabricated welt shoe having a reciprocating trimming knife provided with a trimming edge and means on or movable with the knife for imparting a rubbing and beating action to the inseam as it is being trimmed. The knife is generally arcuate in configuration and has a unilateral, serrated, cutting edge at one end. A driven feed wheel having two surfaces tapering toward the periphery of the wheel is employed to feed the shoe and to cooperate with the trimming knife as a shearing member. The knife is oscillated about an axis with its cutting edge in substantial shearing engagement with one surface of the wheel. The other surface of the wheel is engageable with the sole attaching surface of the welt to feed the inseam against the knife edge. The means for rubbing and beating the inseam is a work-engaging iron on or adjustably secured to the side of the knife opposite its cutting edge so as to be movable with the knife. The iron extends outwardly from the axis of the knife beyond the trimming edge and is provided with an arcuate work-engaging surface including a plurality of ridges which engage the trimmed inseam to rub and beat it thereby reducing its height.

The above and other features of the invention including various novel details of construction and combinations of parts will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular machine embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

In the drawings,

FIG. 1 is a side elevation of an inseam trimmer embodying the invention and viewed from the side opposite to which the shoe is inserted;

FIG. 2 is a front elevation of the machine shown in FIG. 1 and viewed as the operator sees the machine;

FIG. 3 is a top plan view of the trimming, rubbing and beating instrumentalities of the machine;

FIG. 4 is a sectional view taken along the line IV–IV on FIG. 3 and including a portion of a shoe;

FIG. 5 is a side elevation of the instrumentalities shown in FIG. 3 viewed in the direction in which the shoe is fed;

FIG. 6 is a side elevation of the instrumentalities shown

in FIG. 5 and including a sectional view of the inseam of a shoe in the process of being trimmed and rubbed;

FIG. 7 is a sectional view of the inseam of the shoe of FIG. 6 after trimming has taken place but before the inseam has been beaten and rubbed; and,

FIG. 8 is a view similar to FIG. 7 showing the inseam after it has been beaten and rubbed.

The construction of the inseam of the usual welted shoe illustrated in FIGS. 6 through 8 includes the following elements: a last 2, an insole 4, a welt 6, a preformed insole rib 8, a lining 10, an upper leather 12 and a line of stitches 14 that form the actual inseam joint.

To sever the excess portion of the sewn inseam extending above the stitch line and to beat and rub the trimmed inseam, the shoe being held bottom upward, there is provided a trimming knife 20 and an iron 21, each of which will be described in more detail hereinafter. Cooperating with the knife 20 and iron 21 to feed and trim the shoe is a driven feed wheel 22 which is also a rotary shearing member, a welt crease guide 24 and a rib guide 26. The welt crease guide 24 is shaped and mounted on the machine to enter the crease between the grain side or upper engaging surface 6*a* of the welt 6 and the upper leather 12 to press the welt against the wheel 22 and also to act as an anvil for the work as beating and rubbing take place. The guide also restricts lateral movement of the shoe inwardly of the machine, i.e., to the right as seen in FIG. 6.

The wheel 22, which is also referred to alternatively as the shearing or feeding wheel, has a generally conical surface 27 provided with ridges 28 engageable with the flesh side or outsole attaching surface 6*b* of the welt opposite the welt crease guide 24 to feed the shoe to the trimming knife. The rib guide 26 is engageable with the inner surface of the insole rib 8 and with the bottom of the insole 4 in the "channel" area. The above-mentioned elements comprising the trimming and feeding mechanism will be described in more detail hereinafter and their cooperation explained more fully.

Referring next to FIGS. 1 and 2, the illustrative inseam trimming machine will be seen to include a main frame 30 in which is journaled a main drive shaft 32.

The shaft receives its power from any convenient means, as for example, a motor driven belt 34 and pulley 35. The shaft 32 rotates in a counterclockwise direction when viewed opposite to the direction of feed or as seen in FIG. 1 which represents the left-hand side of the machine as seen by the operator. The feeding or shearing wheel 22 is mounted on the upper end of a driven shaft 36 journaled for rotation in the main frame 30. It derives power from a gear 38 meshing with a worm 40 on the main drive shaft 32.

The welt crease guide 24 is mounted for rotation on the forward or right-hand end of a bifurcated lever 42 which is adjustably secured by conventional slot and screw connections 44 to the bifurcated end of a lever 46 which is pivoted in the machine frame on a stud 48. The welt crease guide 24 is biased upwardly toward the feeding wheel 22 by a spring 50 which is compressed between the rearward or left-hand end of the lever 46 and a boss 51 secured to a rearward part of the main frame 30.

To release the welt crease guide from its operative position, which is the position shown in the drawings, to insert a shoe, the operator depresses a rod 52 which extends vertically through the frame of the machine to a treadle (not shown). An adjustable force transmitting bell crank lever 54 is mounted for pivotal movement about a stud 56 at the rear of the machine and when a collar 58 secured to the rod 52 bears downwardly upon the right-hand end 60 of the lever 54 its rearward end 61 moves upwardly against the lever 46 thereby pivoting it and lowering the welt crease guide 24. The end 61 of the lever 54 also acts as a stop to limit counterclockwise movement of the lever 46 and upward movement of the

wheel 22 by the spring 50 when the treadle is released and no work is in the machine, i.e., after a shoe has been trimmed. The space between the welt crease guide 24 and the shearing wheel 22 is initially adjusted to an amount just less than the thickness of the welt of the shoe to be trimmed, by an adjusting screw 62 threaded in a depending third arm 64 of the lever 54. The screw 62 bears against a part of the machine frame 30 and the more it is advanced toward the machine frame the greater the space becomes between the welt crease guide 24 and the shearing wheel 22.

The rib guide 26 is mounted for rotation at the lower end of a bracket 66, the upper end of which is mounted for pivotal movement about a horizontal shaft 68 fixed in the upper front portion of the machine frame. The upper end of the bracket 66 is secured to a horizontal plate 70 which mounts apertured bosses 72 and 74 having bearings (not shown) through which the shaft 68 passes. The rib guide 26 may be free to idle at the lower end of the bracket 66 as in some prior art inseam trimmers. However, in this illustrative machine the rib guide is power driven to assist in feeding the shoe. It is secured to a short vertical shaft 76 journaled in the bracket 66. The shaft 76 is operatively connected to a parallel shaft 78 in the bracket 66 by meshing gears 80, 82. The shaft is driven through a pair of mating bevel gears 84, 86, the latter being mounted on the end of the shaft 68. The shaft 68 receives its power from the main drive shaft 32 through the following transmission mechanism: A pulley 88 on the end of the shaft 68 is driven by a belt 90 engageable with a pulley 92 on a shaft 94 journaled in an upper portion of the machine frame. The shaft 94 is driven by a belt 96 passing around pulleys 98 and 100 on the shafts 94 and the main drive shaft 32, respectively.

As in conventional inseam trimmers, when the welt crease guide 24 is depressed by treadle action to insert a shoe, the rib guide 26 also pivots outwardly or in a counterclockwise direction as viewed in FIG. 1. An arm 102 is secured to the horizontal plate 70 which mounts the rib guide bracket 66 on the shaft 68. The opposite end of the arm extends to the rear of the machine (FIG. 1) and is attached to the upper end of the treadle rod 52 by lock nuts 104. A spring 106 is tensioned between a depending arm 108 of the arm 102 and a bracket 110 on the machine frame, the tension of the spring 106 being adjustable by a bolt 111 and wing nut 112 securing the spring to the bracket 110. When the treadle rod 52 is depressed, the plate 70 is pivoted in a counterclockwise direction about the stud 68 against the force of the tension spring 106 thereby moving the welt crease guide 26 outwardly for insertion of a shoe. Release of the treadle rod 52 permits the spring 106 to pivot the rib guide 26 into operative position which is controlled by an adjusting screw 114 threaded in the upper portion of the machine frame and engageable with the arm 102.

Depending from the rib guide bracket 66 is a finger guard 116, seen best in FIG. 6, which prevents an operator from inadvertently placing his finger in engagement with the knife 20.

A shoe guide 118 (FIG. 2) is mounted on an angular bracket 120 secured to the machine frame. The guide 118 is engageable with the shoe as it is inserted in the machine from left to right, as seen in FIG. 2, and not only assists the operator in handling the shoe but causes the upstanding surplus extension of the inseam to assume an upright position as it is fed to the trimming knife 20 and iron 21.

As in the machine illustrated in my above-identified application, the trimming knife 20 is an arcuate blade mounted for high frequency, low amplitude oscillation in shearing relationship with the feeding-shearing wheel 22. The knife 20 is adjustably clamped by a bracket 122 to a lever 124 which pivots about a stud 126. The stud 126 is supported by a bracket 128 which is adjustably secured by slot and screw connections 130 for heightwise adjust-

ment on the front forward portion of the machine frame. A crank arm **132** is pivotally attached to the opposite or inner end of the lever **124**. The crank arm is operated in conventional manner from an eccentric crank shaft **134** journaled in bearings **136** mounted at the top of the machine frame. Power input to the eccentric crank shaft **134** comes from a belt **138** passing around a pulley **140** (FIG. 2) secured to the shaft. The driving power for the belt **138** and, hence the knife **20**, comes from the main drive shaft **32** by way of a power train comprising: a pulley **142** on the main drive shaft **32**, a belt **144**, a pulley **146** and a concentric pulley **148** keyed thereto, both pulleys being journaled on the shaft **94**, the belt **138** passing around the pulley **148**. The belts **138** and **144** are tensioned by idler pulleys **150**, **152**, respectively, the idler pulleys being adjustably mounted on interior portions of the machine frame.

It will be obvious to one skilled in the art that the above-described driving mechanism is typical and representative of drive mechanisms for inseam trimmers and it will be appreciated that it is shown for illustrative purposes only and not as a limitation of the invention.

The operative shoemaking instrumentalities will now be described with particular reference to FIGS. 3 to 6.

The trimming knife **20** has a lower surface **160** which is formed on the arc of a circle having a center A (FIG. 5) which is the axis of the stud **126**. The blade is ground as shown in FIGS. 3 to 5 to provide at one end a beveled surface **162** intersecting the surface **160** to form an arcuate, unilateral trimming edge **163**. Either or both of the surfaces **160** or **162** may be formed with serrations **164** (herein shown on the surface **160** only) which assist in cutting through lasting staples in the inseam and in preserving knife life.

The knife cooperates with a concave shearing surface **166** formed in the face of the feed wheel **22**. The knife is initially adjusted so that its surface **160** is located in substantial shearing engagement with the surface **166**. When the knife is oscillated by the above-mentioned eccentric crank shaft **134** through the crank arm and lever **132**, **124**, respectively, it has a short, high-frequency stroke between the solid and broken line positions shown in FIGS. 3 and 5, whereby the knife blade is not withdrawn from the periphery **168** of the shearing-feeding wheel **32**.

The iron **21** has an upper leg **170** adjustably secured by a slot and screw connection **172** to the lever **124** whereby it oscillates with and at the same stroke and speed as the knife **20**. The iron has an arcuate work-engaging surface **174** which is formed with a series of ridges or projections **176**. As seen in FIGS. 3 and 4, the iron is located laterally of the knife, engaging the side opposite the cutting edge **163**. A forward portion **178** of the iron passes below the exterior or welt engaging surface **27** of the feeding-shearing wheel **22**.

The iron **21** is initially adjusted by the slot and screw connection **172** so that its work-engaging surface **174** extends outwardly from the axis A beyond the trimming edge **163**, i.e., below the working surface **160** of the knife (see FIGS. 4 and 5). The working surface **174** is preferably non-concentric with the working surface **160** of the knife and has a smaller radius of curvature in order to impart a progressively increasing rubbing action to the surface of the inseam trimmed by the knife **20**, the serrations **176** imparting a beating action to the inseam as well as a rubbing action.

The mechanism operates in the following manner. The shoe is inserted in the machine as in conventional inseam trimmers. As shown in FIG. 6 the welt crease guide **24** engages the grain or upper attaching surface **6***a* of the welt **6** urging it upwardly against the serrated feeding surface **27** of the feeding wheel **22**. The rib guide **26** engages the inner surface of the inseam rib **8** to guide and feed the shoe. If the surplus portions of the inseam bend outwardly over the welt **6** they are engaged by the guide **118** and are urged into a substantially erect position prior to reaching the trimming point. The shoe is fed away from the viewer, as seen in FIG. 6, against the oscillating cutting edge **163** of the knife, which in cooperation with the shearing surface **166** of the wheel **22**, severs the excess portion of the inseam to a height as shown in FIG. 7. It will be seen that the cut is made substantially above the line of stitches **14** and with no danger of severing the stitches. The severed surface of the inseam is then directly engaged by the iron **21** which is oscillating with and at the same speed as the trimming knife. Since the working surface **174** of the iron **21** is substantially lower than the working surface **160** of the knife **20** it simultaneously rubs and pounds the inseam to the desired level close to the line of stitches and as a substantial continuation of the sole attaching surface **6***b* of the welt. During this operation the welt crease guide **24** acts as an anvil. Depending upon the degree to which the shoe is tilted, the iron **21** may also engage the sole attaching surface **6***b* of the welt to impart a welt beating action thereto, as the welt is supported by the crease guide **24**. The welt beating action is particularly advantageous in overcoming the undesirable condition known as "strapping" which is a tendency of the sewn welt to bend out of the desired flat plane and toward the upper material particularly around the toe.

It will be obvious from the foregoing that the work-engaging iron **21** is movable with the knife **20** and therefore has the same speed and amplitude. It is within the scope of this invention that the iron may be formed as an integral part of the knife **20** or may be a separate member secured directly to the knife. In the latter instance it would be adjustable heightwise relatively to the knife as it is in the illustrative machine described above in which both the knife and the iron are adjustably secured to the same operating elements, i.e. the lever, **124**.

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

1. In an inseam trimming machine, a trimming cutter having a trimming edge, means for reciprocating said cutter transversely of the inseam, and means on the cutter for imparting a reciprocating rubbing and beating action to a workpiece being trimmed by the edge of said cutter.

2. In an inseam trimming machine, a trimming knife having a serrated trimming edge at one end, means for oscillating said knife transversely of the inseam, and a work-engaging iron movable with the knife adjacent said end to impart an oscillating rubbing and beating action to the surface of a work piece trimmed by said edge.

3. In an inseam trimming machine a trimming knife having a unilateral cutting edge at one end, means for reciprocating said knife transversely of the inseam, and a work-engaging iron on the side of the knife opposite the cutting edge and reciprocable with the knife to impart a transverse rubbing and beating action to a work piece immediately after the knife has trimmed it.

4. In an inseam trimming machine, an arcuate trimming knife having a trimming edge at one end, means for oscillating the knife about an axis and transversely of the inseam, and a work-engaging iron movable with said knife adjacent said end and extending outwardly from the axis beyond the trimming edge for imparting a transverse oscillating rubbing and beating action to the surface of the work piece trimmed by said knife.

5. In an inseam trimming machine, a reciprocating trimming knife having an arcuate trimming edge at one end and a work-engaging iron movable with the knife adjacent said end, said iron having an arcuate work-engaging surface which includes a plurality of ridges, said iron being engageable with the surface of the work piece trimmed by said knife edge to impart a rubbing and beating action thereto.

6. In an inseam trimming machine, an arcuate trimming knife having a trimming edge at one end, means for

oscillating the knife about an axis and a work-engaging iron adjustably secured adjacent said end of the knife, said iron extending outwardly from said axis beyond the trimming edge, said iron having an arcuate work-engaging surface which includes a plurality of ridges engageable with the work piece to beat and rub the surface of the work piece trimmed by said knife.

7. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, a feed wheel having an annular portion engageable with the sole attaching surface of the welt, a trimming knife having a cutting edge at one end, means for reciprocating the knife in substantial shearing engagement with a concave shearing surface on said feed wheel, and a work-engaging iron movable with said knife and engageable with the surface of the inseam trimmed by said knife to impart a beating and rubbing action thereto.

8. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, a trimming knife having a cutting edge at one end, a driven wheel which includes two annular surfaces tapering together toward the periphery of the wheel, means for reciprocating the knife in substantial shearing engagement with one surface of said wheel, the other surface being engageable with the sole attaching surface of the welt to feed the inseam against the cutting edge of the knife, and a work-engaging iron adjacent said end of the knife and movable therewith, said iron having a surface engageable with the trimmed portion of the inseam to impart a rubbing and beating action thereto.

9. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, a trimming knife having a unilateral cutting edge at one end, a driven wheel which includes two annular surfaces tapering together toward the periphery of the wheel, means for reciprocating the knife in substantial shearing engagement with one surface of said wheel, the other surface being engageable with the sole attaching surface of the welt to feed the inseam against the cutting edge of the knife, and a work-engaging iron located on the side of the knife opposite the cutting edge and movable therewith, said iron having a surface engageable with the inseam to impart a rubbing and beating action to the work piece immediately after the knife has trimmed it.

10. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, a trimming knife having a cutting edge at one end, a driven wheel which includes two annular surfaces tapering toward the periphery of the wheel, means for reciprocating the knife in substantial shearing engagement with one surface of said wheel, the other surface being engageable with the sole attaching surface of the welt to feed the inseam against the cutting edge of the knife, and a work-engaging iron located on the knife adjacent said end and movable therewith, said iron having a surface including a plurality of ridges engageable with the work piece to beat and rub the surface trimmed by the knife.

11. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, an arcuate trimming knife having a cutting edge at one end, a driven wheel which includes two surfaces tapering toward the periphery of the wheel, means for oscillating the knife about an axis with its edge in substantial shearing engagement with one surface of said wheel, the other surface being engageable with the sole attaching surface of a welt to feed the shoe against the knife edge, and a work-engaging iron adjustably secured adjacent the knife and movable therewith, said iron extending outwardly from said axis beyond said cutting edge, said iron having a surface engageable with the work piece to beat and rub the portion trimmed by the knife edge.

12. A machine for trimming the inseam of a partially fabricated welt shoe having, in combination, an arcuate trimming knife having a unilateral serrated cutting edge at one end, a driven wheel which includes two surfaces tapering toward the periphery of the wheel, means for oscillating the knife about an axis with its edge in substantial shearing engagement with one surface of said wheel, the other surface being engageable with the sole attaching surface of a welt to feed the shoe against the knife edge, and a work-engaging iron adjustably secured adjacent the side of the knife opposite its cutting edge and movable therewith, said iron extending outwardly from said axis beyond said cutting edge, said iron having an arcuate work-engaging surface including a plurality of ridges engageable with the inseam to impart a rubbing and beating action thereto after the knife has trimmed it.

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